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Infection Control Practices within the Diagnostic Imaging Department

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Infection Control Practices within the Diagnostic Imaging Department.

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Abstract

This study investigated radiographers' infection control practice within the Diagnostic Imaging Department. The investigation was carried out in three phases. Structured observations were carried out in four hospitals to determine the frequency and identify the situations in which infection control procedures were performed. Bacterial analysis was performed on equipment in one hospital to identify levels of contamination associated with the lack of cleaning witnessed during the observational study. Finally Focus Group discussions were used in two hospitals to establish the opinions and attitudes of radiographers regarding infection control, and to identify factors that prevented as well as those that facilitated these practices.

Radiographers' compliance with infection control practice was low. Hand decontamination prior to patient contact was observed on only (n=34) 4% of occasions, and afterwards on (n=145) 17% of occasions. Infection control practice was frequently inappropriate when radiographers were dealing with situations involving immunosuppressed patients, those with open wounds, and in the handling of needles. Equipment was cleaned on only (n=30) 4% of occasions. It was found that 56% of the pieces of equipment were found to have unacceptable levels of bacterial contamination. However, after simple decontamination the measure of bacterial load was significantly reduced. The Focus Group discussions indicated that radiographers had good levels of knowledge regarding infection control, but issues such as lack of time and resources, low perceived risk of infection and the culture of the departments and NHS trusts had a negative effect on compliance rates.

For maximum compliance it is thought that a multifaceted intervention should be implemented. The researcher believes the use of Quality Circles would develop a culture that would encourage compliance with infection control protocols. Better compliance with infection control protocols achieved through changes in education, procedures and culture in the Diagnostic Imaging Department are therefore, vital to protect both patients and staff.

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Glossary of Abbreviations

A+E	Accident and Emergency
ACC	Aerobic Colony Count
AHR	Alcohol Hand Rub
AIDS	Acquired Immune Deficiency Syndrome
CDC	Center for Disease Control
CFU	Colony Forming Unit
CH	Cancer Hospital
CPR	Cardiopulmonary resuscitation
CT	Computed Tomography
DGH	District General Hospital
HAI	Hospital Acquired Infection
HBM	Health Belief Model
HCAI	Health Care Associated Infection
HCP	Health Care Professional
HIV	Human Immunodeficiency Virus
ICU	Intensive Care Unit
IDH	Infectious Disease Hospital
IRMER	The Ionising Radiation (Medical Exposure) Regulations
IV	Intravenous
IVU	Intravenous Urogram
MREC	Multi-Center Research Ethics Committee
MRI	Magnetic Resonance Imaging
MRSA	Meticillin-Resistant Staphylococcus Aureus
NHS	National Health Service
PHLS	Public Health Laboratory Service
PMZ	Pressure Zone Microphone
PPE	Personal Protective Equipment
SARS	Severe Acute Respirator Syndrome
SCBU	Special Care Baby Unit
TB	Tuberculosis
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UK	United Kingdom
UP	Universal Precautions
USA	United States of America
VRE	Vancomycin-Resistant Enterococci

Glossary of Terms

Antibiotic	A drug which inhibits growth of micro-organisms
Antiseptic	Antimicrobial substances that are applied to living tissue/skin to inhibit the growth of infectious agents and so reduce the possibility of infection to the individual.
Aseptic technique	Procedure that is carried out under sterile conditions.
Audit Cycle	A cycle of activity involving measurements of the quality against a prespecified standard in order to identify any weakness', implementation of changes to rectify any weaknesses, followed by evaluation of changes to practice against the original standard.
Breast plate	Equipment used in mammography to compress the breast.
Broad Audit	A full audit cycle, including implementing changes and re-monitoring
Cannula	A tube that can be inserted into a cavity and remains in place to either to withdraw fluid or insert medication.
Cassette	Object that encases the radiographic film.
Catheter	A tube that can be inserted into a cavity and remains in place to either withdraw fluid or insert medication. In this study, it mainly refers to a catheter inserted into the bladder.
Chest stand	Equipment used to hold a radiographic cassette when carrying out chest examinations.
Clinical governance	A framework through which NHS organisations are accountable for maintaining and improving the quality of their services and high standards of care.
Colonised	Individual has microbes that have established themselves on a body surface without producing disease or symptoms.
Colony	A group of cells growing on a solid nutrient surface, each arising from the multiplication of an individual cell.
Confluent growth	Large number of colony's that have joined together and are no longer distinct from one another making it difficult to count.
Covert observations	Carrying out observations without the knowledge of those being observed.
Cross contamination	Transmitting bacteria from one individual or inanimate object to another.
Detergent	Compound that possesses a cleaning action.
Disinfectant	An agent that reduces pathogenic micro-organisms or their toxins, to a safe level, from an inanimate object.
Emollient.	An agent that softens the skin or soothes irritation in the skin or mucous membrane.
Erect bucky	A moving anti-scatter grid.
Faucet handles	Taps designed to be turned on and off using the elbow

Fluoroscopy	Technique which uses an image intensifier to give a real time X-ray image on a visual monitor.
Focus Group	A collection of people who take part in a discussion on a particular topic led by a moderator
Hand Hygiene/ Decontamination	The process for the physical removal of blood, body fluids, and transient micro-organisms from the hands, i.e., hand washing, or use of alcohol gel.
Hawthorn effect	An effect which results in the change of behaviour of a participant when they are aware they are being observed.
Health Belief Model (HBM)	Conceptual framework for understanding health behaviour. It is used to motivate people to perform positive actions and uses the desire to avoid a negative health outcome as its prime motive.
Hospital Acquired infection	An infection with develops, usually within 48 hours of admission, which was not present or incubating prior to admission of the patient.
Image Intensifier	An electronic method for increasing light intensity from a fluorescent screen. Often used in fluoroscopy examinations and operating theatres.
Immunocompromised	A state in which the immune system's ability to fight infectious disease is reduced, leaving a person more vulnerable to infections
Incidence study	Study of the occurrence of new cases of a disease or condition within a specified time frame.
Indicator organism	Presence of a specific organism indicates conditions such as its oxygen level or the presence of a contaminating substance.
Infection	Invasion of the host that causes clinical disease.
Intravenous Urogram	An imaging study to look at the structure and function of the kidneys, ureters, and bladder
Invasive Device	Any device inserted into the body through the skin or a body orifice for treatment or diagnosis.
Micro- organism	An organism that is microscopic. Too small to be seen with the naked eye.
Mobile radiography	Radiographic examination performed outside the Diagnostic Imaging Department.
Moderator	Facilitator of the focus group. Their role is to ensure the objectives of the research are accomplished.
Neutropenic	The presence of abnormally small numbers of neutophils in the circulating blood. Patients with neutropenia are more susceptible to bacterial infections.
Observation	Data collection method using the researcher as the instrument to gather behavioural data from subjects by watching or interacting with them.
Opinion leader	An individual who is able to exert a large amount of social influence over others.
Overt observations	Carrying out observations openly.

Parenteral infection	Introduction of infectious agent into the body by means other than through the gastrointestinal tract.
Pathogen	Any virus, micro-organism or other substance that can cause disease.
Prevalence study	The study of the overall occurrence of a particular disease in a specific population at a specific point in time.
Qualitative	A systematic, subjective approach used to describe life experiences and give them meaning.
Quality circle	A group of individuals who meet regularly to discuss the way work is performed in order to find new ways to improve performance.
Quantitative	A formal, objective, systematic process to describe and test relationships and examine cause and effect interactions among variables.
Radiographic film marker	Provides identification of left or right anatomy.
Reservoir	The place where micro-organisms live and multiply.
Resident skin flora	Microorganisms that have adapted to the hostile environment and colonise the skin. They are not readily transferred to other people or objects. Not easily removed by the mechanical action of soap and water, but can be reduced in number with the use of an antiseptic solution. Usually of low pathogenicity.
Restricted Audit	A single stage assessment or measurement of the area under suspicion against an established standard. Change is not initiated when carrying out a restricted audit
Skull unit	A device used to aid in the x-ray examination of the skull.
Social desirability	Participants of a study presenting themselves in a manner that will be viewed favorably by others.
Source	The place where micro-organisms causing infection originate. Not all reservoirs are sources.
Standard precautions	Infection control procedures that all HCPS should incorporate into the routine clinical practice for every patient. They include good hygiene habits, such as hand decontamination, hospital environmental hygiene The use of personal protective equipment, The safe use and disposal of sharps.
Stationary grid	Device for reducing scattered radiation reaching the film.
Theatre blues	Uniform worn by theatre staff.
Theoretical saturation	The point at which sampling and data collection are stopped because the information being collected is redundant and repetitive.
Theory of Planned Behaviour (TPB)/ Theory of Reasoned Action (TRA)	A framework to examine attitudes towards a particular behaviour. This can be used to help alter behaviour.

Transient skin flora	Micro-organisms acquired on the skin through contact with other people, objects or the environment. Can easily be transferred to other people or objects. The majority are removed by washing with soap and water.
Triangulation	The application and combination of multiple research methodologies in the study of the same phenomenon.
Universal precautions	An infection control technique involving, hand decontamination and the use of gloves, aprons and other barriers, correct sharps handling, and aseptic techniques in order to avoid contact with patients' body fluids. Every patient is treated as if they are infected and therefore precautions are taken to reduce risk.
Viewing area	Area in the Diagnostic Imaging Department where radiographic films are developed and viewed.

1.0 Chapter One: Introduction

The value of hygiene in controlling the spread of infection has been known for over a century. In 1861 Ignaz Semmelweis demonstrated the importance of hand disinfection in preventing Hospital Acquired Infection, and thus saving lives. He found that puerperal fever was more common on a maternity ward where medical students provided care, than on the ward run by midwives. He believed that students' hands were becoming contaminated during cadaver dissection. Consequently, he ordered hand decontamination in chlorinated lime after dissection and before examining patients. As a result infection and mortality rates fell sharply. However, when patients were found to have puerperal fever on a ward where the students on that ward had no contact with cadavers, Semmelweis deduced that infection was also transmitted by living organisms. He then insisted on hand decontamination with chlorinated lime between all patient examinations (Semmelweis, 1861 in Jarvis, 1994).

When Semmelweis attempted to put into practice the simple measure of hand disinfection he was faced with resistance from his colleagues. Undiplomatically, though correctly he condemned his colleagues as 'killers' (Voss and Widmer, 1997). In 1851 and 1855, Semmelweis was appointed to hospitals with high infection and mortality rates. Again, his hand antisepsis methods resulted in significant decreases in infection and mortality rates in these hospitals (Jarvis, 1994). However, in spite of advances in hospital epidemiology and infection control, converting Semmelweis' theory into practice still remains a major challenge (Jarvis, 1994; Larson *et al.*, 1997; Pittet *et al.*, 1999b).

With today's technological advances in medicine and health care, patients attending hospital expect their health to be improved. In most cases this expectation is met. However, during a hospital stay a number of patients develop an infection not related to the medical condition they were originally undergoing treatment for. If a patient develops an infection, usually within 48 hours of admission, which was not present or incubating prior to admission, then it is known as a Hospital Acquired Infection (HAI), they may also be called

nosocomial infections and more recently they have been termed Health Care Associated Infections (HCAI). For this study however, they will be addressed as Hospital Acquired Infections. Hospital acquired infections include almost all clinically obvious infections that do not arise from a patient's initial admitting diagnosis (Nguyen, 2002). The most frequent types of HAIs are urinary tract, respiratory, wound, skin and soft tissue infections and septicemia (Gillespie and Bamford, 2000). Within hours of admission hospital strains of bacteria can colonise the patient's skin (Nguyen, 2002). The bacteria, which may include pathogenic bacteria, come from various sources, including Health Care Professionals (HCP) and the environment (Talon, 1999).

An estimated one in 11 patients in acute hospitals has a HAI at any one time, and many people who have recently been in hospital present with a HAI after their return home (National Audit Office, 2000). It is estimated that HAIs cost the health sector in England almost one billion pounds each year. This includes costs accrued during the patients' stay in hospital and after discharge, along with costs incurred by patients and carers (National Audit Office, 2004). Besides the financial cost of HAIs to the National Health Service (NHS), the personal price to patients can be very high, in terms of lengthy stays in hospital away from their families, loss of earnings and even death. Patients with a HAI remain in hospital, on average, an extra 11 days. That is 2.5 times longer than patients without a HAI. Patients with a HAI are also seven times more likely to die in hospital than those who do not become infected (National Audit Office 2000). In the United Kingdom (UK) 5000 patients a year die as a direct result of infections contracted in hospitals and a further 15000 in-patient deaths can be partially attributed to the effects of HAI. Annually, 300,000 patients will develop one or more of these infections during their time in hospital (National Audit Office 2000). This information highlights the importance of reducing these infections. The overall figures have remained unchanged for four years (National Audit Office, 2004). However, the rate of antibiotic resistant infections is increasing, for instance the number of meticillin-resistant *Staphylococcus aureus* (MRSA) infections rose from 7250 in 2001 to 7647 in 2004 *i*.e. by 3.6% (National Audit Office, 2004). This indicates the increasing difficulty in treating these infections. However,

there is evidence that hygiene and infection control measures can reduce the prevalence of HAIs (Sharir *et al.*, 2001; Sharek *et al.*, 2002).

In 2001 The Assembly Government instructed hospitals in Wales to give hygiene a high priority in order to reduce the number of HAIs and provide a safe environment in which patients are cared for. The Assembly instruction states that it is a key management responsibility to ensure hygiene and infection control issues become embedded as a core item of management agenda and managers at all levels are accountable (National Assembly for Wales, 2001).

The reduction of HAIs has also become a priority for the UK government.

John Reid, Secretary of State for Health stated that:

> 'Preventing as many healthcare associated infections as possible is a top priority. That's why action is being taken now, across the NHS, to fight them. The greatest concern is, of course, the illness and death that result from these infections, but the economic costs are also high, and provide a compelling reason to reduce the number and severity of these infections'.
>
> (Department of Health, 2003)

The Department of Health has set targets for the NHS and expects the number of bloodstream MRSA infections to be halved by 2008 (Department Of Health, 2004).

It is now also a legal requirement for acute hospitals and other care providers to implement the Code of Practice for Prevention and Control of Healthcare Associated Infections (Health Act 2006). The Code of Practice states that

> "effective prevention and control of HCAI has to be embedded into everyday practice and applied consistently to everyone".

The Saving Lives program provides the tools and resources for the Trusts to achieve this.

The importance of reducing HAIs led to the researcher's decision to investigate the topic of radiographers' infection control practice in the Diagnostic Imaging

Department was investigated because of the large number and variety of patients attending the department. Whilst the researcher was an undergraduate student at the University of Wales, Bangor, she conducted a case study investigating the risk of cross contamination associated with the use of moving and handling aids in the Diagnostic Imaging Department (Kelly 2000, unpublished). Through this work and observations made as a student and as a qualified radiographer, it became apparent that infection control in this department was given a low priority. Research into current levels of HAI and the consequences for patients and the health service, has focused predominantly on the ward setting and particularly on the nurses' role in cross contamination (Larson *et al.*, 2001; Pittet *et al.*, 2001; Gould, 2004). No research has been published assessing the compliance of radiographers' infection control practices when working in the Diagnostic Imaging Department. This lead to the question:

> What infection control practices are carried out by radiographers in the Diagnostic Imaging Department?

To answer this question an observational study was performed in four hospitals. These included two District General Hospitals, one Specialist Cancer Centre and one hospital with an Infectious Disease Unit. These hospitals were chosen to determine if the type of patients the radiographers would examine would alter their infection control practice. It was thought that radiographers working in the Specialist Cancer Centre would be aware of the susceptibility of their patients to infection and so perform infection control practices more rigorously than those working in the general hospitals. It was also thought that radiographers employed in the hospital housing an infectious disease unit would be more aware of the risk to themselves of contracting infections, and would again result in higher compliance with infection control guidelines. However, overall it was found that radiographers' compliance with infection control guidelines in all four hospitals was very low. As a result of these findings two further questions were formulated.

1) How does this poor practice affect levels of bacterial contamination on the radiographic equipment and are these levels affected by cleaning?

2) What are radiographers' opinions and attitudes toward infection control within the Diagnostic Imaging Department?

It is necessary to address question 1 as a large number of patients visit the Diagnostic Imaging Department and often come in direct physical contact with the radiographic equipment. A number of studies during the 1970's were performed showing that bacteria can survive on radiographic equipment (Haskin *et al.*, 1970; Haskin *et al.*, 1972; Le Frock *et al.*, 1978). More recently a small number of studies have also found that bacteria can survive for long periods of time on radiographic equipment (Hodges, 2001 and Lawson *et al.*, 2002). It is possible that patients attending the radiology department may contaminate the equipment or become contaminated by it. Radiographers can also become contaminated as a result of contact with the patient and with the equipment when they are positioning the patient for the examination. Despite this there have been no studies investigating the levels of contamination of the equipment and the affects of cleaning with general purpose detergent. Therefore, bacterial swabs were taken from numerous pieces of equipment found in the Diagnostic Imaging Department and levels of bacterial contamination were established. Bacterial swabs were also taken after cleaning certain pieces of equipment. In many cases, before cleaning, contamination levels were considered to be high. However, in the majority of cases after cleaning, with general purpose detergent, these levels of contamination were reduced to an acceptable standard.

Due to the low compliance with hospital infection control guidelines, question 2 was also important as it was necessary to find out what radiographers' attitudes towards infection control practices are and what motivates and prevents this necessary practice being carried out. This information is required to enable the development and implementation of a suitable intervention to increase compliance levels. To the researchers knowledge only a single study has been carried out investigating radiographers' attitudes towards infection control, this was conducted by Zito *et al.* (2002).

A total of six Focus group discussions were held in 2004, three focus group discussions were carried out in each of the district general hospitals used in phase one of this investigation. It was found that radiographers were aware of the necessary infection control practices, but gave the practices a low priority as a result of their high workload. Lack of education, information, time and resources were the main factors preventing infection control practices being carried out. The radiographers felt that management should place a greater emphasis on infection control; this would then filter down to all HCPs within the hospital.

There is an obvious lack of research into infection control practices within the Diagnostic Imaging Department. This gap in the research makes it plain that a study of these problems is both unique and necessary, therefore prompting and justifying more extensive research in this area.

Consequently, the following aims and objectives were established for the investigation.

Aims of the Study

1. To determine the frequency and identify the situations in which infection control procedures are carried out.

2. To ascertain the level of bacterial contamination on the general radiographic equipment.

3. To establish the opinions and attitudes, of radiographers, regarding infection control within the Diagnostic Imaging Department.

Objectives

Phase one: Observational studies performed for four weeks in each of the four hospitals were carried out to achieve aim one.

Phase two: Bacterial analysis in a single hospital, involved in phase one, were performed to attain aim two.

Phase three: Focus group discussions were held, in two of the hospitals that were used in phase one, to establish the opinions and attitudes of radiographers as sought by aim three.

An extensive literature review will be presented in chapter two. As there is only a small number of studies regarding infection control and the diagnostic radiography profession, the review will concentrate on literature relating to infection control within the nursing profession which is where most of the studies have originated. The principles of infection control will be established and the role of the health care professional and the importance of hand decontamination will be discussed. Levels of various Health Care Professionals (HCPs) compliance will be reviewed from a number of studies and interventions to improve compliance will be examined. This section will be completed with a review of the infection control literature relating to the Diagnostic Imaging Department.

In Chapter three the general methodological issues surrounding the methodologies used to achieve the three aims are discussed.

Chapter four will focus on Aim 1. This will discuss and justify the observational method used. This will be followed by the results and a discussion of the results in light of other studies reported in the literature.

Chapter five will discuss and justify the use of bacterial analysis used to attain Aim 2. Again, this will be followed by the results and a discussion of the results of this phase.

The sixth chapter centres upon Aim 3. Here, justification for the use of the focus group discussions is presented. As with chapters three and four this will be followed by the results and a discussion of these results.

Chapter seven will present the main conclusions and recommendations resulting from the research.

The final chapter will address the limitations of the study.

2.0 Chapter Two: Literature Review.

2.0.1 Overview of the Literature Review Chapter.

As already mentioned, when an individual is admitted to hospital the belief of that individual is that by doing so their health will be improved. However, this is not always the result. A significant complication of healthcare, which can have major consequences for the patient and the health service, is infection (Wilson and Jenner, 2001). As already stated HAIs are those that were not present or incubating in a patient at the time of admission to hospital.

Hospitals contain a large number of patients with infection, as well as a high concentration of individuals who are more susceptible fo infection. Therefore, HCPs have an important responsibility to safeguard the patients from potential microbial pathogens (Inglis, 1996).

Risk factors for infection fall into three categories as shown in (Table 1).

Table 1. Risk Factors for Infection.

1. Iatrogenic risk factors. These include invasive procedures such as urinary tract catheterisation and indwelling vascular lines or intubation, as well as antibiotic use.
2. Organisational risk factors. These include contaminated water systems or air-conditioning systems, physical layout, such as beds placed too close together and staff effects such as low nurse-to-patient ratios.
3. Patient risk factors. These include the state of the patient's immune system, the severity of the illness and the length of stay in hospital

(Nguyen, 2002).

Recent publicity has increased awareness of both the inadequacies of hospital cleaning, and increased levels of antibiotic resistant infection, especially those caused by MRSA, in hospitals in the United Kingdom (UK) (Malik *et al.*, 2003). Regardless of an increased knowledge pertaining to infections, there seems to be a basic cultural reluctance, on the part of all groups of Health Care Professionals (HCP), to take responsibility for the prevention of HAIs (Macqueen, 1995). It

now appears that infection is simply thought of as an expected complication of an invasive technical health care system (Macqueen, 1995).

This chapter will provide a review of the principles and current guidelines of infection control. A detailed discussion of areas indicated below will also be examined.

- Infection control practices.
- The prevalence of hospital acquired infections.
- The use of antibiotics
- The role of the HCP in transmitting bacteria from patient to patient.
- The value of different hand hygiene agents, particularly soap, antimicrobial soap and alcohol hand rubs.
- Barrier methods, including glove use.
- The role of the environment in transmitting bacteria to patients and staff.
- Approaches to improve compliance with hand hygiene guidelines, including education, and patient empowerment.
- The role of the Diagnostic Imaging Department in the spread of infection.

2.1 Prevalence of Hospital Acquired Infection.

There have been two published large scale, multi-site studies of HAI prevalence in the UK, published in 1980 and 1994. (Emmerson *et al.*, 1995; Emmerson *et al.*, 1996; Meers *et al.*, 1980 in Emmerson *et al.* 1995). The first involved sites in England and Wales only, while the second also included sites in Scotland and all of Ireland. Four groups of infections were identified in each study, urinary tract, surgical wounds, lower respiratory tract and skin infections. The overall prevalence did not change over the 15 year interval, being 9.2% in 1980 compared with 9.0% in 1995. However, there was a significant reduction in the prevalence of surgical wound infections, from 18.9% to 12.3%. As Emmerson *et al.* (1995) indicates, improved medical techniques may be a contributing factor in this improvement. Shorter lengths of hospital stay would also make it possible for some surgical wound infections to become evident only after discharge and this data was not available to the study. Compared to the previous study,

Emmerson *et al.* (1996) also found a greater prevalence of lower respiratory tract infections, up from 16.8% in 1980 to 22.9% in 1994. They attribute this in part to the greater number of respiratory tract infections present in the community during the study period, but suggest that the extended length of the study period, needed because of equipment limitations, may also have contributed to the difference.

The later study (Emmerson *et al.,* 1996) also indicated a lower overall prevalence of infection in Intensive Care Units (ICUs), although this difference was not significant. The rates were 26.8% compared to 30% in the previous study (Meers *et al.*, 1980 in Emmerson *et al.*,1995). However, these prevalence rates are still high compared with a rate of 9.7% found in a European prevalence study (Vincent *et al.*, 1995) which will be reviewed later in the chapter. As Emmerson *et al.*(1996) indicate, changes in medical practice and hospital management, and changes in patient characteristics associated with an ageing population make meaningful comparisons difficult, and considerable care is needed in any interpretations.

French *et al.* (1989) avoided some of Emmerson *et al's* (1996) problems by performing single-day, hospital-wide prevalence studies every six months, as part of a continued audit cycle. This allowed any problems to be dealt with appropriately, which reduced HAI prevalence. It also ensured that the quality of care was maintained or increased and any problems were dealt with swiftly.

In 2001, the Department of Health introduced a mandatory MRSA surveillance in acute NHS trusts. Reports have been published every six months for the last four years (Department of Health, 2005b). As part of the Winning Ways Report the Department of Health stated that:

> 'The mandatory surveillance system for healthcare associated infections would be developed further to include: bloodstream infections (caused by a number of different pathogens in addition to MRSA), surgical site infections, *Clostridium difficile* associated disease, serious incidents associated with infection and infections after discharge from hospital'
>
> (Department of Health, 2003)

It is evident from this that the Department of Health is taking the issue of hospital acquired infections seriously. The fact that they will also include infections which become apparent after discharge will give a more accurate representation of the level of HAIs.

The prevention and control of HAIs is not only a challenge to health care institutions in the UK but also globally (Smyth and Emmerson, 2000; Department of Health, 2003). A prevalence study in Europe, involving 1471 ICUs in 17 countries, was carried out with the primary aim of investigating the widespread occurrence of Intensive Care Unit (ICU)-acquired infections, and to identify the predominant infecting organisms and risk factors for these infections (Vincent, *et al.*, 1995).

A total of 10038 patients were included in the study. Of these, 4501 patients (44.8%) were found to have infections. Community acquired infection was recorded in 1376 (13.7%) cases, HAIs in 975 (9.7%) cases and ICU acquired infections in 2064 (20.6%) cases. Of these ICU cases 528 (25.6%) patients were found to have more than one infection. Microbiological culture results were available in 85% of patients with ICU-acquired infections. Of the 528 ICU-acquired infections associated with *S aureus*, resistance patterns were found in 456 (86%). Of these 456 infections 59.6% were associated with meticillin-resistant *S.aureus* strains (MRSA).

From country to country, rates of ICU acquired infections varied dramatically, with only 9.7% occurring in Switzerland compared with 31.6% in Italy. However, it is possible that these differences are due to ICU practices and patient selection, rather than simply standards of care. For example, the UKs number of ICUs beds may be less than other countries and this may result in a more severely ill patient population compared with others. In addition to this, it is possible that not all ICUs were making use of the agreed Centre for Disease Control (CDC) definitions. This prevalence study provided only a snapshot in time, and in comparison with incidence studies, may tend to overestimate the problem (Vincent *et al.*, 1995).

2.2 Antibiotics.

The remarkable conquest in preventing and controlling infectious diseases through the discovery and development of antimicrobial agents during the 1940s, 1950s and 1960s along with prevention strategies and medical innovations developed to control key target plagues, such as cholera, typhoid fever and tuberculosis, led to the belief that infectious diseases were no longer a serious threat. This led to the prediction of imminent elimination of infectious diseases (Exner *et al.*, 2001). Of course the elimination of infectious diseases has not occurred. This mistaken belief reflects the misunderstanding of the real situation. This resulted in the closure of infectious disease units, a reduction in the number of infectious disease physicians appointed, and a decrease in funding for research on infection (Ayliffe and English, 2003). In recent years new microbial pathogens have evolved, some of which cannot be eradicated by currently available antibiotics. Human Immunodeficiency Virus (HIV) is an example of an infectious disease that, at present, cannot be cured (Inglis, 1996). There has also been a revival of *S. aureus*, especially MRSA. Micro-organisms, such as coagulase-negative staphylococci and enterococci, which were previously thought to be of low pathogenicity, have also become more of a problem and have become steadily more resistant to antimicrobial agents (Smyth and Emmerson, 2000). Appleyard (2000) has made us deeply aware of the limitations of the antibiotic solution.

> 'We thought we had won the war against deadly bacteria. But germs have devised ingenious ways of fighting back. Some experts say that if we don't find new antibiotics soon, an ordinary cut on the finger will be fatal'
>
> 'We have no choice but to continue the bacterial and viral arms race. But this time round we must remember there are no miracle drugs and there are no victories, only temporary respites, for the bugs will always be out there, chanting their monotonous mantra – survive, survive, survive. And they will'
>
> (Appleyard, 2000 p53)

Attention is now given to preventative methods to reduce the spread of infection, as a result of the antibiotic limitations (Inglis, 1996; Pratt *et al.*, 2007).

2.3 Strategies to Control Infectious Disease.

In developed countries challenges and risk factors associated with infection include the increase in antibiotic resistant micro-organisms, related mainly with stays in hospital, and lax hygiene standards. Other challenges include the increasing number of people who are elderly, very young, or immunosuppressed. These individuals may be at increased risk of infection. Added to this is the ongoing, but unknown potential for the emergence of new and highly virulent pathogens (Exner *et al.*, 2001).

Surveillance and incident outbreak management are required for the control of infectious diseases. (Exner *et al.*, 2001). However, reactive policies that focus on surveillance and control, and a diagnosis and therapy of infectious disease are both inadequate and inefficient in controlling the new infectious disease challenge. They also have enormous consequences concerning infection risks and discomfort for patients. This is especially so if used without proactive policies that work towards prevention (Exner *et al.*, 1999).

Germany has one of the lower prevalence rates of HAI compared with other European countries. Germany e.g. has a rate of 3.5% patients; UK has a rate of 9% (Astagneau *et al.*, 2000). Interestingly, since 1976 Germany has had a holistic strategy in hospital hygiene involving prevention and control strategies in place rather than a national surveillance system in hospital hygiene (Exner *et al.*, 2001). It is believed by Exner *et al.*(2001 p231) that:

> 'Hygiene has the potential to act as a moderator of diverging positions of different disciplines to create a holistic strategy for the prevention and control of infectious diseases, thereby helping to master future challenges'

Along with this, Exner *et al.* (2001) states that in comparison to Germany and its holistic hygiene concept, countries that emphasise only surveillance and control of infection, have a much greater use of antibiotics. When looking specifically at MRSA rates the Netherlands has extremely low rates, only 1% compared with 19% in Germany and 44% in the UK. To achieve this exceptional result the Dutch follow a search and destroy strategy. To do this patients are screened for

MRSA, those found to be positive are then isolated. They also ensure they have sufficient numbers of isolation rooms and maintain a high HCP to patient ratio (Department of Health, 2003).

2.4 Costs of Hospital Acquired Infections and Savings to be Made.

The cost of HAIs to the National Health Service (NHS) may be in the region of £1 billion a year (National Audit Office, 2000). These costs occur as a result of identification of the bacterium involved and determining antibiotic sensitivity, provision of the antibiotics and the additional medical and nursing care. It was once estimated that up to one third of HAIs could be prevented (Pittet *et al.*, 1999a), however, it is now thought that only a 15% reduction of infection is achievable (National Audit Office, 2000). This reduction is estimated to release resources of £150 million for use elsewhere within the National Health Service (National Audit Office, 2000).

NHS managers who fail to make the necessary investment in infection control could be missing out on financial savings. The infection control team at Guy's and St Thomas' NHS Trust presented evidence showing the estimated annual cost of HAI, in their Trust, was £3.9 million. However, with resources to undertake an efficient infection control program, the infection control team estimated that savings of at least £1million a year could be made (National Audit Office, 2000).

It has been pointed out that any savings are on paper only, as effective infection control simply means beds are freed up for other patients. This will result in increased patient throughput, reduced waiting lists and reduced costs of patient admissions, all of which are reason enough to take the challenge of infection control seriously (Gray, 2000).

In the UK from January 2006 patients will be able to choose the hospital in which they want to be treated. Health Secretary Patricia Hewitt (2006) stated:

> 'Choice is now a reality in the NHS. Patients have new rights over their own healthcare. These rights will allow patients to choose services which best meet their individual needs and preferences'.
>
> (Department of Health, 2006)

With this in mind, NHS trusts will have to prove to patients that they will be safe from infection. Having fewer patients, because of their fear of infection, could result in loss of finances for NHS trusts. Conversely, hospitals that invest in the necessary resources to reduce HAIs may also reap the benefits described by Gray (2000) and their reduced waiting lists may influence patient choice of hospital.

2.5 Principles of Micro-organism Transmission.

To enable the HCP to prevent the spread of HAIs it is essential that the transmission route of a pathogen, resulting in colonisation or infection, is understood.

Factors associated with the transmission of bacteria are often referred to as links in a chain (Figure 1). Each one of these factors is required for infection or colonisation to proceed. Removing any one of these links can prevent the transmission of infection (Damani, 2003). Each part of the chain will now be considered.

Figure 1. Chain of Infection. (Damani, 2003 p2)

2.5.1 Causative Agent.

Hospital acquired infections are commonly caused by a number of specific pathogenic organisms. It is possible for both patients and hospital staff to become infected with these micro-organisms. The micro-organisms can be part of a patient's own body flora; in the immunocompromised host these can cause infection and are known as endogenous infections. Infections which are acquired from other external sources, such as a HCP or equipment, are known as exogenous infections (Damani, 2003).

2.5.2 Reservoir of Infection.

This is the environment in which a micro-organism can survive and in some cases multiply. It includes HCPs, other patients, equipment and environmental surfaces (Damani, 2003). The availability of nutrients and the match between microbial requirements and environmental conditions of the reservoir will affect the ability of the invading micro-organism to survive and possibly multiply

(Damani, 2003). Health care professionals performing adequate hand decontamination and cleaning the equipment remove the bacteria and necessary nutrients required for survival.

2.5.3 Portal of Exit.

The portal of exit is the route by which the micro-organisms leave their reservoir in order to transmit to another host. Common Portals of exit associated with human reservoirs include the respiratory, genitourinary and gastrointestinal tracts, the skin and mucous membranes and the placenta (Damani, 2003). As pathogens can leave the body in excretions, secretions and also blood, these are considered to be an important source of infection (Burd, 1998; McCulloch, 2000). The use of Universal Precautions can aid in the prevention of transmission of bacteria in these situations.

2.5.4 Mode of Transmission.

It is not possible for micro-organisms to move themselves from one host to another. They must be transmitted as a result of direct or indirect physical contact (Wilson and Jenner, 2001). The mode of transmission includes inhalation, through the respiratory tract, ingestion through the gastrointestinal tract or inoculation, through accidental sharp injury and contact (Damani, 2003)
The most common mode of transport is contact transmission. This can be divided into different categories, direct contact, indirect contact and contact with droplets that enter the environment and through airborne transmission (Damani, 2003). Routes of transmission are shown in Figure 2.

Direct contact refers to the spread of micro-organism through physical contact between individuals. Hand decontamination is a simple and effective way to prevent transmission by the direct contact route (Damani, 2003).

Indirect contact occurs when an individual comes into contact with a contaminated object. In the health care setting virtually any item could be contaminated with certain micro-organisms, this includes the equipment found in the Diagnostic Imaging Department. To prevent transmission via the indirect

contact route, thorough cleaning, disinfection and sterilisation is essential (Damani, 2003).

Droplet transmission results from contact with contaminated respiratory secretions. These secretions can be released from the infected host via, sneezing, coughing and talking. The secretions spread through the air to the oral or nasal mucous of a person nearby. Droplets of secretions settle on surfaces. Again, regular thorough cleaning can reduce this mode of transmission. Airborne transmission occurs when fine microbial particles or dust particles containing pathogens remain suspended in the air for a prolonged length of time and may then be moved around by air currents. The tiny particles can be inhaled by individuals and may cause infection (Damani, 2003).

2.5.5 Portal of Entry.

To cause disease a pathogen must be able to enter the body; the point where this happens is known as a portal of entry (Wilson and Jenner, 2001). The pathogen can enter the body via the mouth, a break in the skin or through the respiratory system or any orifice. Insertion of an intravenous device breaks the skin's integrity and devices, such as urinary catheters, provide a direct route for bacteria to enter the bladder (Figure 2). The risk of infection from such devices increases with the length of time they are in position. Aseptic technique, choice of device as well as good staff hygiene when working with invasive devices will all reduce the risks of infection (Gillespie and Bamford, 2000).

2.5.6 Susceptible Host.

The susceptible host is the final link to the chain of infection. The human body has a number defence mechanisms to prevent the entry and multiplication of pathogens. Infection may not occur if these defence mechanisms are functioning normally. However, in immunocompromised patients, these defences are weakened, allowing infectious agents to attack the body and cause disease. As the very young do not have a fully developed immune system and old age results in a declining immune system, these groups of individuals are more susceptible hosts to infection than other age groups. Susceptibility is also determined by

genetic, physiological, nutritional and general health factors. The capability of micro-organisms to cause infection depends on their pathogenicity as well as their numbers (Damani, 2003). More susceptible individuals may acquire infection from exposure to a small number of micro-organism (Wilson and Jenner, 2001).

Of all the factors listed above, the mode of transmission is the easiest link to break and is central to the control of cross-infection in hospitals. All HCPs have the ability to break this link (Damani, 2003).

Figure 2. Routes of Microbial Infection.

(Gillespie and Bamford, 2000 p22)

2.6 Principles of Infection Control.

There are important infection control procedures that all HCPS should incorporate into the routine clinical practice for every patient. Evidence based national guidelines have been produced to guide HCPs practice. Appropriate new research and technological advancement that have been shown to be effective in preventing HAIs is used to regularly update these evidence based guidelines. There are three main areas where HCPs should take appropriate precautions.

1) Standard infection prevention and control principles
   a) Hand decontamination
   b) Hospital environmental hygiene
   c) The use of personal protective equipment
   d) The safe use and disposal of sharps

2) Procedures for avoiding infections associated with the use of short-term indwelling urethral catheters.

3) Procedures for preventing infections associated with the use of central venous catheters (Pratt *et al.*, 2007)

These recommendations are all essential, of equal value and need to be incorporated into local guidelines. They can also be used as a benchmark for determining appropriate infection prevention decisions and provide a baseline for clinical audit, evaluation and education and assist ongoing quality improvements (Pratt *et al.*, 2007). These procedures are applicable to all health care environments in hospitals. Table 2 shows the necessary recommendations to be followed; this is similar to that produced by Wilson and Jenner (2001). All recommendations have been devised using up to date evidence. This should make it easier to convince HCPs that these practices are essential and removes the argument, for not carrying out these practices, of lack of evidence (Cabana, 2000). This is discussed later (2.9.2).

The principles of infection prevention and control take into consideration the factors, associated with the transmission of bacteria, which were discussed earlier.

As infection prevention and control is the responsibility of all HCPs, they must all be aware of the fundamental principles of infection control, including the importance of effective hand decontamination technique, the necessity of maintaining a clean hospital environment in order to minimise opportunities for microbial contamination and the use of protective equipment, such as gloves. Training to include all of these factors should form part of all HCPs annual updating (Pratt *et al.*, 2007). Providing essential infection control education will aid in the creation of the appropriate culture within NHS trusts, (Bolyard *et al.*, 1998). It is now mandatory in all NHS trusts for the National Core Learning Unit's infection prevention program to be completed by all HCPs (National Core Unit, 2005). The National Core Unit's infection control program presents information on the following:

- The costs of HAIs to the NHS and to patients.
- Ways to help protect patients from the risk of infection.
- Different microorganisms, and infections.
- How infections occur.
- The risk of patients becoming infected as a result of healthcare.
- The roles and responsibilities of HCPs in infection prevention and control, along with ways to help protect patients and HCPs.

This can be carried out in e-learning or in a face to face format. It takes approximately 3.5 hours to complete and covers all the necessary components of infection control. The program also contributes towards the Saving Lives delivery program to reduce HAIs.

Table 2. Infection Control Procedures.

Hand Hygiene

- Decontamination of hands before each episode of direct patient contact and after any contact that may result in contamination of hands.
- Decontamination of hands after the removal of gloves.
- Jewellery should be removed before regular hand decontamination.
- Fingernails should be short, clean, and free from nail polish, false nails and nail extensions (Pratt *et al.*, 2007).

Maintenance of Skin Integrity

- Moisturiser should be used to prevent drying of the skin.
- Cuts and abrasions should be covered with a waterproof dressing (Wilson and Jenner, 2001).

The Use of Personal Protection Equipment (PPE)

- Selection of PPE based on risk assessment of transmission of microorganisms.
- Plastic aprons must be worn when there is a risk that clothing may become contaminated.
- Gloves must be changed between patients, or between different care activities for the same patient.
- Gloves must be used during invasive procedures, contact with sterile sites, non-intact skin or mucous membranes, along with tasks carrying a risk of exposure to any body fluids.
- Face masks and eye protection must be worn during activities where there is a risk of any body fluids splashing into the face and eyes.
- Respiratory protective equipment should be used when caring for patients with respiratory infections transmitted by airborne particles (Pratt *et al.*, 2007).

The Safe Use and Disposal of Sharps

- Equipment with safety devices should be used.
- Sharps handling should be kept to a minimum.
- Needles must not be recapped or disassembled before use or disposal.
- Used sharps must be disposed of into a sharps container (Pratt *et al.*, 2007).

Decontamination of Equipment and the Environment

- Decontamination of clinical equipment should occur after each use.
- The hospital environment must be visibly clean, free from dust and soilage.
- Increased levels of cleaning should be considered during outbreaks of infection (Pratt *et al.*, 2007).

2.6.1 Universal Precaution Guidelines.

The rising HIV epidemic highlighted the problem of identifying patients with infectious diseases. To overcome this, in 1987 the USA Center for Disease Control recommended a change in practice and stated that a range of infection control procedures should be carried out routinely in the care of all patients, regardless of whether or not they are known to have an infection (Wilson and Jenner, 2001). This approach was called "Universal Precautions". However, in contrast to the original guideline it became justified to identify patients who were more likely to be infected with bloodborne infections. This was simply because staff failed to take the necessary precautions for all patients (Speller *et al.*,1990). The researcher feels this is a contradiction to the original guideline, as the main reasoning for the introduction of Universal Precautions was the problem of identifying infectious patients. As patients attending the Diagnostic Imaging Department are present for a minimal amount of time it is very difficult to make a reasonable individual infectious risk assessment.

The Department of Health in the UK proposed similar Universal Precaution measures to protect HCPs against infection with bloodborne viruses (Department of Health, 1998a). However the UK Health Department recommends the level of precautions taken should be determined according to the risk of possible exposure to blood and not due to knowledge or speculation about the infectious status of the patient. For Universal Precautions to be successful in preventing cross infection between patients, and with protecting HCPs from bloodborne viruses, appropriate protective clothing should be used and changed when necessary (Wilson and Jenner, 2001). All blood, tissues and body fluids should be considered to be potentially infectious (Department of Health, 1998a). Interestingly, the concept of treating all patients as infectious was controversial at the outset (Wilson and Jenner, 2001).

In addition to bloodborne viruses there is a wide range of other pathogens that can be transmitted through contact with body fluids. The introduction of Universal Precautions provoked interest in the use of routine precautions to prevent HAIs (Wilson and Breedon, 1990). More recently, after reviewing up to

date evidence, Pratt *et al.* (2007) have also recommend this to be standard practice for all patients.

2.6.1.1 Undiagnosed Infectious Patients.

As shown by Vincent *et al.* (1995) some patients will be admitted to hospital who already have an infectious disease; in these cases it is necessary to take precautions, such as hand decontamination, glove use or isolation, in order to prevent transmission of these infections to other patients and to staff. It is also possible for patients and HCPs to be colonised by bacteria or to be infectious before the symptoms of the disease appear. Chickenpox and bloodborne viruses such as human immunodeficiency virus (HIV) and hepatitis B and C are infections which have prolonged asymptomatic carriage so the infectious status of these individual may be unknown. This may result in appropriate precautions not being taken. Using specific precautions only when dealing with patients known to be infectious will miss those patients not yet diagnosed and could result in cross infection (Wilson and Jenner, 2001; Damani, 2003).

2.7 Role of Hands in Cross Contamination.

Health care professionals' hands are the most common vehicle of micro-organism transmission and they are frequently implicated as the route of transmission in outbreaks of infection. It is accepted that hand decontamination is necessary to remove micro-organisms, (Wilson and Jenner, 2001). Two categories of micro-organisms are present on the skin of HCPs hands; the resident and the transient flora (Simmons *et al.*, 1990).

2.7.1 Resident Skin Flora.

As the skin is dry, acidic and low in nutrients it does not provide a suitable environment for most micro-organisms (Hoffman and Wilson, 1994). However, some organisms have adapted to these conditions and survive quite successfully. These micro-organisms are known as resident or normal skin flora. The most common micro-organisms are Gram-positive bacteria; these are mainly coagulase-negative staphylococci, micrococci and coryneforms (Wilson and Jenner, 2001).

Resident skin flora is usually of low pathogenicity and not readily transferred to surfaces or other patients, therefore, during routine clinical care it is not necessary to remove resident skin flora. However, some resident bacteria do have the potential to cause infection if they are introduced into the body during invasive procedures or in susceptible individuals such as patients who are immunosuppressed (Wilson and Jenner, 2001).

2.7.2 Transient Skin Flora.

Transient skin flora is made up of microbes that have been transferred onto the surface of the skin through contact with other people, objects or the environment. Transient organisms are transferred to hands particularly easily if contact is made with moist objects. Health care professionals caring for patients infected by MRSA are often found to have this organism present on their own skin (Wilson and Jenner, 2001, Lawrence and May, 2003).

2.8 Contamination of Hands.

Greater numbers of pathogenic organisms are likely to be found on HCP's hands after handling moist, heavily contaminated substances, such as body fluids and after increased length of time in contact with patients' skin or secretions (Pittet *et al.*,1999a). Other studies have also shown that HCPs hands may become contaminated with 10^2 to 10^3 colony-forming units/ml even following minor brief patient contact (Casewell and Phillips 1977, Jensen *et al.*, in Zimakoff, 1992; Gould and Ream, 1993) and after activities such as, making beds, dealing with clean and used linen and handling urinary catheter bags (Sanderson and Weissler, 1992). The bacteria present on the hands of HCPs have been found to be the same strains as those colonising the skin of patients, but not the same strain as those simply found in the environment (Casewell and Phillips, 1977). In areas of the hospital where patients are considered to be less at risk, such as the Out-patient department, direct contact with patients and a variety of equipment may still result in hand contamination providing potential for the transfer of bacteria between individuals (Sanderson and Weissler, 1992). Episodes of HAI from the Out-patient setting are discussed later in this chapter. Many of the above activities are also carried out by radiographers in the Diagnostic Imaging

Department, therefore, it is possible that their hands are becoming contaminated with bacteria, which can then be transmitted to other patients.

2.8.1 Removing Micro-Organisms from the Hands.

As it is possible for micro-organisms to be transferred between patients, and also from one site to another on the same patient, hand decontamination is commonly acknowledged as the single most important procedure for preventing HAIs (Larson *et al.*, 1988; Bauer *et al.*, 1990; Sharir, 2001). Ideally, hand decontamination should take place before and after any direct contact with a patient's skin (Pratt *et al.*, 2007). As already stated the notion behind hand hygiene is that it breaks the chain of infection by removing transient micro-organisms, thus, preventing them from being transmitted to susceptible hosts (Damani, 2003).

Preventable HAIs are often related to inadequate patient care practice which includes lack of, or inappropriate, hand decontamination (Seto *et al.*, 1990). The practice of hand decontamination between patient contacts is as relevant today as it was in 1847 when Semmelweis made the discovery that hand decontamination reduced mortality rates.

2.8.1.1 Jewellery.

Jewellery worn by the HCP prevents thorough decontamination of the wrist and hands. The area under a ring or watch can become moist, and the Gram-negative bacteria on these surfaces increase (Gould, 2002a). Jacobson *et al.* (1985) found that before hand decontamination there were greater levels of bacteria present on the ringed finger compared with the other fingers, but after hand decontamination there was no significant difference. Nevertheless, the increased levels of bacteria present before hand decontamination does raise questions about transmission risk, especially as many studies have shown low levels of compliance with hand decontamination, particularly before patient contact. It is recommended by Gould (2002a) that jewellery should not be worn when providing patient care and carrying out hand decontamination.

2.9 Compliance with Infection Control Protocols.

Hand decontamination is cheap, easy to perform and effective (Cooper and O'Reilly, 2001). However, this practice appears to continue to be carried out both infrequently and inappropriately (Ward, 1997, Pittet *et al.*, 1999b). Regarding HCPs and hand decontamination frequency, Heseltine stated:

> 'they don't just not do it every time; they don't do it most of the time'.
> (Heseltine, 2001)

Studies have consistently shown that compliance with hand decontamination protocols among HCPs is very low (Larson *et al.*,1995; Pittet *et al.*,1999b; Rochon-Edouard *et al.*, 2004). Interestingly, in 1847 although many doctors did not believe in Semmelwies' theory he still managed to change hand decontamination behaviour enough to result in large reductions in infection and mortality rates. Today, we have many published findings that support the theory that hand decontamination reduces nosocomial infection rates, but it is still a battle to persuade HCPs to comply with this practice.

In a large study Pittet *et al.* (1999b) observed 2834 opportunities for hand decontamination. They found that the average rate of compliance with hand decontamination guidelines was 48%. Surprisingly, hand hygiene compliance was lower in surgical wards and ICU, where the risk of infection is higher than in other locations in the hospital. They also found that procedures associated with high risk for transmission had low levels of compliance compared with procedures with a low risk of transmission, which were found to have high compliance rates. In contrast to the Pittet *et al.* (1999b) findings, (Meengs *et al.*, 1994) found that in the Accident and Emergency department, during patient contact considered to present a low risk of cross infection, many HCPs did not follow correct infection control precautions. This may be due to a lack of awareness of the ease that hands may become contaminated during superficial contact. The differences in these studies may be due to the different populations observed. However, Casewell and Phillips (1977) also discovered that nurses thought in many instances that as their hands looked clean they would not

normally have carried out decontamination. In reality it is possible that contamination had occurred. However, Casewell and Phillips (1977) were not observing the practice of HCPs as Meengs *et al.* (1994) and Pittet *et al.* (1999b) were. It may simply have been that HCPs did not feel the situations described placed them at risk and so stated that in these circumstances hand decontamination was unnecessary. Casewell and Phillip's (1977) study was carried out over 20 years earlier and HCPs knowledge and attitudes to the importance of hand decontamination may have changed. Pittet *et al.* (1999b) also found compliance varied according to the time of day and the day of the week. It was lowest in the morning of a week day; this was also the busiest time of the day. Pettinger and Nettleman (1991); Meengs *et al.* (1994); Pittet *et al.* (1999b) and Tarnow-Mordi *et al.* (2000) found, in general, when the activity index was high compliance was low, suggesting that maximising staff work load may conflict with standards of patient care. The relationship between the intensity of patient care and non-compliance argues that hand decontamination should not be seen as problematic individual behaviour but instead as an organisational element which must be taken into account in order to attain a successful solution (Pittet *et al.* 1999b). Part of the successful strategy used in the Netherlands to reduce MRSA rates includes maintaining a high HCP to patient ratio (Department of Health, 2003).

Studies have shown that HCPs were more likely to wash their hands after patient care rather than before (Thompson *et al.* 1997; Pittet *et al.,* 1999b; Sharir *et al.,* 2001). It was found by Lankford *et al.* (2003) that as hand decontamination often occurred after an invasive procedure, this would have no benefit to the patient. This may suggest HCPs see hand decontamination as a form of protection for themselves rather than for the patient. However, it is possible that the HCPs thought that hand decontamination after patient contact would also protect future patients.

Isolation of individuals who are infected or patients who are considered to be at high risk from an infection, such as neutropenic patients, takes place to prevent or control outbreaks or epidemics of infection in hospital (Wilson and Jenner, 2001). However, maintaining isolation may be considered pointless if staff fail to

adhere to agreed practice (Gillespie and Bamford, 2000). Interestingly, in contrast to Thompson *et al.* (1997); Pittet *et al.,* (1999b); Sharir *et al.,*(2001) and Lankford *et al's.*, (2003) findings, during Pettinger and Nettleman's (1991) study failure to decontaminate hands upon leaving the isolation room, after patient care, was the single most common cause of non-compliance.

When investigating compliance with hand decontamination protocols a move to a newly built hospital with improved sink location resulted in an unexpected drop in compliance levels. It was standard policy that hand decontamination took place and gloves were worn prior to direct contact with a patient. Compliance with the policy was found to be poor in the old setting with only 12% of observed workers following it, but in the new setting compliance was even lower at 6%. As shown in other studies, HCPs preferred to wash their hands after patient contact, with 53% doing so in the old hospital, unfortunately, this level of compliance also dropped in the new hospital to 23%. Staff from the old facility washed their hands outside the room; whereas in the new hospital sinks were placed inside the isolation rooms (Lankford *et al.*, 2003). This shows that changing the setting and adjusting the location of sinks to make hand decontamination easier to perform did not result in the expected increase in compliance with hand decontamination protocols, but in fact reduced the frequency in which these practices occurred. This agrees with Larson's *et al.* (1991) belief that any single intervention to alter behaviour regarding hand decontamination would be unsuccessful, unless it was part of a program recognising the multifaceted nature of behaviour and difficulties in achieving behaviour change. This was demonstrated on the introduction of an automated sink, that simply required staff to place their hands under the tap and water and soap was automatically delivered. It was found to deliver significant improvements in the quality of hand decontamination technique. Unfortunately, this also resulted in a decrease in the frequency of hand decontamination. The introduction of the automated sinks produced a variety of feelings among staff including confusion about how to use them. As a result of these two studies, Larson *et al.* (1991) and Lankford *et al.* (2003) considered that a relearning process was needed when moving to a totally new facility or new equipment was introduced.

2.9.1 Compliance Rates of Different Professional Types.

In contrast to Pittet *et al.* (1999b), and Larson *et al.* (1995) findings, Sharir *et al.* (2001) found that for at least 20 years hand hygiene compliance levels have been much higher, 68% before patient treatment and 81% after patient treatment. This is thought to be due to an intensive and constant infection control educational programme being in place. Table 3 shows compliance rates for the different professionals (Sharir's *et al.*, 2001). These rates challenge the theory that 100% compliance may be impossible. High levels of compliance with hand decontamination protocols were also found by Pettinger and Nettleman (1991), however, in their study it was only HCP working in isolation units that were observed. In these areas it is possible that HCPs were more aware of the need of infection control practices.

Table 3. Hand decontamination Results Before and After Patient Contact

Department	**Hand decontamination Before Patient Contact**	**Hand decontamination After Patient Contact**
ICU, General, Cardiological, Neonatal and Dialysis	95%	99%
Radiology and Oncology	85%	89%
Emergency Department	52%	73%

(Sharir *et al.*, 2001).

A number of studies have found that variation in hand decontamination frequency occurs between professions, with nurses being the most compliant (Wendt *et al.*, 2004). Pittet *et al.* (1999b) found 52% compliance in nurses, 47% in nursing assistants and only 30% in doctors. Boyce (1999) also found that nurses were more likely to be compliant with hand decontamination protocols than other HCPs. Different compliance levels between different professions were also identified by Pettinger and Nettleman (1991). Nurses were found to wash their hands significantly more frequently than physicians 81% against 69% respectively. The compliance of auxiliary staff was 77%. The results for the remaining departments can be seen in Table 4.

Table 4. Hand decontamination Compliance of Different Professions

Visitors	88%
Overall Hospital personnel	41%
Health Care Assistants	35%
Radiology Technicians	33%
Physicians	30%

(Pettinger and Nettleman, 1991)

As shown, visitors included in the study were found to be more compliant with infection control practices than HCPs. This may be due to their belief that by not doing so they could in fact be putting the patient they are visiting at risk of infection.

Paediatric personnel have been shown to carry out hand decontamination more frequently than those in other areas of the hospital (Larson, 1995; Pittet *et al.*, 1999b). It may be possible that compliance with hand decontamination guidelines is affected by the expectation of successful outcomes for patients. Heseltines' (2001) states that his paediatric colleagues are usually enthusiastic about their patients' outcomes. This maybe due to their belief that each small act of care, which includes hand decontamination, may have a large impact on the chances of the survival of a tiny 800g baby. This is similar to the possible reasoning behind visitors high compliance with hand decontamination rates found in Pettinger and Nettleman's (1991) study.

2.9.2 Reasons for Non-Compliance with Hand Decontamination Guidelines.

Various reasons have been cited by HCPs for non-compliance with hand decontamination and the use of barrier precautions. These include insufficient hand decontamination equipment and skin irritation caused by hand cleaning agents (Rochon-Edouard *et al.*, 2004). It is suggested by Boyce (1999) that a lack of awareness of the situations that require hand decontamination is an

important factor in non-compliance. Pittet, (2000) provides other factors for non-compliance, which are shown in Table 5.

Table 5. Reasons for Non-compliance with Hand Decontamination Guidelines.

• Lack of knowledge
• Disagreement with or even uncertainty about recommendations
• The feeling that hand hygiene might interfere with health personnel/patient relations
• Lack of scientific data reporting concrete evidence of improved hand hygiene on HAI rates
• The notion that the risk for cross transmission is low for the patients
• The belief that glove use dispenses the need for hand hygiene
• The idea that patient needs take priority over hand hygiene

Cabana (2000) agrees with many of the findings provided by Pittet (2000). She found that although a guideline exists, HCPs may be unaware of it, or may not understand it. It was also found that 10% of doctors surveyed were unaware of a guideline. Others felt that certain guidelines were over simplified, not practical or not completely justified by scientific evidence, and this leads to low compliance rates (Cabana, 2000). As already mentioned (2.6), it is hoped that guidelines produced by Pratt *et al.* (2007) would overcome this issue as they make use of up to date evidence based data.

2.9.2.1 Length of Time it Takes to Wash Hands.

Kretzer and Larson (1998), Simmons *et al.*, (1990) and Pittet *et al.* (2000) found that time constraints were the most influential factor in non compliance with infection control protocols. Voss and Widmer (1997) argue that infection control staff may not realise the implications of what they are asking of HCPs. It is hypothesised that the required time for appropriate hand decontamination might interfere with patient care and in part may explain the low compliance rates with hand decontamination guidelines. The time it took for staff to wash their hands including walking to and from the sink took a total mean time of 61.7 seconds. Voss and Widmer (1997) calculated for 100% compliance the total time required, for traditional hand decontamination for a 12 person team working for eight

hours, would consume a total of 16 hours nursing time, this is equal to 17% of the total work force. During a two hour observation period of a single nurse, 70 episodes of direct contact with a single patient were recorded by Gould (2004). She believes that hand decontamination after each episode of care would not have been possible. This poses the question:

> Can hospitals expect 100% compliance with hand decontamination given the workload and limited resources?

Even though traditional methods of hand decontamination may require an extended length of time, this should not be a reason to refute present hand decontamination protocols. Efforts should be made to reduce the length of time required to perform this act. This may be to increase the number of sinks present, so reducing the distance between patients and the sink or possibly increase the workforce, thus increasing the time allocated to each patient. High HCP to patient ratio in the Netherlands has resulted in low MRSA rates (Department of Health, 2003). However, using alcohol hand rub is a simpler method; it was found that the time required for effective hand hygiene was reduced taking only 2.7 hours or less than 3% of the workforce. Alcohol hand rubs may improve compliance with hand hygiene guidelines (Voss and Widmer, 1997). With regards to Gould's (2004) findings, it may be necessary in these situations to re-evaluate the situations that require hand decontamination. Although full compliance with hand decontamination protocols may be unrealistic it is still important to aim for 100% compliance, because if the target figure is only 50% compliance, it is unlikely that more than 50% will ever be achieved.

2.9.3 Additional Reasons for Non-compliance.

Simmons *et al.* (1990) found that nurses think they wash their hands more frequently than they actually do. Through the use of questionnaires and an observation study it was shown that nurses believed they were decontaminating their hands appropriately 80% of the time, whereas, they were actually only performing this task 22% of the time. After an intervention to improve

compliance rates, hand decontamination still only occurred on 30% of possible occasions. Simmons *et al.* (1990) feels that no significant difference in compliance rates was seen as nurses did not perceive that they had a hand decontamination problem that needed improvement. This could be a reason for other HCPs low compliance with hand decontamination guidelines.

Other factors for non-compliance are forgetfulness, the lack of positive role models in colleagues or superiors, and the absence of an institutional priority for hand decontamination (Pittet, 2002). According to Voss and Widmer (1997) even though HCPs fail to wash their hands for many reasons it is rarely due to negligence. However, it could be argued that if HCPs are aware of the need for hand decontamination but find excuses not to carry out this practice then they could be considered to be negligent. Elliott agrees with this.

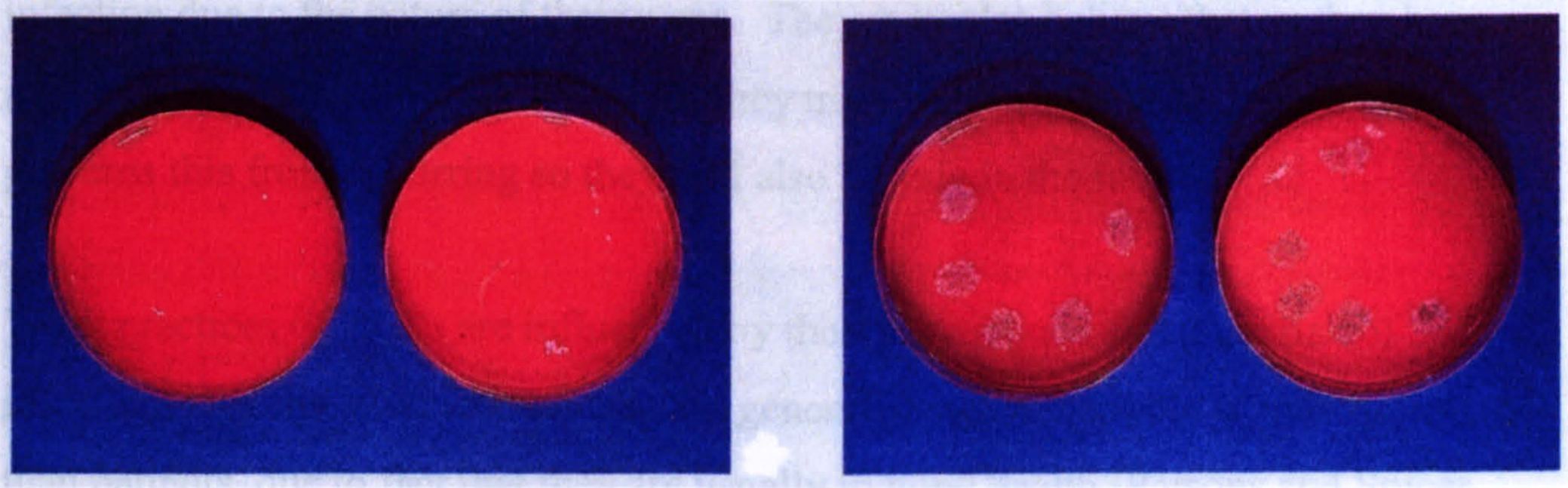
> 'Staff who fail to wash their hands properly, appropriately or effectively are unsafe and unprofessional'.
>
> (Elliott, 1996 p360)

In another study clinical medical staff were questioned about the significance of hands as a source of nosocomial infections and if hand decontamination was an effective means of reducing this risk. Both questions were answered positively by all subjects (Larson, 1982). Showing that

> 'Inadequate hand decontamination is not the result of ignorance or lack of available information'
>
> (Larson, 1982 p93)

HAIs usually present as sporadic cases so may be seen as unimportant or unrelated to non-compliance with hand decontamination protocols (Teare, 1999). Present knowledge of HCPs could be reinforced by showing the effects of hand decontamination on blood agar plates. Wilson and Jenner (2001) found much greater contamination before hand decontamination than afterwards (Figure 3). Camm (2004) also describes the use of a glow box to demonstrate how microbes can spread. This method may have a personal impact which could result in

increased compliance, but according to Teare (1999) these improvements are usually only temporary. However, Camm (2004) found infection control nurses believe that, compared to printed information, the use of glow boxes can make a lasting impression. This may be due to subjects witnessing the spread of micro organisms, whereas the contaminated agar plates which are prepared in advance may not be seen as much more than printed text material.



A. B

Figure 3. Different Contamination Levels of Hands.

A: After hand decontamination. B: Before hand decontamination.

2.9.4 Health Care Professionals Perception of Risk of Hospital Acquired Infections.

The beliefs people hold about their vulnerability to harm are key variables in theories of self protective behaviour (Weinstein, 1986). When people fail to take precautions, such as not wearing a seat belt or not giving up smoking, their inaction is often connected to an optimistic bias:

> 'it won't happen to me' (Weinstein, 1986 p482).

Different processes that may induce optimistic biases include the idea that unrealistic optimism represents defensive denial, or an attempt to prevent the anxiety one would feel from acknowledging a threat to well being. Another possibility is that people claim they are less at risk than their peers, thus enhancing or maintaining their self-esteem. To do this they may tend to compare themselves with people who are at particularly high risk, or they may overestimate skills that would help them avoid risk. Lack of experience with a

problem may also make it difficult to imagine how one might be affected, so lead them to claim that their own risk is below average. Finally, previous work has suggested that people predict future vulnerability using their past experiences. For many hazards, people may hold the incorrect belief that they are exempt from risk if they have not yet experienced the problem (Weinstein, 1986). The researcher feels these optimistic biases may be held by some HCPs, they may believe other individuals, such as surgeons or nurses, suffer a higher risk of infection due to the nature of their work. They may also believe that as they have not yet been affected by infection then they must be working in such a way that prevents this from occurring so they will also be safe in the future.

Work practices of HCPs are influenced by their perceptions about the risk of infection. Health Care Professionals are generally less susceptible to infection than patients, due to fact that they are usually in good health (Parsons and Spicer, 1995). Nurses' views relating to risk of infection to themselves and patients were assessed by Gould and Ream (1994). More than half over estimated the prevalence of HAIs compared with the National Prevalence Study. It was believed by 39% of nurses that through patient contact they were at particular risk of developing an infection. Intensive Care Unit nurses were much more likely to consider themselves at particular risk (Gould and Ream, 1994). It is thought that the threat stemmed from the frequent handling of blood and body fluids. This is an interesting finding as ICU staff have shown low compliance with infection control procedures in many studies, so fail to protect themselves as well as their patients (Pittet *et al.*,1999b). Some nurses believed that the dissemination of bacteria via the airborne route was where the danger lay. They believed these bacteria may have the ability to cause respiratory infections among members of staff who felt physically run down (Gould and Ream, 1994). Interestingly, those who did not feel they were at particular risk were aware of parenteral infection. It was their belief that attention to infection control protocols, which they linked to high standards of nursing care, effectively reduced the risk of becoming infected (Gould and Ream, 1994).

Camm (2004) says that hand decontamination occurs frequently in situations where there is an obvious risk, such as after dealing with blood or faeces. This is

described by infection control nurses involved in the 'Cleanyourhands campaign' as the 'yuck factor'. Without these visual prompts they often fail to consider any infection risks. Teare (1999) also had thoughts about visual prompts, she felt:

> 'Staff may be horrified by lice on a patient but fail to consider the potentially far more serious consequences of bacteria present on their hands'.
>
> (Teare, 1999 p686)

2.10 Hand Decontamination Practice.

Gould (2002b) indicates a need to review the existing terminology for hand cleansing. 'Hand washing', a term commonly used to describe something that is not only performed clinically but also socially, is not considered by Gould (2002b) to be a satisfactory description of the hand cleansing recommended to prevent HAIs. The term 'decontamination' is more precise, it is accepted to mean:

> 'the mechanical removal of micro-organisms and their debris or the destruction of micro-organisms'
>
> (Gould, 2002b p48).

The use of soap or skin antiseptic will determine whether or not micro-organisms are removed or destroyed.

2.10.1 Hand Decontamination Agents.

The ability to choose the appropriate hand decontaminant is a skill that is required by all HCPs. Appropriate hand decontamination techniques must be acquired at an early stage of a HCPs career (Gould, 2002a). This knowledge should be obtained during training before HCP careers begins (Elliotte, 1996). The effects of different decontamination methods are shown in Table 6. This knowledge should be updated regularly through continual professional development (Gould, 2002a; Pratt *et al.*, 2007). Hand hygiene resources and individual practice should also be audited at regular intervals and the results fed back to healthcare staff. This would aid in the improvement and maintenance of correct hand decontamination practices.

Table 6. Decontamination Methods.

Choice of Decontaminant	**Effects of Decontaminant**	**Situations to Use**
Liquid soap and water	Removes transient bacteria from the skin, but the bacteria are not killed.	In low risk situations when hands are visibly soiled or potentially contaminated with dirt or organic material (ie following the removal of gloves)
Antimicrobial soap	Mechanically removes and kills, or inhibits bacteria growth.	In high risk situations or before invasive procedures when hands are potentially contaminated with dirt or organic material (ie following the removal of gloves)
Alcohol Based Handrub	kill or inhibit bacteria, but do not remove soil.	Should be used to decontaminate hands between patients or between different care activities for the same patient, unless hands are visibly soiled.

(Anonymous, 2001b, Pratt *et al.*, 2007).

Alcohol handrubs (AHRs) have been found to be an effective alternative to conventional hand decontamination (Pittet *et al.*, 2000; Girard *et al.*, 2001). They have many advantages, such as being easy and fast to use, inexpensive and effective (Larson *et al.*, 2001). Boyce *et al.* (2000) also found that skin dryness, irritation and cracking diminished slightly, but not significantly, when using AHR. The AHRs have been shown to improve hand decontamination compliance by HCPs (Larson *et al.*, 2001; Rochon-Edouard *et al.*, 2004). This effect was also reported by Earl *et al.* (2001) when dispensers containing hand decontamination gel were placed on units and in patient rooms, however compliance still only occurred 57% of the time after the intervention. During Lankford *et al.* (2003) study they did not find this improvement, although the reason for this may be due to the additional environmental changes that had also occurred. Although there are advantages with the AHR, there are also limitations. It was found by Sickbert-Bennett *et al.* (2005) that the best efficiency of AHR occurs after a single episode of hand hygiene but over the subsequent 10 episodes of hand hygiene the efficiency decreases. It has also been shown that

AHR are not effective at removing spore forming organisms. Studies by Gordin *et al.* (2005) and King (2004) found that following the introduction of AHR there was an overall reduction in the number of HAIs, there was no reduction in the cases of Clostridium difficile–associated diarrhoea. These factors show that conventional hand decontamination techniques are still required.

2.10.2 Importance of Correct Hand Decontamination Technique.

There have been numerous studies carried out investigating the frequency with which hand decontamination occurs. However, less emphasis has been given to the quality or technique of hand decontamination practiced in the clinical setting (Gould, 2000). It is important that HCPs practice good quality hand decontamination technique in order to ensure bacteria are removed from all areas of the hands (Quinlan, 2000).

Good quality hand decontamination technique is comprised of five components:

- Frequency
- Agent used e.g. soap, antiseptic soap or alcohol
- Appropriateness
- Duration
- Technique (Gould, 2000)

The correct technique for hand decontamination and the use of alcohol hand rub is described by Pratt *et al.* (2007).

The procedure for hand washing with soap and water requires

1) Wetting hands under tepid running water.
2) Applying liquid soap or an antimicrobial preparation. The handwash solution must come into contact with all of the surfaces of the hand.
3) Hands should be rubbed together vigorously for a minimum of 10-15 seconds, paying particular attention to the tips of the fingers, the thumbs and the areas between the fingers.
4) Rinse hands thoroughly.
5) Dry hands with a good quality paper towel.

The procedure for decontaminating hands with alcohol hand rub

1) The handrub solution must come into contact with all surfaces of the hand.
2) Hands must be rubbed together vigorously, paying particular attention to the tips of the fingers, the thumbs and the areas between the fingers, until the solution has evaporated and the hands are dry.

It is important to ensure all surfaces of both hands have adequate contact with soap or skin antiseptic. Larson (1995) suggests that 15 seconds is an ideal length of time to allow for this. Careful attention should be given to the areas that are most frequently missed (Figure 4). Sprunt *et al.* (1973) argues that a significant number of transient micro-organisms can be removed effectively when carrying out a brief hand wash with the hand decontamination solution only making contact with the skin for a few seconds. However, Sprunt *et al.* (1973) does not include the time required for rinsing and drying hands. Due to the friction caused when rubbing hands together with a towel, it is possible to remove additional bacteria. Micro-organisms can more easily be transferred on damp surfaces than dry ones. Therefore, drying the hands is an important aspect of hand decontamination. Leaving hands slightly wet may cause hands to become dry and cracked (Wilson and Jenner, 2001; Gould, 2002a).

Figure 4. Areas of the Hand Most Frequently Missed During Hand Decontamination.

(Wilson and Jenner, 2001 p136)

Duration is only one factor involved in good quality hand decontamination technique. Using observational techniques Gould and Ream (1993) compared the hand decontamination technique of nurses from ICU, surgical and medical units. Medical units were found to be better at choosing the correct hand decontamination agent and ICU were the least likely to make an appropriate choice. However, in all other aspects of hand decontamination technique, listed earlier in this section, ICU nurses performed significantly better than the other nurses. The duration of hand decontamination was longer when carried out by ICU nurses i.e. 8.29 seconds in comparison to 6.56 seconds for the other groups of nurses. It should be noted that these times were lower than the 10 or 15 seconds recommended for adequate hand decontamination by Larson (1995) or Pratt *et al.* (2007). Gould and Ream (1993) found no relationship between technique and frequency, so nurses who washed their hands a higher number of

times did not necessarily wash them to a higher standard. Larson *et al.* (2000) also found no relationship between nurses' improved technique and increased frequency when an automated sink was introduced on the ward. In actual fact, frequency of hand decontamination reduced while technique improved. Gould and Ream, (1993) also found individuals performing well in one aspect of good technique were found to perform well in other aspects. During a later observational study Gould (2004) again found that many nurses had good hand decontamination technique and the quality of the technique appeared to be constant. When nurses were observed performing hand decontamination well they tended always to perform well and this was not affected by pressures of work. This suggests that teaching effective hand hygiene technique is a worthwhile exercise. Once the skill has been mastered, performance should remain good (Gould, 2004).

2.10.3 Skin Problems.

Irritant contact dermatitis associated with detergent based products is an unpleasant condition (Wilkinson 2000; Thune 1996). It is extremely common, occurring in about one quarter of full time nursing staff (Cimiotti *et al.*, 2003). This dermatological damage often becomes chronic and difficult to treat (Cimiotti *et al.*, 2003). With the loss of the barrier function of the skin, dermatitis can increase the risk of acquiring a bloodborne infection (Wilkinson, 2000). According to Forrester and Roth (1998) there is a significantly increased risk of developing dermatitis in individuals washing their hands more than 35 times per day. This becomes an issue if HCPs, including radiographers, were to decontaminate their hands before and after each patient contact, as instructed, many would exceed this number and be at risk of developing dermatitis.

Skin problems are often cited as a reason for poor compliance with hand decontamination protocols (Pittet *et al.*, 2001; Rochon-Edouard *et al.*, 2004). These are usually discussed with regards to traditional hand decontamination techniques using soap and water. However, Cimiotti *et al.* (2003) compared skin reactions caused by soap and water with those caused by AHRs. Table 7 shows the skin problems associated with both cleansing techniques. Cimiotti *et al.*

(2003) identified that skin reactions are an important drawback to the use of alcohol-based products. Seven out of 58 nurses studied were treated for skin reactions associated with the alcohol hand rub. This is compared with four out of the 58 nurses reporting reactions to traditional detergent-based antiseptic. Two of the seven nurses were instructed to replace the alcohol product with a detergent based antiseptic. An alternative alcohol product was given to the remaining five nurses. After several days four of these nurses were able to resume use of the original alcohol hand rub. This suggests that the reaction was not caused by an allergy to the product.

Table 7. Skin Problems Associated with Different Decontamination Methods

Traditional Detergent	**Alcohol Hand Rub**
Reactions occur after prolonged Use	Reactions occurred immediately or soon after initial exposure
Difficult to treat	Generally subsides within a few days
Reactions occurred in Older HCPs	Reactions occurred in younger HCPs

(Cimiotti *et al.*, 2003)

The immediate irritation found when using an alcohol hand rub has the potential to cause problems with compliance, as staff may be unaware that the symptoms would subside and, understandably, may refuse to use it again. Departments may not change products as readily as they did in the study simply because some staff members were uncomfortable using them.

2.10.3.1 Protecting Skin with the Use of Hand Creams.

Using an appropriate moisturiser may be one means of preventing hand dermatitis in HCPs (Marino and Cohen, 2001). It can help repair the barrier function of the skin (Loden, 1997). Pratt *et al.* (2007) also advocate the use of moisturiser to reduce drying effects of frequent hand decontamination. The use of an emollient at least five times per day was found to have protective results. Provision of such emollients in a health care setting might prove beneficial (Wilkinson, 2000). Within the Diagnostic Imaging Department the use of

moisturisers is limited. Staff in the general area may have difficulty handling the x-ray films after using moisturiser. However, there are times in the day when staff are not in contact with these items, such as, during their tea and lunch breaks, and once they have finished work for the day. At these times such products would be beneficial.

2.11 Interventions Used to Increase Hand Decontamination Frequency.

Prevention is the key to controlling infection (Pinney, 2000). There is evidence that when a concerted effort to educate staff about the need for appropriate hand decontamination occurs, an improvement in hand decontamination procedures can be seen. Some studies also show a significant reduction in HAI rates, these are discussed later (2.12). In spite of the rising profile of HAIs and the publication of guidelines to prevent and control the problem, low levels of compliance with good infection control practices still persist. A number of interventions to increase infection control practices, including hand decontamination frequency, have been utilised.

2.11.1 The Need for Appropriate Education and Training.

The CDC infection control guidelines (Bolyard *et al.*,1998) indicate that personnel education is imperative in an effective infection control program. As the different job categories produce varying risks of infection, then infection control education should be modified accordingly. Pinney (2000) agrees with this and believes the delivery of education needs to be appropriate. This is very important as much of the education and published information relates only to ward situations. However, care given to patients in other departments of the hospital such as the Diagnostic Imaging Department may be very different. Bolyard *et al.*(1998) also states that all HCPs should receive education about the organisation's infection control policies and procedures. Larson *et al.* (2000) indicates that by only giving specific training to the individual departments then the process can become fragmented. It is essential that the NHS trusts deal with infection control as a whole. Staff should be educated fully about the topic of

infection control in a general manner and in addition to this they should be given training specific to their work. Only dealing with infection control specific to the Diagnostic Imaging Department could become a problem for radiographers as they often spend time in a variety of other hospital settings, including theatre, ICU, Special Care Baby Unit (SCBU) and the general wards. It is important that they are also aware of the infection control practices necessary in these different areas of the hospital.

Although it is considered essential for all HCPs to receive appropriate infection control education and training it has been found that a considerable proportion of NHS trusts fail to provide it (Akid, 2001). A report by the National Audit Office (2000) found that less than two thirds of infection control nurses provide annual infection control training. By not implementing training and updates staff will be unaware of the appropriate practice they should be following. It could also lead HCPs to believe, wrongly, that infection control performance is already adequate and extra vigilance to improve is not required. As discussed earlier (2.6) The National Core Learning Unit's infection prevention programme is now mandatory in all NHS trusts.

There is a need for both educational and health care establishments to work together in the important area of infection control to enable the development of safe practice among trainee HCPs. It is important that hand decontamination is included within the curriculum and is given sufficient emphasis. If infection control, including hand decontamination, is not taught at a sufficiently high standard during HCPs formal training then it is unlikely that they will carry out hand decontamination appropriately once they are qualified (Meengs *et al.*, 1994; Elliotte, 1996). This will then add to the already large problem of HAI.

Elliotte (1996) is concerned that a number of educational establishments fail to make use of specialists when it comes to educating students about the importance of appropriate hand decontamination. Those establishments that do make use of these specialists, unfortunately only utilise them during the initial stages of the educational program with little or no follow up in later stages. It would seem that infection control is not considered to be an important area by educational

establishments. Meengs *et al.* (1994) believe that strategies for improving hand decontamination guideline compliance need to be introduced during HCPs training as attempts to alter habits developed throughout their career may be difficult.

Nurses were questioned about pre and post registration opportunities to learn about infection control (Gould and Ream, 1994). All agreed that the education they had received before qualifying was only sufficient for training and that continual updating was required. Mayone-Ziomek (1998) also believed this. Many nurses had attended courses, such as Intravenous administration training, which would have included an infection control element; however, these sessions were not mentioned. Gould and Ream (1994) felt that it was possible that opportunities to learn were provided but not appreciated. Seto *et al.* (1991) states that infection control team members are usually the best individuals to carry out the infection prevention and control education programs. They also believe infection control procedures should be seen as an integral part of patient care practice rather than a separate subject. By viewing infection control as a separate issue it becomes an additional task to complete. It is possible that HCPs do appreciate the infection control education, but when questioned by Gould and Ream (1994), as it was not a separate subject or not provided by infection control nurses, they may not have recognised it as infection control education, rather than actually forgetting the information they had received. Whatever the situation, clinical staff did not feel that their needs were being met, either because of lack of provision or because the opportunities that were provided had very little impact.

2.11.1.1 Educational Interventions.

Calabro *et al.* (1998) performed pre and post intervention tests in addition to an educational session. It was found that the mean overall post test knowledge scores increased significantly (Calabro *et al.*, 1998). Unfortunately, no observations were made to determine if this increased knowledge altered practice in any way, so the value of these tests cannot be assessed. However, it would address the issue described by Gould and Ream (1994), where nurses were provided with education, but the information was not retained. By testing HCPs

the value of the session could be examined and any necessary improvements could be made.

A study by Roberts *et al.* (1998), in which new Australian infection control legislation was explained to HCPs through an in-service educational program, showed a good level of awareness of changes to infection control legislation and hand decontamination practices. Whilst this was encouraging, as found in many other studies, the actual compliance rates were disappointing. Staff were observed to be failing to wash their hands 45% of the time and not changing gloves between episodes of care 24% of the time. The compliance rates, although still low, were higher than those found by Pittet *et al.* (1999b) so it could suggest that knowledge of required infection control practices does influence compliance rates. However, the studies were carried out in different countries, and it may be possible that there are many different factors accountable for the different compliance rates. In contrast to this, with the use of questionnaires, Gruber *et al.* (1989) found no correlation between increased knowledge about AIDs and increased use of Universal Precautions (UPs). It should be noted that the CDC had only recommended the use of UPs the year previously and Gruber *et al.* (1989) did not provide educational sessions regarding AIDS and the use of UPs which may have enforced the need to follow such guidelines.

As described earlier (2.9.1), Sharir *et al.*'s (2001) ongoing in-service education program for all HCPs, including hospital volunteers, was in place in a hospital in Israel. Activities in the program also included the updating of hand hygiene guidelines and nursing school tutorials. Sharir *et al.* (2001) suggests that a continuous and active educational program has the potential to increase and, more significantly, maintain high compliance rates with hand decontamination protocols which may ultimately result in a reduction of HAIs. A similar intervention was carried out by Sharek *et al.* (2002). Compliance data were monitored and displayed at two, three and six months after the intervention. This resulted in an increase in compliance rates. For example, compliance of the radiographers was 56% before the intervention but rose to 94% afterwards. However, it is possible that along with the education sessions the increase in

compliance rates occurred as a result of the observations and feedback. To determine if the increase was due to education alone control groups providing baseline information would have been required.

Dubbert *et al.*, (1990) also observed the benefits of education given to ICU nurses. In this, four 15 minute education sessions about hand decontamination were preformed. Compliance was seen to increase from 81% to 94% of occasions where hand decontamination was indicated. Unfortunately compliance steadily declined over the subsequent three weeks. The second intervention in Dubbert *et al's*, (1990) study made use of feedback, this resulted in increased compliance to 97%, and this remained constant for the remaining three weeks of the study. Khatib *et al.*, (1999) observed a similar decline in hand decontamination rates after an educational intervention. In both studies additional interventions were introduced, including feedback and reminders. In each case an increase in hand decontamination rates was seen. As shown in many studies discussed in this chapter increasing compliance does not seem to be a problem. However, maintaining the increase proves to be very difficult. Unlike Sharir *et al's*. (2001) study, in both Dubbert *et al's* (1990) and Khatib et al's (1999) studies the intervention was not continued over a long period of time, so it is difficult to determine how effective they actually were at maintaining the increase. Interestingly, in the Dubbert *et al.* (1990) study, hand decontamination compliance, at the start of the study, was already at a higher level than many other studies have indicated. It is thought this may be due to staff awareness of the observations. This high compliance rate remained throughout the study period and so the benefits of observations may be an effective means of increasing hand decontamination.

2.11.1.2 Education for Key Individuals.

Ventilator-associated pneumonia is the most common HAI among patients requiring mechanical ventilation (Zack *et al.*, 2002). Studies have shown that an educational intervention increased nurse's infection control knowledge and decreased the incidence of ventilation-associated pneumonia (Zack *et al.*, 2002; Babcock *et al.*, 2004). Both studies suggest that aiming the education

specifically toward respiratory care practitioners and ICU nursing staff highlighted their role in preventing ventilator–associated pneumonia (Zack *et al.*, 2002; Babcock *et al.*, 2004). By directing the education at these individuals it may have encouraged them to take ownership of the problem.

2.11.1.3 Combining Opinion Leaders with Education Sessions.

Seto *et al.*, (1991) investigated the use of opinion leaders in addition to in-service education about infection control measures. Opinion leaders are individuals who exert a large amount of social influence over others within a social group. It is imperative that the opinion leaders accept new information; this then allows the information to be effectively transmitted to the whole group. Within management and marketing research this concept is widely accepted, however, it has not been applied to the situation of infection control education. Seto *et al.*, (1991) found that when the use of opinion leaders and in-service lectures delivered by infection control personnel were combined, compliance with infection control guidelines were significantly higher than in groups where a lecture by infection control personnel or opinion leader alone was given. The reason for these differences may be that the in-service lecture officially endorsed the guidelines to be followed; this then enhanced the ability of the opinion leader to influence others. The added advantage of the opinion leader was that more members of staff were reached with the new information. This is important as it has been shown in many studies that not all members of staff are able to attend in-service lectures (Seto *et al.*, 1991). However, this study states that when an opinion leader delivers the lectures without infection control personnel they are not as successful as when combined with infection control personnel, so they may not be of use in providing in-service lectures to additional staff. The opinion leader may be useful as a recognised individual who continues to encourage compliance with infection control protocols once the in-service lectures have been delivered.

The value of positive role models has been shown in a number of studies. Lankford *et al.* (2003) noted that HCPs working with superiors or peers would often mirror their compliance or lack of it. Pettinger and Nettleman (1991) also

noted that when HCPs worked along side others in the isolation rooms they were more likely to follow infection control practices. Connolly (1998) also noted the value of good role models when observing doctors hand decontamination practice. A group of doctors were found to have a 50% higher level of hand decontamination compliance compared to a second group of doctors. It was thought that this was because one doctor in the first group consistently washed his hands and insisted his team follow his lead (Connolly, 1998). Many interventions used to improve compliance may have resulted only in short term behavioural changes because staff, seen as role models, do not comply with infection control guidelines and so do not reinforce the importance of this practice (Fell, 2000). This was seen by Lankford *et al.* (2003).

2.11.2 Feedback.

There has been some evidence suggesting that interventions focusing on the organisational level improve adherence (O'Boyle *et al.*, 2001). Routine observation and feedback have been shown to be an effective strategy. Moongtui *et al.* (2000) found, during a peer feedback program, compliance rates rose sharply. Unfortunately, as with many studies once the intervention period was complete and feedback ceased the compliance rate dropped. This demonstrates the importance of continuing with observation and feedback measures (Moongtui *et al.*, 2000).

The impact of education on hand hygiene practice followed by the reinforcing effect of performance feedback in ICU was assessed in Argentina. Three hospitals were involved in the study. Attendance at these education sessions was voluntary. Performance feedback and surveillance data were provided monthly and were available to all HCPs. During the study the rate of hand decontamination increased significantly from 16.5% to 58.1%. Observation and performance feedback were used on a continuous basis, and the short-lived improvements seen by others when feedback was discontinued, were not being witnessed (Rosenthal *et al.*, 2003). This illustrates the importance of reinforcing factors. Dubbert *et al.* (1990) had similar results, although the investigation was not carried out over a long period of time. As already mentioned, Sharek (2002) also found improved compliance over an extended period of time when using

continuous performance feedback. However, Bittner *et al.* (2002) did not find similar results. They found that the use of observers increased the frequency of hand decontamination. When the observers were removed frequency rates lowered. Information relating to hand decontamination frequency was gathered in the second phase of their study by measuring soap and paper towel usage, feedback of this data was presented to the intervention group of HCPs, but no other training or information was provided. The feedback did result in an increase in compliance rates, however, it was not sustained. It was Bittner's *et al.* (2002) opinion that it was the use of live observers that resulted in the increase seen in other studies. In addition to feedback other studies have made use of other interventions, Rosenthal *et al.*, (2003) included AHR and extensive point of service reminders as part of the intervention along with education. These may also be factors in the extended compliance. These studies could be viewed in terms of the PRECEDE/PROCEED model (2.15.4). The education sessions address the predisposing factors, the AHRs attend to the enabling factors and the reminders and feedback acts as reinforcement. This highlights the importance of using multifaceted interventions when trying to maintain increased compliance rates.

Many of the infection control studies published are, in fact, audits. They observe current practice, compare the results with a set standard, implement changes and then observe again. Unfortunately, many of these studies do not continue to monitor the situation, so one of the major benefits of audit is lost, that is, the ability to protect quality. A number of studies aiming to increase compliance with infection control protocols mention the Hawthorne effect which occurs due to the presence of an observer (Moongtui *et al.*, 2000). This effect could be considered as a method of increasing compliance in addition to feedback.

2.11.3 Patient Empowerment.

Hand decontamination improvement programs currently directed toward the HCP can be categorised into three techniques, in-service training, behavioural modification/intervention and observational. Initial success and improvement has been seen with each of these methods, however, successes, on the whole, have only been short term. No success has been achieved in making HCPs aware

of their individual responsibility regarding hand decontamination compliance. In light of this, McGuckin *et al.*, (1999) considered that focus on the patient rather than the HCP may be the next move. The affect of patients asking HCPs to wash their hands was investigated in the USA in 1999 and then repeated in the UK in 2001. Health educators discussed with patients the importance of hand decontamination in preventing HAIs. Patients were told to ask all HCPs who had direct contact with them 'Did you wash your hands?' Soap usage was employed to calculate the frequency of hand decontamination. In the USA it was found that all sites involved in the study had an overall increase in soap usage of 35% and in the UK an increase of 50%. Of 276 patients contacted after discharge in the USA, 157(57%) claimed to have asked HCPs if they had washed their hands. Out of those, 141 (90%) claimed to put the question to the nurses, whereas only 50 (32%) claimed to ask physicians the same question. In the UK all patients asked nurses if they had washed their hands, but as in the USA only 35% put the same question to physicians. During the study participants were not asked why they chose not to put the question to physicians. This may have been useful information if this intervention is to be used in the future. It may be that the patients had developed more of a rapport with the nurses and felt more comfortable asking them the set question. It has already been shown that physician's compliance rates are lower than nurses so this method may not be any more successful than any other in increasing compliance among physicians. Physicians may also be seen as role models, and if they are more compliant with the guidelines, other professional groups may be encouraged to follow and improve their own practice (Lankford *et al.*, 2003). Although soap usage is an indicator for increased hand decontamination it does not really give an accurate picture of the quality of the hand decontamination technique, which is also important. The reason for the larger increase in hand decontamination frequency in the UK compared with the USA may be due to three factors:

1. Awareness of the program - the program was announced to physicians by the medical director, and flyers were sent to other HCPs.

2. Non awareness of control versus test ward - the majority of patients were cared for in a bay, rather than in private or semi private rooms as they are

in the U.S.A. Because of this arrangement, nurses in the UK would be blind to who was involved in the study so may have washed their hands for all patients. One patient claimed she did not have to ask her nurse if she had washed her hands, as when the nurse saw the literature relating to the study on her bed it prompted her to wash her hands (McGuckin *et al.*, 2001). This is a positive example of the Hawthorne effect.

3. Support from administration on the importance of the program.

The difference in increased compliance between the control group and the intervention group in the UK was 10%. This may have been due to the fact that increased compliance began when the program was announced, this may suggest that patients asking staff if they had washed their hands was a reinforcement of practice that was already in place (McGuckin *et al.*, 2001). However, as there was only a 10% difference in hand decontamination it could be argued that patient empowerment didn't really make a huge difference and awareness of the study alone may have been significant in increasing the compliance.

A patient empowering study was also carried out by Sen *et al.* (1999). Patients were given a printed card to display if they felt uncomfortable verbally asking HCPs if they had washed their hands. Over a six week period observations were carried out. During this time the infection control team did not witness patients showing the cards, consequently they were pinned above the beds to serve as a reminder. The overall frequency of hand decontamination by all HCPs was only 37% (Sen *et al.*, 1999). Unfortunately a baseline of hand decontamination frequency had not been obtained prior to the introduction of the cards, therefore, this study is unable to identify any changes in hand decontamination practices. However, the result was still lower than that found by (McGuckin *et al.*, 2001). Patients may have been reluctant to ask HCPs if they had washed their hands as they may not have been fully aware of the potential implications of not carrying out this task. It may still be easier to find an effective way to educate HCPs about their responsibility to decontaminate their hands, than explain to each new patient admitted to hospital about the need to ask HCPs to carry out this task. This type of intervention is most suited to areas where patients have a prolonged

stay in hospital. This method may not be possible in areas, such as the Diagnostic Imaging Department, as patients are only present for a short period of time. However, patients involved in such an intervention on the ward may feel empowered to ask all HCPs including radiographers if they had washed their hands. This may in turn cause radiographers to think more about their infection control practices. It may also be possible to place notices around the Diagnostic Imaging Department informing patients that they should ask all HCPs if they have washed their hands.

The value of patient empowerment has been incorporated into the 'cleanyourhands' campaign. In this intervention, using evidence obtained from a number of studies that suggest a sustained improvement in hand decontamination is achievable through a range of methods, additional factors have also been used, including:

- AHR was placed near all patients or carried by the HCPs
- Posters directed specifically to the patient or the HCP were displayed and changed on a regular basis.
- Patient information and empowerment leaflets were distributed. The aim of these was to:
  - Raise campaign awareness.
  - Raise HAI awareness.
  - Encourage patients to question HCPs.

The 'cleanyourhands' campaign has been implemented across England and Wales, since the encouraging results of its pilot study. It was found during an observation period, of 12 months, that hand decontamination rates increased from 2% in the first two months to 56% in the third month and 63% in the final months. This shows the value of the campaign as it has been able to sustain an increased improvement over a 12 month period. The baseline findings from the pilot study were much lower than reported in other studies, such as Pittet *et al.* (2000). However, a great increase in compliance was observed throughout the study. A further investigation will be carried out over four years to establish the value of the national wide intervention (National Patient Safety Agency 2004).

2.12 Effects of Hand Decontamination on Hospital Acquired Infection Rates.

Many studies have concentrated on increasing hand decontamination compliance but there have been few investigations, since the initial study by Semmelweis, showing that hand decontamination does in fact decrease rates of HAI (Larson 1999, Doebbeling *et al.*, 1992; Salemi *et al.*, 2002).

Good evidence showing the effect of a procedure, such as hand decontamination, on HAI rates should be obtained from placebo-controlled, double blind, crossover studies. Up to the present time there have been no such studies into the effect of hand hygiene and it is unlikely that there will ever be such a study. Allowing some patients to be intentionally cared for by staff with unclean hands would never be agreed to by an ethics committee. Furthermore, Nystrom (1994) believes the construction for any placebo for hand decontamination would be extremely difficult if not impossible, as all elements, such as the rinsing effect of water or the detergent effect of soap may have importance. Yet, Sprunt *et al.* (1973) showed that the type of cleansing agent did not have a significant effect on reducing levels of bacteria, however, this is an old study and development of improved cleansing agents may have occurred. Practical and efficient means to influence behaviour and increase compliance with hand hygiene guidelines need to be studied, rather than complex studies on the effects of hand decontamination (Nystrom, 1994). Although there is no direct evidence for transferring infection from HCPs hands to patients there is indirect evidence that this happens.

Hand decontamination compliance rates in the Sharir *et al.* (2001) study were found to be very high. In 1997 a survey carried out by the Israeli Centre for Disease Control found that the hospital involved in the study had the lowest rate of nosocomial infections. This hospital claims to have maintained high rates of compliance for over 20 years. It was noted by Girou *et al.* (2006), in a French rehabilitation hospital, that lower MRSA rates were achieved in wards where staff decontaminated their hands more than 70% of the required time. Both these studies may suggest a link between good hand decontamination compliance and lowered nosocomial infection rates. Conly *et al.* (1989) also found that HAI

rates were reduced significantly from 30% to 12% during an intervention that successfully increased the frequency of hand decontamination. It also showed that as the frequency of hand decontamination decreased at the end of the intervention, HAI rates increased. Conly *et al.* (1989) are mindful that increased hand decontamination alone may not be the reason for the reduced HAI rates. They feel that the education sessions provided to aid in the increase in frequency of hand decontamination may also have altered other practices including hand decontamination technique, attention to aseptic technique when dealing with invasive devices, avoidance of unnecessary procedures and more careful handling of contaminated material. These factors were not specifically observed or controlled. During Simmons *et al,* (1990) study the frequency of hand decontamination increased slightly, but, there was no significant difference in the number of HAIs before and after the intervention. However, as hand decontamination frequency was not increased significantly and had not increased for a great length of time, this may be the reason for HAI rates remaining stable. It may be possible that had the study period been lengthened these results may have improved.

2.13 Glove Use.

Disposable gloves are a reliable method of reducing the numbers of micro-organisms acquired on HCPs hands (Wilson and Jenner, 2001; Lawrence and May, 2003). Glove use is recommended when HCPs may come into contact with blood, other body fluids, mucous membranes or non-intact skin of all patients (Pratt *et al.*, 2007). This is because in many cases neither physicians nor patients are aware of their HIV status (Linn *et al.*, 1990, Godin, 1998). This can also be the case for many other infections. In spite of increasing literature Wilkinson, (1992) says that some HCPs will only wear gloves when dealing with patients once a diagnosis of infection has been made. This was also found by Linn *et al.* (1990) Glove use can also provide protection to HCPs with damaged skin (Wilson and Jenner, 2001).

It is important that gloves are changed after each procedure in order to prevent transmission of infection to other parts of the patient's body or to other patients

with whom they may come into contact (Patterson *et al.*, 1991; Pratt *et al.* 2007). This is discussed under heading 2.13.2. It is not recommended to wash gloves between patients, as it is possible they may become damaged by the soap (Mayone-Ziomek, 1998). Gloves also need to be changed if they are worn for long periods of time, as hydration of the latex may cause the gloves to become porous (Department of Health, 1998a).

A major concern raised in an educational study was that almost one fifth of respondents thought hand decontamination was unnecessary if gloves were worn (Roberts *et al.*, 1998). It is possible that gloves may become punctured, allowing body fluids to seep in and contaminate hands (Wilson and Jenner, 2001). It is also possible that hands become contaminated when removing the gloves. The warm moist environment of the gloved hand provides an excellent breeding ground for bacteria, in these situations bacteria can multiply rapidly. Due to all of these reasons hand decontamination is essential after glove use and remains as important as ever (Roberts *et al.*, 1998; Mayone- Ziomek, 1998; Wilson and Jenner, 2001).

2.13.1 Doctors Use of Gloves.

Physicians' attitude towards glove wearing has been examined (Linn *et al.*, 1990; Godin, 1998). It was found by Linn et al. (1990) that 39% of physicians would prefer to wear gloves more frequently, and 55% were happy with their level of use, 6% felt they would prefer to wear them less often than they did. Physicians who reported wearing gloves more frequently than their peers and physicians who wanted to wear gloves more often were concerned about becoming infected with HIV. This preventative behaviour may be an adaptive means of coping with the threat of infection rather than other options, such as the withdrawal or reduction of patient services. However, the HIV status of the patient is not always known, so the option of withdrawal or reduction of patient services would only be effective in patients already diagnosed with HIV. It would, of course, also be unethical to withdraw services from these patients. Younger physicians who had more frequent contact with high risk patients and high risk clinical situations were reported to wear gloves most often and they also had a greater

concern about HIV infection. This greater exposure to HIV is a likely explanation for their greater concern (Linn *et al.*, 1990; Godin, 1998)

Reasons most frequently reported for not wearing gloves involved the low likelihood of infection transmission. This was followed by fear of alienating or offending patients. The reasons least cited for not wearing gloves often involved unavailability and inconvenience (Linn *et al.*, 1990). Interestingly, the gloves were available to all staff, yet a large number of physicians stated they would like to wear them more often. This would suggest that availability was not a large factor involved in making the decision as to whether or not to wear gloves.

2.13.2 Cross Contamination Through the Use of Gloves.

Nosocomial transmission of malaria usually occurs through blood transfusion, needle stick injury or organ transplants. Piro *et al.* (2001) found cases of hospital acquired *Plasmodium falciparum* malaria in a general hospital in a malaria free zone. On occasions when nursing staff dealt with infusions through a cannulae, there was a back flow of blood onto gloved fingers. Gloves were not always changed after such activities. This may have resulted in malaria transmission. Therefore, it is possible that transmission of malaria from one patient to another occurred via contaminated gloves. (Piro *et al.*, 2001). This is obviously something that should be avoided at all costs and emphasises the need to change gloves between patients.

2.14 The Role of the Environment in the Spread of Infection.

The role of the environment should not be forgotten when discussing the control of infection. Procedures should be in place at all hospitals to prevent transmission of infection from the environment. All hospital staff must follow these procedures to ensure its effectiveness.

The degree to which environmental reservoirs contribute to nosocomial infection is unknown (Talon, 1999). Consequently there is some argument as to its risk

(Bures *et al.*, 2000). Any fomite has the potential to become colonised with organisms and then act as a vehicle for transmission (Morello *et al.*, 1998; Gillespie and Bamford, 2000). The usual route of entry for infections acquired by indirect contact is oral, following hand to mouth transfer of infective matter from a contaminated surface. Occasionally, entry may occur through the skin or mucosa, particularly if a local injury or lesion is present (Morello *et al.*, 1998). Therefore, Pratt *et al.* (2007) recommend regular cleaning of equipment.

When a hospital infection control team were concerned that cross infection with MRSA could occur if patients were admitted to a contaminated area a program of environmental screening was put in place. Screening for environmental contamination took place when patients who were colonised or infected with MRSA were discharged or transferred. Meticillin Resistant *Staphylococcus aureus* was found to have contaminated many pieces of equipment, furniture and surfaces. Despite, apparently, thorough cleaning, a number of these rooms still showed evidence of MRSA. Similar findings were observed by Bhalla *et al.* (2004). This finding may be due to electrical equipment, such as call buttons, being overlooked when the areas were cleaned. Bhalla *et al.* (2004) also found that bed rails and bedside tables were not thoroughly cleaned. As a result of Blythe's *et al* (1998) study, rooms are now inspected and documented, after decontamination, by a senior ward nurse and a member of the domestic services management team. This, hopefully, enhances ownership of the problem. As MRSA was still found after, apparently thorough cleaning, it is clear that this bacterium could pose a problem in the Diagnostic Imaging Department if cleaning is not carried out on a regular basis. The findings from Bhalla *et al's.* (2004) investigation suggest that HCPs hands become contaminated with pathogenic bacteria after contact with the bed rails and bed side tables, as a result they recommend that hand decontamination occurs after contact with these items, even if no direct contact with the patient has occurred. The data for this study were collected once hand decontamination was carried out. The selected HCPs then purposely made contact with the bed rail and bed side table for five seconds on each piece of equipment.

The potential of computer keyboards and faucet handles in the ICU to act as a reservoir for pathogenic bacteria have also been investigated (Bures *et al.*, 2000). The most common pathogen identified was MRSA. An indistinguishable MRSA strain was found in two patients and on the keyboards and faucets in each of their rooms and on several other keyboards in the ICU. As found by Bures *et al.* (2000) and Bhalla *et al.* (2004) these results suggest that it is possible that the fomites can become contaminated by pathogenic bacteria from colonised patients and may hold clinical relevance as possible reservoirs for pathogenic bacteria. The pieces of equipment tested were considered to fall under the non-patient contact surface category. Environmental contamination has also been found in other studies. Layton (1993) found areas, such as communal showers and blood pressure cuffs, to be contaminated with MRSA. Heavy environmental contamination of equipment such as mattresses, beds, floors, chairs and bedside lockers was found during prolonged outbreaks of infection (Rahman, 1993). Patients are often brought to the radiology department in their own beds; if these beds are contaminated then there may be a risk of contaminating the Diagnostic Imaging Department. Bowden (1997) witnessed a grossly bloodied sphygmomanometer cuff from one patient being placed on the arm of another patient whose skin was not intact. After the death of the first patient it was found that he was HIV positive and hepatitis B positive. Whether or not transmission of these infections had occurred was not discussed. However, the use of the contaminated sphygmomanometer cuff is dangerous practice and could be considered negligent (Base-Smith, 1996).

2.14.1 Decontamination of Equipment.

An important factor in preventing HAIs is frequent decontamination. The decision to clean, disinfect or sterilize depends on the risk of the equipment transmitting infection or acting as a reservoir for bacteria (Table 8) (Wilson and Jenner, 2001).

As environmental surfaces, and many of the pieces of equipment described above (2.14), come into contact with intact skin they are often considered to be low risk objects (Rutala and Weber, 2004). Although these low risk objects have not been

directly implicated in transmission of infection there is a potential for them to become contaminated (Blythe *et al.,* 1998; Bures *et al.*, 2000; Rutala and Weber, 2004). As HCPs can also become contaminated after touching these pieces of equipment it may be that the surfaces or equipment act as a reservoir or source of MRSA and VRE in hospitals (Bhalla *et al.*, 2004; Rutala and Weber, 2004). The notion that equipment is considered to be low risk if it only touches intact skin is, therefore, questionable.

Table 8. Categories of Decontamination.

Category	**Indication**	**Example**	**Methods**
Low risk	Environmental surfaces or items that come into contact with intact skin	Radiographic equipment found in the general diagnostic imaging department	Clean with detergent and hot water, and dry
Medium risk	Environmental surfaces or items that have contact with non-intact skin or mucous membranes, or are contaminated by microbes that are easily transmitted	Vaginal ultrasound Probes	Disinfect or sterilize, using autoclave or chemical disinfectants.
High risk	Items that penetrate the skin or mucous membranes or that enter sterile body areas.	Catheters, IV Equipment	Sterilise

(Wilson and Jenner, 2001 p226).

2.14.2 Staff Uniforms

For many years HCPs have worn uniforms. Although unlikely, it is not impossible for uniforms to become contaminated by a variety of pathogens (Perry *et al.,* 2001). It was found that, apart from the staff working on a maternity ward, all other staff had cared for patients with MRSA, *C. difficile* and VRE. Uniforms were sampled for these micro-organisms at the start and finish of shifts. At the beginning of a shift 22 (39%) uniforms were found to be positive for one or more of the organisms. Three members of staff were found not to wear clean uniforms for each shift; in each of these cases the levels of contamination were much higher. At the end of the shift 31 (54%) uniforms

were found to be contaminated with one or more of the micro-organisms. These findings suggest that uniforms do become contaminated with organisms as a result of clinical duties. Transmission of these organisms from the uniform to the patients was not investigated; however, it is thought that if uniforms can transmit pathogenic bacteria to patients or the environment then it is important that uniforms are decontaminated adequately. In more recent years home laundering of uniforms has become standard practice. The uniforms found to be contaminated before the start of a shift suggests that home laundering does not always perform the task of decontamination effectively. Also staff must be provided with enough uniforms to allow clean clothing to be worn for each shift (Perry *et al.*, 2001). Nye *et al.* (2005) agrees with this, but found that 45% of NHS trusts do not provide an adequate number of uniforms to allow a clean uniform for each shift. Interestingly, theatre scrubs are now worn in areas other than theatre to deal with issues of infection control (Nye *et al.* (2005). In contrast to this Kretzer *et al.* (2005) does not believe that uniforms pose an infection risk. They argue that uniforms are a means of corporate identity rather than personal protective equipment. They feel that HCPs should be following the guidelines established by Pratt *et al.* (2007) stating that disposable aprons should be worn by HCPs if there is a risk of their clothing becoming contaminated.

2.14.3 Screening Patients and Staff for Infection.

A number of methods can be employed to stop the spread of infection from one patient to another e.g. hand decontamination, isolation of patients and screening patients and staff to determine if they are infected or are carriers of pathogenic organisms. It is believed that the incidence of MRSA infection in hospital can be reduced through the practice of screening symptom-free staff and patients. In the continuing pursuit for greater efficiency, hospitals are trying to maximise bed occupancy and reduce lengths of stay. With this in mind, the value of MRSA screening and control measures is being questioned, as they may increase costs to the NHS trust. They may also result in closure of beds, limit transfer and discharge of hospital patients, and lead to infection control teams being put under pressure to relax their MRSA control policies (Bendall *et al.*, 1994).

As part of an audit on infection control policies, the value of current screening practices for MRSA were analysed for a period of 15 months. MRSA was isolated from 265 people, 17 of these were staff members. Thirteen of the patients who were found to be colonised with MRSA later developed an MRSA infection. MRSA was isolated from the blood of three of the thirteen patients with MRSA infections. Two of these patients died from septicaemia. This data showed that a high proportion (10.2%) of patients who were colonised with MRSA go on to develop infection. This information is useful in that it allows earlier administration of appropriate antibiotics. So, along with restricting the potential spread of resistant pathogens in hospitals, MRSA screening and infection control may aid in the prevention of serious HAIs (Bendall *et al.*, 1994). This is not something Teare and Barrett (1997) agree with. They state that screening for MRSA is an extremely costly intervention, can lead to stigmatisation of staff found to be carriers and may lead to threats of litigation. They worry that patients found to be carriers and isolated may receive less attention from HCPs. It is also argued that as all staff and patients cannot be screened simultaneously then transient carriage may be missed. Along with this, attempts to eradicate the organisms from a colonised individual are only warranted if they benefit that individual, as providing potentially toxic antibodies to asymptomatic carriers raises ethical questions. It is their opinion that standard infection control precautions should be implemented in order to minimise the risk of cross infection. However, the Department of Health (2006) believe that transmission of MRSA can only be dealt with effectively if MRSA carriers or potential sources are identified and treated. They recommend screening specific patients to identify their MRSA status. This can occur either before or on admission. A decolonisation regime can then be implemented if necessary. This action is required for pre-operative patients, including elective orthopaedics, cardio-thoracic and neuro surgery, critical care patients and patients requiring renal dialysis.

Summary 1.

- Hospital Acquired Infections (HAIs)
  - Approximately 9% of admitted patients develop a HAI.
- Cost of HAIs
  - £1 billion a year.
  - Personal costs to patients, extended stay in hospital, loss of income, death.
- Strategies to reduce HAIs
  - Reactive policies, such as surveillance and control, are inadequate and inefficient. A Holistic strategy looking at prevention of HAI may be more effective.
  - Education, observations, feedback, and positive role models all increase infection control compliance.
- Hand decontamination
  - The single most important procedure to prevent cross contamination.
  - Compliance with hand decontamination protocols does not exceed 50%.
- Reasons for non compliance
  - Lack of time.
  - Lack of resources.
  - Increased risk of Dermatitis.
- Hand decontamination and HAI rates
  - Limited number of studies showing that increased hand decontamination reduces HAI rates. This may be due to
    - Studies investigating ways to increase frequency rather than looking at HAI rates.
    - Inability to maintain increased hand decontamination frequency long enough to see a difference in HAI rates.
- Glove use
  - The need to change gloves after each procedure
  - The need for hand decontamination after glove use.
- The role of the environment in cross contamination
  - Variety of equipment harbouring micro-organisms
  - Types of decontamination and effects of cleaning on contamination levels
- Uniforms role in cross contamination
  - Uniforms contamination levels increased by the end of a shift.
- Screening patients and staff for infection.

2.15 Behavioural Change

The challenge of the promotion of infection control guideline adherence can be summarised by two simple questions:

1. How can we change the behaviour of HCPs? Various methods have been shown to improve compliance.
2. How can we maintain such a change? (Pittet, 2002). This is where the real challenge lies.

2.15.1 The Health Belief Model.

The health belief model (HBM) is one of the most widely used conceptual frameworks for understanding health behaviour. Originally it was developed as a systematic method to explain and predict preventive health behaviour. Today it is used to include general health motivation (USF 2004). It has been used with great success to promote condom use, seat belt use and medical compliance with guidelines. It is a framework for motivating people to perform positive actions and uses the desire to avoid a negative health outcome as its prime motive. The HBM suggests that an individual's tendency for certain behaviour is affected by several factors (Table 9).

Table 9. Factors Affecting Behaviour.

• Perceived personal vulnerability to disease.
• Perceived seriousness of disease.
• Perceived benefits and barriers to practicing the behaviour.
• Belief that they can successfully follow a recommendation

(Larson and Kretzer 1995).

Attitudes and beliefs are the areas upon which the HBM focuses. With regard to compliance with infection control guidelines, based on this theory, people who fail to comply do not perceive much personal risk and do not believe they will become infected, do not consider the infection to be significant, or perceive barriers to performing infection control practices to be too great to outweigh the benefits, Figure 5.

These barriers can include:

- Difficulty.
- Cost.
- Discomfort.
- Time (Larson & Kretzer, 1995).

Problems with the HBM are

1. It stresses personal responsibility; however, care needs to be taken not to place blame.

2. The HBM does not deal with economic and environmental factors. This can be an issue as health problems are often complex, or may be caused by factors over which an individual has less personal control. For example, environmental factors such as lack of, or badly positioned sinks (Prochaska *et al.*, 1997).

Trying to utilise the HBM to improve compliance with infection control protocols may be difficult as these practices are perceived by HCPs to mainly benefit the patient as it is these individuals who are more susceptible to infection. Therefore the consequences of radiographers or other HCPs transmitting an infection to a patient may need to be highlighted.

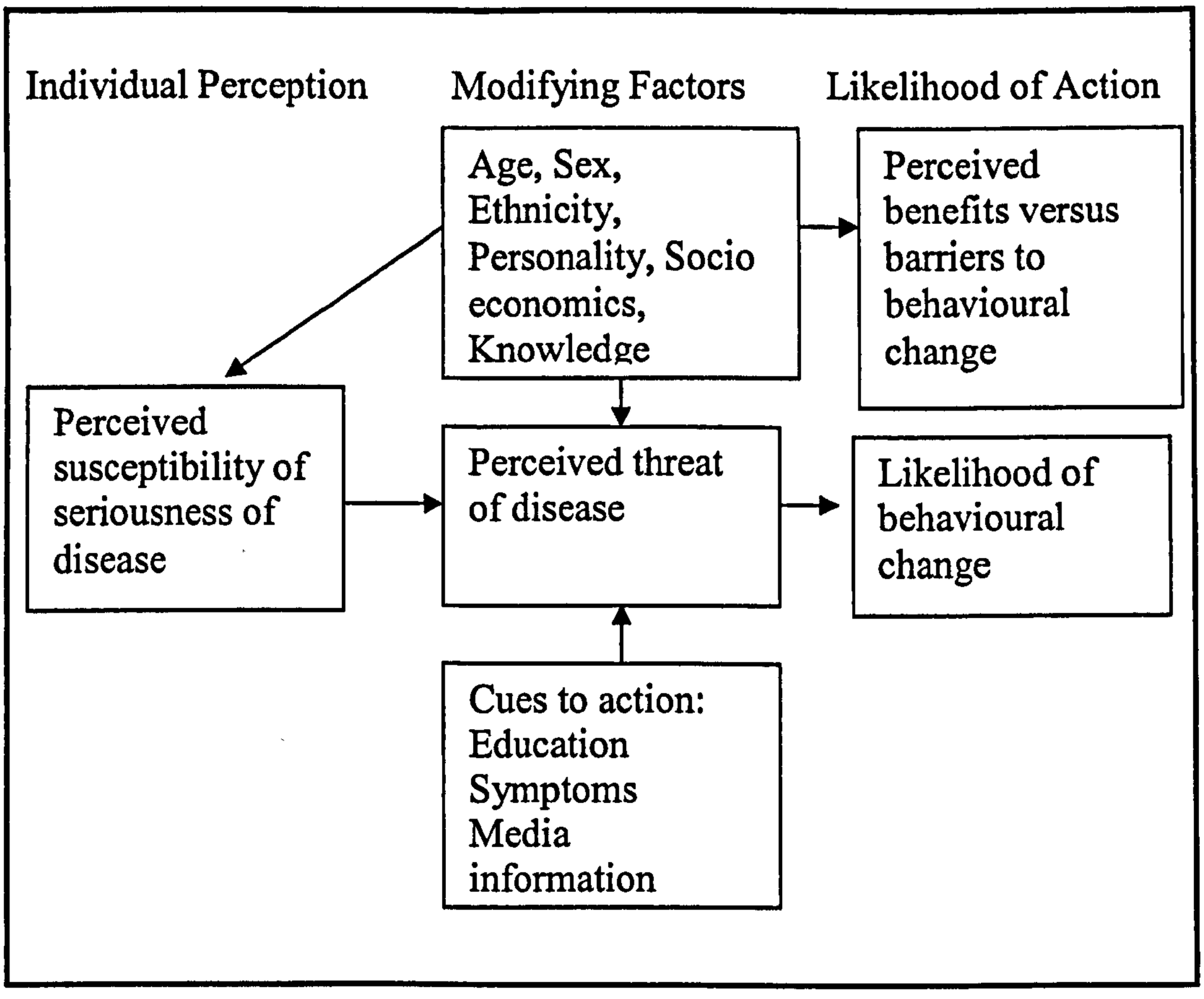


Figure 5. Health Belief Model: Components and Linkages.

(Strecher and Rosenstock, 1997

2.15.2 Theory of Reasoned Action and Theory of Planned Behaviour.

Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB) provide a framework to examine attitudes towards a particular behaviour. Figure 6 shows TRA. These theories state that the most important influential factor of an individual's behaviour is behavioural intention. This is made up of both attitude toward performing the behaviour and subjective norm. Attitude is determined by the individual's beliefs about an outcome. Subjective norm is determined by normative beliefs, *i.e.* if a person is motivated to meet the expectations of others and those others approve or disapprove of performing the behaviour (Montano *et al.*, 1997).

As in the HBM, if an individual believes that the result of performing a behaviour is positive and if a person is motivated to meet the expectations of others and those others view the behaviour as positive then a positive attitude and

subjective norm is expected. These will result in increased intent to perform a behaviour (Montano *et al.*, 1997).

Theory of Reasoned Action and the Theory of Planned Behaviour are both based on the assumptions that human beings are rational, make logical use of available information and reflect upon the possible outcomes of their actions, before engaging in a behaviour. It is assumed a behaviour is under ones own control and can be predicted from intention (Ajzen, 1988). It is in these circumstances that TRA works most successfully. However, one of TRAs greatest limitations is with people who have little or feel they have little control. This is also seen with the HBM. In these cases even if the individual is highly motivated by their own attitudes and subjective norms, due to the conditions of the environment they may not carry out the behaviour. To predict behaviours of those who do not have full control over their behaviour a third element, known as perceived behaviour control was added to the theory (Ajzen, 1998). This created a second theory known as the Theory of Planned Behaviour (USF, 2004) (Figure 7). The notion of perceived behavioural control is made up of two factors, control beliefs and perceived power. Perceived behavioural control indicates that a person's motivation is influenced by how difficult the behaviour is considered to be, as well as the perception of how successfully the individual can or cannot perform the activity. If a person holds strong control beliefs about the existence of factors that will facilitate a behaviour, then the individual will have high perceived control over a behaviour. This perception can reflect past experiences, anticipated obstacles and the attitudes of the influential norms that surround the individual (Ajzen, 1988). These theories suggest that a favourable attitude will be held by one who believes that a particular behaviour will lead to a positive outcome. Therefore, there is likely to be a willingness to try to perform the behaviour (Fishbein and Middlestadt, 1987).

Perhaps radiographers, who believe that they are protecting themselves by following appropriate infection control protocols and if they think that other individuals expect this practice, will be more likely to follow the infection control protocols. However, an environment with badly positioned sinks, no gloves immediately available and lack of time can make these practices difficult.

The radiographers' practice may then be influenced by the perception of how difficult the task is and how successful their outcome will be. If radiographers view the searching for gloves or moving to a badly situated sink to be difficult then it is unlikely that infection control protocols will be adhered to.

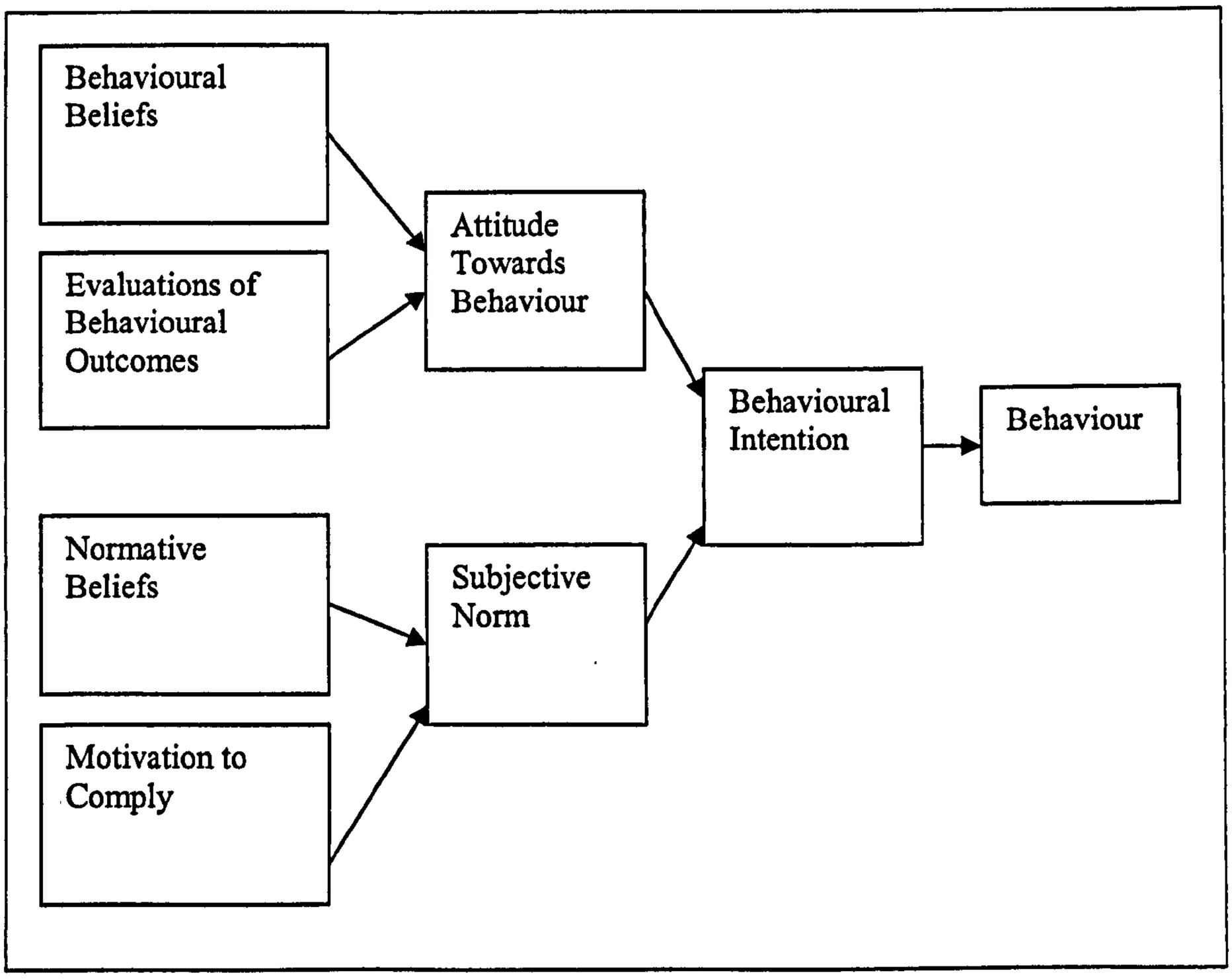


Figure 6. Theory of Reasoned Action

(Montano *et al.*, 1997 p87)

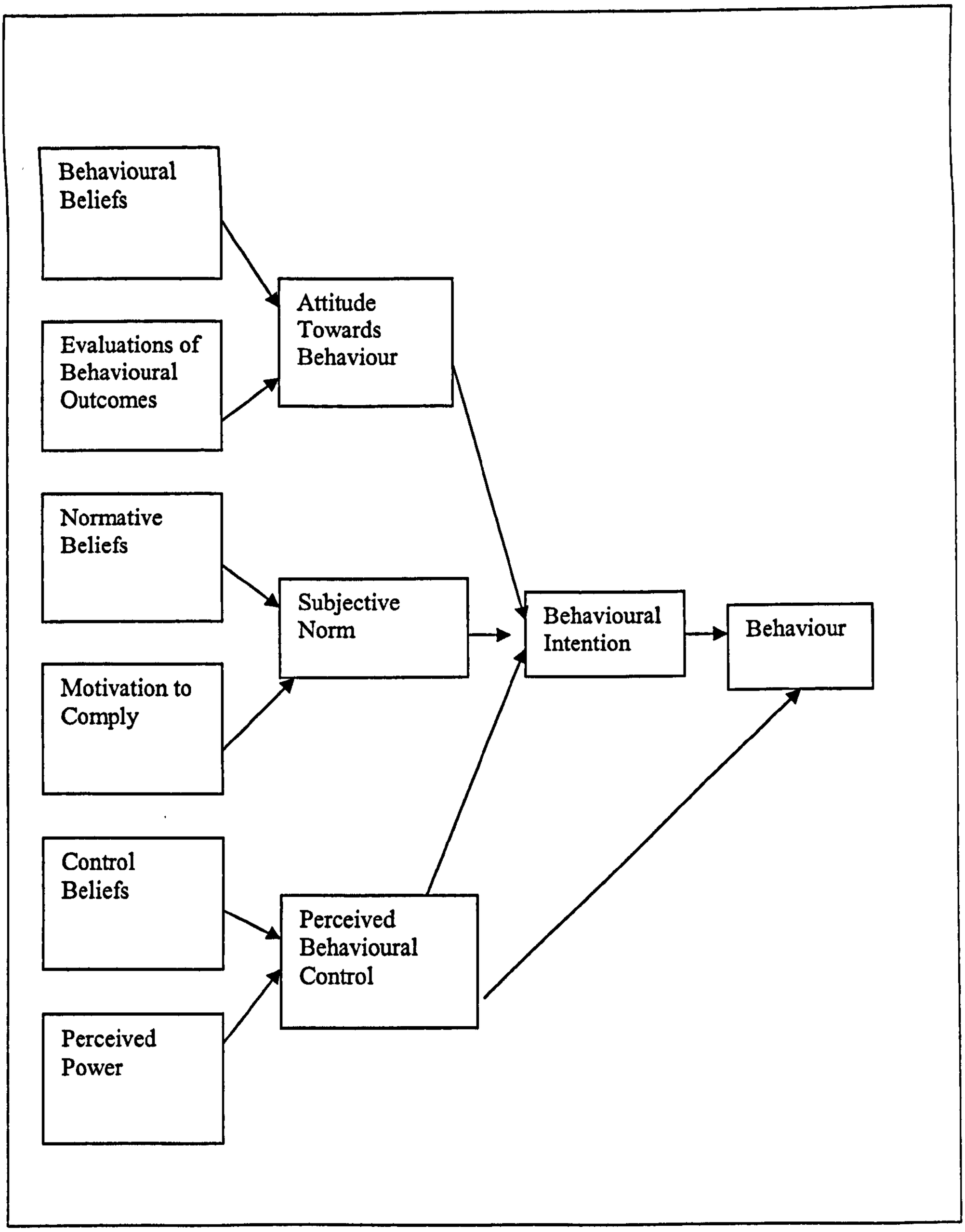


Figure 7. Theory of Planned Behaviour.

(Montano *et al.*, 1997 p92)

2.15.3 Behaviour Change in Health Care Professionals.

Interventions to change the behaviour of HCPs must be theoretically sound and multidimensional; otherwise they will continue to meet with minimal success. It is recommended that efforts to improve compliance with infection control

strategies take an integrated approach, including behaviour modification strategies, and training experiences to improve skills (O'Boyle *et al.,* 1994).

No behavioural theory has been shown to predict behaviour consistently. However, many theories share similar constructs that could be incorporated into an intervention to improve infection control practices. The common thread of beliefs is incorporated in varying degrees in many of the behavioural theories, belief in a health threat, found in the HBM along with the concept that determinants are formed by beliefs in TRA and TPB (Kretzer and Larson, 1998). In the past individuals have usually been targeted with behavioural theories and interventions that are based on these theories. However, individual factors, environmental constraints and the institutional climate all need to be taken into account when relating them to behaviour change in a health care setting (Kretzer and Larson, 1998; Boyce, 1999). Due to the complexity of the process of change it is not surprising that a single intervention or even interventions that are based on a single behavioural theory, but are out of organisational or individual context, often fail (Kretzer and Larson, 1998).

The effect of perceived barriers in affecting behaviour in the HBM is similar to the concept of perceived behavioural control in TPB. The constructs of HBM and TRA and TPB are closely related, subjective norms found in TRA and TPB may provide situational prompts in HBM, because observing the actions of others might promote or prevent an action (Kretzer and Larson, 1998). This is shown by Connolly (1998) and Lankford *et al.* (2003). According to Kretzer and Larson (1998) TRA and TPB interventions targeted toward changing attitudes and increasing intention are likely to be associated with behavioural change. Attitudes are thought to be larger contributors to both intention and behaviour than subjective norms (Kretzer and Larson, 1998).

2.15.4 PRECEDE/PROCEED Model.

The PRECEDE model has successfully been used in numerous health education and research models (Green *et al.,* 1980). The purpose of the PRECEDE/PROCEED model is to direct initial attention to outcomes rather than

inputs (Table 10) (USF, 2004). In this model appropriate health education is considered to be the intervention for a properly diagnosed problem. PROCEED was added to the framework in recognition of the emergence of and need for health promotion interventions that go beyond traditional educational approaches to changing unhealthy behaviour. The PROCEED model takes into account the political, managerial, and economic actions necessary to make social systems environments more conducive to healthy lifestyles and a more complete state of physical, mental and social well-being for all.

Table 10. Factors Included in the PRECEDE/PROCEED Model

- Predisposing factors – any characteristic that motivates behaviour e.g. professional status, knowledge, beliefs, values and attitudes.
- Enabling factors – characteristics of the environment that facilitate action e.g. accessibility, availability, skills and laws.
- Reinforcing factors – rewards or punishments as a consequence of behaviour. They serve to strengthen the motivation for behaviour.

(USF, 2004).

The factors in Table 10 should all be taken into account for the successful promotion of hand hygiene and prevention of HAIs (Pittet, 2000; Larson *et al.*, 1997, Kretzer and Larson, 1998). The advantage of this model is that it takes into account the multifaceted nature of behaviour change. However these types of strategies are much more difficult to implement and require more resources than those interventions focusing on a single element (Pittet, 2002). It could be argued that resources used to implement single element interventions are simply a waste of time and money, as they have been shown to have limited success, whereas investment in a more complex strategy that may yield the desired effects would be beneficial. Most interventional studies discussed in this chapter have tried to influence hand decontamination by focusing on a single element, e.g. knowledge, equipment or peer support (Larson *et al.*, 1997).

Many interventions aimed at influencing hand decontamination behaviour have been directed toward the predisposing factors, such as knowledge and attitudes. It has been claimed that attempts to provide reinforcing factors such as peer or

supervisor feedback have been only moderately successful (Bittner, 2002). However, Larson *et al.* (2000) and Sharir (2001) found that continuous feedback has resulted in a high frequency of hand decontamination.

2.15.5 Studies Using Multidimensional Interventions.

O'Boyle *et al.* (2001) carried out a multifaceted intervention which included education, reminders, and role modelling by unit heads which only resulted in short-lived improvements. After two months, improvements reverted back to baseline. It is thought by O'Boyle *et al.* (2001) that six months of ongoing support is needed before a task is incorporated into behaviour. This shows the importance of continual reinforcement.

Over a 14 month period the effects of an intervention using the PRECEDE model was measured. Predisposing factors were addressed using focus group sessions and a review of the results of a survey on practices, beliefs and opinions about hand decontamination. In addition, findings from previous behavioural studies, staff reported practices, and HAI rates were discussed. The group process was used to develop a unit-based plan for improving hand decontamination. This was to assist staff in viewing hand hygiene from a different perspective and assuming ownership of the problem (Larson *et al.*, 1997). This appears to be a very good idea. By discovering what motivates or prevents the practice of infection control new appropriate interventions can be introduced.

Automated sinks were installed with the aim of making hand decontamination easier and increase the frequency of hand decontamination. Instructive sessions were also provided to reinforce learning. These interventions addressed the enabling factors of the PRECEDE model (Larson *et al.*, 1997). The third aspect of the intervention addressed reinforcement factors. This included active and visible participation and support of the unit's administration along with feedback to the staff on hand decontamination frequency (Larson *et al.*, 1997). Graphs of hand decontamination rates were posted weekly on the unit. Three monthly follow up observations were made. During the interventional phases there was a significant increase in hand decontamination frequency, unfortunately a return to

baseline followed after several months. Larson *et al.* (1997) feels that the novelty of the automated sink wearing off may explain some of the return of hand decontamination frequency to baseline. The initial study of the value of automated sinks by Larson *et al.* (1991), discussed earlier (2.9), stated that the frequency of hand decontamination actually reduced with the introduction of automated sinks. During the second study instructive sessions were given, with regard to use of the automated sinks, and resulted in an increase in the hand decontamination frequency, illustrating the need for more than implementation of new equipment alone, education is also required. As with many studies discussed a return to baseline occurs when feedback ceases. In the context of the PRECEDE model, predisposing and enabling factors continued, but the reinforcing factors, feedback and continuous educational sessions did not. This may be the reason for return to baseline. Larson *et al.* (1997) feels that a large amount of energy and resources are required to provide reinforcing factors, and there may not be a significant cost/benefit reward. Therefore, making it more difficult not to wash hands, by means of environmental controls, automation or administrative mandate, should be the target area. Additionally, ideas from the food handling industry might be considered whereby a minimum standard for hand decontamination is set (*e.g.* at least once per hour) particularly as the 'ideal' frequency is unknown (Larson *et al.*, 1997). In the USA, Centres for Disease Control (CDC) stipulated that during a standard nursing shift hand decontamination should occur 10 times (Gould and Ream, 1993). This would only be suitable if the amount of contact with patients in one hour or during the shift was low. However, any increase in frequency of hand decontamination could reduce the risk of HAI transmission.

2.16 Culture.

Culture change may be difficult, but similar changes in culture, such as appropriate disposal of sharps and the use of seat belts in cars, have been faced and attained. Hand decontamination should be given similar status to other health and safety policies, where individuals are accountable for their day to day practices. A clear policy should be set, stating that hands must be decontaminated before each patient contact. This is also necessary for the

cleaning of hospital equipment. If such a policy is not in place or being followed the Trust concerned may be liable in the event of litigation (Teare, 1999).

When interviewed in 2001 Larson felt that trying to alter behaviour in one unit at a time can be frustrating or even pointless. She states:

> 'I think the trick is taking a systems approach rather than trying to work on individual change'.
>
> 'It takes the blame out of things. The whole organisation expects this behaviour from you and it's the norm'.
>
> (Larson in Anonymous, 2001a p117)

As the issue of infection control is so crucial a greater commitment from management is needed to influence HCPs behaviour (Teare, 1999). In general, HCPs pay attention to what is deemed important by upper-level management (Larson *et al.*, 2000; Rosenthal *et al.*, 2003). It must be believed by staff that management really value good infection control practice. Long-term support of any intervention is also necessary to achieve what has proved to be so difficult, so far, the sustained change required to reduce HAIs (Larson *et al.*, 2000). During Larson *et al.* (2000) study the chief executive endorsed interventions to improve compliance with hand decontamination. The intervention included the demonstration of competency in hand hygiene. This was required by all employees. As a result of the intervention hand decontaminations per patient were found to be double that of the control group at a six month follow up. A significant reduction of HAIs with vancomycin-resistant enterococci was also seen (Larson *et al.*, 2000). The introduction of competency based practice shows HCPs how important management think hand decontamination is. It also shows them that it is their responsibility to carry out this practice and so reduce the risk of transmitting the infections. Sharir's (2001) study, discussed earlier in this chapter, also shows the effect of culture change on maintaining improved practice.

After MRSA rates in a cardiothoracic unit were found to have increased significantly a change in policy was implemented and enforced (Myatt and Langley, 2003). The ward was closed to allow a deep cleaning and disinfection program to be performed. This resulted in delays to patient's surgery, however, this may show HCPs the importance of this practice. Pre-admission screening was extended to all patients due to have surgery in the cardiothoracic unit, including day case patients. This is thought to be particularly important in discovering if MRSA is coming into the hospitals with patients, for example, those transferred from care homes. As mentioned this has now been recommended by the Department of Health (2006). Any patients with MRSA or with outstanding results were nursed in isolation until a negative result was obtained. These patients were treated with mupirocin nasal cream for at least 24 hours before surgery (Myatt and Langley, 2003). This may be considered an unnecessary use of antibiotics in cases where there is no confirmation of MRSA and could further increase the risk of microbial resistance. John Reid described new Pilot studies investigating a new rapid swab technique which will allow the identification of patients with MRSA within hours rather than days (Department of Health, 2005a), these may overcome this problem. Staff were reminded of the importance of good hand decontamination techniques and the principles of cross infection through a series of educational initiatives (Myatt and Langley, 2003). The MRSA infection rates were fed back to all staff on a monthly basis. It was hoped this feedback would produce a more responsible approach to the problem. Additional isolation nursing staff were also employed.

These interventions resulted in an immediate decrease in MRSA infection rates (Myatt and Langley, 2003). Many of these changes required input from senior management levels, this also aids in showing that infection control is valued. Unfortunately, due to an over spend on the nursing budged it was not considered necessary by the directorate management to continue with the additional isolation nursing team, this was despite the fact that one of the NHS Trust targets was to reduce HAIs. Subsequently MRSA infection levels rose (Myatt and Langley, 2003). This is an example of lip service being paid to infection control. As the directorate have evidence that the new practice improved MRSA rates, yet still decided to remove it, they may risk legal action in the future. As Wenzel *et al.*

(1991) stated, there are not only medical reasons to prevent the spread of MRSA but also ethical ones, as HAIs result in personal as well as financial loss to the patient.

A new policy was enforced in another hospital in order to reduce the spread of tuberculosis (TB). The number of TB exposure episodes (HCPs exposed to culture-positive patients not in isolation) was measured. Isolation of known or suspected culture-positive patients became mandatory. Before a patient could be removed from isolation three negative sputum smears were required. The previous policy allowed respiratory isolation to stop after two weeks of drug therapy. The results after the policy change showed that exposure episodes were reduced from 4.4 per month to 0.6 per month. However, the new stringent policy led to over isolation of patients, as only about one in eight patients in isolation had a TB diagnosis confirmed by a positive culture. Nonetheless Blumberg (1995 p62) would prefer to be overprotective, stating:

> 'The problem is you can't miss very many people. If you miss only one person, that person can expose tens of HCPs and patients and can have a huge impact'.

Skin testing also became mandatory for employees at the hospital. Any HCP refusing to be tested risked losing their job. This measure may seem drastic but the consequences of having staff becoming contaminated are severe (Blumberg, 1995). Another instance of drastic measures was witnessed by Heseltine (2001) in a foreign military hospital. Here an armed soldier was stationed outside the ICU with instructions to arrest anyone entering the unit who did not wear a gown and gloves after washing their hands. This level of commitment aids in establishing a culture, whereby, the importance of infection control is seen. Initially the point of how committed this hospital was to infection control was missed Heseltine was so unimpressed by this show of force. However, infection control is an area claimed to be essential. This led Helseltine (2001) to the question:

> Are the lives of other ICU patients less important than those in the military hospital, that others cannot levy the same commitment?

Obviously NHS Trusts cannot employ armed soldiers to enforce infection control practices, nor should they have to, but some stringent method of enforcement may be required. Unfortunately, in this study compliance rates were not measured and HAI rates were not revealed.

2.17 Hospital Acquired Infections in Other Areas of the Care Setting.

Many studies have focused on HAIs in the ICU or the ward setting, however, there are a large number of patients who attend the hospitals out-patient departments. Infections transmitted in the Out-patient setting are not usually monitored (Goodman and Solomon, 1991). It has been found that it is not only patients admitted to hospital who are at risk but, also patients attending hospital for short periods of time. A total of 53 reports of transmission of infectious diseases in the Out-patient setting were found by Goodman and Solomon (1991) between the years 1960 and 1990. Cross contamination occurred in general medical offices, clinics, emergency departments, a podiatry office, ophthalmologists' office and clinic and dental offices. Contaminated equipment or solutions were associated with 29 episodes of transmission. Goodman and Soloman (1991) felt that the episodes of cross infection in these settings were often associated with low compliance with established infection control procedures. They thought that Out-patient personnel may not have the appropriate knowledge of adequate infection control measures that would prevent the spread of infection.

2.17.1 Cross Contamination in the Community.

Traditionally, most antimicrobial-resistant organisms surfaced in the acute care hospital, often in the intensive care unit, and then gradually become prevalent in the community (McGowen and Tenover, 1997). Today it is recognised that infection can also be spread via hands in primary and community health care settings, although the risk of HAIs are currently unknown. However, the increasing number of procedures performed in these settings increase the risk of vulnerable individuals acquiring an HAI (Pellowe *et al.*, 2003a). Therefore, strategies to promote awareness and prevention are also required in the

community. To do this National evidence based guidelines aimed at the community and primary care services were developed and include:

1. Standard infection prevention and control principles
    a. Hand hygiene
    b. The use of personal protective equipment
    c. The safe use and disposal of sharps
    d. Education of patients, their carers and HCPs.

2. Procedures for avoiding infections associated with the use of long-term urinary catheters.

3. Procedures for preventing infections associated with the use of central venous catheters central feeding systems.

These guidelines are similar to those produced by Pratt *et al.* (2007). As non professional carers, along with professional carers, need to be able to use these guidelines they also need to be user friendly. Patient education and information has also been integrated as part of the guidelines (Pellowe *et al.* (2002). As some drug resistant strains of bacteria are now common in the community, health care systems must be aware of the possible spread of these resistant strains from incoming patients to ambulatory clinics (McGowen, 2000). This is especially so in the Diagnostic Imaging Department, where a large number of patients examined are Out-patients. Any infections brought into the department may then be spread throughout the hospital.

2.17.2 Infection Control within the Diagnostic Imaging Department.

Infection control is an important professional duty for any HCP, including the radiographer. However, infection control is often neglected in the Diagnostic Imaging Department (Zito *et al.*, 2002). As already noted many studies investigating infection control interventions, to increase compliance rates, take place in the ICU this limits the generalisation to other settings (Naikoba & Hayward, 2001). Judging by the limited amount of research available into the role of the Diagnostic Imaging Departments and the spread of HAIs it would seem that this department has not been considered a major concern. However, up to the present time the researcher has not been able to locate any studies to

suggest that the Diagnostic Imaging Department does not pose any risk of infection to patients.

Adequate and current infection control education should be included in the curriculum for undergraduate courses in health related studies. Infection control education is considered to be very important in the Diagnostic Imaging Department as this area is very different from the ward setting, and a variety of patients are seen every day (Zito *et al.*, 2002).

Approximately 80% of patients admitted to a hospital, with the exception of most obstetric patients and newborns, attend the Diagnostic Imaging Department at least once (LeFrock *et al.*, 1978). In the Diagnostic Imaging Department and in no other place in the hospital, medical and surgical patients, infected and non infected patients gather together in waiting rooms (Haskin *et al.*, 1970). More importantly they physically share contact with a number of fomites, such as x-ray tables, cassettes and chest boards. These provide an ideal situation for cross contamination, directly from patient to patient and indirectly by means of fomites. As with all HCPs the hands of radiographers can also transfer bacterial contamination from patient to patient. It is important to keep the radiographic equipment clean to prevent the transfer of organisms to hands and to other skin surfaces of patients. Radiographers' hands are constantly being exposed to equipment that must be presumed to be bacterially contaminated, and then handle patient after patient (LeFrock *et al.*, 1978).

2.17.2.1 Contaminated Radiological Equipment.

In order to determine the risk of bacterial transmission in the Diagnostic Imaging Department Hansen (1998) believes it is important to identify materials which have the potential to harbour bacteria. A number of studies have been carried out to do this. A few of these are over 30 years old, but do still show how radiographic equipment can become contaminated.

Despite, apparently, good hygiene a variety of micro-organisms such as S.*aureus*, coagulase negative S.*aureus* and Streptococcus *viridans* were detected on fomites including x-ray tables, chest stands and head units, wheel chairs, stretchers, waiting areas and barium preparation rooms (Haskin *et al.*, 1970; LeFrock *et al.*, 1978). A number of grooves can be found on the X-ray tables, these are difficult to disinfect and provide a good refuge for micro-organisms (Haskin *et al.*, 1970). More recently the survival of E coli, E faecalis and S *aureus* on diagnostic imaging cassettes was examined (Lawson *et al.*, 2002). Swabs were taken from three diagnostic imaging cassettes. Each bacterium on each cassette revealed visible evidence of confluent growth, even after two weeks. Throughout the test period there was no noticeable reduction in bacterial growth, demonstrating that harmful micro-organisms can survive on the imaging cassettes for prolonged periods of time and are a potential source of HAI transmission. Although this study showed the ability of bacteria to survive for long periods of time, unlike LeFrock *et al.* (1978) and Haskin's (1970) studies, it was a laboratory experiment and may not mimic actual events in the Diagnostic Imaging Department.

As a large number of patients visit the Diagnostic Imaging Department there is a risk that many of these patients could become contaminated by this equipment. Effective cleaning regimes are fundamental in controlling and preventing potential HAI transmission (Lawson *et al.*, 2002). In (1969) Meyers developed cultures from various pieces of radiographic equipment before and after cleaning with antiseptic wipes. Once equipment was cleaned no bacterial growth was found, confirming the success of decontaminating the radiographic equipment (Meyers, 1969).

The radiographic film marker is a commonly used accessory device that had not previously been addressed, with regards to cross contamination. They are placed on a variety of surfaces, such as cassettes, tables and upright bucky, all of which have been shown to harbour pathogenic organisms. The adhesive tape used to fix the markers to these surfaces was tested to determine whether the tape could be a potential source of infection transmission (Hodges, 2001). After only one week of use a large variety of organisms were found on the tape, including

bacilli, mould, S.*epidermis* and S.*aureus*. A definite increase in the number of organisms was found between one week and two weeks. If the tape used on radiographic markers is not changed frequently radiographers could be carrying opportunistic and pathogenic bacteria around in their pockets. These pieces of equipment could be a potential hazard to the immunosuppressed patient (Hodges, 2001). During this study it may have been useful to also test the anatomical marker itself as this also comes into contact with equipment so only solving the problem of the adhesive tape could still leave the marker itself to be a source of cross contamination. This study also highlights the important fact that the organisms can survive for long periods of time on radiographic equipment.

Although many of these studies were carried out over 30 years ago, the evidence from the newer studies, along with the literature regarding equipment contamination on the wards suggests that the situation has changed very little.

2.17.2.2 Radiographers' Attitudes Towards Infection Control.

The attitude held by radiographers, in regard to the issues of infection control, is an area that lacks attention (Zito *et al.*, 2002). Radiographers' knowledge, application of knowledge and opinion of infection control within different areas of the general Diagnostic Imaging Department was examined with the use of questionnaires. It was found that only 86% had received education about infection control procedures. Of these, 54% received education at university, 23% at a hospital meeting and 23% had learnt during the course of their employment. However, even though a large number of radiographers claimed to have received training, less than half thoroughly understood the meaning and relevance of Universal Precautions (Zito *et al.*, 2002). This is something that would have been expected to have been discussed during their training. However, it could be, as found earlier (2.11.1.1), that the radiographers simply do not retain all of the information provided during the education sessions.

Hand decontamination is considered to be the single most important procedure for preventing cross-infection, unfortunately, less than half of the radiographers

claimed to wash their hands. A small number even admitted to never washing their hands (Zito *et al.*, 2002). Gloves were not always worn when removing needles after an intravenous examination, this was a task carried out by nearly all of the radiographers. Not all radiographers were aware of the correct procedure in the event of a needle stick injury. These are accidents that can and do occur. To protect cassettes barrier methods were used, this involved placing the cassettes into pillow cases or a plastic cover, again this practice was not always carried out (Zito *et al.*, 2002). As has already been demonstrated there is often a discrepancy between what people think they do and what they actually do. Health Care Professionals often over estimate the amount of times they wash their hands (Simmons *et al.*, 1990). This could make these results even more worrying.

In a profession such as radiography, where close contact with patients occurs, it should be expected that all radiographers have received some form of infection control training. The results of Zito *et al.* (2002) study revealed many instances where radiographers fail to comply with infection control guidelines. Comments made on the questionnaire included

> 'it (infection control) appears to be an area where the younger radiographers are much more aware than older ones'.
>
> 'the radiology department is probably the least infection control conscious area that I know of'.
>
> (Zito *et al.*, 2002 p64)

Briody (1991) raises the question of whether radiographers expect nurses to be the ones who worry about infection control. When discussing the cleaning after a barium study she states

> 'I am sure radiographers are allergic to cleaning for the most part'
>
> (Briody, 1991 p23)

2.17.2.3 Examining Infectious Patients.

When examining infected patients the services of two radiographers at a minimum – a clean radiographer and a dirty radiographer – are needed. The 'clean' radiographer performs all activities that do not physically involve touching the patient, operating the equipment, opening and closing of doors etc. This limits the transmission of micro-organisms to the radiographic equipment and the 'clean' radiographer. The 'dirty' radiographer handles the patient, is responsible for protective coverings on the equipment and cleaning once the patient has left the area (Culmer, 1995; Shagam, 1999). This practice is similar to that found in the operating theatre, in that some members of staff are considered to be sterile and others non sterile. However, this practice can only be carried out when dealing with known infectious patients. If radiographers are not informed of the infection or the patient is not yet diagnosed as infectious and then radiographers do not decontaminate their hands they have the ability to transmit the infection to other patients.

2.17.2.4 Mobile Radiography.

On occasions patients are too ill to visit the Diagnostic Imaging Department, in these cases mobile radiography is performed. This involves the radiographer and the radiographic equipment visiting the patient. These examinations can be performed in every patient care area of the hospital including areas with patients who are highly susceptible to infection (Haskin *et al.*, 1970). During a study by LeFrock *et al.* (1978) cassettes taken to various wards including ICU and Special Care Baby Unit (SCBU) were found to be contaminated with organisms, such as Pseudomonas aeruginosa, S.*epidermidis*, *bacillus sp, S.aureus* and *S.viridans*. Of seven x-ray cassettes randomly chosen for testing by Haskin *et al.* (1970) only one contained no bacterial growth. These studies all show the importance of decontaminating radiographic equipment in order to prevent the spread of infection.

Summary 2.

- ❖ Behavioural change models can assist in increasing compliance rates.
- ❖ Multifaceted approaches such as PRECEDE/PROCEED models may be of value.
    - Three main elements required, predisposing, enabling and reinforcing factors.
    - Reinforcement is often the missing factor in behaviour change interventions.
- ❖ Change in culture required. Management must show HCPs that they believe in the necessity of infection control protocols.
- ❖ Changes in protocol and polices have been shown to result in compliance rate improvement.
- ❖ Antimicrobial resistant bacteria is prevalent in the community.
- ❖ Infections transmitted in the Out-patient are not routinely monitored.
- ❖ It is imperative that radiographers are aware of the correct procedures to follow as they often examine patients with low immunity.
- ❖ There is very little published research investigating the role of the Diagnostic Imaging Department in the potential spread of infection.
    - ➢ A small number of studies show that the radiographic equipment can harbour bacteria.
    - ➢ There is a lack of infection control education for radiographers.
- ❖ Infectious and immunosuppressed patients are grouped together in waiting rooms have contact with the same equipment and radiographers.
- ❖ Radiographers also examine patients in other departments so have the potential to spread infection throughout the hospital.
    - ➢ Radiographers and nurses working in Diagnostic Imaging Department thought that radiographers' infection control practices were poor.

2.18 Overall Summary of Literature Review

With approximately 9% of patients developing a HAI and costs to the NHS estimated to be in the region of £1 billion a year, along with severe consequences for patients, a large amount of research has been carried out into this problem. However, as shown in the literature review the research has largely focused on the ward setting and particularly on the nurses' role in cross contamination (Larson, 2001; Gould, 2004). There is an obvious lack of research into infection

control practices within the Diagnostic Imaging Department. This is surprising because even in 1970 80% of all In-patients were examined in the radiology department at some point during their hospital stay (Haskin *et al.*, 1970) and more recent technological developments have made these services even more important. Radiographers also perform radiographic examinations in other areas of the hospital if patients are too unwell to visit the department.

There have been investigations examining the role of the environment in the spread of HAI and showing that it is possible for contaminated equipment to lead to cross contamination. A small number of studies have also shown that bacteria, including pathogenic bacteria, can survive on radiographic equipment (Haskin *et al.*, 1970; Haskin *et al.*, 1972; Le Frock *et al.*, 1978). Patients visiting the Diagnostic Imaging Department often come in direct physical contact with the radiographic equipment, and may contaminate the equipment or become contaminated by it. Radiographers can also become contaminated as a result of contact with the patient and the equipment when they are positioning the patient for the examination. Despite this there have been no studies into the levels of contamination of the equipment and the effects of cleaning with general purpose detergent.

A variety of reasons have been identified from nursing staff as to why they do not comply fully with infection control protocols, these included lack of time, lack of resources and low perceived risk of cross contamination. However, only a single study, using a questionnaire to investigate radiographers' attitudes towards infection control, has been carried out, this was conducted by Zito *et al.* (2002). The reasons for non-compliance were not greatly addressed in the study.

These gaps in the research make it plain that a study of these problems is both unique and necessary.

3.0 Chapter Three: Methodological Considerations

3.1 Research Approach Used in the Infection Control Study.

The subject was approached from three different perspectives to provide a more holistic understanding of the problem. Each perspective constituted a phase of the study and each phase was developed sequentially from the findings of the previous phase. By doing this the lines of enquiry could be followed and checked. Phase one of the research began by identifying radiographers' actual infection control practice, through observational studies. In phase two the effects of the radiographers practice on the levels of bacterial contamination were determined, using bacterial analysis. The study was completed with phase three, in which, radiographers' knowledge and opinion of infection control was established using focus groups. Looking at the phenomena from different perspectives and having the opportunity to explore the results further, it was reasoned, would enhance the validity of the overall findings.

The researcher chose to investigate the subject of radiographers' infection control practice in the Diagnostic Imaging Department as a result of observations made as a student and as a qualified radiographer, and because of the lack of published research. The author believed infection control in this department was given a low priority; this prompted her to explore the area further to gain more insight into infection control within the Diagnostic Imaging Department. Both quantitative and qualitative research methods were used to collect and analyse the required data for this study.

3.2 Quantitative or Qualitative Research.

Quantitative Research is defined as

> 'A formal, objective, systematic process to describe and test relationships and examine cause and effect interactions among variables'
>
> (Burns and Grove, 1993 p791)

In this study quantitative data is in a numerical format. In phase one the researcher set out to collect data that measures how often infection control practices are performed. In phase two the number of bacterial colony counts present on the equipment was measured. Statistical techniques were applied to the data to establish and describe any relationships that exist in the data (Walsh, 2001).

Not all research collects data in a numerical form. Research may be carried out into the experiences of people. Researchers investigating people's feelings and beliefs or ways of life find qualitative data in a variety of sources and are interested in the meanings attached to them (Walsh 2001).

Qualitative Research is defined as:

> 'A systematic, subjective approach used to describe life experiences and give them meaning'
>
> (Burns and Grove, 1993 p791)

The quantitative data from phase one established that good infection control practices were not carried out regularly, this was also highlighted in phase two. As a result the researcher collected data through focus groups in an attempt to understand why poor infection control practice occurred; this in turn indicated the need for a qualitative approach.

Quantitative and qualitative research methods can be thought of as opposing and polarised views, but they do not need to be used in isolation from one another (Crossan, 2003). It is becoming increasingly common to follow a triangulated or combined methodological approach when addressing different aspects of a research issue (Bowling, 2002; Crossan, 2003). It is possible for quantitative findings to be enhanced by carrying out qualitative research. The addition of the qualitative findings places the quantitative data into real social contexts and increases the understanding of social processes (Bowling, 2002).

3.3 Triangulation.

The term 'Triangulation' arises from a process adopted in navigation, whereby the location of an object can be determined more accurately by making measurements from two separate points (Sim and Sharp, 1998). The use of different research methods is not simply a different way of achieving the same end, but in actual fact provides different ways of answering different questions. For example, following the positivist approach, a quantitative method enabled the true level of infection control practice to be measured. By following this up with a post positivist approach, using a qualitative research method, reasoning for following a particular practice can be established. Using the two methods a more holistic insight can be gained. Each perspective and each method is useful for verification and generation of knowledge. Triangulation can be particularly advantageous in health and health service related research because of the multidisciplinary nature of the problems (Shepard *et al.*, 1993).

It is suggested that by using qualitative and quantitative data the strength of one method will make up for any weaknesses of another, resulting in an improved quality of the data collected, and in improvement in validity and reliability issues in the study (Bowling, 2002). Rossman and Wilson (1994) point out that sources of data can be inconsistent, or conflicting, therefore triangulation is a useful way of bringing together the different data collected in order to make sense of them.

Bowling (2000) indicates that:

> 'The importance of using triangulated research methods is enhanced by the multifaceted nature of health and the multidisciplinary character of research on health and health services'
>
> (Bowling, 2002 p2).

3.4 Reliability and Validity

Reliability and validity are used to assess the quality of a study. If a method of collecting evidence is reliable, anyone else using this method, or the same person

using it at another time, would obtain the same results. The reliability of a method is defined as:

> 'The degree of consistency or dependability with which an instrument measures the attribute it is designed to measure'
>
> (Polit and Hungler, 1997 p467)

The definition of validity is:

> 'The degree to which an instrument measures what it is intended to measure'
>
> (Polit and Hunger,1997 p471)

Validity and reliability are used simultaneously in quantitative research and both are vital for research studies to be of any use. It is important to be aware that a measure obtained that is considered to be reliable is not automatically considered to be valid, and a valid measure is of no use unless it is reliable (Polit and Hungler, 1997).

Evaluation of research is an essential requirement as incorrect conclusions could result in the implementation of harmful practices (Long and Johnson, 2000). Therefore, in all research methods a great deal of consideration is given to the reliability and validity of the study (Morse *et al.*, 2002). Without this rigour research is worthless, it cannot be considered to be factual and it loses its usefulness (Morse *et al.*, 2002). Although these factors are essential in quantitative studies (Long and Johnson, 2000), a number of leading qualitative researchers argue that these terms are not relevant to qualitative inquiry (Altheide and Johnson, 1998). A number of stances can be found on this subject including the use of traditional existing terms and criteria of reliability and validity or adopting the use of different labels with slight modification to the traditional criteria such as dependency, and credibility (Long and Johnson, 2000).

3.4.1 Reliability in Qualitative Research.

The standardisation of the data collection instrument is at the heart of the conventional understanding of reliability (Mason, 1996). This relies on the belief

that methods of data generation can be thought of as tools and can be standardised, and non-biased (Mason, 1996). The non standardisation of qualitative methods and the desire to seek increased validity through the preservation of context makes reliability in the traditional sense unattainable in qualitative research (Long and Johnson, 2000).

Brink (1991) proposes three tests of reliability for qualitative work, each to be used accordingly for specific studies. These include:

- Stability, this looks for similar results through repeated observations of the same event over a period of time. Had this test of stability been carried out using the original focus group participants the discussion may not have provided the same information as the original members would have heard other participants views during the initial focus group discussion. This may have altered their opinion of the topic under investigation. This change of opinion may also occur overtime due to new experiences. However, in this study further focus groups, carried out using the same questioning tool, did provide similar accounts.

- Consistency, this looks for respondents in a single interview providing the same answer on a given topic. During focus group discussions opinions may change as a result of comments made by other group members. As the group discussion continues participants may feel more comfortable and so give additional information, this may agree with information already provided on a given topic, or even contradict it.

- Equivalence, this is tested with the use of alternative forms of questions within the single interview in order to establish the consistency of the data elicited regardless of the form of question.

It is accepted that qualitative studies may not always be able to use all three tests (Brink, 1991). Long and Johnson (2000) feel that these strategies appear to employ standard approaches of replicability and inter-rater reliability to

qualitative studies, seeking incorrectly to standardise highly variable data collection methods.

There are some qualitative researchers who feel they have modified the criteria for reliability and make use of the term dependability to describe it (Sandelowski, 1986; Hall and Stevens, 1991). Through assessment of the decision trail dependability can be established. However, the basic concerns are the same for both dependability and reliability, which is ensuring that data collection is carried out in a consistent manner without any excessive variations that could affect the resulting data. Therefore, Long and Johnson (2000) conclude that dependability and reliability are arguably identical concepts. The stability of data collection measures, otherwise known as reliability, remains an important notion. It may be preferable for interpretive researchers to accept that reliability is unlikely to be a demonstrable strength of their work, than try and disguise the term as something else. Although efforts may be made to enhance a study's reliability, as mentioned earlier, for the most part, the nature of the sample and data collected make this virtually impossible (Long and Johnson, 2000).

3.4.2 Validity in Qualitative Research.

Validity in qualitative research deals with descriptions and explanations, and whether or not a given explanation fits a given description. In other words, is the explanation credible? (Denzin and Lincoln, 2003). When discussing validity in relation to qualitative research it can be defined as:

'An account is valid or true if it represents accurately those features of the phenomena that it is intended to describe, explain or theorise'.

(Hammersley, 1992 p69)

Like the definitions of reliability there is little difference between the perspectives. Hammersley (1992) believes that no knowledge can be regarded as definite and the most we can achieve is to search for ways of judging claims to knowledge in terms of their probable truth. This includes such ways as considering the plausibility and credibility of the claim and the amount of

evidence for each of these. Hammersley (1992) states that the different levels of confidence required are dependent upon the significance of the claim. He suggests a number of claims are within our common experience, therefore, the risk of error on the part of the researcher is low. As a result, these claims require less evidence. Other claims may present a higher possibility of misinterpretation by the researcher and in light of this requires greater evidence.

As with reliability, those who consider the need for tests of validity in qualitative research commonly require the use of different terms, such as 'adequacy' and 'credibility', claiming that this provides an alternative concept (Guba and Lincoln, 1989).

Adequacy refers to the amount of data collected, rather than the number of subjects recruited, as in quantitative research (Denzin and Lincoln, 1994). Hall and Stevens (1991) explain adequacy as follows.

'Results are adequate if analytic interpretations fairly and accurately reflect the phenomena that investigators claim to represent'

(Hall and Stevens, 1991 p20).

This definition agrees with the traditional definition of validity and so calls into question the claim that adequacy is different to validity (Long and Johnson, 2000).

It is argued that the traditional term validity refers to the naïve reality of positivism and an effort to establish

'isomorphism between findings and objective reality'

(Guba and Lincoln, 1989 p236).

The alternative term credibility replaces this with
'isomorphism between constructed realities of respondents and the reconstructions attributed to them'

(Guba and Lincoln, 1989 p237).

There is very little difference between the two terms other than the presumed objective reality of positivism and the constructed realities of post positivism.

The underlying concept of trying to communicate what is reported by the researcher about the phenomenon under investigation appears to be the same for both validity and credibility (Long and Johnson, 2000). Hammersley (1992) suggests that the main difference is found more in the ways to achieve appropriate levels of the criteria as opposed to the criteria itself.

3.4.3 Rigour in Research.

According to Hammersley (1992) the more common ways to meet the criteria for reliability in qualitative research include audit of the decision trail and triangulation. To meet the criteria for validity self-description and reflective journal keeping, respondent validation, long-standing involvement, continual observation, peer debriefing and triangulation should be included.

3.4.3.1 Respondent Validation (member check).

It is suggested by Brink (1991) that the use of respondent validation can provide stability. Checking the results with respondents, on completion of the data collection or of the whole study, would meet the requirements of diachronic reliability (stability over time). However, as field notes, observation of non-verbal signs and recognition of unconscious changes in tone and emphasis make up elements of raw data, the respondent may not remember, or they may have been unaware of some non-verbal actions so they may deny certain aspects of their behaviour. Reactions from respondents cannot be taken as absolute validation or refutation of the observer's conclusion. It may prove difficult at the end of a study to contact respondents. Also over a period of time respondents situations may have altered along with their views. While respondent validation may be useful Hammersley and Atkinson (1995), Mason (1996) and Morse *et al* (2002) warn against giving to much value in the results of respondent validation. Hammersley and Atkinson (1995 p227) state that:

> 'we cannot assume that anyone is a privileged commentator on his or her actions, in the sense that the truth of their account is guaranteed'.

3.4.3.2 Prolonged Involvement and Persistent Observation.

Prolonged routine contact with the people in the area under investigation enhances sensitivity and enhances validity. Kirk and Miller (1986 pp30-31) believe this highlights:

> 'discrepancies between the meanings presumed by the investigator and those understood by the target population',

Researchers spend a good length of time in contact with individual respondents and with the topic generally, this allows time for concepts to surface and develop, this also allows time for any potential implications to emerge (Long and Johnson, 2000).

3.4.3.3 Peer Debriefing.

Robson (1993 p404) describes peer debriefings as:

> 'exposing one's analysis and conclusions to a colleague or other peer on a continuous basis'.

He believes that formulating the research for presentation to a peer promotes subsequent credibility. Peer debriefing may be attained in a number of ways. This includes discussing the emerging findings at intervals with knowledgeable colleagues; this can encourage reflection and investigation of other perspectives and explanations at different stages of the data collection process and analysis. Presenting a study at national research conferences is a recognised way of providing findings to other researchers, so as to invite and respond to critical comment. Presenting the findings and implications to interested groups provides similar opportunities but with particular importance on the relevance of the study (Long and Johnson, 2000).

3.4.3.4 Audit of Decision Trail.

Sandelowski (1986) describes the decision trail as the presentation of details of all data sources, collection methods and experiences, assumptions made, decisions taken, meanings interpreted and influences of the researcher. The aim of the decision trail is to leave an adequate amount of evidence to enable

interested parties to reconstruct the process by which the researcher reached their conclusion. It also allows them to determine the value of the investigation by comparing their own conclusions made from the same information with those of the original researchers (Denzin and Lincoln, 1994). The audit trail demonstrates the level to which the researcher has remained true to the data and to the confines of the sample. This shows whether beliefs are justifiable and data collection was carried out rigorously and reported accurately (Long and Johnson, 2000).

However, this is something that Morse *et al.,* (2002) are wary of, they believe the audit trail is simply documentation of the course of development of the completed analysis, it cannot be used to guide the research process or ensure a high quality product. Therefore, they feel that these processes contribute very little to accomplishing reliability and validity.

3.4.3.5 Problems with evaluative procedures at the end of the study (post-hoc)

It is felt by Morse *et al.* (2002) that over the past 20 years, criteria and standards for evaluation of the overall significance, relevance, impact and utility of completed research have subtly replaced reliability and validity. Approaches to ensure rigour is built into the research process itself were back staged to these new criteria to the degree that, while they continue to be used their value and recognition as factors of rigour are lessened.

Morse *et al.* (2002) feel that by concentrating on approaches to establish rigour at the end of the study, rather than focusing on these processes during the study, it may be too late to correct any issues that arise. Therefore, these approaches for ensuring rigour must be built into the qualitative research process. These include investigator responsiveness, methodological coherence, theoretical sampling and sampling adequacy, an active analytic stance and saturation. When used correctly these force the researcher to rectify both the direction of the analysis and the development of the study as necessary. This then results in reliability and validity of the completed project (Morse *et al.,* 2002).

Investigator Responsiveness is the creativity, sensitivity, flexibility and skill of the researcher in using procedures for verification that establishes the reliability and validity of the study. It is the investigator who decides whether or not data collection tools are actually working and so persevered with, or if a different approach is necessary. The lack of responsiveness of the investigator is the biggest hidden threat to validity and is difficult to detect on completion of a study (Morse *et al.*, 2002).

The aim of Methodological Coherence is to ensure harmony between the research question and the components of the method.

> 'The interdependence of qualitative research demands that the question matches the method, which matches the data and the analytic procedures' (Morse *et al.*, 2002).

The interaction between collecting data and analysis is fundamental to achieving reliability and validity (Morse *et al.*, 2002).

Thinking theoretically is another way to address reliability and validity. Ideas coming through the data are reconfirmed by new data; this produces new ideas which must be verified in the old data. This ensures that the data is constantly checked and rechecked, so allows a solid foundation to be built (Morse *et al.*, 2002).

Together all of these verification strategies play a part in establishing reliability and validity, thus ensuring rigour (Morse *et al.*, 2002). The pursuit for rigour in qualitative research is clearly necessary to enable findings to carry conviction and strength. Alternative terminology for reliability and validity is not essential as they are concepts applicable to qualitative studies (Morse *et al.*, 2002).

3.5 Sampling

Representativeness refers to the question of whether the group of people or the situation being studied is typical of others *i.e.* whether it is safe to conclude that what is true of this group is also true of another. If it is not known whether

samples are representative then it cannot be claimed that the conclusions have any relevance to any other groups (McNeill, 1990).

Obviously the more cases selected the better the result. In general, the optimum sample size is one which is sufficient to making accurate inferences from a sample of a population (Polgar and Thomas, 1991).

3.5.1 Sampling Strategies.

There are a number of ways that sampling can occur. Sampling strategies are generally placed under two main categories, non-probability sampling and probability sampling. Probability sampling makes use of some form of random selection when choosing participants. This form of sampling allows the researcher to estimate the probability that each element of the population will be included. On the other hand when carrying out non-probability sampling, participants are chosen using nonrandom methods. The limitation to this method is that there is no way of making sure every element has a chance of inclusion in the sample (LoBiondo-Wood and Haber, 1998).

The non-probability sampling methods are not as rigorous as the probability sampling method; therefore, they may produce less representative samples. However, many samples in nursing research and other areas of health care use the non-probability sampling strategy (Parahoo 1997).

Incidental Sampling otherwise known as Convenience Sampling is the easiest and cheapest sampling method to use. In this type of sampling the members of a target population who are most easily accessible are used (Polgar and Thomas, 1991).

3.5.2 Sampling in Qualitative Research.

There is a difference in the approaches and needs of sampling between quantitative and qualitative research. Qualitative researchers intentionally choose individuals who are theoretically representative of the population needed for the study to gain in-depth information (Morse, 1991). The researcher

continues to sample until 'theoretical saturation' has been reached. Whereas, quantitative methods usually depend on larger samples selected randomly (Patton, 2002).

3.6 Ethical Considerations.

Serious thought to the ethics of a study should be given at a very early stage in research process (Robson, 2002). It is believed by Gans (1982 p57) and Johnson (1992) that investigators should be honest about their reasons for carrying out research. Without this honesty, the loss of trust in significant groups or society as a whole could prevent research taking place in the future so any potential benefits would be lost.

While it is obvious that ethical problems can arise in scientific experimental research involving people, dilemmas can occur in any research involving people (Robson, 2002). Examples can be found in Table 11.

Table 11. Ethical Dilemmas.

- Is the provision of additional resources of staff or equipment to places where the research takes place necessary? Is the investigator showing good faith by giving as well as taking? Is there coercion used to get people to take part?
- Do individuals have a real choice in whether they take part or not? And even if they do, are there any penalties for declining?
- Are they fully informed before consent is given? Do they understand what is expected of them?
- Will participants be protected from any direct effects of the intervention?

(Robson, 2002).

No additional resources were required by the NHS trusts involved in this study as no staff were removed from their place of work. During the observational study, the researcher was employed as a radiographer. This, allowed her to build up a rapport with the participants and to give something back to the department, rather than just taking the information required for the study. Whilst performing the

focus group sessions, the participants stated that they had found the discussions to be beneficial to their working practice. This is discussed in more detail later (7.5).

It was not expected that any participants would need any protection from the effects of the research. However, in order to protect participants, the researcher explained to both participants and the management of the departments involved in the study, that the research was intended to examine what the current practice was and not to look for areas to criticise. The researcher also explained that any problematic practice would be reported to the management but identification of any individuals involved would not be divulged.

During all phases of this research the hospital name is omitted from the reports and access to information that exposes the participant's identities is restricted. During the observational study, only the first names of the radiographers were noted, these were then changed to a number when entering the details into the excel spreadsheet. When transcribing the audio recordings made during the focus group sessions, the radiographers names were removed and a code given to each participant. The observational notes, audio recordings and a list of the names and corresponding numbers or codes were locked in a filing cabinet in a locked office. These are the first steps in maintaining confidentiality. Further steps are described in the information sheet provided to each participant (Appendix 12).

The sharing of information is an inevitable result when Focus Groups are used; therefore, one of the key ethical concerns is privacy (Morgan, 1998(1)). This sharing of information between participants is unique to group interviews as a research method. The amount of self disclosure from a participant depends on who they are talking with and the setting for the conversation (Morgan, 1998(1)).

Figure 8 gives an overall view of the methods used in the study.

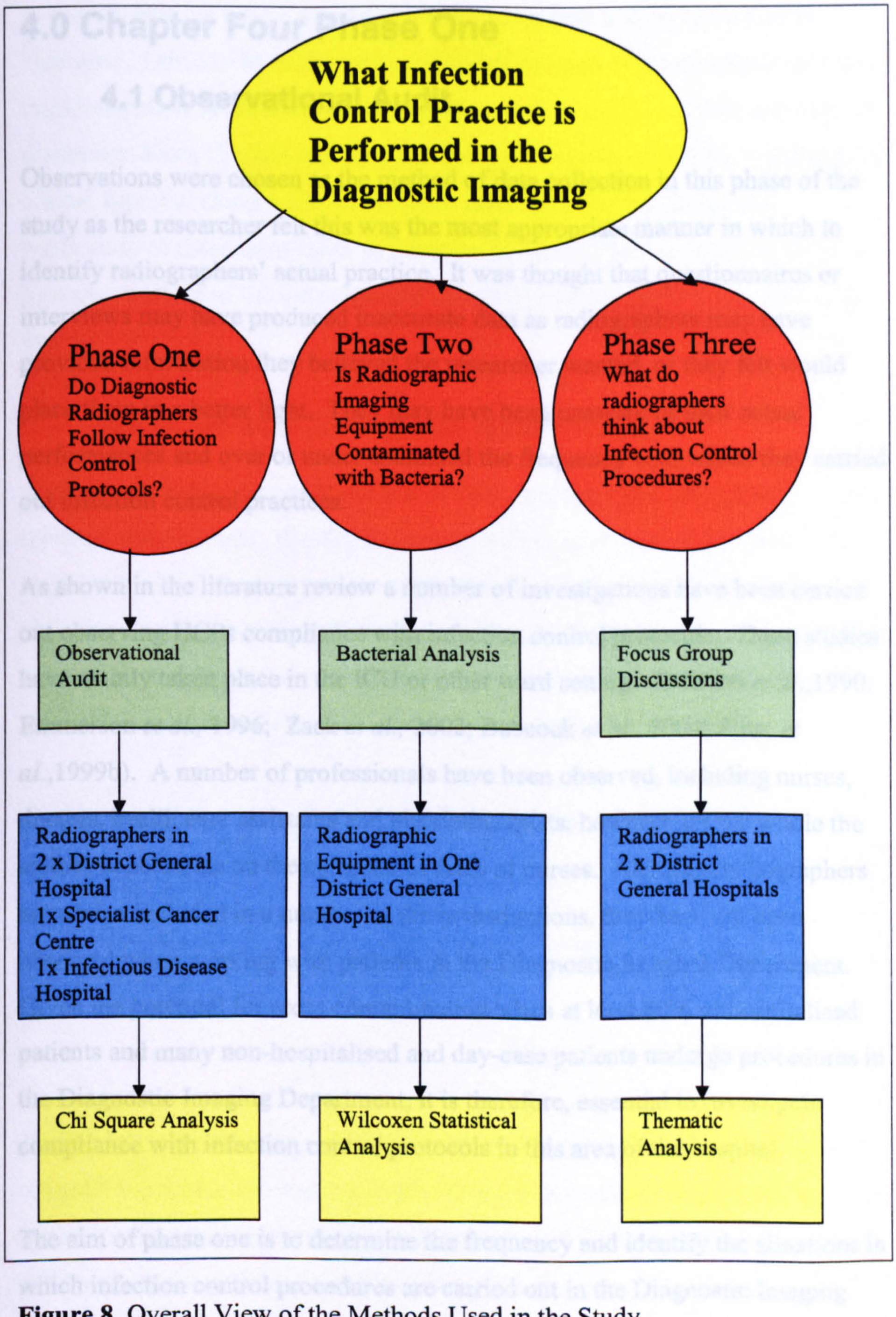


Figure 8. Overall View of the Methods Used in the Study.

4.0 Chapter Four Phase One

4.1 Observational Audit.

Observations were chosen as the method of data collection in this phase of the study as the researcher felt this was the most appropriate manner in which to identify radiographers' actual practice. It was thought that questionnaires or interviews may have produced inaccurate data as radiographers may have provided information they believed the researcher wanted, or they felt would place them in a better light. They may have been unaware of their actual performances and over or under estimated the frequency with which they carried out infection control practices.

As shown in the literature review a number of investigations have been carried out observing HCPs compliance with infection control protocols. These studies have mainly taken place in the ICU or other ward settings (Dubbert *et al.*,1990; Emmerson *et al.*, 1996; Zack *et al.*, 2002; Babcock *et al.*, 2004; Pittet *et al.*,1999b). A number of professionals have been observed, including nurses, doctors, health care assistants and physiotherapists, however, on the whole the studies concentrate on the compliance rates of nurses. Although radiographers have been included in a number of the investigations, they have not been observed when working with patients in the Diagnostic Imaging Department. Given the potential for cross-contamination when at least 80% of hospitalised patients and many non-hospitalised and day-case patients undergo procedures in the Diagnostic Imaging Department, it is therefore, essential to investigate compliance with infection control protocols in this area of the hospital.

The aim of phase one is to determine the frequency and identify the situations in which infection control procedures are carried out in the Diagnostic Imaging Department.

To achieve this aim a Restricted Audit in the form of an observational study was carried out in four hospitals between January 2001 and October 2002.

In this chapter the use of Audit and how this can feed into research will be discussed. This will be followed by a detailed account of the development and implementation of the observational studies used to collect the relevant data. A discussion about the data analysis, sampling techniques, reliability, validity and ethical approval along with the literature used to justify the choice and application of these techniques will also be included. This will then be followed by a presentation of the data obtained using this method and a discussion of this data.

4.2 Audit and its Uses in Health Care.

Audit is devoted to the establishment of facts, and has been developed by many types of organisations. Quality assurance audit is used by many businesses to improve the overall quality of the organisation and its output. It provides an objective evaluation of the effectiveness of the quality assurance program and its component parts so that any weaknesses can be identified, and the changes needed to improve outcomes can be implemented (Bell *et al.*, 1994).

Quality assurance and audit are also an essential part of health care (Mawson and McCreadie, 1993). Audit is defined as:

> 'the process of reviewing the delivery of health care to identify deficiencies so that they may be remedied'.
>
> (Crombie *et al.*, 1993 p27)

Audit is closely linked to clinical governance through which NHS organisations are accountable for the ongoing improvement in the quality of their services and for protecting high standards of care (Department of Health, 1998). The current culture of ongoing evaluation reflects the present emphasis on quality through continuous improvement in clinical care (Kogan *et al.*, 1995).

The aim of audit in health care is to ascertain the degree to which clinical practice complies with recognised review criteria. It is a powerful method of

identifying areas where improvements should be made and improving quality through these changes (Hearnshaw *et al.*, 2003).

Often clinical audit is initiated once there is a suspicion of a deficiency in health care. The deficiency is identified using a single stage assessment or measurement of the area under suspicion against an established standard, this is known as a Restricted Audit (Crombie *et al.*1993). Where improvement is required and implemented, a cycle of activity involving measurements of quality and the evaluation of changes to practice, the term Broad Audit is employed (Kogan *et al.*, 1995). In this latter sense, audit is defined as:

> '...a process used by health professionals to assess, evaluate and improve the care of patients in a systematic way in order to enhance their health and quality of life'.
>
> (Irvine and Irvine, 1991 p2)

Operational definitions of quality within health care reflect the importance of actual care provided against pre-set criteria. A major consideration is the controversial issue of whether cost should be included as part of the definition of quality. In the United Kingdom (UK) concern over costs has increased substantially (Kogan *et al.*, 1995).

> 'Quality does cost money, but so does the lack of it and often the lack costs even more'
>
> (Morris, 1989 p4)

With the current financial limitations in the National Health Service (NHS), it is important that in achieving quality, the best possible use is made of available resources. Clinical Audit can also help inform this debate. Clinical audit will subsequently be referred to as 'audit'.

4.2.1 The Process of Audit.

Broad audit is a cyclical process in which current practice is compared against a standard and measures for improvement are evaluated (Kogan *et al.*, 1995). Audit should be a continuous process where efforts made repeatedly result in an

incremental improvement at the end of each audit cycle (Figure 9). This protects or enhances quality of care. The focus of the Audit does not have to change, but core standards are continually monitored. Thus the effect of change is monitored and, if successful, standards are reset at a higher level and the cycle continues. Interestingly, implementing change is the stage of the cycle least likely to be carried out (Kogan *et al.*, 1995).

The cycle comprises of six phases

1. Identifying a problem or concern.
2. Establishing a standard or goal.
3. Measuring performance to determine if standards are met.
4. Recognising the change needed.
5. Instigating change.
6. Evaluating the effects of the change (Kogan *et al.*, 1995).

Figure 9. Radiology Audit cycle.

(Goodwyn *et al.*, 1996 p4)

4.2.2 The Relationship Between Audit and Research.

Whether audit constitutes research has in the past been unclear (Jacyna *et al.*, 1992). Part of the misunderstanding may occur because audit involves enquiry into the delivery of health care and enquiry could be seen as a synonym for research (Crombie *et al.*, 1993). Audit also uses many research techniques, such as survey sampling, questionnaire design and statistical analysis (Crombie *et al.*, 1993), and both require well designed studies. However, research and audit

tackle different topics, serve different purposes and may often use different methods.

The fundamental difference between the two is that research establishes what constitutes good care, whereas audit determines whether good care is being carried out (Dixon, 1990). Audit examines what is actually happening, *ie*, whether existing clinical knowledge, skills and resources are being used effectively and appropriately (Crombie *et al.*, 1993). Research, on the other hand, generates new knowledge that can be added to the existing knowledge base. The intention of audit is to influence the activities of an individual or small team, whereas research seeks to influence practice as a whole (Crombie *et. al* 1993).

However, audit and research can feed into one another. If the outcome from an audit shows non compliance with best practice, then research can identify the reason for this practice (Kogan *et al.*, 1995).

Many published studies are Restricted Audits, that is, they are simply an evaluation of current practice resulting from the early stages of Broad Audit, and lack the intention to change behaviour (Kogan *et al.*, 1995). Merely identifying a shortfall does not necessarily identify the changes required for improvement. This latter stage usually involves identifying the underlying reasons for failure to meet standards and is a missing element from the audit cycle (Kogan *et al.*, 1995). As indicated earlier this stage can involve research.

4.3 Observational Studies.

Observations are a form of field research, which involves the analysis of real-life situations and the study of actions or activities as they occur in their naturalistic setting (Burgess, 1982). Observation can be used for several purposes in a study. It is frequently used in an exploratory phase, to determine what is happening in a situation, prior to further investigation. It can also be used to support or supplement data collected through other means (Robson, 2002).

Parahoo (1997) suggests that observation is the most important method of collecting information in practice-based professions, such as health care. Observational studies offer a unique opportunity for researchers to see for themselves the situations subjects encounter and how they react to them (Byrne, 2000). According to Robson (1993), the directness of watching what people do and listening to what they say, is fundamentally important to real world research. Observations combined with other methodologies allow inconsistencies between what the health care workers believed they did and what they actually did to be highlighted (Cowman, 1997; Pound *et al.,* 1999; Robson, 1993). This occurred in phases two and three, in which the effects of infection control practice on the bacterial contamination levels of radiographic equipment was evaluated, and the radiographers' views on their infection control practice was explored.

Observational Studies as a method of data collection have been comprehensively accepted in the literature. As indicated earlier, they can play an invaluable role in health care research, and have been used to great effect in evaluating infection control practice (Dubbert *et al.,* 1990; Hammond *et al.,* 1990; Kelen *et al.,* 1990; Simmons *et al.,* 1990; Watanakunakorn *et al.,* 1998; Girard *et al.,* 2001).

4.4 Reliability and Validity of Observational Audit.

In order to optimise the reliability of the observations, a structured observation schedule was developed (Keoppel, 2001). With guidance from an infection control nurse, the schedule, which can be found in Appendix 4, was developed from a hand-washing audit tool, protocols and checklists (Appendix 1,2 and 3) already in use in one of the study hospitals and adapted for the needs of a Diagnostic Imaging Department. The schedule identified all the aspects of practice that should be observed by the researcher and recorded. Following Ash's (1997) example, each was to be recorded in the form of "1", indicating the action was carried out, or "0" indicating the action was not carried out. No judgment was made about the quality of the particular action. However, with regard to whether the patient was dirty or not, the researcher made a judgment based on what the radiographers said, or how they reacted to a patient. In all cases deemed as 'dirty' the radiographers made a comment about the patient's

condition or disclosed why they were refraining from touching the patient without gloves.

It is acknowledged that the presence of an observer forms a significant social stimulus which may then cause subjects to alter their behaviour (Spouse, 1997; Robson, 2002). This change in behaviour is known as the Hawthorn effect (Polgar and Thomas, 1991). Byrne (2000) and Bowling (2002) argue that after a while people become accustomed to the observer's presence and cannot keep up the pretence of best behavior for very long. However, Robson (2002) believes that it is not possible to be completely sure that the presence of the observer has not altered what they seek to observe in some way.

The observations of the radiographers were carried out over a four week period. This allowed the observer time to integrate with the team and for any changes in behaviour, which may have been caused due to their being watched, to settle down. These steps are important with regards to the validity of the data (Martin 1995; Gittelsohn *et al.,* 1997). With this in mind the researcher did not make any record of the initial observations, in any of the departments, in case her presence had altered the normal practice of the radiographers. However, it soon became apparent that her presence was not prompting them to change their behaviour. Cowman (1997 p20) claims that:

> 'Observational methods have a good track record in providing valid information'

Accusations of bias in what is observed are common in observational studies. This issue can be addressed by being purposive about the process of observation and its interpretation in field notes (Fitzpatrick and Boulton, 1996). As much time as possible should be spent in the natural setting of the subjects being observed to optimise the variety and number of observations. It is also essential that the observations are made on different days and at different times of the day; this ensures that the data are complete, shows typical events and interactions. This also enhances their validity and reliability (Bowling, 2002). For these reasons the researcher was present during all periods throughout the normal working day.

Sampling of different settings is also essential (Fitzpatrick and Boulton, 1996), so as already stated during this infection control study four hospitals were used. They included two district general hospitals, one specialist cancer centre and one large city hospital that specialised in infectious diseases. The reasons for choosing these hospitals are discussed later in this chapter under the heading of 'Sampling'. It is expected that when carrying out comparative studies, any alteration to the behaviour of the subjects under observation would occur to the same degree in each setting and this factor should not contribute to differences between the settings (Pound *et al.*, 1999).

The structured observations helped overcome the major problem of observer bias which may occur in unstructured observations. Behaviour can be described accurately and reliably in this approach due to the systematic collection of the data (Cowman, 1997). This increases the validity of the field research (Polgar and Thomas, 1991).

4.5 Sampling of Radiographers in the Infection Control Study.

The aim in this study was to draw a representative sample of the diagnostic radiographer population, allowing generalisations to be made with regard to the rest of the diagnostic radiographer population. To do this radiographers from four hospitals, including two District General Hospitals, one specialist Cancer Centre and a large City Hospital, with a specialty in infectious diseases were observed. For confidentiality reasons the hospital names have been changed. Details of the hospitals used and the number of radiographers observed along with number of observations made are shown in Table 12.

Table 12. Hospitals Used and Observations made.

Pseudonym	Type of Hospital	Number of Beds	Radiographers Observed/Total Radiographers	Number of Observations
DGH 1	Large City District General Hospital	750	23/59	217
DGH 2	Smaller District General Hospital	618	28/55	231
CH	Specialist Cancer Centre	75	19/25	207
IDH	Infectious Disease Hospital	600	14/50	176

The two DGHs were selected as these were considered to be standard hospitals with no specialist expertise which may alter the way in which radiographers worked. The specialist Cancer Centre was chosen because the radiotherapy or chemotherapy treatment would reduce patients' immune function, making them particularly susceptible to infection. It was of interest, therefore, to observe the infection control practice of radiographers dealing with 'at risk' patients. The final hospital specialising in infectious diseases, was of interest because of the increased infection risk to radiographers if their infection control practice was inadequate. Although this hospital treats other conditions in addition to infectious disease, the working title of Infectious Disease Hospital has been chosen because it serves the purposes of this study.

Convenience Sampling was deemed to be the most appropriate sampling strategy because it would allow the researcher to observe the practice of the radiographers with minimal interference in the daily running of the Diagnostic Imaging Department. Although the radiographers were aware that an observational study was taking place, the Convenience Sampling strategy also meant that they did not always know when they were being observed, therefore reducing the Hawthorn Effect.

The researcher spent five weeks in DGH1 and four weeks at each of the remaining hospitals. Equal amounts of time were spent observing radiographers scheduled to work in Accident and Emergency, In-patient and Out-patient

departments. The researcher was rostered to work in these departments, and used much of the time to observe the radiographers who were working in the same area. In the areas mentioned, all of the radiography staff were observed on at least one occasion during the study. A number of the radiographers were observed in more than one department.

4.6 Ethical Considerations in Observational Audit.

Practical and ethical problems can arise when the researcher takes on the role of either Complete Observer, in an overt study, or Complete Participant usually carried out in a covert manner (Byrne, 2000). Gans (1982 p57) and Johnson (1992) believe that investigators should be honest about their reasons for carrying out research. Without this honesty, the loss of trust in significant groups or society as a whole could prevent research taking place in the future so any potential benefits would be lost.

In a covert study involving care in a mental health secure unit Clarke (1996a) justified not telling the group they were being observed because of the group's likely refusal to co-operate if they had been aware of the study. A subsidiary consideration was that behaviour under observation would change. There are strong ethical objections to this stance and many researchers find this indefensible. This type of study is becoming increasingly rare (Robson, 2002).

Robson indicates that increasingly, the position taken by Kirby and McKenna (1998 in Robson, 2002) is being adopted.

> 'It is essential that as a participant, who is also a data gatherer, the researcher recognise the obligation to inform those in the setting about the research (i.e. what sort of research it is, for what purpose and who is involved). Research from a covert or manipulative perspective is not generally acceptable'.
>
> (Kirby and McKenna, 1998, p78).

The infection control observations were carried out overtly to adhere to ethical considerations as discussed by Robson (2002). A notice was placed in work areas where observation was carried out and in staff common rooms, informing

staff of when, why and by whom the study would be carried out. It also offered the opportunity for staff with any questions to approach the researcher (Appendix 7). Besides this form of notification, staff were also informed of the study by their seniors and during conversations with the researcher. During these conversations staff were informed that they had the right to refuse to participate in this study. This addresses one of the ethical concerns noted in Table 11.

There is also a practical reason to disclose a study to the observed group when considering the use of additional research methods at a later date. These additional methods will usually depend on the cooperation and knowledge of the persons involved (Robson, 2002). This researcher found carrying out the study overtly helped to overcome some practical problems that may have been encountered had the study been carried out in secret. These included the removal of the researcher from the area of interest to carry out other aspects of the radiographers duties, such as work in theatre or on the wards. This would have prevented the observations from taking place. However, in CH the supervisory staff considered the researcher to be a radiographer who should carry out all general radiographic tasks, so duties at a distance from the area being observed were allocated, *e.g.* theatre. This prevented observations from taking place during this time. Fortunately this occurred infrequently. This demonstrated the need to achieve a balance between valuing sociability as a means of building trust (e.g. accepting routine tasks which were inconvenient in the collection of observational data) and the need to create sufficient distance between the researcher and the radiographers (Gerrish, 1997).

Although the subjects were aware that an observational study was being carried out they were not necessarily aware of when they were actually being observed. This was also the case in Clarke (1996b). This concealment of observations may be considered necessary to prevent the subjects acting differently and so skewing the findings (Polit and Hungler, 1997). Archibold (1986) claims that all research is to some extent secret, since it is impossible to tell the subject everything.

At the time that this observational study was carried out, the researcher was unaware that ethical approval was required when using NHS property or when

NHS staff were included in a study. Retrospective ethical approval was requested from the appropriate ethical committees. Three of the hospitals considered the study to be an audit so ethical approval was not necessary. Letters and emails confirming this information can be found in Appendix 5. CH stated that because no patients had been involved in the study, then ethical approval was not necessary (Appendix 5).

4.7 Pilot Study.

The purpose of the pilot study is to test protocols, data collection instruments, sample recruitment strategies and other aspects of a study in preparation for a larger study (Polit and Beck, 2004). A pilot study should be carried out with as much care as the major study so that any weaknesses that are detected will be truly representative of inadequacies inherent in the major study. For the same reason subjects, within a pilot study should be chosen from the same population as subjects for the major study. When the data from the test run have been collected and scrutinised, the researcher should make the revisions and refinements that, in his or her judgement, would eliminate or reduce problems encountered during the pilot study (Polit and Hungler, 1999).

A pilot study was undertaken in the first week of the study at DGH1. The aim of this was to ensure that the data collection tool collected the appropriate data. The researcher also wanted the chance to practice her observation technique and become accustomed to the tool. Another benefit of carrying out the pilot study was that it enabled the researcher to identify the best way to take notes of the data collected.

The pilot study showed up two areas that needed to be addressed. The first was how to define an open wound. Initially the researcher had thought of an open wound as simply an open cut. The hand decontamination notices near the sinks, put in place by the infection control team, which stated that cannulas and other invasive devices, such as catheters, provide entry into the body so should be addressed in the same way as an open wound. During this study open wounds and any invasive devices in place, were grouped together under the category of

open wound. The second area that had to be considered was the start and end point of an examination. After careful thought, and observing the radiographers it was deemed that the beginning of an examination started once the radiographer picked up the request form and started to prepare the examination room or once they had called the patient in to the examination room, whichever was the sooner. The end of the examination was considered to be the point at which the patient left the examination room or was informed they could leave the Diagnostic Imaging Department, whichever occurred last.

During busy periods it was thought there may be an issue regarding blurring of the end of an examination and the beginning of the next. In these situations it was considered that as contact would still have occurred with various other pieces of equipment then hand decontamination should occur both before and after each patient.

Although the participants knew that a study was taking place they did not necessarily know when they were being observed, therefore it was thought acceptable to carry out the pilot study in one of the hospitals in which the major study would take place.

4.8 Audit Used in the Infection Control Study.

As no previous studies regarding radiographers' infection control practice, within the Diagnostic Imaging Department have been published there are no benchmarks set for the appropriate level of infection control practice. However, many other studies investigating infection control practices use the benchmark of 100% compliance, therefore, this level of compliance was adapted for this study.

4.8.1 Approach Used During Observational Studies

There are two approaches to observational studies. The first is the informal approach. This is relatively unstructured and the observer has a large amount of freedom regarding what information is gathered and how it is recorded. The researcher would take notes and generally gather information from respondents.

Robson (2002 p313)states that:

> 'This kind of information is relatively unstructured and complex and requires the observer to perform difficult tasks of synthesis, abstraction and organisation of data'

Secondly, there is the formal approach, which involves prior decision on what is to be observed, and normally requires the use of some kind of observation schedule (Robson, 2002). This allows the observer to pay attention only to predetermined aspects of the situation under investigation. Structured observations are considered to be quicker and easier to collect, make analysis less complicated and offer standardised results (Holyoake, 1998). High reliability and validity are easier to achieve with the more formal approach, but it is at the cost of less complexity and completeness by comparison with the informal approach (Robson, 2002).

In order to establish how radiographers perform, with regard to following infection control procedures, it was felt that a structured observational study was the best approach. This placed the researcher in a position to directly observe and record specific activities as they occurred. As the researcher was a qualified diagnostic radiographer, she was already familiar with the setting of a Diagnostic Imaging Department. This reduced the length of time required to become accustomed to the departments. This prior experience also allowed the researcher to decide prior to the study what to observe and when. This is important as unless observations are confined to the phenomena under investigation, it will become an unmanageable task (Bowling, 2002).

4.8.2 Observing Infection Control Practice.

Gaining the approval of senior staff is essential to the success of any study (Byrne, 2000). One of the first steps the researcher took, in this investigation, was to gain access to the research setting. In the Diagnostic Imaging Departments involved, the Business Manager and Superintendent were consulted and permission for the study to take place was obtained in writing (Appendix 6).

The areas in the four Diagnostic Imaging Departments to be monitored were:

1. Accident and Emergency
2. In-patients
3. Out-patients
4. Mobile radiography.

These areas were chosen as the researcher was interested in the working practice of diagnostic radiographers in the general area of the Diagnostic Imaging Department. The researcher was present during normal working hours Monday to Friday 9am to 5pm. These times were chosen as all areas of the department were open and more staff members were available for observation. 'Out of hours' work would have restricted the areas covered to Accident and Emergency and In-patient departments, where only one or two members of staff would be present. Dubbert *et al.* (1990) also found the normal working hours to have the highest activity *i.e.* when most staff on duty had patient contact. It should be noted that one of the hospitals used in the study did not have an Accident and Emergency department.

The extent to which the observer is exposed to those being observed depends on various factors, such as the setting, the group involved and the research task. There are four main roles to be taken when carrying out observations as explained in Table 13 (Gold, 1958).

Table 13. Four Main Observer Roles.

Observer Role	Description of the Role
Complete Observer	The researcher is removed from the setting they are investigating. The observations can be made from outside, so the observer is unnoticed or unseen (Denzin and Lincoln, 1994).
The Observer as Participant.	The status of the researcher is known to the group being observed, but the observer takes no part in the activity under investigation (Gold, 1958).
Participant as Observer.	The observer participates in the daily life of the people Involved in the study. This participation can be carried out openly or covertly with the observer in some disguised role (Byrne, 2000; Robson, 2002).
Complete Participant.	This role involves the observer concealing that he or she is an observer, acting as naturally as possible to become a full member of the group (Robson, 2002).

The researcher chose to adopt the role of Participant Observer during this infection control study. It was expected that the researcher would be able to meet the two objectives described by Martin (1995), that is, she would be able to integrate into the social environment by performing radiographic duties along side the radiographers under observation, as well as carrying out the role of researcher and collecting the required data.

During the study the researcher collected data through watching, and occasionally if radiographers chose to give her information relating to infection control this was also noted. The researcher did not question the radiographers about their infection control practice as she felt that this may alienate them, causing them to feel that they were being criticised, she also felt they may alter their practice due to this prompt.

Observations were made whenever the researcher was not carrying out the normal duties of a radiographer. It was thought that this would reduce any conflict between the roles of worker and researcher. Jorgenson (1989) pointed out the two roles compete for time; the more time spent observing, the less the researcher is able to participate and vice versa. The lack of time participating may prevent the necessary rapport being built between the observer and the

subjects. The observations were recorded when the researcher was able to observe the subject from the beginning to the end of an examination.

The researcher needed to be in a location that allowed her to observe the practice of radiographers from the beginning to the end of the examination. In DGH1, DGH2, and CH the researcher positioned herself in the viewing and processing area which, in most cases, was located between the examination rooms. This allowed the researcher to discretely observe the practice of radiographers without having to enter the examination rooms. In the Out-patient department in DGH1, the researcher did have to reposition herself once the radiographer had left the examination room and entered the viewing area, as the processing machines would block the view of a sink and make it difficult to see if hand hygiene or any cleaning of the cassettes was occurring at that point. This was still easy to do and was not thought to cause any problems with the observation.

In DGH2 the researcher was always working alongside the radiographers and it was not unusual for a number of them to be present in the examination rooms while an examination was taking place. It was also very easy to move around and observe the radiographers once they had left the room to process and view the films.

It was often found in CH the viewing area was positioned between the two examination rooms, allowing easy visibility, so the researcher was able to position herself quite easily.

The In-patient and Out-patient examination rooms in IDH were positioned differently to the other three hospitals, there was four rooms placed in a row with the viewing and processing area at the end. The first two rooms were joined together and a computer was positioned between them. In these two rooms it was easy to carry out the observations as many radiographers congregated around the computer, making the presence of the researcher less obvious. The remaining two examination areas were separate rooms. As the researcher was new to the hospital, she did not find it very difficult to follow the radiographers into the examination rooms, to be shown how to use the equipment. She also

offered any assistance when examining unsteady patients or those in beds. The greatest difficulty arose due to the position of the viewing area, the researcher needed to be able to watch the radiographers at this point as there was a sink present. However, in many cases the researcher was able to either observe from afar, or she was able to follow the radiographers to the processor without highlighting the fact that observations were being carried out. This problem did not occur in A+E in IDH as the examination rooms and the processing areas were laid out in an open plan arrangement.

4.8.3 Note Taking.

Aside from integrating with the subjects in their setting, the fundamental discrete task of the observer is the taking of field notes. If this does not occur, the researcher might as well not be in the setting (Lofland and Lofland, 1984). Writing in the form of continued notes, by which the past is retained in the present, is absolutely necessary. Notes should be written up as close to the time of data collection as possible (Bowling, 2002) as Lofland and Lofland (1984 p62) state 'the human mind forgets massively and quickly'.

It is agreed by Lofland and Lofland (1984) and Bryne (2000) that initial brief notes can be made so that the researcher has something to refer to when actually sitting down to write up field notes. When carrying out the infection control observations the researcher recorded the collected data in a notebook immediately after each observation was made, to ensure it was recorded accurately. These notes were then transferred to an Excel Spreadsheet, which contained the structured observational tool (Appendix 4), at the end of the day. Spouse (1997) believed that an open approach to note taking should be used so that participants could read the field notes and alleviate their fears of a possible hidden research agenda. Lofland and Lofland (1984) disagreed with this openness and felt that it may be unwise for the known observer to take notes in the immediate presence of the people being observed. They felt the overt observer may well increase any existing anxieties of the observed subjects by continuously and openly writing down what is seen and heard (Lofland and Lofland, 1984). This researcher believed that to be as open as Spouse (1997)

suggested would increase the Hawthorne Effect by prompting the radiographers being observed to carry out infection control procedures unnaturally, and agreed with Lofland and Lofland (1984) that the data should be recorded discreetly. To do this the researcher simply moved away from the radiographers, to either an empty examination room, or out of the department entirely to the cloakroom or staff room. In some cases, the radiographers themselves would move away from the researcher to carry out various other tasks, allowing the researcher to record the observations.

4.8.4 Issues with Observational Studies.

Audit as a process of monitoring services can be intimidating due to its potential to disclose downfalls in health care practices. Some health care professionals consider the audit process as a way of checking up on them (Evans, 2002). Staff may worry that findings may reveal lack of care and undermine their professional reputation (Crombie *et al.*, 1993). Initially radiographers' in one hospital thought that the researcher was checking up on them, so it became necessary to make it clear that the observations were not being carried out to see if they performed badly, simply to see what practice was performed. This seemed to be accepted and no other issues, regarding audit, arose.

It is not unusual that an observer will be accepted as an expert on the subject being researched. This can result in subjects involved in the research asking for advice from the observer (Robertson, 1982). In these instances the researcher has to decide how much of themselves and their own opinions and experience they can afford to give away without altering the situation or interaction between researcher and subject (Robertson, 1982). This was experienced during the infection control study, a superintendent remarked that the researcher should actually be instructing the team about dealing with a trauma setting, in relation to infection control. The superintendent did not understand that the role of the researcher was simply to observe and not to instruct.

A more subtle manifestation of this problem and one which may be more difficult to deal with is the researcher's wish to improve the conduct of a subject, or to act upon suggestions made by subjects indicating they would like the

researcher to intervene to make improvements to the system (Robertson, 1982; McGarvey *et al.*, 1999). While believing that the researcher should remain neutral in their observation and interpretation of such events, a problem that may be experienced is whether to intervene in situations of unsafe practice or to remain a distant researcher role. Morse and Field (1996) have recommended that the safety of a patient precedes research objectives. On various occasions, during the infection control study, the researcher had to refrain from intervening, especially when inappropriate actions were taking place. For example, where staff members were dealing with a blood contamination incident, which may put the radiographer at risk, there was a conflict for the researcher between the professional duty to fellow radiographers of instructing them to clean the contaminated equipment and wash their hands, and maintaining the status of observer. Interventions were not made when qualified radiographers were involved as it was felt this may have altered their natural behaviour and they may have felt they were being criticised. The researcher believed that she was not present to educate the radiographers, but to observe their current practice. Many other studies have also followed this practice (Larson and Kretzer, 1995; Pittet et al.1999a, 1999b). However, if it was obvious that a student radiographer was at risk, intervention was needed and justified, and was thought it would be better accepted than it would be by qualified staff. The researcher also believed that as a qualified radiographer working in a department with students, she had a responsibility towards protecting them and should teach them how to practice safely. If such an intervention occurred during an observation then it was not recorded as data.

Situations also arose in which blood stained equipment may have subsequently come into contact with patients. The researcher found this aspect difficult to deal with as she did not want to alienate radiographers, or allow patients to be put at risk of infection. However, she believed she had a moral obligation not to put patients at risk, so when equipment was not in use, and before it was required, she cleaned this equipment and made no comments to the staff. During observations, the researcher was able, diplomatically, to present the radiographer carrying out the examination with clean equipment or a cover to prevent the patient from having contact with the contaminated equipment.

4.9 Statistical Analysis.

The data was recorded manually in an SPSS 11.5 data file for analysis. The data was anonymised in accordance with the Data Protection Act (1998), and each radiographer was only identified by a number.

Differences between hospitals and departments in infection control practices were evaluated using the Chi-square test, which is appropriate for categorical or nominal data (Green and D'Oliviera, 1999).

Significance levels were analysed at the $p<0.05$ level. A probability number (p) below this value indicates that it is significant, whereas a probability number (p) above this value is insignificant.

In cases where a significant result was found for example between the four hospitals in hand decontamination after patient contact, further subsets of analysis using 2x2 tables were carried out to establish where the significant differences lay.

The chi-square value is based on the sample size, the amount of independence between the variables, and the degrees of freedom; this makes the value of the chi square difficult to interpret. In order to overcome these factors, a number of statistical tests, including Phi, have been created that measure the "degree of association" between the two nominal variables (Becker, 1999).

A Phi test was carried out to measure the strength of the relationships. This is a version of the chi-square coefficient for use with nominal data, it eliminates the effect of the sample size from the measure. Phi is used for 2x2 tables. Some computer packages, use special formulas for phi in 2x2 tables so that phi varies from -1 to +1, This allows it to indicate negative relationships when used with dichotomous ordinal data. However, the sign can be ignored when using dichotomous nominal data (Garson n.d. accessed 14.02.06).

Phi is calculated as the square root of the value of chi-square divided by *N*, the total sample size.

$$\phi = \sqrt{\chi^2 / N}$$

Chi square analysis was not used for all observations. In some cases the level of data collected was not sufficient for this type of analysis. In these situations the data was analysed using only percentages. Observations carried out during Mobile radiography were also not included, when comparing the hospitals and departments; this was due to the small number of observations made.

The process used in this phase of the study is shown as a flow chart (Figure 10).

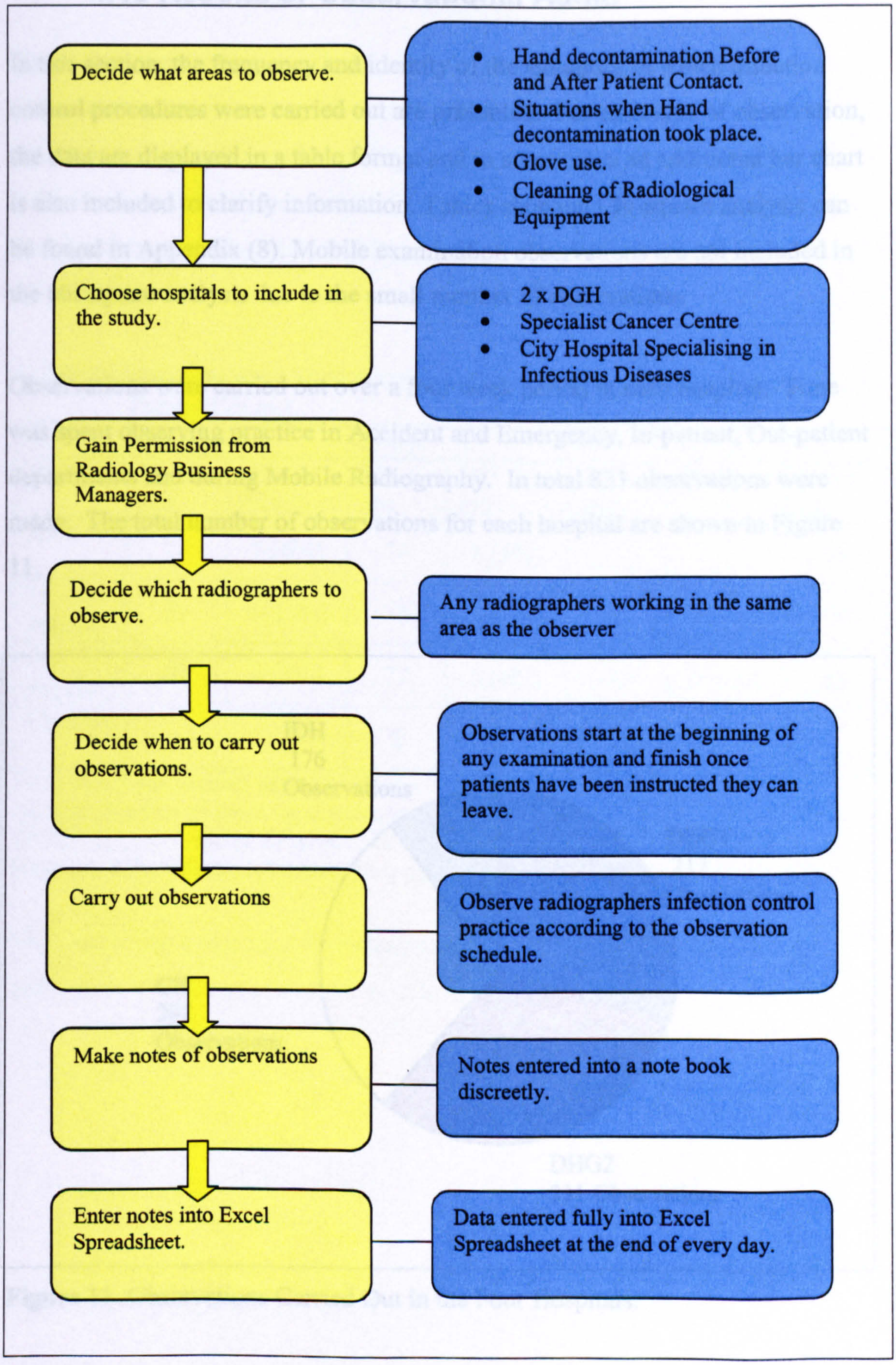


Figure 10. Flow Chart for Observation Audit.

4.10 Results of Observational Audit.

In this section, the frequency and identity of the situations in which infection control procedures were carried out are presented. For each type of observation, the data are displayed in a table format and in some cases an additional bar chart is also included to clarify information. Tables showing Chi-square analysis can be found in Appendix (8). Mobile examination observations are not included in the chi square analysis due to the small number of observations.

Observations were carried out over a four week period in each hospital. Time was spent observing practice in Accident and Emergency, In-patient, Out-patient departments and during Mobile Radiography. In total 831 observations were made. The total number of observations for each hospital are shown in Figure 11.

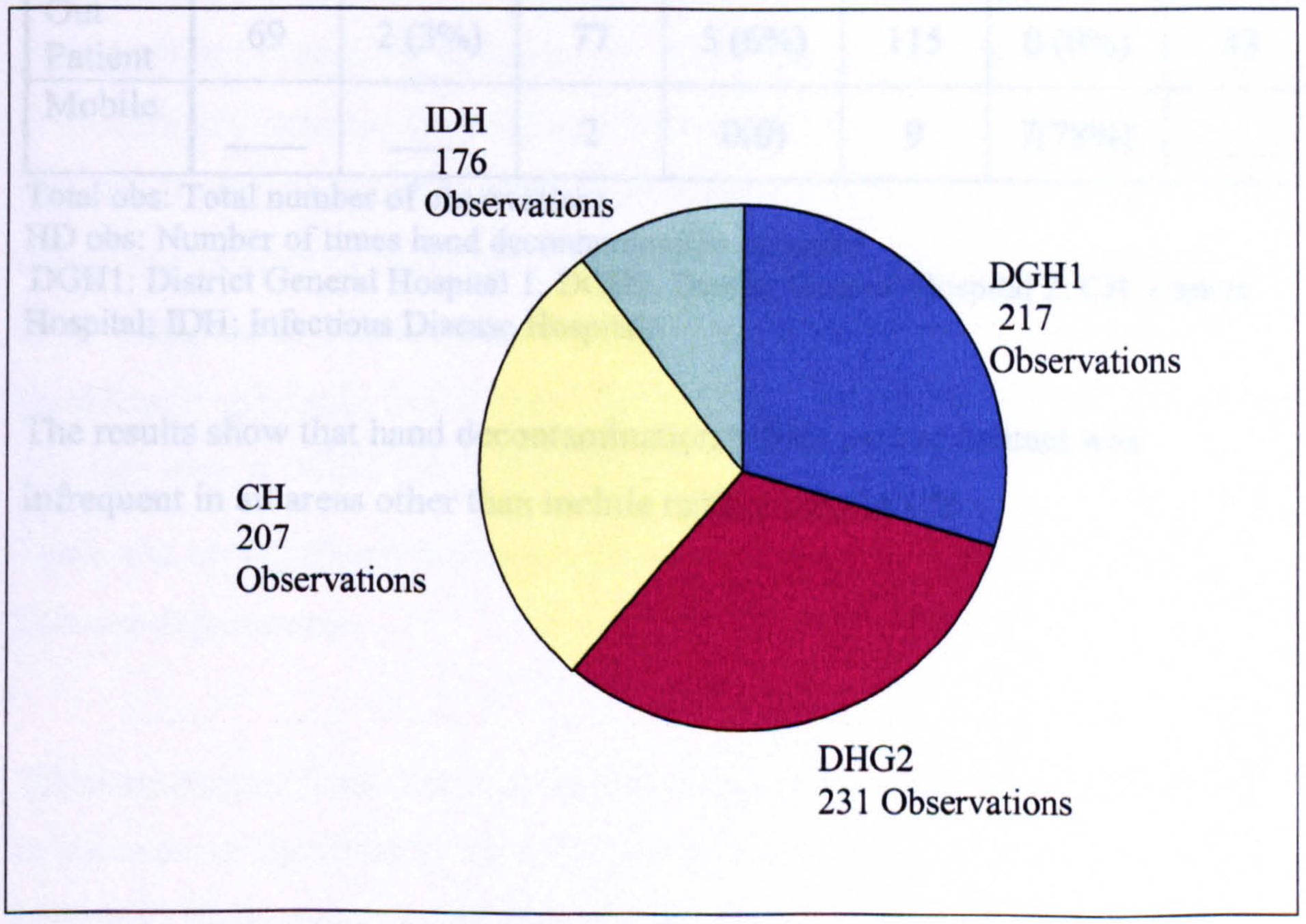


Figure 11. Observations Carried Out in the Four Hospitals.

4.10.1 Hand Decontamination.

Hand decontamination was found to occur infrequently. Overall hand decontamination was observed on 179 (22%) occasions.
Hand decontamination before patient contact occurred on 34 (4%) occasions.
Observations of hand decontamination before patient contact are broken down into the individual hospitals and departments. The data are displayed in Table 14 and Figure 12.

Table 14. Radiographers Hand decontamination Practice Observed Before Patient Contact.

	DGH1		DGH2		CH		IDH	
Dept	Total obs	HD obs (%)	Total obs	HD obs (%)	Total obs	HD (%)	Total obs	HD obs (%)
A+E	87	5 (6%)	74	1 (1%)	____	___	59	0 (0%)
In Patient	61	9 (15%)	78	1 (1%)	83	0 (0%)	64	2 (3%)
Out Patient	69	2 (3%)	77	5 (6%)	115	0 (0%)	53	2 (4%)
Mobile	____	____	2	0(0)	9	7(78%)	____	____

Total obs: Total number of observations.
HD obs: Number of times hand decontamination occurred.
DGH1: District General Hospital 1; DGH2: District General Hospital 2; CH: Cancer Hospital; IDH; Infectious Disease Hospital.

The results show that hand decontamination before patient contact was infrequent in all areas other than mobile radiography in CH

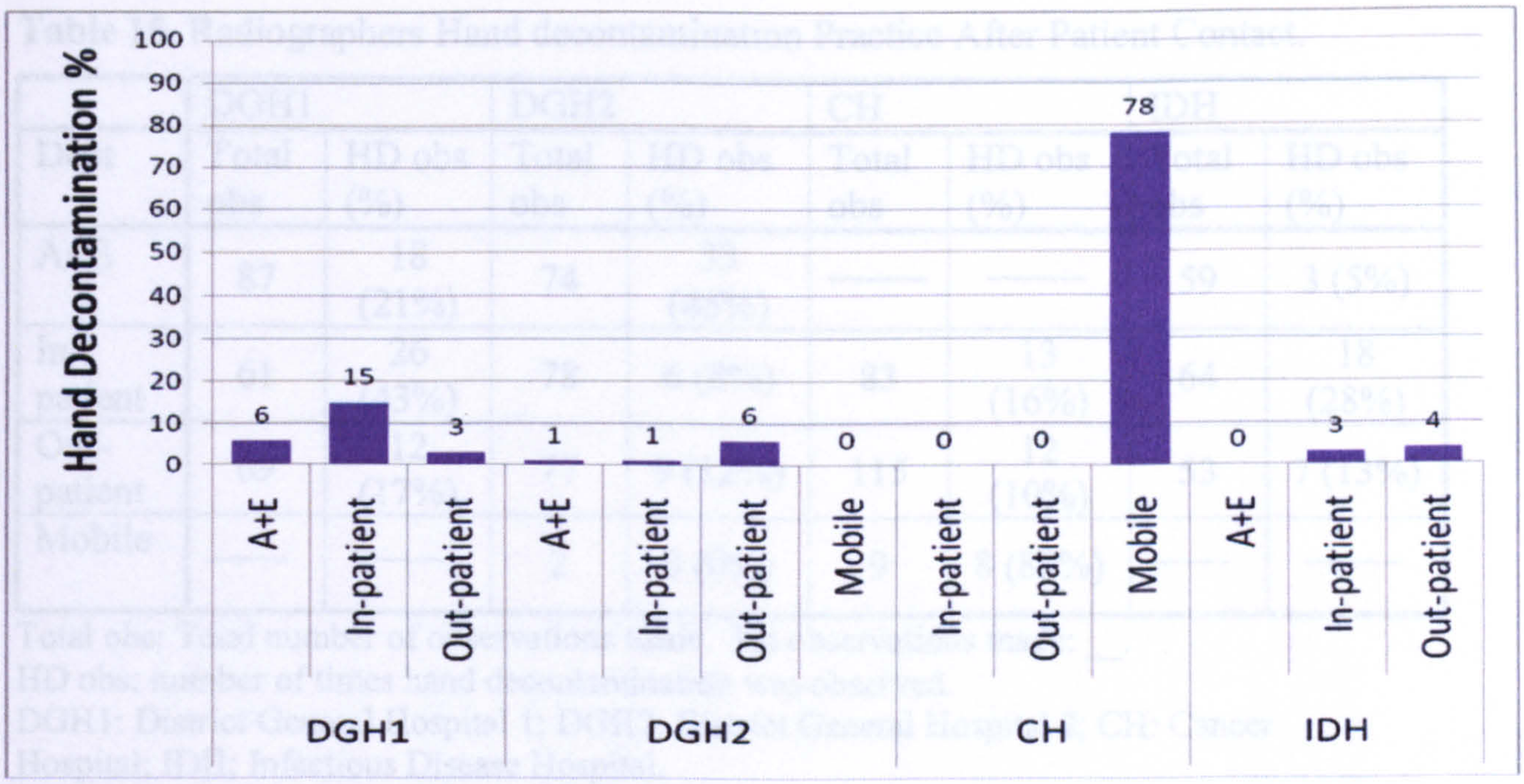


Figure 12. Hand decontamination Before Patient Contact.

Chi-Square analysis was carried out to identify any statistically significant differences between the hospitals with regard to hand decontamination before patient contact (Table I in Appendix 8). The same analysis was also performed to identify any statistically significant differences between the departments.

Statistically significant differences were found in the proportion of hand decontamination prior to patient contact between all hospitals except DGH2 and IDH. Compliance with hand decontamination before patient contact was significantly greater in DGH1 than CH ($p=0.00$). A higher significant difference was also seen in DGH2 than CH ($p=0.013$).

There was no significant difference found in hand decontamination practices between departments.

When monitoring hand decontamination after patient contact, this practice was found to occur significantly more frequently than before patient contact ($p=0.00$). Radiographers were observed decontaminating their hands after patient contact on 145 (17%) occasions. Observations of Radiographers' hand decontamination practice after patient contact are broken down into individual hospitals and departments. The data is displayed in Table 15 and Figure 13.

Table 15. Radiographers Hand decontamination Practice After Patient Contact.

	DGH1		DGH2		CH		IDH	
Dept	Total obs	HD obs (%)	Total obs	HD obs (%)	Total obs	HD obs (%)	Total obs	HD obs (%)
A+E	87	18 (21%)	74	33 (45%)	——	——	59	3 (5%)
In-patient	61	26 (43%)	78	6 (8%)	83	13 (16%)	64	18 (28%)
Out-patient	69	12 (17%)	77	9 (12%)	115	12 (10%)	53	7 (13%)
Mobile	——	——	2	0 (0%)	9	8 (89%)	——	——

Total obs: Total number of observations made. No observations made: __.
HD obs: number of times hand decontamination was observed.
DGH1: District General Hospital 1; DGH2: District General Hospital 2; CH: Cancer Hospital; IDH; Infectious Disease Hospital.

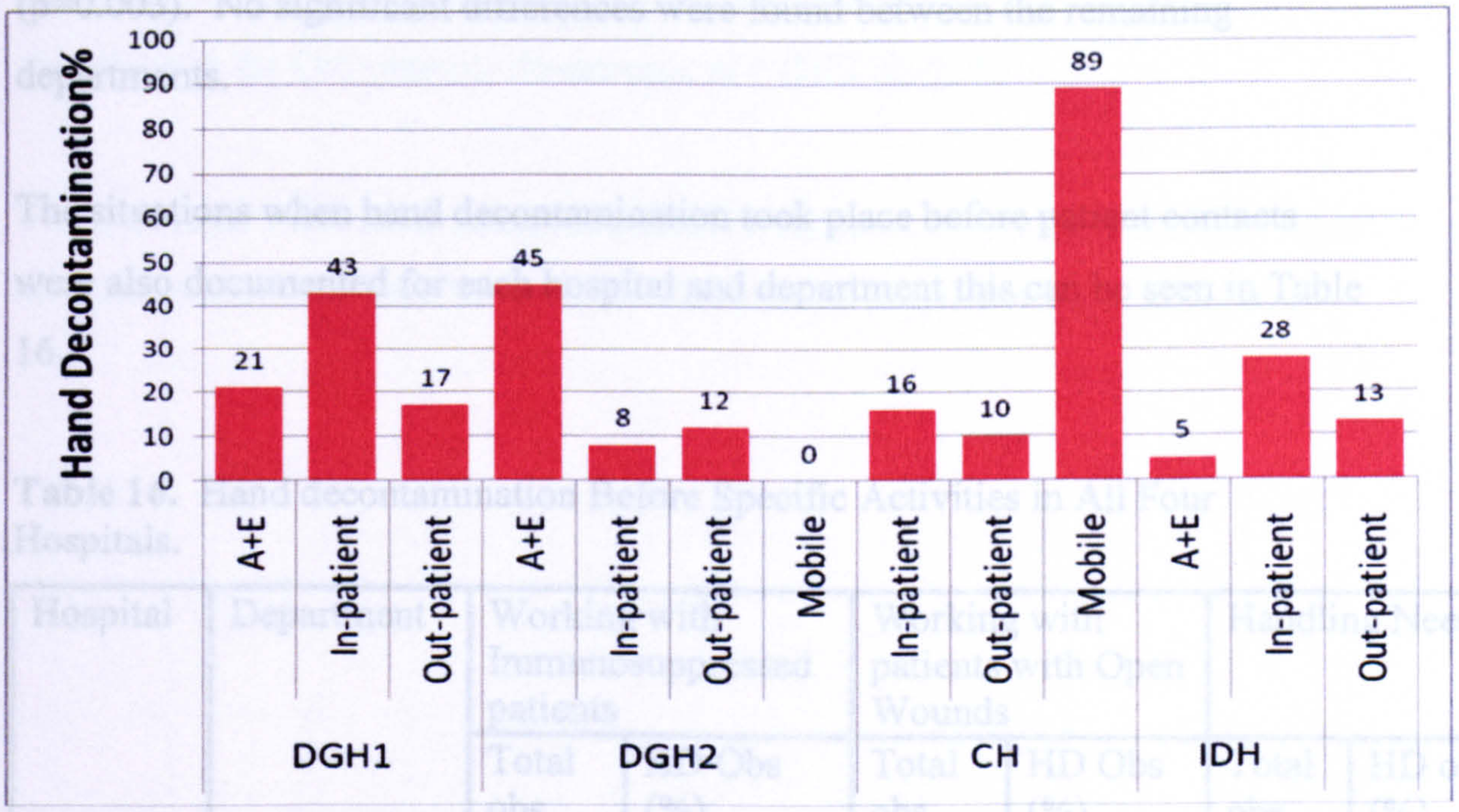


Figure 13. Hand decontamination After Patient Contact.

The results in Figure 13 show that hand decontamination after patient contact occurred more often than before patient contact. Hand decontamination after patient contact occurred most frequently after mobile examinations in CH (n=8, 89%). Hand decontamination after patient contact within the In-patient department in DGH1 (n=26, 43%) was also relatively frequent, as was A+E in DGH2 n=33 (45%).

Chi-Square analysis was carried out to identify any statistically significant differences between the hospitals with regard to hand decontamination after patient contact. The same analysis was also performed to identify any statistically significant differences between the departments (Table II and III in Appendix 8). Compliance with hand decontamination after patient contact was significantly greater in DGH1 than DGH2 (p=0.000). Compliance was also significantly greater in DGH1 than in CH (p= 0.001) and in DGH1 compared to IDH (p= 0.017). No significant differences were found between the remaining hospitals.

Compliance with hand decontamination after patient contact was significantly higher in the In-patient department than in the Out-patient departments (p=0.003). No significant differences were found between the remaining departments.

The situations when hand decontamination took place before patient contacts were also documented for each hospital and department this can be seen in Table 16.

Table 16. Hand decontamination Before Specific Activities in All Four Hospitals.

Hospital	Department	Working with Immunosuppressed patients		Working with patients with Open Wounds		Handling Needles	
		Total obs	HD Obs (%)	Total obs	HD Obs (%)	Total obs	HD obs (%)
DGH1	A+E	1	0 (0%)	14	0 (0%)	6	3 (50%)
	In-patient	1	0 (0%)	10	0 (0%)	13	8 (62%)
	Out-patient	2	0 (0%)	2	0 (0%)	1	1 (100%)
DGH2	A+E	0	____	12	0 (0%)	0	____
	In-patient	2	0 (0%)	34	0 (0%)	2	0 (0%)
	Out-patient	1	1 (100%)	3	0 (0%)	4	3 (75%)
CH	In-patient	27	0 (0%)	36	0 (0%)	0	____
	Out-patient	11	0 (0%)	7	0 (0%)	0	____
	Mobile	7	7 (100%)	9	7 (78%)	0	____
IDH	A+E	0	____	6	0 (0%)	0	____
	In-patient	6	0 (0%)	26	0 (0%)	0	____
	Out-patient	1	1 (100%)	0		0	____

Total obs: Total number of observations made. No observations made: ____.
HD obs: number of times hand decontamination was observed.
DGH1: District General Hospital 1; DGH2: District General Hospital 2;
CH: Cancer Hospital; IDH; Infectious Disease Hospital.

Hand decontamination before contact with patients with open wounds was not observed in any department in DGH1, DGH2 or IDH. However, in CH, during Mobile radiography, radiographers decontaminated their hands frequently when dealing with patients with open wounds (n=7, 78%). In the Out-patient

departments of DGH2 and IDH and during Mobile radiography in CH hand decontamination before contact with an immunosuppressed patient always occurred. Hand decontamination also occurred frequently prior to giving IV injections in the Out-patients department in DGH2 (n=3, 75%).

The situations when hand decontamination took place after patient contacts were also documented for each hospital and department this can be seen in Table 17.

Table 17. Hand decontamination After Specific Activities in all Four Hospitals.

Hospital	Dept	Contact with Body Fluid		Contact with 'unclean' patients		Contact with Infectious		Handling Needles		Removal of Gloves		Cleaning	
		Total obs	HD obs (%)	Total obs	HD obs (%)	Total obs	HD obs (%)	Total obs	HD obs (%)	Total obs	HD obs (%)	Total obs	HD obs (%)
DGH1	A+E	6	6 (100%)	2	1 (50%)	0	___	4	2 (50%)	5	3 (60%)	5	2 (40)
	In-patient	0	___	3	3(100%)	0	___	13	6 (46%)	0	___	1	1(100)
	Out-patient	0	___	4	3 (75%)	0	___	1	0 (0%)	5	1 (20%)	2	2(100)
DGH2	A+ E	5	1 (20%)	0	___	0	___	0	___	3	2 (67%)	5	2 (40)
	In-patient	2	1 (50%)	0	___	2	2(100%)	2	0 (0%)	2	2(100%)	2	2(100)
	Out-patient	0	___	1	1(100%)	1	0 (0%)	4	3 (75%)	2	1 (50%)	0	___
CH	In-patient	0	___	0	___	12	4 (33%)	0	___	0	___	2	0 (0)
	Out-patient	0	___	0	___	2	1 (50%)	0	___	0	___	4	3 (75)
	Mobile	0	___	0	___	0	___	0	___	9	7 (77%)	0	___
IDH	A+E	3	0 (0%)	0	___	0	___	0	___	3	0 (0%)	7	5 (71)
	In-patient	0	___	0	___	12	9 (75%)	0	___	10	9 (90%)	1	0 (0)
	Out-patient	0	___	1	1(100%)	0	___	0	___	0	___	1	1(100)

Total obs: Total number of observations made. No observations made: ___
HD obs: number of times hand decontamination was observed.
DGH1: District General Hospital 1; DGH2: District General Hospital 2; CH: Cancer Hospital; IDH; Infectious Disease Hospital.

Table 17 shows that hand decontamination practice occurred most frequently in DGH1 when dealing with body fluids (n=6, 100%). In the three hospitals where radiographers were observed dealing with unclean patients, hand decontamination was carried out frequently. When dealing with infectious patients, radiographers in IDH performed hand decontamination most frequently in the In-patient department (n=9, 75%). The highest frequency of hand decontamination after glove use was seen during examination within the In-patient department in IDH (n=9, 90%) and during mobile radiography in CH (n=6, 75%).

Where hand decontamination did take place, the method of decontamination was examined and the results are shown in Table 18.

Table 18. Hand Decontamination Methods.

Hospital	Department	Total number of observations	Soap & Water use	Alcohol use	Soap, Water & Alcohol use
DGH1	A+E	26	23 (88%)	3 (12%)	0
	In-patient	36	36 (100%)	0	0
	Out-patient	15	15 (100%)	0	0
DGH2	A+E	14	11 (79%)	0	3 (21%)
	In-patient	6	6 (100%)	0	0
	Out-patient	12	12 (100%)	0	0
CH	In-patient	12	12 (100%)	0	0
	Out-patient	12	12 (100%)	0	0
	Mobile	15	14 (93%)	0	1 (7%)
IDH	A+E	3	2 (67%)	1 (33%)	0
	In-patient	20	8 (40%)	8 (40%)	4 (20%)
	Out-patient	9	6 (67%)	2 (22%)	1 (11%)

DGH1: District General Hospital 1; DGH2: District General Hospital 2; CH: Cancer Hospital; IDH; Infectious Disease Hospital.

Table 18 shows that soap and water use was the most frequent method of hand decontamination in all four hospitals. Within Out-patients in DGH1, DGH2 and CH, soap and water were used 100% of the time. However, alcohol gel was also frequently used in all departments in IDH.

4.10.2 Glove Use.

Another important area for protection against infection is the use of protective clothing. In this study the use of non-sterile gloves was observed. This information is shown in Table 19.

Table 19. Non-sterile Glove use in all Four Hospitals.

	DGH1		DGH2		CH		IDH	
Dept	Total obs	Obs of Gloves worn (%)	Total obs	Obs of Gloves worn (%)	Total obs	Obs of Gloves Worn (%)	Total obs	Obs of Gloves worn (%)
A+E	87	5 (6%)	74	3 (5%)	____	____	59	3 (5%)
In-patient	61	0 (0%)	78	2 (3%)	83	0 (0)	64	10 (16%)
Out-patient	69	5 (7%)	77	2 (3%)	115	0 (0)	53	1 (2%)
Mobile	____	____	2	0 (0)	9	7 (78%)	____	____

Total obs = Total number of observations made. No observations made: ___.
Obs of Gloves worn: number of times glove use was observed.
DGH1: District General Hospital 1; DGH2: District General Hospital 2; CH: Cancer Hospital; IDH; Infectious Disease Hospital.

Non sterile gloves were most frequently worn during Mobile radiography in CH (n=6, 67%). Chi-Square analysis was carried out to identify any statistically significant differences between the hospitals with regards to glove use (Table IV in Appendix 8). The same analysis was used to compare departments. Glove use was significantly greater in IDH than in CH (p= 0.000). Glove use was also significantly higher in DGH1 than CH (p= 0.002). There was no significant difference in glove use between the departments.

As with hand decontamination, the situations in which gloves were worn were also observed. The results of each hospital are shown in Table 20. The results show that gloves were most frequently worn by radiographers examining infectious patients. Gloves were also frequently worn in DGH1 when dealing with body fluids.

Table 20. Conditions when Non-sterile Gloves were used in all Four Hospitals.

Hosp	Dept	Body Fluids		Handling Needles		Infectious		Contaminated Objects	
		Total obs	HD obs (%)	Total obs	HD obs (%)	Total obs	Hd obs (%)	Total obs	HD obs (%)
DGH1	A+E	8	5 (63%)	6	0 (0%)	0	____	1	0 (0%)
	In-patient	3	0 (0%)	13	0 (0%)	0	____	0	____
	Out-patient	7	5 (71%)	1	0 (0%)	0	____	0	____
DGH2	A+E	6	3 (50%)	0	____	0	____	0	____
	In-patient	2	0 (0%)	2	0 (0%)	2	2 (100%)	0	____
	Out-patient	1	0 (0%)	4	2 (50%)	2	0 (0%)	0	____
CH	In-patient	13	0 (0%)	0	____	12	0 (0%)	0	____
	Out-patient	1	0 (0%)	0	____	2	0 (0%)	0	____
	Mobile	0	____	0	____	0	____	0	____
IDH	A+E	3	1 (33%)	0	____	0	____	0	____
	In-patient	0	____	0	____	12	10(83%)	1	0 (0%)
	Out-patient	0	____	0	____	0	____	0	____

Total Obs: Total number of observations made. HD obs: number of observations of hand decontamination.
No observations made: ___. DGH1: District General Hospital 1; DGH2: District General Hospital 2;
CH: Cancer Hospital; IDH; Infectious Disease Hospital.

4.10.3 Cleaning.

Cleaning of the radiographic equipment was another activity observed. This included any equipment that came into direct contact with the patient or the radiographer. Overall cleaning was observed on 30 (4%) occasions. Observations of cleaning the equipment have been broken down into individual hospitals and departments. The data is displayed in Table 21 and Figure 14.

Table 21. Cleaning of Radiographic Equipment.

	DGH1		DGH2		CH		IDH	
Dept	Total obs	Cleaning obs (%)	Total obs	Cleaning obs (%)	Total obs	Cleaning obs (%)	Total obs	Cleaning obs (%)
A+E	87	5 (6%)	74	5 (7%)	___	_____	59	1 (2%)
In-patient	61	1 (2%)	78	2 (3%)	83	2 (2%)	64	7 (11%)
Out-patient	69	2 (3%)	77	0 (0%)	115	4 (3%)	53	1 (2%)
Mobile	___	_____	2	0 (0%)	9	0 (0%)	___	_____

Total obs: Total number of observations. Cleaning obs: number of observations of cleaning. No observations made: ___.
DGH1: District General Hospital 1, DGH2: District General Hospital 2, CH: Cancer Hospital, IDH: Infectious Disease Unit.

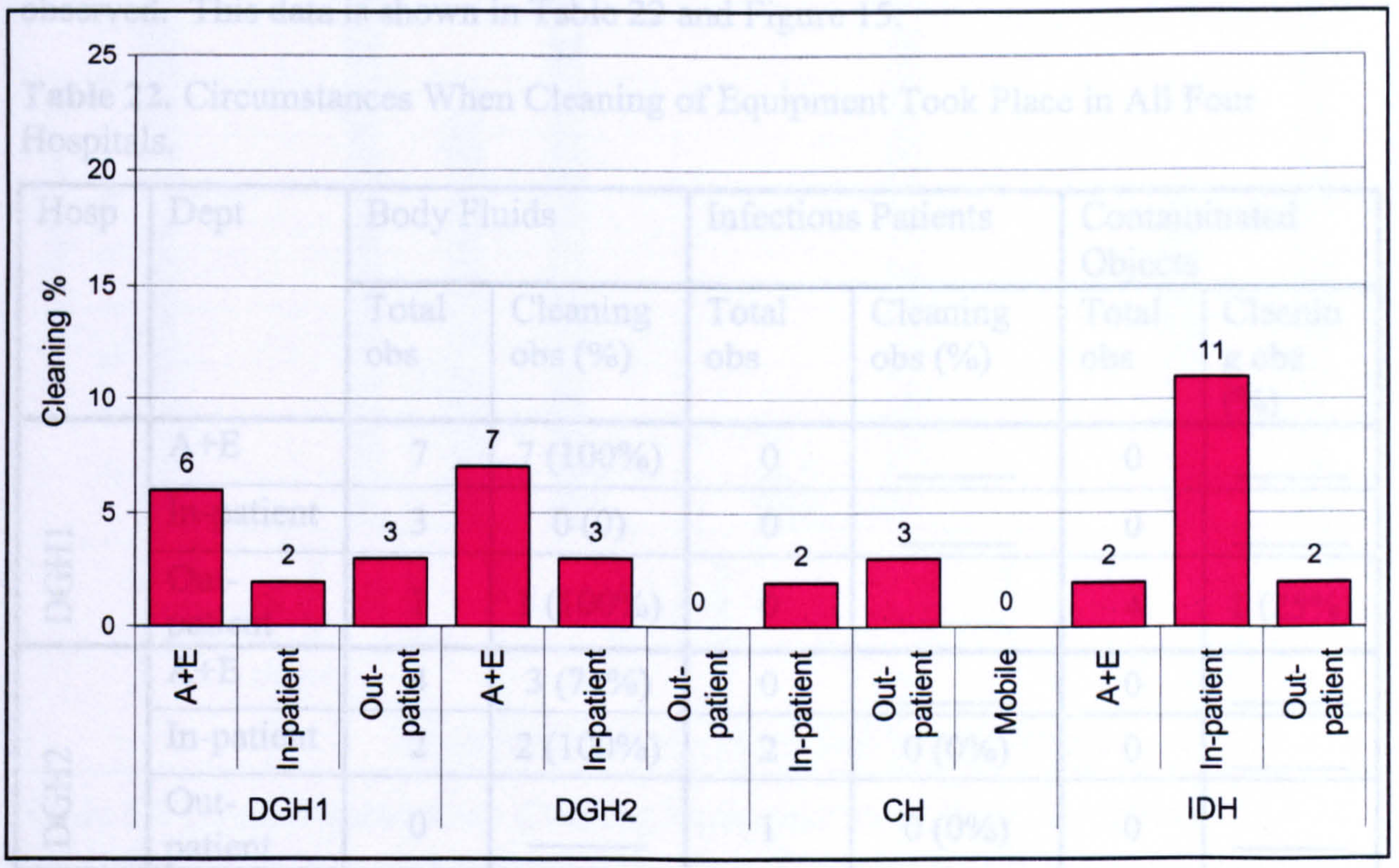


Figure 14. Cleaning of Radiographic Equipment.

Cleaning did not occur frequently during the observational study. However, it occurred most frequently in the In-patient department in IDH (n=7, 11%). This was followed by the A+E departments in DGH1 (n=5, 6%) and DGH2 (n=5, 7%).

The circumstances when cleaning of the radiographic equipment took place were observed. This data is shown in Table 22 and Figure 15.

Table 22. Circumstances When Cleaning of Equipment Took Place in All Four Hospitals.

Hosp	Dept	Body Fluids		Infectious Patients		Contaminated Objects	
		Total obs	Cleaning obs (%)	Total obs	Cleaning obs (%)	Total obs	Cleaning obs (%)
DGH1	A+E	7	7 (100%)	0	____	0	____
	In-patient	3	0 (0)	0	____	0	____
	Out-patient	1	1 (100%)	0	____	4	1 (25%)
DGH2	A+E	4	3 (75%)	0	____	0	____
	In-patient	2	2 (100%)	2	0 (0%)	0	____
	Out-patient	0	____	1	0 (0%)	0	____
CH	In-patient	9	1 (11%)	12	1 (8%)	0	____
	Out-patient	2	0 (0%)	2	2(100%)	0	____
	Mobile	0	____	0	____	0	____
IDH	A+E	3	1 (33%)	0	____	0	____
	In-patient	0	____	12	7 (58%)	0	____
	Out-patient	0	____	0	____	1	1 (100%)

Total obs: Total number of observations. Cleaning obs: Number of observations of cleaning. No observations made: ___.
DGH1: District General Hospital 1, DGH2: District General Hospital 2, CH: Cancer Hospital, IDH: Infectious Disease Unit.

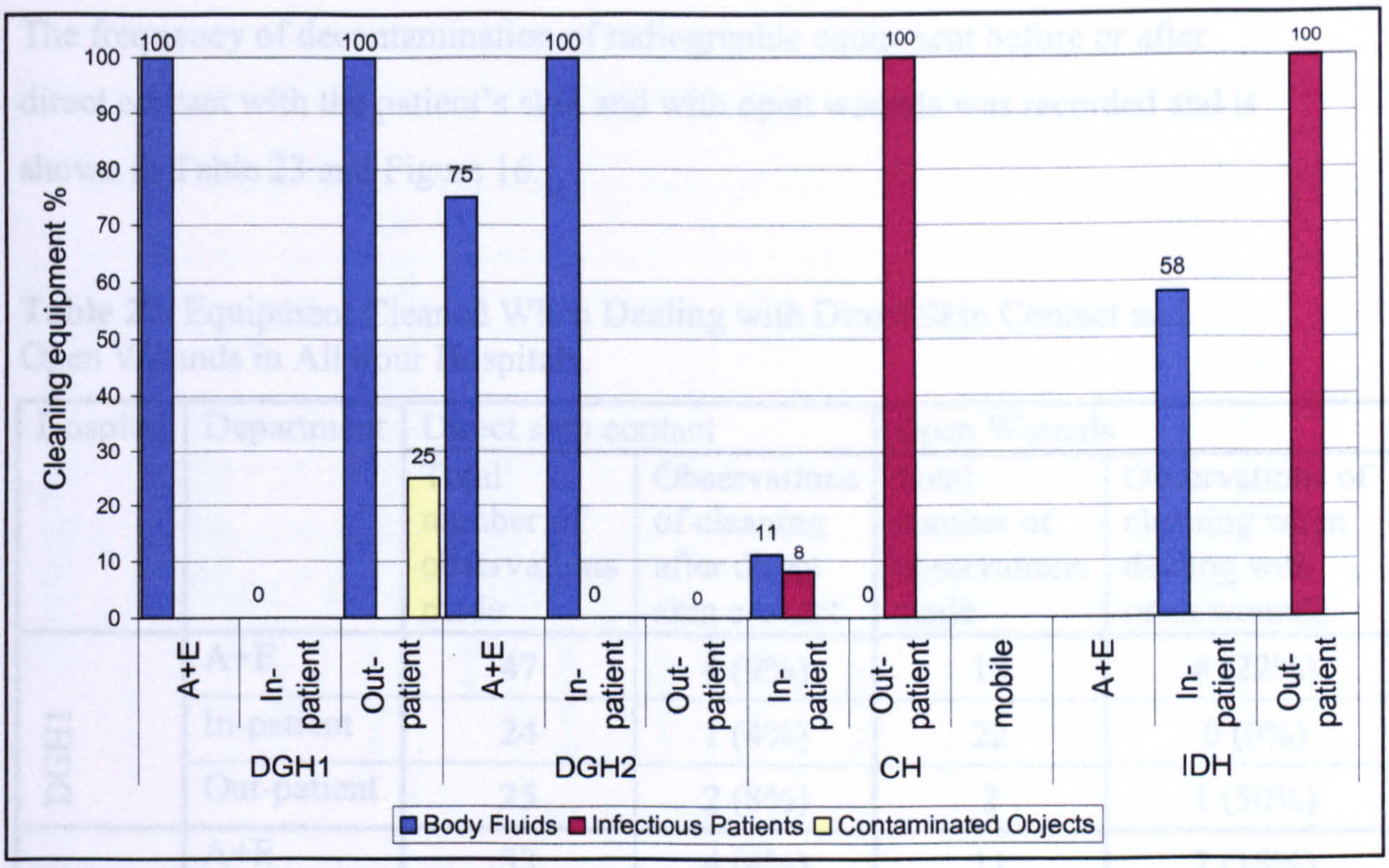


Figure 15. Circumstances when Cleaning Equipment Took Place in All Four Hospitals.

Equipment contaminated with body fluids was cleaned by radiographers in DGH2 A+E (n=3, 75%) and In-patients department (n=2, 100%). When dealing with known infectious patients the equipment was most frequently cleaned in A+E (n=7,100%) and IDH In-patient department, (n=7, 58%).

The frequency of decontamination of radiographic equipment before or after direct contact with the patient's skin and with open wounds was recorded and is shown in Table 23 and Figure 16.

Table 23. Equipment Cleaned When Dealing with Direct Skin Contact and Open Wounds in All Four Hospitals.

Hospital	Department	Direct skin contact		Open Wounds	
		Total number of observations made	Observations of cleaning after direct skin contact	Total number of observations made	Observations of cleaning when dealing with open wounds
DGH1	A+E	47	4 (9%)	18	4 (22%)
	In-patient	24	1 (4%)	22	0 (0%)
	Out-patient	25	2 (8%)	2	1 (50%)
DGH2	A+E	53	4 (8%)	11	2 (18%)
	In-patient	25	1 (4%)	36	1 (3%)
	Out-patient	32	0 (0%)	4	0 (0%)
CH	In-patient	29	1 (3%)	35	0 (0%)
	Out-patient	61	3 (5%)	8	1 (13%)
	Mobile	2	0 (0%)	9	0 (0%)
IDH	A+E	48	1 (2%)	8	1 (13%)
	In-patient	22	3 (14%)	20	6 (30%)
	Out-patient	31	1 (3%)	0	0 (0%)

DGH1: District General Hospital 1, DGH2: District General Hospital 2, CH: Cancer Hospital, IDH: Infectious Disease Unit.

Equipment was most frequently cleaned after direct skin contact within the In-patient department in IDH (n= 3, 14%). Cleaning of the equipment when dealing with patients with open wounds occurred most frequently in In-patients in IDH (n=6, 30%) and A+E in DGH1 (n= 4, 22%).

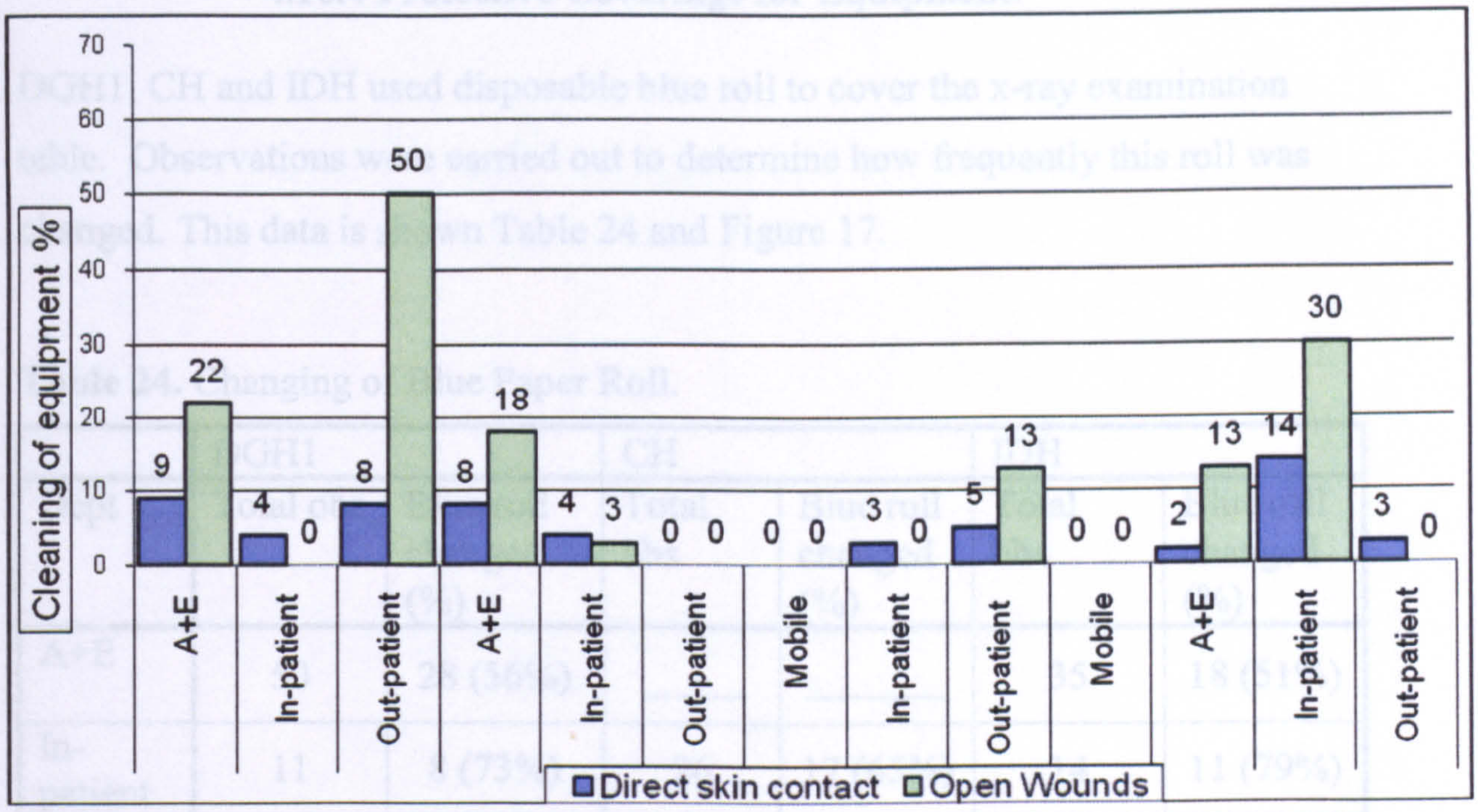


Figure 16. Circumstances When Cleaning of Equipment Took Place.

Chi-square analysis was carried out to identify any differences between the hospitals and departments with regard to the cleaning of equipment when dealing with patients with open wounds (Table V and VI in Appendix 8). Cleaning the equipment was significantly higher in IDH than DGH2 ($p=0.018$). Cleaning was also significantly greater in IDH than CH ($p=0.004$). There was no significant difference found between the remaining hospitals.

It was found that when comparing cleaning of equipment when dealing with open wounds and department that cleaning was significantly higher in A+E than the In-patient department ($p=0.005$).

4.10.4 Protective Coverings for Equipment.

DGH1, CH and IDH used disposable blue roll to cover the x-ray examination table. Observations were carried out to determine how frequently this roll was changed. This data is shown Table 24 and Figure 17.

Table 24. Changing of Blue Paper Roll.

	DGH1		CH		IDH	
Dept	Total obs	Blue roll changed (%)	Total obs	Blue roll changed (%)	Total obs	Blue roll changed (%)
A+E	50	28 (56%)	____	_____	35	18 (51%)
In-patient	11	8 (73%)	26	17 (65%)	14	11 (79%)
Out-patient	39	29 (74%)	26	25 (96%)	22	16 (73%)

Total obs: Total number of observations. : Blue roll changed: Number of times blue roll was changed. No observations made: ____.
DGH1: District General Hospital 1, DGH2: District General Hospital 2, CH: Cancer Hospital, IDH: Infectious Disease Unit.

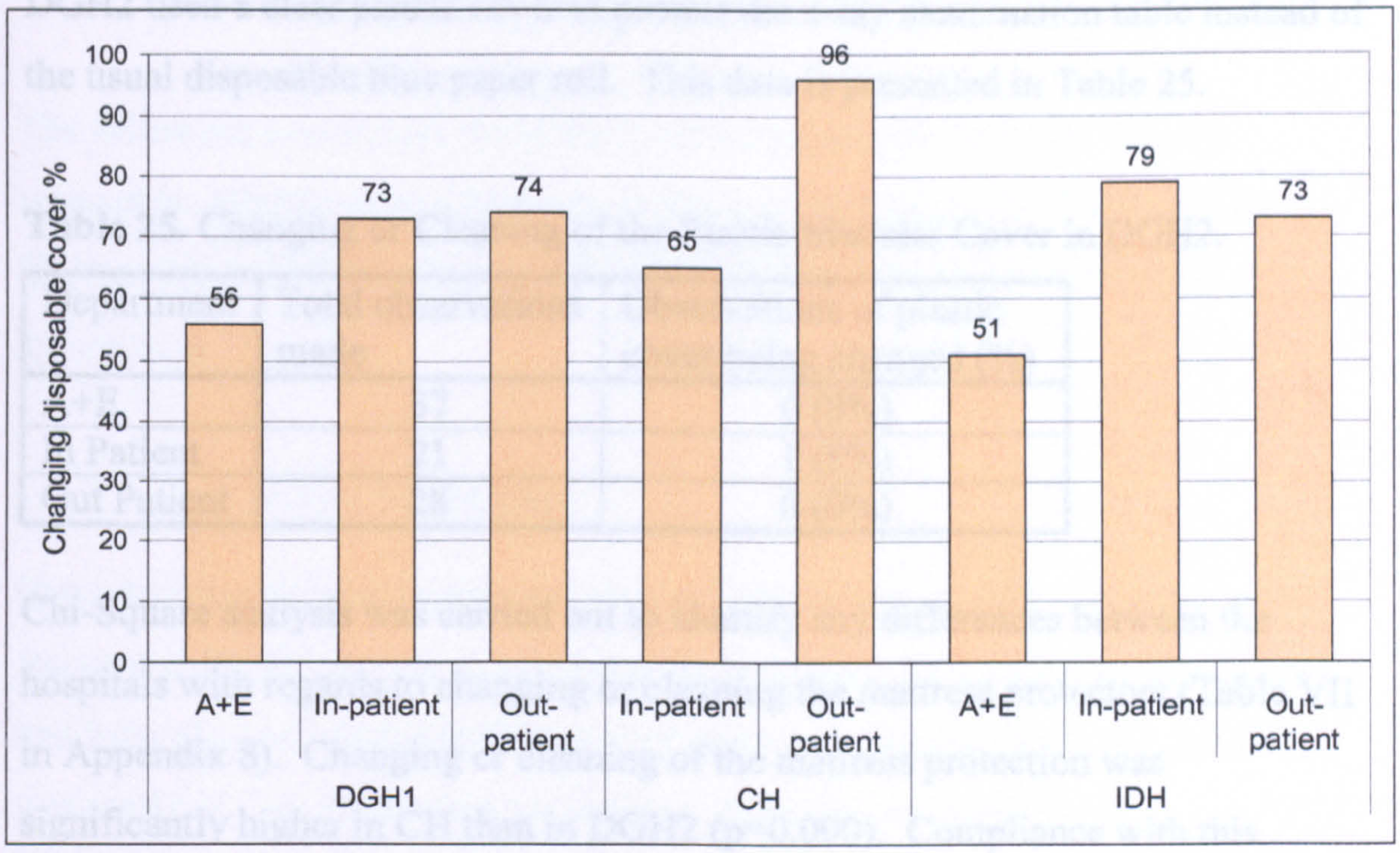


Figure 17. Changing Blue Paper Roll.

The results in Figure 17 show that the disposable paper was changed frequently.

The Out-patient department in CH was found to carry out this practice the most frequently n=25 (96%).

DGH2 used a clear plastic cover to protect the x-ray examination table instead of the usual disposable blue paper roll. This data is presented in Table 25.

Table 25. Changing or Cleaning of the Plastic Mattress Cover in DGH2.

Department	Total observations made	Observations of plastic cover being changed (%)
A+E	37	0 (0%)
In Patient	21	1 (5%)
Out Patient	28	0 (0%)

Chi-Square analysis was carried out to identify any differences between the hospitals with regards to changing or cleaning the mattress protectors (Table VII in Appendix 8). Changing or cleaning of the mattress protection was significantly higher in CH than in DGH2 (p=0.000). Compliance with this practice was also significantly greater in IDH than DGH2 (p=0.000), and DGH1 than DGH 2 (p=0.000).

The only statistically significant difference between departments with regards to changing/ cleaning the protective mattress covers occurred between the A+E department and the Out-patient department (Table VIII in Appendix 8). Compliance was significantly greater in the Out-patient departments than the A+E departments (p=0.00).

4.10.5 Protective Covers for Cassettes during Mobile Radiography.

In many cases during Mobile radiography in CH, barriers, such as pillow cases were used to prevent the patient coming into direct contact with the cassettes. It was found that barrier methods were employed on 6 (67%) occasions.

4.11 Discussion Phase One - Observational Study.

The following is a discussion of the observational audit findings. Where applicable, references will be made to literature to support the findings. The findings from the three phases of the study will be linked together where appropriate.

4.11.1 Knowledge

Hand decontamination before and after patient contact was significantly more frequent in DGH1 than in any of the other hospitals. This was surprising as it had been expected that infection control practice would be carried out more frequently in CH, where they are dealing with a greater number of immunosuppressed patients. Radiographers in CH demonstrated their knowledge of the process for decontaminating their hands when dealing with immunosuppressed patients on the wards, as they not only performed this task, but also instructed the researcher in the appropriate practice. As IDH has an infectious disease unit, this hospital also was expected to have higher compliance rates due to the radiographers having more knowledge about infectious patients.

4.11.1.1 Hand Decontamination After Patient Contact.

Hand decontamination after patient contact was found to be significantly more frequent in the In-patient department than the Out-patient department. During the Focus Group discussions, the radiographers demonstrated their knowledge that In-patients were more likely to harbour infection as a result of their stay in hospital, as well as being more susceptible to infection due to illnesses or open wounds from surgery or injury. This knowledge may explain why increased compliance occurred in the In-patient department. The researcher had thought that hand decontamination would have been carried out frequently in the A+E department, due to the increased risk of open wounds and the lack of available medical information about their patients; however this was not the case. Possible reasons for this are discussed later (4.11.2).

4.11.1.2 Hand Decontamination After Contact with Infectious Patients.

Lack of information about a patient's infectious status was a reason given by many radiographers for not complying with infection control protocols. Radiographers in IDH had the highest frequency of hand decontamination after contact with infectious patients. This may suggest that these radiographers may have been more aware of the infection risk to themselves and to future patients because of the hospital having a specialised infectious disease unit. The radiographers in IDH also gained more information regarding the patient's infectious status by telephoning the referring clinician. Obtaining this information and taking ownership of the issue may have prompted them to carry out hand decontamination. Interestingly, radiographers in CH were found to have the lowest levels of compliance when dealing with infectious patients. This was surprising, as the patients in this hospital were considered to be at a higher risk of infection, due to their lowered immune systems, this was knowledge the radiographers should have been aware of. A system in CH was in place to inform all HCPs about the patient's infectious status. Unfortunately, a number of radiographers did not value this system as they felt the information was not up to date, so chose to ignore it. It is therefore important to ensure that radiographers are aware that the computer records are updated regularly. In addition to this issue a radiographer was unaware of the appropriate protocol to follow when examining an infectious patient. A system for informing staff of the infectious status of patients may be of little use if radiographers do not have the required knowledge to deal safely with these patients. Simply providing a written protocol is not enough. Cabana (2000) says: HCPs need to be made aware of the existence of the protocol; they also require training to ensure they have the necessary skills to adhere to them.

4.11.1.3 Method of Hand Decontamination.

A number of studies have found Alcohol Hand Rubs (AHRs) to be a suitable alternative to the conventional soap and water method of hand decontamination, when hands are not soiled. The AHRs have also been found to improve

compliance with hand decontamination protocols because they are quick and easy to use (Rochon-Edouard *et al.* 2004). It is indicated by Gould (2002) that the ability to choose an appropriate hand decontaminant is a skill that is required by all HCPs and must be acquired at an early stage of a HCPs career. As the radiographers in this study infrequently used AHR alone, it may suggest that they do not possess this skill and are unaware of how the AHR should be used i.e. if the hands are not soiled it is not necessary to use both soap and water and AHR. Increased knowledge in this area may aid in increasing compliance.

4.11.1.4 Cleaning of Equipment.

Ensuring that the environment is kept clean is crucial in the bid to prevent cross contamination. Studies have shown that MRSA can be found on pieces of equipment even after, apparent, thorough cleaning (Blythe *et al.*, 1998). The radiographic equipment is often used for more than one patient, and by more than one radiographer, so it is possible that a patient could transmit bacteria to the radiographers and from one patient to another. This makes the cleaning of equipment in this area essential. Unfortunately, cleaning of the radiographic equipment occurred infrequently. It mainly occurred if equipment became contaminated with body fluids, however, there were occasions when the equipment was visibly contaminated with blood and no cleaning took place. During this study no significant differences were found between the four hospitals or between the different departments in the cleaning of equipment. This could suggest that the poor practice arises as the radiographers are unaware of the ease of bacterial transfer and the importance of cleaning. Radiographers may believe that, on the whole, their work is clean and because they do not frequently deal with body fluids or open wounds the equipment is unlikely to become contaminated. This of course is not the case; even 'clean' activities can lead to the transfer of large numbers of bacteria to the equipment and HCPs hands (Casewell and Phillips, 1977; Sanderson and Weissler, 1992). The bacterial analysis in this study, along with other studies, has shown the radiographic equipment to be contaminated with bacteria, in some cases pathogenic organisms have also been found (Meyers, 1969; Lefrock *et al.*, 1978). Interestingly, many radiographers in all four hospitals made comments

during the observational study about their not wishing to touch various pieces of equipment if they themselves were the patient. This leads the researcher to believe that they do in fact recognise the risks involved with not cleaning the equipment, but choose not to carry out this practice.

4.11.2 Perception of Risk.

It was found that the frequency of hand decontamination after patient contact, in comparison to hand decontamination before patient contact, increased significantly from 4% (34) to 17% (45). However, these compliance rates were still much lower than that found by Pittet *et al.* (1999b), this is a very worrying finding. Due to the high number and variety of patients examined in the Diagnostic Imaging Department, the lack of hand decontamination has the potential to spread infections throughout the hospital. It was originally thought that HCPs may see hand decontamination as a form of protection for themselves, rather than only for the patient's benefit and that this would explain the increase in hand decontamination frequency after patient contact. While this may be true in some circumstances, if radiographers truly believed this they would have been expected to have complied with all infection control guidelines to a much higher degree, especially after dealing with body fluids, yet, this did not occur. Low levels of compliance with hand decontamination protocols under these circumstances may occur because they do not adequately perceive the infection risk posed by the patients they care for. This places the radiographer at greater risk of infection as well as contributing to cross contamination in the department. The Department of Health (1998) state that 'Universal Precautions' should be used for every patient when there is a risk of contact with blood or other body fluids. Interestingly, the radiographers involved in the Focus Group discussions indicated that they were aware of the need for hand decontamination when dealing with body fluids, and believed that they took the appropriate precautions.

It was expected that radiographers working in IDH would have been more aware of the risks of contracting an infection than radiographers in other hospitals because of IDH having a specialised infectious disease unit. The radiographers from IDH would have been expected to wash their hands more frequently in order to protect themselves and future patients. However, in IDH, compared

with the other three hospitals no statistically significant difference was found (see Table I and II in Appendix 8). An issue with only decontaminating hands after patient contact is that the risk of cross contamination is not removed completely, it may still be possible to transmit infection as HCPs hands may be re-contaminated after contact with a number of objects prior to their next patient contact. This suggests that radiographers may be unaware of the contamination risk associated with the handling of equipment.

As already stated, the increased frequency of hand decontamination after patient contact may have occurred due to the radiographers' belief that In-patients were more likely to harbour infection, as well as being more susceptible to infection. The increase in hand decontamination may also be due to the provision of more information when dealing with admitted patients than Out-patients and A+E patients. The researcher had thought that there would also be a difference in hand decontamination practice between the A+E department and Out-patient department as there is limited knowledge about A+E patient's medical history and they may have injuries resulting in open wounds. However, this was not the case, this may be due, as stated by Wilkinson (1992), that some HCPs will only wear gloves when dealing with a patient once a diagnosis of infection has been made. It may be that radiographers require definite information regarding a patient's infectious status before any infection control measures are implemented. It is also possible that as a number of A+E patients present with injuries with intact skin, radiographers believe they are unlikely to come into contact with open wounds or body fluids which could lead to contamination. During the observational study, radiographers in CH said that many patients would have already been in contact with infectious patients in the waiting rooms and possibly on public transport, therefore, they did not feel that the Diagnostic Imaging Department posed any great risk to the patients. This attitude may also explain why compliance with infection control practices was low.

Compliance with hand decontamination protocols, before and after patient contact, during Mobile radiography in CH was found to be much higher than in other departments. However, because only a very small number of observations were made, no statistical analysis was carried out. The main reason for Mobile

radiography to take place in CH was because the patients were neutropenic; hospital policy dictated they should not attend the main Diagnostic Imaging Department for their examinations, due to the high risk of contracting an infection. Reasons for the increase in compliance with infection control measures may be due to radiographers' belief that infection control measures are vital to prevent these susceptible patients from contracting an infection. The majority of the patients requiring mobile examinations in CH were also cared for in isolation rooms with notices outside these rooms reminding HCPs to wash their hands before and after entering. These factors may also have prompted the use of infection control practices and so explain higher levels of compliance.

4.11.2.1 Hand Decontamination and Cleaning Before Contact with Patients with Open Wounds.

When examining patients with open wounds hand decontamination is essential prior to patient contact, because the natural skin barrier has been impaired, and thus, provides a portal of entry for bacteria to enter the body and cause infection (Damani, 2003). Surprisingly, with the exception of mobile radiography in CH, in all other departments in the four hospitals involved in the study no hand decontamination took place before dealing with a patient with an open wound. This may suggest that radiographers do not fully understand the risk of infection that an open wound poses to the patient. However, this was discussed during the Focus Group sessions, and included the risk associated with performing an intravenous injection. As a result, it seemed that although the radiographers are aware that open wounds allow bacteria to enter the body, they may doubt that there is any real risk of this occurring through their work in the Diagnostic Imaging Department. The increased frequency of hand decontamination in CH may have occurred because, as already stated, these patients were cared for in isolation rooms with infection control reminders and not solely because they had open wounds. With regard to the risk of infection to the radiographer it became clear during the Focus Group sessions that radiographers believed they were less at risk of contracting an infection than nurses, because they do not have to carry out activities such as dressing wounds. It is possible that radiographers believe

that open wounds only pose a risk if there is prolonged direct contact with the wound.

Equipment making direct contact with a patient's skin or the radiographer's hands can result in it becoming contaminated with bacteria. As shown in the Literature Review (2.14.1, Table 8) Wilson and Jenner (2001) placed the risk of direct contact into three categories. Contact with intact skin is classified as a low risk; however, there is still the potential for the equipment to become contaminated and for transmission of infection to further patients (Rutala and Weber 2004). Equipment in contact with an open wound is classified as a medium risk (Wilson and Jenner 2001). In these cases clean equipment is essential to reduce the risk of HAI. During this study, as in any clinical situation, an invasive device in place was classed as an open wound. When dealing with patients with open wounds the equipment should be decontaminated prior to contact with the patient to prevent any bacteria entering the body through the opening in the skin. Worryingly, in CH the equipment was cleaned only once when dealing with a patient with an open wound, in this case cleaning occurred after patient contact. It could be assumed that radiographers only perceive a risk of open wounds and cross contamination to subsequent patients and not to the initial patient whose defence mechanism has been breached. It was assumed that radiographers in IDH may be more aware of the risks of cross contamination when dealing with open wounds, as a result of working with patients from the infectious disease unit. However, if this was the case it would have been reasonable to expect radiographers from the IDH to comply to a greater degree with other infection control procedures, but this did not happen. It is possible that the radiographers did not see many of the openings into the body as open wounds this may explain why cleaning of the equipment occurred infrequently.

4.11.2.2 Hand Decontamination When Handling Needles.

Radiographers in DGH1 and DGH2 were observed inserting and removing intravenous needles while performing Intravenous Urograms (IVUs). Apart

from the two observations in the In-patient department in DGH2 where no hand decontamination took place, radiographers washed their hands on at least 50% of the occasions before handling needles. During training for this activity the importance of infection control would have been explained so, a 50% compliance rate is still too low. This poor practice could be as a result of radiographers believing that the risk of infection is only present when inserting the needle, thus removing the need to decontaminate their hands prior to removing the needle. Hand decontamination after inserting or removing needles was also low, never occurring more than 50% of the time. It may be that radiographers believe they only need to carry out this procedure if they come into contact with the patient's blood. Radiographers not qualified to perform IV injections may still remove needles or cannulas. These radiographers may not have been educated about the importance of infection control practices in these situations. Lack of knowledge, or low perceived risk to themselves or the patient could be the reason why infection control protocols are infrequently followed when performing this procedure.

4.11.2.3 Decontamination of equipment After Contact with Infectious Patients.

As with hand decontamination cleaning of the radiographic equipment occurred more frequently in IDH than the other hospitals. However, compliance rates were still extremely low. Decontaminating equipment is essential after contact with infectious patients to prevent transmission of the infection. In DGH2 when dealing with known infectious patients, radiographers would cover the cassettes, and in doing so may believe the equipment could not have become contaminated. As a result, they may not regard the equipment as a real threat to the patients so cleaning was not necessary.

4.11.2.4 Hand Decontamination After Contact with 'Unclean' Patients.

Interestingly, dealing with patients considered by the radiographers to be 'unclean' resulted in a compliance rate in each department of at least 50%. Again, this may indicate that hand decontamination was carried out to protect

the radiographer. It may also be due to the belief that dirt increases the number of bacteria present and so increases the risk of infection. Camm (2004) found that staff are more likely to carry out hand decontamination in situations where there was a visual prompt showing the risk, such as after dealing with blood or faeces. However, during this study radiographers' compliance with hand decontamination practice was still low when dealing with patient's body fluids. The researcher does agree that visual prompts encourage HCPs to carry out hand decontamination, but, like Teare (1999), feels that staff are more uncomfortable with situations considered to be dirty and believe that they pose a very obvious risk to themselves. The researcher also believes that hand decontamination, when hands are visibly soiled, may occur due to social conditioning rather than the belief that they will become contaminated with bacteria.

4.11.3 Culture.

The researcher believes that the culture of the department plays a vital role in compliance with infection control protocols. Glove use and hand decontamination was greatest during mobile radiography in CH. As mentioned earlier this may be due to knowledge of the susceptibility of the patient and by the presence of reminders to follow infection control practices displayed close to the patient. Interestingly, even though many of radiographers were aware that the patients may have been immunocompromised, as a result of their treatment, hand decontamination before patient contact was not observed on any other occasion in CH. These differences may be due to radiographers gaining more definite information regarding a patient's susceptibility to infection when carrying out mobile radiography. This could be reinforced by the culture of the departments they visited along with improved facilities and available resources. The lack of patient information given to radiographers working in the Diagnostic Imaging Department may be due to poor communication between the departments. However, it is possible that staff in other departments of the hospital are also unaware of a patient's infectious status when they send them for investigations. During the Focus Group discussions radiographers' claimed to carry out infection control procedures more rigorously when examining patients outside the Diagnostic Imaging Department. Again this suggests that the culture

in other departments is more conducive to compliance with infection control procedures.

4.11.3.1 Glove Use.

The use of gloves is included in the 'Universal Precautions' policy. This states that gloves should be used in procedures involving blood and other body fluids. Gloves provide an important barrier to the radiographers' hands preventing the transmission of infection through wounds or breaks in the skin. When examining infectious patients the use of gloves also reduces the level of contamination on the radiographers' hands, this then also protects subsequent patients. With this in mind it was surprising to find that compliance with the glove use protocol was extremely low. Compliance was significantly higher in the IDH and DGH1 than in CH. Radiographers working in IDH wore gloves more frequently when examining infectious patients than those working in other hospitals. As already stated, in IDH the In-patients department had a policy to allow identification of infectious patients. This may have increased awareness of the necessity to wear gloves when examining these patients. In contrast, radiographers in CH did not wear gloves when dealing with infectious patients. Radiographers in CH were also made aware of a patients' infectious status, but chose to ignore the information provided. Lack of knowledge regarding the correct protocols to follow may be a reason for low compliance with infection control protocols, including the use of gloves.

Observations carried out in DGH1 and DGH2 showed that glove use was not frequently employed when handling needles. In these circumstances, due to the risk of contact with blood, glove use is very important. These results show that radiographers are putting themselves at risk of infection. In the Focus Group discussions, superintendent radiographers were very concerned about the lack of glove use in these situations. Many felt it was due to the example set by consultants and doctors who do not wear gloves when inserting needles, this may reinforce the belief that no risk of cross infection is present in this activity.

4.11.3.2 Examining Infectious Patients.

When carrying out examinations of infected patients, radiographers in DGH2 were observed to follow their protocols and cover the equipment to prevent it becoming contaminated. On occasions no cleaning was observed. This may be because radiographers believed that no direct contact had occurred between the patient and the equipment. However, during the Focus Group sessions radiographers stated that they cleaned the cassettes after using the protective cassette covers in ICU. It is interesting that they don't follow this same practice when dealing with infectious patients in the Diagnostic Imaging Department. It may be, as found in CH, that the culture of departments outside the Diagnostic Imaging Department are more demanding of compliance with infection control protocols. It may also be possible that there is a difference between what the radiographers say they do and what they actually do. As found by Simmons *et al.* (1990) this may occur because they believe they practice infection control to a higher standard than they do in reality. It is also possible that the radiographers informed the researcher of practices they thought they should be doing, rather than what they did, in order to present themselves in a better light. This effect is known as 'social desirability' (Robson, 2002).

4.11.4 Facilitating Infection Control

4.11.4.1 Hand Decontamination Facilities.

As expected, in all hospitals soap and water was available and in the majority of cases this was the chosen method of hand decontamination. This may suggest that availability is a major factor in deciding which method of hand decontamination to use. However, in DGH2 and CH wall units dispensing AHR were also provided at every sink. The IDH had loose bottles of AHR in the main viewing area and in some of the examination rooms. In all three hospitals the AHR was rarely used alone. It has been argued that hand decontamination compliance rates could be increased with the provision of AHRs. Interestingly, at the time of the observations, DGH1 had no AHR available, yet compliance rates with hand decontamination protocols were still higher than the other four hospitals. This would suggest that factors additional to availability are required

to increase compliance levels. As mentioned earlier it may be that radiographers do not have the appropriate skills to choose an appropriate hand decontaminant.

4.11.4.2 Mattress Protection.

To ensure that the mattress on the examination table remained clean, disposable blue paper roll was used in DGH1, CH and IDH; this roll should be changed after each patient. In DGH2 a plastic covering was used to protect the mattress, this should be cleaned or changed after each patient. Compared with other infection control practices, changing the blue paper roll was carried out on a regular basis. However, the changing or cleaning of the plastic mattress cover was observed significantly less frequently. This difference in compliance rates suggests that if the task is easy and not time consuming then radiographers are more likely to comply. It may also have been more obvious to patients if the blue paper roll had already been used by a patient. Although it is noticeable that the plastic covers in DGH2 had been used, patients may assume because it is plastic the radiographers would have wiped it to ensure that it is clean for the next patient.

It was also found that radiographers were significantly more likely to change the blue paper roll in the Out-patient department than in A+E. The reason for this may be because patients are frequently examined on the examination table in the Out-patients department, therefore it becomes routine for the radiographer to change the blue roll. Patients attending the A+E department are on occasions examined on their trolley, so radiographers may simply forget to change the blue paper roll. However, if this was the case a similar finding would be expected in the In-patient department as a number of these patients are examined on their beds.

4.11.5 Obstacles to Carrying Out Infection Control Procedures.

Radiographers indicated that lack of time was an obstacle to following infection control protocols, including hand decontamination. Using AHR where appropriate would reduce the length of time needed to decontaminate hands. It

was often found that two methods of hand decontamination, such as soap and water followed by AHR occurred. In these situations the radiographers are in fact increasing the length of time it takes to decontaminate their hands, and possibly increasing the risk of developing unhealthy skin conditions (Wilkinson, 2000; Cimiotti *et al.*, 2003). Studies have also shown that AHR create fewer dermatological problems than soap and water (Boyce *et al.* 2000). This is another important fact, as radiographers are required to wash their hands many times, due to the high number of patients they deal with. In the long run these factors are likely to decrease compliance with hand decontamination, so measures aimed at informing radiographers at an early stage in their career of appropriate hand decontamination methods and instilling this into practice are important. In some instances lack of time may have been a contributing factor, but there were a number of occasions observed where the radiographers were not busy and on some occasions when they had no patients. In these situations routine infection control practices could easily have been carried out.

Radiographers also thought poor communication between departments effected there infection control practices. If they were not told that a patient was infectious then they often failed to carry out the necessary procedures to prevent the spread of infection.

4.12 Summary of Observational Audit Findings.

The results from the observational audit carried out, in all four of the hospitals used in this study, showed that infection control practices were followed infrequently by the radiographers. It was found that the frequency of hand decontamination after patient contact, in comparison to hand decontamination before patient contact, increased significantly from 4% (34) to 17% (45). An issue with decontaminating hands only after patient contact is that the risk of cross contamination is not removed completely, it may still be possible to transmit infection as HCPs hands may be re-contaminated after contact with a number of objects prior to their next patient contact.

Hand decontamination before and after patient contact occurred more frequently in DGH1 than the remaining three hospitals. This was surprising as it had been expected that infection control practice would be carried out more often in CH and IDH. This was because radiographers in CH are dealing with a greater number of immunosuppressed patients, and IDH has an infectious disease unit. It was thought that compliance rates in this hospital would be higher due to the radiographers having more knowledge about infectious patients.

However, radiographers in IDH had the highest frequency of hand decontamination after contact with infectious patients occurring 75% (n=9) of the time.

Compliance with hand decontamination protocols, before and after patient contact, during Mobile radiography in CH was found to be much higher than in other departments. However, because only a very small number of observations were made, no statistical analysis was carried out.

Unfortunately, cleaning of the radiographic equipment occurred infrequently 4% (n=30). It mainly occurred if equipment became contaminated with body fluids, but, there were occasions when the equipment was visibly contaminated with blood and no cleaning took place. During this study no significant differences were found between the four hospitals or between the different departments with regard to cleaning the equipment.

To ensure that the mattress on the examination table remained clean, disposable blue paper roll was used in DGH1, CH and IDH; this roll should be changed after each patient. In DGH2 a plastic covering was used to protect the mattress, this should be cleaned or changed after each patient. Compared with other infection control practices, changing the blue paper roll was carried out on a regular basis. However, the changing or cleaning of the plastic mattress cover was observed significantly less frequently. This difference in compliance rates suggests that if the task is easy and not time consuming then radiographers are more likely to comply.

5.0 Chapter Five: Phase Two.

5.1 Bacterial Analysis of Radiographic Equipment.

The role of the environment may be significant in the control of HAIs (Griffith, 2000). It has been found that organisms can survive on a range of surfaces and pieces of equipment. Lawson *et al.* (2002) found that visible confluent growth of bacteria was present two weeks after a radiographic cassette was inoculated. It is well documented that the hands of HCPs can contribute to the spread of infection from patient to patient and it is possible that individuals who have contact with contaminated surfaces or equipment can themselves become contaminated. They may then go on to touch susceptible patients, transmitting the bacteria from the environment to the patient (Damani, 2003). It is also possible that patients with open wounds could come into contact with contaminated equipment which may result in infection (Damani, 2003). Even with, apparently, thorough cleaning, studies have shown that some bacteria such as MRSA can still be present on equipment (Blythe *et al.*, 1998).

A number of studies in the past have looked at the contamination of radiographic equipment and many have found this equipment provides a suitable environment for a variety of bacteria to survive (Haskin *et al.*, 1970; LeFrock *et al.*, 1978). A more recent investigation showed that the adhesive tape used to keep radiographic anatomical markers in place can also harbour bacteria (Hodges, 2001). One study also found antiseptic wipes were effective for cleaning radiographic equipment (Meyers, 1969).

With the information in the literature and the finding in phase one of the study, that cleaning of the equipment occurred infrequently, it was important to evaluate the impact of such cleaning on the levels of bacterial contamination of the equipment used in the Diagnostic Imaging Department. It was also of interest to assess the effect cleaning of the equipment would have on the level of bacterial contamination.

The aim of phase two is to ascertain the level of bacterial contamination on the general radiographic equipment.

As there have been no recent studies investigating the levels of contamination on general radiographic equipment or the effectiveness of general purpose detergent with regards to decontaminating these pieces of equipment, this second phase of the research project, to ascertain the level of bacterial contamination on the general radiography equipment, is justified. Consideration was also given to investigating levels of bacterial contamination of HCPs hands. However, as it is already well known that hands can easily become contaminated and transmit bacteria from one area to another, it was decided that investigation into this area was not necessary.

This section will provide a justification of the methods and detailed accounts of the processes used to pursue the aim described above. The use of bacterial analysis in assessing cleanliness of the equipment will be discussed, along with sampling techniques, reliability, and validity and the literature used to justify the choice and application of these techniques.

5.1.1 Identification of Relevant Bacterial Contamination on General Radiographic Equipment.

The microbiology laboratory plays an essential role in the diagnosis of infectious disease. The equipment needed to successfully culture and identify microorganisms varies according to:

1. The type of organism.
2. The environmental conditions each requires.

Most microorganisms have specific temperature requirements for growth and must be cultured in a constant temperature incubator. Most pathogenic bacteria grow best at 35°C to 37°C (Morello *et al.*, 1998). To culture bacteria in the laboratory, pathogenic bacteria requires specific nutrients to survive, therefore, the culture media must contain the required nutrients for growth. These media can be liquid, referred to as broth, or solid, which is formed by adding agar to the broth. It is assumed, that under the appropriate conditions of incubation each

viable microorganism will multiply and give rise to a single colony. These can then be counted, and the micro-organism can be identified using specific tests (Morello *et al.,* 1998).

A quantitative culture is prepared by placing a measured quantity of the sample on one or more solid media, counting the number of colonies that grow, and translating the figure arithmetically to express the number of organisms present in 1 millilitre of sample. (Morello *et al.,* 1998 p85).

The food industry uses two tests as indicators of overall sanitation (Food and Environmental Hygiene Department, 2001). These tests are for levels of aerobic bacteria, known as Aerobic Colony Counts (ACC), and Enterobacteriaceae colony counts (Food and Environmental Hygiene Department, 2001). Aerobic bacteria grow in the presence of oxygen. Enterobactericeae are usually found in the gut. They may be transmitted to the equipment as a result of faecal contamination and poor personal hygiene of patients or HCPs who come in contact with the equipment (Health Canada, 1992). The Colony Count or Colony Forming unit is a measure of bacterial load under the specified culture conditions and consists of both environmental organisms and of those derived from humans. This measure is used in this study to compare different pieces of equipment. Again in this study the colony counts are used to compare loads between different pieces of equipment. Establishing the levels of these two groups of bacteria on equipment provides an indication of efficiency of cleaning.

Studies investigating the role of the environment regarding HAIs have found that cleanliness of surfaces is often monitored using visual assessment. However, according to Griffith (2000), this method of assessment is unacceptable. Areas may look clean, but may not in fact be microbiologically clean. At present there is no agreed standard of cleanliness available for surfaces in the health care setting, in terms of microbial counts. Griffith (2000) and Dancer (2004) suggest making use of the benchmarks agreed by food agencies.

There are two issues to be considered when carrying out bacterial analysis of the environment:

- Identification of an indicator organism – these provide a measure of specific types of contamination, such as Enterobacteriaceae or Staphylococcus *aureus (S.aureus).*
- Quantitative assessment of organisms found within a certain area, regardless of the identity of the micro-organism (Dancer, 2004).

Dancer (2004) considers that the International Food Agency standard is a good starting point for assessing hospital hygiene. This is <5 Colony Forming Units (CFU)/cm^2, whatever the identity of the organism and <1cfu/cm^2 if an indicator organism, such as *S.aureus*, which provides an indicator of contamination by human skin flora, is present.

According to Dancer (2004) a finding of ≥5cfu/cm^2 may suggest an increased risk of infection for the patient. A greater density of bacteria suggests inadequate cleaning, which would increase the risk of pathogenic organism being present. However, high levels of bacterial contamination may also make it more difficult to isolate and identify any pathogens (Dancer, 2004). It may be argued that although these standards are acceptable and necessary in food processing areas, they are not feasible in other areas of the hospital including the Diagnostic Imaging Department. This is because, other than the operating theatres, most clinical settings are not a sterile setting and so it is likely that bacteria would be present. However, as the standard precautions indicate that equipment should be cleaned before each use (Pratt *et al.*, 2001), then levels of bacterial contamination should be expected to be low.

5.2 Reliability and Validity of Bacterial Analysis.

Reliability and validity considerations in this study were addressed by following the standard methods for obtaining bacterial swabs from equipment and analysing the environmental bacteria present. The bacterial analysis was

performed by the local Public Health Laboratory Service (PHLS), which is an organisation that routinely performs this analysis and follows standardised protocols. The analysis was also performed in each case by the same technician to increase reliability.

5.3 Sampling of the Contamination on Equipment

A total of 101 swabs were taken from the equipment using a purposive sampling method. A purposive sample is one which is subjectively selected by the researcher. An attempt is made to obtain a sample that appears to be representative of the population. Items of equipment found in the A+E, In-patient and Out-patient departments were chosen for this study because they were used frequently during general radiography. In many cases there was only one piece of a particular item of equipment in each room, such as the control panel, erect bucky and x-ray table. In instances where several identical pieces of equipment were used in rotation, such as sponges, lead-rubber strips and cassettes, there was considered to be no difference in use between them and only one of each type was selected for swabbing.

Table 26 shows the equipment which was swabbed and whether or not the patient or radiographer would have contact with the equipment.

A total of 33 pieces of equipment were chosen to be cleaned then re-swabbed. These included pieces of equipment that had a flat surface so could be easily cleaned and those that would have contact with both the patient and the radiographer. Items such as the control panel, x-ray tube housing and chest stand were not cleaned as they did not fit the criteria mentioned above. Sponges and sandbags were not cleaned due to the difficulty in cleaning the material from which they were made.

Table 26. Equipment Swabbed.

Radiographic Equipment and total numbers swabbed	**Contact with radiographer**	**Contact with patient**	**Swabbed before and after cleaning**
Cassettes various sizes x 36	✓	✓	✓ 17/36 cleaned
35cm x 45cm Stationary grid x 6	✓	✓	✓ 3/6 cleaned
30cm x 40cm Stationary grid x 2	✓	✓	✓ 1/ 2 cleaned
24cm x 30cm Stationary grid x 8	✓	✓	✓ 4/8 cleaned
Chest stand x 3	✓	✓	✗
Erect bucky x 6	✓	✓	✓ 3/6 cleaned
X-ray table x 6	✓	✓	✓ 3/6 cleaned
Mattress cover x 4	✓	✓	✓ 1/4 cleaned
Lead rubber-strips various sizes x 4	✓	✓	✗
Sponge pads various sizes x 12	✓	✓	✗
Sandbags various sizes x 5	✓	✓	✗
Leg rest x 3	✓	✓	✓ 1/ 3 cleaned
Control panel x 3	✓	✗	✗
X-ray tube housing x 3	✓	✗	✗

5.4 Pilot Study for the Bacterial Analysis.

A pilot bacterial analysis study was carried out in a hospital not used in the definitive study. A total of 10 pieces of radiographic equipment were swabbed. A laboratory technician demonstrated how to take the swabs from the pieces of the equipment. After some practice, the researcher took one swab from each of

the 10 pieces of equipment in an examination room. Each swab was moistened in sterile saline solution and then moved over the whole surface area of the piece of equipment. The sample was then plated on to the nutrient agar, after which the plate was labelled and taken to the laboratory to be processed and analysed by the laboratory technician.

The laboratory technician identified environmental bacteria but, in many cases, found it difficult to count the number of colony forming units due to the large numbers present on the plates. Consequently, it was decided that a specific area of each piece of the equipment should be swabbed, rather than the whole area.

Initially, it was thought necessary to identify all the bacterial colonies cultivated from the swabs. However, it was decided that as the researcher was interested in assessing the level of bacterial burden and the value of cleaning the equipment that it would be sufficient to simply carry out quantitative culturing to calculate the number of bacteria present and to enable comparisons between colony forming units before and after cleaning. However, the samples were also tested for the presence of Enterobacteriaceae and identification *of* Staph *aureus,* as already mentioned above these bacteria are used as measures of hygiene in the food agency Food and Environmental Hygiene Department, 2001).

5.5 Bacterial Analysis in the Infection Control Study.

Phase two took place in DGH2. Initially the researcher had wanted to carry out this part of the investigation in both DGH1 and DGH2. Permission was granted by the Radiology Business Manager at DGH1, who was very interested in establishing the situation with regards to the potential contamination of radiographic equipment. Unfortunately the Consultant Microbiologist, who was also the Infection Control Consultant, was less enthusiastic and refused to carry out the necessary laboratory investigations. Managers and the Consultant Microbiologist, who was also the Infection Control Consultant at DGH2 on the other hand were keen for their hospital to be involved in this part of the study. This hospital was included as it had been used in the first phase of this study. It was also in a convenient location for the researcher to visit frequently. CH and

IDH were not approached because they were too far away from the researcher's work base.

To avoid any disruption to the Diagnostic Imaging Department the swabs were taken at eight o'clock before the normal workings hours commenced. Swabbing and bacterial analysis took place over a five week period. These dates had to be arranged with the Superintendent of the Diagnostic Imaging Department and the Microbiology Laboratory. No protocol was in place stating when cleaning of the equipment would have taken place, therefore these times were considered by the researcher to be acceptable.

5.5.1 Procedure for Obtaining the Bacterial Samples.

A cotton swab was moistened with Maximum Recovery Diluent with Neutraliser. This enabled the cotton swab to become more efficiently coated by any bacteria present and reduced any effects of any detergents that may have been present on the equipment. The swabs were taken from various pieces of equipment (Table 26) all of which had contact with the patient, the radiographer or both. A 10 cm^2 cardboard template was made for each piece of equipment to ensure the same size area was swabbed. The cotton swabs were wiped over the area of equipment under investigation. A new template was used for each piece of equipment to ensure that no bacteria were transferred from a previous piece of equipment. To prevent contaminating the areas being sampled, the templates were placed carefully on the equipment and not moved. To avoid any contamination from the templates themselves, when taking the sample the researcher did not allow the cotton swab to touch the edges of the template. When swabbing equipment that did not have a flat surface, such as the chest stand, control panel and x-ray tube housing an estimate of 10cm^2 area was made.

After the initial swabbing, pieces of equipment were cleaned using the diluted detergent that was already available in the department, and not freshly prepared, and then wiped with a clean paper towel. This was followed by drying with a clean paper towel. Detergent that has not been freshly prepared is less effective at decontaminating equipment than a freshly made up solution. However, the researcher chose to use the detergent already in place in DGH2 in order to try

and emulate the practice carried out by the radiographers in this hospital. A number of swabs were retaken once the equipment had been decontaminated. The swabs were then taken to the Public Health Laboratory, located in the hospital, for analysis. As the swabs were taken to the laboratory immediately, it was not necessary to place them in a transport medium. The Microbiologist followed standard procedures for analysis (Appendix 9). The process used in this phase of the study is shown in a flow chart (Figure 18).

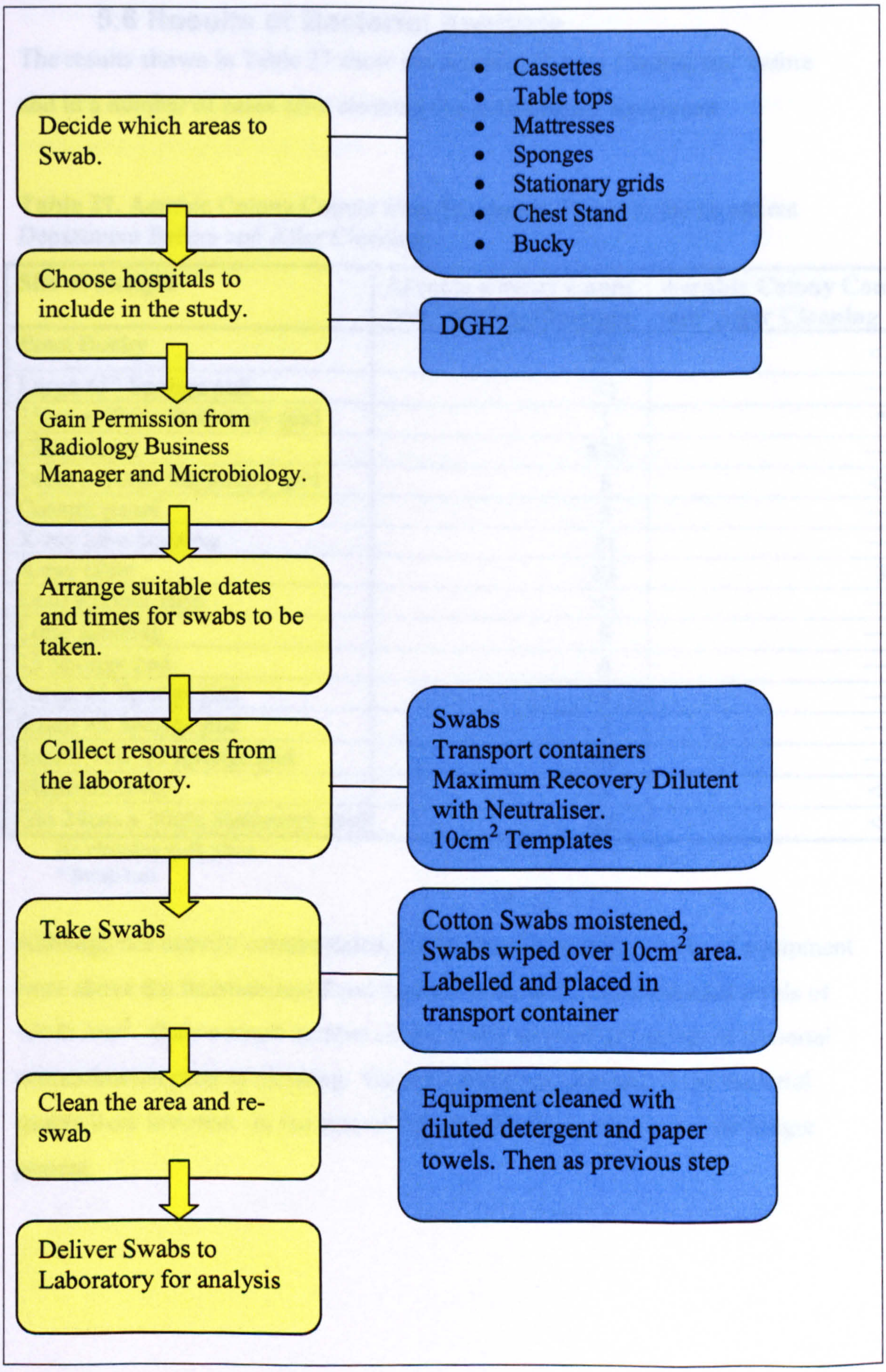


Figure 18. Flow Chart for Bacterial Swabbing.

5.6 Results of Bacterial Analysis

The results shown in Table 27 show the Aerobic Colony Counts/ cm^2 before and in a number of cases after cleaning the radiographic equipment

Table 27. Aerobic Colony Counts from Equipment Found in the In-patient Department Before and After Cleaning.

Site of Sample	Aerobic Colony Count /cm^2 Before Cleaning	Aerobic Colony Count /cm^2 After Cleaning
Erect Bucky	520	<1
Large 45° Sponge pad	<1	—
35cm x 43cm Stationary grid	1	*
Chest stand	830	—
24cm x 30cm Stationary grid	8	<1
Control panel	5	—
X-ray tube housing	21	—
X-ray table	83	3
Lead Rubber strip	<1	—
Long sandbag	6	—
15 Sponge pad	4	—
Large 45 Sponge pad	2	—
Small 45 Sponge pad	2	—
Small New 45 Sponge pad	<1	—
Mattress cover	3	<1
Old 24cm x 30cm Stationary grid	22	<1

No cleaning took place: —
* Swab lost

Although not heavily contaminated, it was found that many pieces of equipment were above the International Food Agency Standard's recommended levels of <5cfu /cm^2. Only a small number of the swabs showed low levels of bacterial contamination prior to cleaning. Once cleaning was performed the bacterial counts were lowered. In the case of the erect bucky S. *aureus* was no longer present.

It was discovered that two swabs were labelled 15° sponge pad by mistake. The results shown in Table 28 show the aerobic colony counts and Enterobactericeae counts for each swab, however they may not correspond to the actual pieces of equipment.

Table 28. Bacterial Analysis of 15° Sponge Pads Found in the In-patient Department.

	Aerobic Colony Count /cm^2	Enterobactericeae Count/cm^2
15° Sponge pad	3	<1
15° Sponge pad covered	4	<1

These results show that the aerobic colony counts and Enterobactericeae counts /cm^2 from the equipment were low in both cases, when making use of the International Food Agency standard.

Table 29 shows results of swabs taken from pieces of equipment used within the A+E department. Enterobactericeae Count/cm^2 in all cases were found to be <1 both before and after cleaning. The presence of S.*aureus* was not found on any pieces of equipment in the A+E department before or after cleaning.

Table 29. Aerobic Colony Counts from Equipment Found in the A+E department Before and After Cleaning.

Site of Sample	**Aerobic Colony Count /cm^2 Before Cleaning**	**Aerobic Colony Count /cm^2 After Cleaning**
30cm x 40cm Stationary grid	55	<1
Large 45 Sponge pad	14	—
Long sandbag	20	—
Square sandbag	41	—
Lead-rubber strip	14	—
Large 45° Covered sponge pad	3	—
Large 45° Sponge pad	13	—
Control panel	28	—
X-ray tube housing	30	—
Mattress cover	5	—
Chest stand	140	—
Erect bucky	47	<1
24cm x 30cm Cassette fast	30	—
18cm x 24cm Cassette fast	10	2
Leg rest	156	—
X-ray table	13	<1
35cm x 43cm Cassette	510	6
24cm x 30cm Cassette regular	3	<1
24cm x 30cm Stationary grid	<1	<1
35cm x 43cm Stationary grid	<1	<1

No cleaning: —

The results in Table 29 show that although many of the pieces of equipment in the A+E department were found to have low levels of contamination, a number of them are still contaminated with higher levels of colony counts/cm^2 than the International Food Agency believe is acceptable. A 35cm x 43cm cassette was found to have the highest Aerobic colony count/cm^2. After cleaning the Aerobic Colony Counts /cm^2 were very low in all cases.

Table 30 shows Aerobic Colony Counts/ cm^2 taken from pieces of equipment used within the Out-patient department. With the exception of the x-ray table, all other pieces of equipment were found to have <1 Enterobactericeae Count/cm^2. The x-ray table was found to have 1 Enterobactericeae Count/cm^2. No contamination with S.*aureus* was found on the equipment in the Out-patient department. The swabs were taken prior to and in some cases after cleaning.

Table 30. Aerobic Colony Counts from Equipment Found in the Out-patient Department Before and After Cleaning.

Site of Sample	**Aerobic Colony Count /cm^2 Before Cleaning**	**Aerobic Colony Count /cm^2 After Cleaning**
Large 45° Sponge pad	<1	
X-ray table	2400	<1
Chest stand	42	—
35cm x 43 cm Stationary grid	6	1
24cm x 30cm Stationary grid	8	<1
Leg rest	70	<1
Small 45° sponge pad	129	—
Control panel	12	—
X-ray tube housing	13	—
Mattress	2	—
Erect bucky	<1	<1
Medium 45° sponge pad	6	—
Square sandbag	16	—
Long sandbag	<1	—
Lead-rubber strip thin	<1	—
Lead-rubber strip thick	<1	—

No cleaning: —

Enterobactericeae Counts /cm^2 from the equipment were found to be low in all cases. The Aerobic colony counts from the x-ray table were found to be the highest, followed by a small 45° sponge pad After cleaning the equipment the aerobic colony counts/cm^2 were found to be very low in all cases.

Enterobactericeae Counts /cm^2 also remained low after cleaning.

Table 31 shows Aerobic Colony Counts/cm^2 taken from x-ray cassettes used throughout the Diagnostic Imaging Department. It shows swabs taken prior to and after cleaning. All cassettes included in the study were found to have <1 Enterobactericeae count/cm^2 and there was no S.*aureus* present.

Table 31. Aerobic Colony Counts from Cassettes Before and After Cleaning.

Site of sample	Aerobic Colony Count /cm^2 Before Cleaning	Aerobic Colony Count /cm^2 After Cleaning
(15) 24cm x 30cm Extremity	60	<1
(30) 24cm x 30cm Extremity	1.0×10^4	300
6) 30cm x 40cm Regular	<1	14
(18) 24cm x 24cm Extremity	<1	<1
(4) 18cm x 24cm Extremity	14	<1
(1) 18cm x 24cm Regular	2	<1
18cm x 24cm Regular	<1	<1
(1) 35cm x 35cm Regular	<1	<1
(8) 30cm x 40cm Regular	3	<1
(9) 35cm x 35cm Regular	4	<1
(5) 35cm x 43cm Regular	4	2
(9) 35cm x 43cm Regular	9	<1
(19) 24cm x 30cm Regular	11	<1
(5) 24cm x 30cm Regular	2.9×10^3	90

These results show that after cleaning the cassettes the aerobic colony counts fell, in most cases, to very low levels.

The Wilcoxon statistical analysis was carried out to identify any statistically significant differences between the ACC/cm^2 before and after cleaning (see Table VIX in Appendix 8). The analysis involved data from all pieces of equipment that were swabbed before and after cleaning. ACC/cm2 were found to be significantly lower after cleaning than before cleaning the equipment ($p=0.000$).

5.8 Discussion of Bacterial Analysis Findings.

The second phase of the research was conducted to assess the effects of infrequent cleaning of equipment observed in phase one, along with the effectiveness of cleaning with the general purpose detergent already present in each room. Various pieces of equipment that could come into contact with the patient, the radiographer or both were swabbed. Aerobic colony counts and Enterobactericeae colony counts were used as an indicator of overall cleanliness. The results from phase two will be discussed. Where applicable, references will be made to literature to support the findings. Appropriate findings from the three phases will be linked together.

5.8.1 Equipment with Low Levels of Bacterial Contamination.

The plastic mattress covers found in each of the three departments were found to have low levels of bacterial contamination. Patients frequently lie or sit on the covered mattress, but in many cases there would be no direct skin contact. The results were still surprising, as noted earlier in the observational audit the plastic covering was rarely seen to be changed or cleaned.

Swabs taken from a number of lead-rubber strips and stationary secondary radiation grids from the A+E, In-patient and Out-patient areas of the Diagnostic Imaging Department also indicated low levels of bacterial contamination. The lead-rubber strips are frequently used to section off different areas of cassettes so no direct patient contact occurs. They may also be used to protect certain parts of a patient's anatomy, such as the gonads, from radiation. In these cases the lead-rubber strips would usually come into contact with the patient's gown or clothing. These factors may account for the low levels of bacterial contamination.

It is possible that cleaning of the equipment and changing the mattress cover occurred the evening before, the swabs were taken, in preparation for use the next morning, and this would explain the low colony count. In retrospect,

swabbing during daytime activity may have provided a more realistic measure of the bacterial contamination levels.

5.8.2 Difficult to Clean Equipment.

The researcher had thought that items that are difficult to clean, particularly the sponge pads and material covered sand bags may have high levels of contamination. In the A+E department, all but one sponge pad, which was covered with plastic, had unacceptable levels of contamination compared with the International Food Agency standard, this was also the case when investigating the sandbags. In the Out-patient department two out of the three sponges were found to have unacceptable levels of contamination levels, along with one of the sandbags. The issue here is that these pieces of equipment are very difficult to clean and so the level of bacterial contamination may increase over time. These items should be covered in a material that allows easy cleaning to take place.

5.8.3. Equipment with High Levels of Bacterial Contamination.

Equipment found to have unacceptable levels of contamination when compared with International Food Agency Standards included, the x-ray table, chest stand, erect bucky and leg rest. Although patients lie or sit on a mattress on the x-ray table, their hands often come in contact with the side of the table when they are positioning themselves. Radiographers also have contact with the edges of the table in order to manoeuvre the table top to position the patient. The levels of contamination found on these pieces of equipment may be a cause for concern. This contamination may be transmitted through the radiographers' hands to other patients, other pieces of equipment or picked up directly by patients. As found in the literature, hands are the worst culprits for transmitting infection (Wilson and Jenner, 2001). The x-ray table in the A+E department had the lowest level of contamination, suggesting that the x-ray table had been cleaned recently. This is possible as the A+E department would have been in use through the night, as a result of the 24 hour emergency service in place. The highest level of contamination occurred in the Out-patient department, this was

surprising as this department was considered to provide the lowest risk of infection due to the reduced risk of leakage of blood and body fluids, compared with In-patients. There is also slightly lower risk of Out-patients visiting being contaminated with specific organisms than admitted patients, for example, MRSA. With this in mind it is possible that radiographers believe that the patients examined in this area present a very low risk; so they do not feel the need to clean the equipment. However, if this was the case, it would have been expected that many other common pieces of equipment found in the Out-patient department, such as the control panel, x-ray tube housing and chest stand, would have yielded similar high results, but this was not found to be the case.

The chest stand was also found to have unacceptable levels of high bacterial contamination when compared with the International Food Agency standards. The chest stand is one of the most frequently used pieces of equipment in the Diagnostic Imaging Department and often comes into direct contact with the patient's skin, namely the chin. Previous studies have shown this equipment to be heavily contaminated (Le Frock *et al.*, 1978). The chest stand may not be a piece of equipment radiographers consider necessary to clean, as indicated in the focus group sessions, because of the short length of time it is in contact with the patient.

The erect bucky is used in a variety of examinations and in some hospitals it is used when carrying out chest, lumber and thoracic spine examinations and facial bones. However, in DGH2 it was only used for spinal and facial bones examinations, which are performed less frequently than chest examinations. Contamination levels varied but in the In-patient department contamination was extremely high. It seems likely that this equipment had not been cleaned as recently as the equipment in the other departments. This is a cause for concern because In-patients may be more likely to contract an infection from the equipment because of their illness status.

The leg rests in both A+E and the Out-patient department were also found to have unacceptable levels of contamination. The leg rest is used when examining a patient with a suspected fractured neck of femur. Direct skin contact with this

piece of equipment is common. The levels of contamination found on the leg rest in the Out-patient department were surprising, as this piece of equipment would normally be used infrequently in this area, possibly because of this it was rarely cleaned. Higher levels of contamination were found on the leg rest in the A+E department, where this piece of equipment is used frequently. As this particular leg rest was made with fabric, it would be difficult to decontaminate between patients and this may have contributed to the high levels of contamination.

Equipment that only the radiographer would have direct contact with included the control panel and the x-ray tube housing. These pieces of equipment in all three departments were contaminated with ≥ 5 cfu/cm^2. This may suggest that these pieces of equipment have not recently been cleaned and have become contaminated via the radiographers' hands. During the Focus Group discussions, it became apparent that radiographers felt that equipment that did not come into direct contact with a patient would provide a lower infection risk. However, as shown by Bures *et al.* (2000) and Bhalla *et al.* (2004) it is possible for equipment to become contaminated from colonised patients. As a result radiographers' hands could become contaminated with bacteria, which could then be transmitted directly to a patient or to other pieces of equipment that may come into direct contact with a patient. The risk of this actually occurring has not been investigated in this piece of research.

5.8.4 Equipment Contaminated with Staphylococcus a*ureus.*

Two pieces of equipment were found to have very low levels of contamination with S *aureus*, which is a potential pathogen. Both the erect bucky and a 45° sponge pad which were located in the In-patient department were contaminated. These results along with results from other studies Smith (2004) show that the equipment can provide a suitable environment for pathogen survival.

5.8.5 Contaminated Cassettes.

Cassettes were found to have varying levels of contamination ranging from <1cfu/cm^2 to 1.0 x 10^4 cfu/cm^2. Compared to acceptable contamination levels

recommended by the International Food Agency standard (<5cfu/cm^2), many of the levels of contamination found on the cassettes are unacceptable and pose a real risk to health. Dancer (2004) states that a finding of ≥5cfu/cm^2 suggests there might be an increased risk of infection for the patient. The levels of contamination found on the radiographic cassettes may reflect poor levels of hygiene and demonstrate that the frequency of cleaning is inadequate. It could be that many of the cassettes have been cleaned more recently, and the two cassettes highly contaminated have simply been missed out. This was something that a radiographer, during the Focus Group discussions, was concerned with; stating that areas of equipment could be forgotten or missed on a number of occasions resulting in high contamination (H2 Srm3, Line 20). It was found by Lawson *et al.* (2002) that pathogenic bacteria could survive on cassettes for an extended period of time. Hodges (2001) found that bacterial growth increased over a two week period on equipment, such as radiographic markers, which regularly have contact with the cassettes.

In DGH1 the radiographic cassettes are used in both In-patient and Out-patient settings and can be used in other wards in the hospital. Therefore, the high levels of contamination are a concern as it may be possible for cross contamination to occur. This may then lead to infection in the susceptible patients examined in the In-patient department or on the wards during mobile radiography. The radiographers make frequent contact with these cassettes so it is possible their hands would become contaminated; they could then transmit the bacteria to other pieces of equipment or to patients if hand decontamination does not take place (Griffith *et al.*, 2003). Boyce *et al.* (1997) also found that HCPs hands could become contaminated when caring for patients in a heavily contaminated environment. This emphasises the importance of hand decontamination.

5.8.6 Equipment After Decontamination.

Comparing the number of colony forming units found on the radiographic equipment before cleaning, with the benchmark of <5cfu/cm^2, only (n=30) 30% of the pieces of equipment could be deemed to be satisfactory. In many cases the remaining pieces of equipment exceed the benchmark of clean standards considerably and support the findings of the observational audit where cleaning

was rarely witnessed. Many of the radiographers, during the Focus Group discussions, admitted that they did not clean the equipment after each patient. This lack of cleaning increases the risk of pathogenic organisms surviving Additional re-contamination from subsequent patients can also occur, this may increase the risk of infection to susceptible patients attending the Diagnostic Imaging Department. According to Dancer (2004) the greater levels of contamination may also obscure the existence of pathogenic bacteria.

Decontamination of 33 pieces of radiographic equipment was carried out using the cleaning materials already situated in each of the examination rooms. This resulted in the reduction of the number of cfu/ cm^2, (n=28) 85% of the pieces of equipment were found to have <5cfu/cm^2. One cassette was found to have a much higher cfu/cm^2 once cleaned. This increase could be due to a mistake in labelling the swabs, or a mistake by the laboratory technician when writing down the results. It may also be due to using contaminated material when cleaning the cassette, although this is unlikely as a new paper towel was used to clean each cassette. As all the other pieces of equipment and cassettes were found to have fewer cfu/cm^2 after cleaning the value of cleaning is clearly demonstrated. It should also be noted that once cleaned, (n=22) 67% of the pieces of equipment were found to have <1 cfu/cm^2. However, the two cassettes with high levels of contamination were found to still have unacceptable levels of contamination after this degree of cleaning. These high levels after decontamination, would suggest that the greater the contamination of the equipment the more difficult it is to clean. Therefore, to keep bacterial levels to a minimum, regular, good quality cleaning is essential.

The bacterial analysis took place some time after the initial observational audit. A checklist was described in the Focus Group discussions, by radiographers in DGH2, which required them to clean equipment on a daily basis. Although the checklist could be found in the Diagnostic Imaging Department during the observational audit, there was no individual taking responsibility for collecting the sheet and ensuring that it had been completed. The researcher does not know when the improved practice was introduced and so cannot comment about its

usefulness, however, the results from the bacterial analysis show that cleaning was not taking place regularly in many cases.

5.9 Summary of Bacterial Analysis Findings.

In this phase 101 bacterial swabs were analysed. It was found that very small amounts of S*taphylococcus aureas* were present on two pieces of equipment. One piece of equipment had 1 Enterabactericae Count/cm^2 , all other pieces of equipment swabbed were found to have less than 1 Enterabactericae Count/cm^2 . When comparing the number of colony forming units found on the radiographic equipment before cleaning, with the benchmark of <5cfu/cm^2, only (n=30) 30% of the pieces of equipment could be deemed to be satisfactory.

Equipment found to have lower levels of bacterial contamination included, the plastic mattress covers, lead-rubber strips and stationary radiation grids found in each of the three departments. In many cases the patients do not have direct skin contact with these pieces of equipment.

Equipment found to have higher levels of contamination included, the x-ray table, chest stand, erect bucky and leg rest. These pieces of equipment often come into direct contact with the patient. The levels of contamination found on these pieces of equipment may be a cause for concern. This contamination may be transmitted through the radiographers' hands to other patients and other pieces of equipment or picked up directly by patients.

The radiographic cassettes were found to have varying levels of contamination ranging from <1cfu/cm^2 to 1.0×10^4 cfu/cm^2. The radiographic cassettes are used in both In-patient and Out-patient settings and can be used in other wards in the hospital. Therefore, the high levels of contamination are worrying as it may be possible for cross contamination to occur. This may then lead to infection in the susceptible patients examined in the In-patient department or on the wards during mobile radiography

When comparing the levels of Aerobic colonies before and after cleaning it was found that in all but two cases, the colony counts were lowered after cleaning the equipment. The decontamination of 33 pieces of radiographic equipment resulted in the reduction of the number of cfu/ cm^2. After cleaning (n=28) 85% of the pieces of equipment were found to have <5cfu/cm^2 and (n=22) 67% of the pieces of equipment were found to have <1 cfu/cm^2. However, two cassettes which had the highest levels of contamination were still found to have unacceptable levels of contamination after cleaning. This would suggest that the greater the contamination of the equipment the more difficult it is to clean. Therefore, to keep bacterial levels to a minimum, regular, good quality cleaning is essential.

6.0 Chapter Six: Phase Three.

6.1 Focus Group Discussions.

As described in the literature review many studies have shown extremely low compliance with infection control protocols. A small number of studies have also shown that a reduction in HAI rates can be achieved if compliance with these protocols increases. These are therefore important findings and show the need for infection control practices to be carried out. It would seem that simply having infection control protocols in place is not enough to ensure compliance.

The findings from phase one of this study show that radiographers' compliance with infection control protocols within the Diagnostic Imaging Department is very low. Phase two showed that as a result of low compliance rates radiographic equipment could become contaminated. Simple cleaning reduced this bacterial contamination significantly. As already mentioned, there is a lack of published research into infection control within the Diagnostic Imaging Department, and this phase of the research became necessary. Phase three explored the reasons behind the low rates of compliance with infection control protocols within the Diagnostic Imaging Department.

The aim of this phase of the study was to establish the opinions and attitudes, of radiographers, regarding infection control within the Diagnostic Imaging Department.

The Focus Group technique was the chosen method to achieve this aim. This technique enables participants to share their views in a non threatening environment. Although infection control is not a particularly sensitive subject, participants could have felt that their clinical practice was being criticised if they were interviewed individually. It was also felt that responses may have been limited if questionnaires had been utilised in this phase.

Prior to carrying out the Focus Group sessions the researcher attended a two day course at the National Centre of Qualitative Research in London. This course gave invaluable information about successfully carrying out Focus Groups.

6.2 Focus Groups.

Focus Groups comprise of a collection of people who take part in a discussion on a particular topic led by a moderator. Its objective is to explore participants' attitudes and feelings about a particular topic and to understand the reason for a particular behaviour (Greenbaum, 2000).

For a discussion to be categorised as a genuine Focus Group, almost all of the characteristics shown in Table 32 should be included.

Table 32. Characteristics of a Focus Group.

- Be performed by an objective, external, trained moderator.
- Involve seven to ten participants (or four – six for mini groups). These should be recruited on the basis of common characteristics e.g. age, sex or position held in an organisation.
- Include a discussion guide or question route that has been prepared in advance.
- Encourage participant interaction verbally and non-verbally.
- Be carried out in an environment that is favorable to all participants, enabling them to provide their complete attention to the discussion topics for the entire session.

(Greenbaum, 2000).

One of the significant advantages of group discussion, compared with other research techniques, is the interactions that can occur as a result of participants' opinions being shared among the group. The free flowing participant interaction can stimulate the generation of more information than would be forthcoming from an interview with a single individual. This in turn allows participants to reflect their views differently to the way they may have done if it were only their own experiences that were being described (Goering and Streiner, 1996). In fact

the sum of a group's interaction is greater than the total value of a number of individual interviews (Greenbaum, 1998).

6.3 Reliability and Validity of Focus Group Discussions.

Validity in qualitative research deals with descriptions and explanations, and whether or not a given explanation fits a given description. In other words, is the explanation credible? (Denzin and Lincoln, 2003).

6.3.1 Respondent Validation (member check).

It was considered possible that participants hearing arguments and opinions of others, within the group, may have changed their opinion by the end of the discussion. As a result of this, they may have liked to have the record of what they actually said, during the discussion, changed. Therefore member checks in this study were not carried out.

6.3.2 Prolonged Involvement and Persistent Observation.

The researcher was able to spend a long period of time in each of the radiology departments involved in the study. During the observations and subsequently when organising the Focus Group sessions the researcher had sufficient time to identify appropriate participants, and to explain the research and its aims to potential participants. This prolonged involvement also allowed the researcher to become immersed in the culture of the department, to build up a rapport and gain the trust of the participants. This is advised by Guba and Lincoln (1989).

6.3.3 Peer Debriefing.

During the four years of this research into infection control, the methods and processes used to collect and analyse the data were discussed with other researchers along with supervisors. Progress and results were presented each year during a post graduate forum to fellow researchers at the university,

allowing other perspectives about the research to be given. This experience was found to be invaluable. In June 2005 the researcher presented the findings of the study to The UK Radiography Conference.

6.3.4 Methodological Coherence

Analysis of the Focus Group data started on completion of the first Focus Group meeting and from that point collection and analysis of the data occurred simultaneously. This allowed the researcher to determine what is known and what one needs to know. This interaction between collecting data and analysis is fundamental to achieving reliability and validity (Morse *et al.*, 2002).

6.3.5 Theoretical Thinking

The data obtained from the observational study led the researcher to particular ideas, in some cases these were confirmed by the data from the Focus Group sessions. Information from the Focus Group discussions also led to new ideas. The new ideas were then confirmed more strongly by subsequent focus group sessions.

6.4 Sampling.

The precise number of groups required can only be decided once the Focus Group meetings have begun. If the same thoughts on a topic are held by almost everyone this will be evident after a few meetings. Considerably more groups will be required to gain all the information when the responses are more diverse (Morgan, 1998(2)). It can often be a risk to use just one group as it is impossible to separate the content of the discussion from what was unique about the group (Morgan, 1998(2)). Comments made during the discussion in any given group can be influenced by many things, such as:

- Unbalanced composition of the group. Superiors mixed with subordinates.
- Mix of personalities. Maybe someone irritated or upset everyone else.
- Unequal group dynamics. Some participants dominating the discussion (Morgan, 1998(2)).

During the planning stages it was considered necessary to use Focus Groups in more than one hospital to ensure that the opinions were not specific to a particular NHS trust.

The Focus Group meetings took place in DGH1 and DGH2, these two hospitals were chosen as the researcher was interested in determining the reasons for the practices of the radiographers observed during the audit in phase one. CH and IDH were not involved in this phase as permission from the radiology business managers could not be obtained.

It is important to be aware that the quality of the participants greatly affects the value of Focus Group output. The information generated from the session may be poor or even worthless if the appropriate people are not recruited. The characteristics of the participants who would provide the most worthwhile input into the sessions need careful consideration (Greenbaum, 1998). It is found that the more homogenous the group the better the participants will interact and the higher the quality of information they will generate (Greenbaum, 1998). Qualified radiographers, of all grades, from DGH1 and DGH2 were invited to participate in the discussions. Three groups were used in each hospital. One group consisted of radiographers, another group of senior grade radiographers and the last group of superintendent grade radiographers. They were divided into grades to make it easier for staff to air their views without the fear of repercussions, for example junior staff may not want to admit failing to comply with policies in the presence of senior staff. Table 33 shows the number of individuals participating in each group.

Table 33. Number of Individuals Participating in Each Focus Group.

Hospital	Number of Radiographer Grades	Number of Senior Grades	Number of Superintendent Grades
DGH1	5	5	4
DGH2	7	5	5

When recruiting radiographer grade staff an effort was made to include staff with varying amounts of experience, full and part time radiographers and agency staff were also included. When recruiting senior and superintendent radiographers, staff working in different areas of the department were used, such as computed tomography, ultrasound and interventional radiography, as well as those from general areas. On completion of six Focus Group meetings it was felt that no new information was being generated, therefore it was considered that the point of 'theoretical saturation' had occurred and it was at this point the Focus Group element of the study ended.

6.4.1 Recruiting Radiographers

The radiographers were invited verbally to take part in a Focus Group discussion. Following this the department rotas were looked at to determine which members of staff would be available to participate. Those who were free were then asked again if they would like to take part. On this occasion dates, times and locations were given out, along with an information sheet (see Appendix 12) providing details of the study and a contact number of the researcher.

The day before the Focus Group was scheduled to take place the researcher again contacted all those who had agreed to take part, reminding them of the session. Following this pattern of continual contact reduces the chances of participants failing to attend the session. This is important as participants failing to turn up could result in an outright failure (Morgan, 1998(2)). In only one case did a radiographer fail to attend. Due to this non attendance only four radiographers were present so the group was smaller than previous ones, although it still met the criteria for the minimum number of people required (6.3, Table 32). It was found during the continual contact that some radiographers had changed shifts or had arranged annual leave so were no longer available, in these cases another radiographer was invited to participate.

6.5 Ethical Considerations.

The sharing of information is the inevitable result when Focus Groups are used; therefore, one of the key ethical concerns is privacy (Morgan, 1998(1)). Restricting access to information that exposes the participant's identities is the first step in maintaining confidentiality. Further steps are shown in Table 34. During the infection control Focus Group discussions participants addressed each other by name. Originally participants were asked not to use names of other staff members, however, it was found that they stumbled over this and it prevented the discussion from flowing freely. Therefore, the researcher decided it would be acceptable to remove the names during transcription.

Table 34. Steps to Help Maintain Confidentiality.

- The researcher is the only person who will have access to the recruitment information and this information will be destroyed once the investigation is complete.
- Throughout the discussion, participants will use only first names or pseudonyms.
- As with the recruitment information, once transcription is complete only the researchers will have access to the recorded discussion and these recordings will be destroyed at the conclusion of the project.
- For any transcripts that are made, names and any other potentially identifying information (e.g. mention of specific individuals, events or places) will be either removed or modified

(Morgan, 1998(1)).

Before the Focus Groups could be used full ethical approval was required. As multiple NHS trusts were involved, the researcher applied for ethical approval from the London Multi-centre Research Ethics Committee. The researcher was invited to attend the ethics committee meeting, although this was not compulsory it was thought that any small queries may be dealt with during the meeting and save time in the future. During this meeting the researcher was not

called in to discuss the application. A number of minor amendments were requested by the ethics committee (Appendix 10).

The minor amendments included:

- Clarifying the hospitals to be used. It was explained that DGH1 and DGH2 would be used as provisional permission had already been granted.
- Clarifying what facilities in the Diagnostic Imaging Department would be investigated. It was explained that only the general and accident and emergency radiology departments would be investigated.
- Would the study benefit from seeking advice from a microbiologist or infection control department? Advice had been taken from both professions prior to the Focus Group discussions.
- A measure of reliability of results and sample size was required. It was explained that these were not essential when carrying out qualitative research.
- The committee required a copy of the questioning route. This was provided.
- The committee requested that audiotapes be destroyed at the end of the study. This has been agreed to and noted on the information sheet which was provided to each participant.
- Alterations to the information sheet. The required alterations were made to the information sheet and a copy provided to the committee (Appendix 12).

The ethics committee also stated that the researcher must write to each NHS trust informing them of the study and that ethical approval had been obtained. The researcher was not required to wait for an answer before commencing the studies (Appendix 11). Formal written consent was also required from each participant. This was collected from radiographers on attendance at the Focus Group meetings (Appendix 17). A copy of the ethical approval can be found in Appendix 13.

6.6 Pilot Study.

Pilot testing presents certain problems with Focus Groups. It would be difficult to determine if the Focus Group technique failed due to the questions asked, rather than being due to the moderator, or the room, the recruitment method or a variety of other factors. The first Focus Group with participants is the true pilot test. If this is successful it is considered to be the first group, if unsuccessful it becomes a pilot test (Krueger, 1998 (3)).

A pilot Focus Group discussion was however, carried out in this study using third year radiography students; this was performed to allow the researcher an opportunity to practice the moderating techniques. Alterations were made to the discussion guide in the form of additions, such as the introduction of risks of infection to radiographers' families and the use of vaccinations. The introduction to the Focus Group was also altered as a result of the pilot test.

6.7 Infection Control Focus Group Discussion

There are at least three different techniques known as 'Focus Groups'. These include full groups, mini-groups and telephone groups.

When choosing the type of group to use it may not be feasible to recruit more than six people, as is needed for the full group. This may be due to the cost of enlisting subjects, or the reluctance of some target groups to be involved in the research (Greenbaum, 1998). On occasions a small group is the only possible option. Other reasons for choosing a mini group may be that there are only a few people to be in the same place at the same time (Morgan, 1998(2)). The number of radiographers employed in each hospital in this study was relatively low. When moving up through the different grades of radiographer, the more senior the grade the smaller the numbers of these staff there are. It was not possible to use full groups as requesting large numbers of radiographers to attend at one time would interfere with the work load of the department, so mini groups were

used. It was anticipated that the infection control Focus Group meetings would last approximately one hour.

6.7.1 Timing and Location of the Focus Groups.

Appropriate times and locations are an important element in the success of the recruitment process. Both of these factors need to be convenient to the participants in order to encourage them to attend (Greenbaum, 1998).

Consideration should be given to the convenience of the timing of the Focus Groups (Greenbaum, 1998). As no payment was to be made to participants in this study, it was thought that the response rate to groups held outside normal working hours would be low. It was decided that as staff were already in the building during the lunch hour this would be the best time to hold the Focus Group meetings. The session would then simply become part of their day rather than an extension to it.

When choosing a location for the Focus Groups the primary requirements, from the moderator's point of view, are the capacity of the venue to hold a discussion and allow data capture. Convenience and comfort are the main concerns from the participants' point of view (Greenbaum 1998). In DGH1, the location of the room used to hold the Focus Group meetings was some distance from the radiology department, but still within the hospital. This room was used for three reasons, one was availability, the second was convenience and the third was for psychological factors. (Morgan, 1998 (2)) advises using a more neutral setting, remote from the routine working environment, especially when new ideas are being sought. In DGH2 a conference room within the radiology department was used, again this was for reasons just mentioned. Although this room was part of the Diagnostic Imaging Department it was not central to it.

It is important to emphasise to people outside the room that quietness must be maintained during the Focus Group session (Greenbaum, 1998). Noise outside

the rooms used in this study was not an issue, due to their locations and the timing of the sessions.

The temperature of the room is also important, as it should not be too hot or cold, either of these can negatively affect the involvement of the group (Greenbaum 1998,). The room in DGH1 was very warm, so a fan had to be used; the fan appears to be quite noisy on the recordings, although the discussion was still audible. The noise of the fan did not appear to be a problem during the discussion in the group.

6.7.2 The Moderator.

The crucial role of the moderator is as facilitator of the group to ensure the objectives of the research are accomplished. The moderator establishes a climate for communication (Krueger, 1998 (3)). The first few minutes in a Focus Group discussion are crucial. In a brief time the moderator must create a thoughtful, relaxed atmosphere, establish ground rules and set the tone of the discussion (Krueger, 1998(4)). The introduction made by the moderator should include the necessity of hearing all points of view both positive and negative (Krueger, 1998(4)).

The moderator's role is not to participate but to guide the discussion. It is wrongly assumed by some moderators that sharing their personal ideas will promote increased sharing among participants. This approach may prompt participants as to what is wanted and may result in a limited range of views being expressed (Krueger, 1998(4)). The researcher took the role of moderator during this study. When first starting the Focus Group sessions the moderator was pleased that people were talking, however it was necessary to listen carefully to the participants, this was to show an interest in what they had to say and to ensure that they were answering the question. Maintaining a completely objective perspective is a difficulty that the moderator has to overcome (Greenbaum, 1998). In order to do this care was taken to listen and question all participants to the same level, regardless of what their opinion of infection

control was. An effort was especially made to do this when participants were discussing infection control in a negative manner. When the topic was discussed in this way the researcher had to refrain from making any comments arguing against their opinion. This was difficult to achieve, but had the researcher not maintained her position as a moderator then the information collected from the discussion may have been skewed towards her opinions.

It is the responsibility of the moderator to decide when a question has been answered adequately and then move on to the next question. In some instances the group would wander off the topic and the participants needed to be brought back to the question. In some cases members of the group also brought the discussion back to the key topic. To help direct the flow of the discussion a discussion guide is required. There are two different questioning strategies available. These are:

- The topic guide – this is a list of topics or issues to be covered by the Focus Group. The moderator is guided by phrases that act as prompts.
- The questioning route - contains all the topics to be covered and questions are written in a complete format (Krueger, 1998 (3)).

Whatever method is chosen a good discussion guide is vital for an effective Focus Group discussion. It informs the moderator of the topics to cover and allocates an approximate length of time to be given to each topic. Controlling the timing of a group is often a significant problem for new and inexperienced moderators (Greenbaum, 2000). The timing of the questions was something that the moderator initially struggled with. In the earlier groups there was a tendency to rush through some of the questions as she was worried that there would not be sufficient time to discuss subsequent questions. However, with experience this became less of a problem.

During this study a questioning route was developed. This was found to be a great help. The researcher was able to ask all the appropriate questions to each group and there was no risk of forgetting to put a question forward that had been

used in previous Focus Groups. As the questioning route had been designed by the moderator/researcher she was fully aware of its contents, this made it easier to be able to note mentally if a question had already been answered somewhere else in the discussion. If a question has been answered previously in the discussion then the moderator should alter the sequence of the questions or even remove a question (Krueger, 1998(3)). Theoretical saturation was also easier to determine as the same questioning route was followed for each focus group. A copy of the questioning route can be found in Appendix 14.

6.7.3 Focus Group Questions.

The questions for Focus Groups are arranged in a sequence by the researcher. The first question becomes a base upon which later discussion is developed (Krueger, 1998 (3)). Participants have the opportunity to listen to and comment about other group member's experiences and opinions; this is something that participants seldom experience in other research methods. This approach is intentional as it aids group members in remembering their own experiences and then comparing and contrasting them with those of others (Krueger, 1998 (3)).

Open-ended questions are used during the Focus Group discussion. The major advantage of this type of question is that it allows the participants to reveal what they think, rather than what the moderator suspects they think. That said, closed questions can be used and do have their own advantages (Krueger, 1998 (3)).

It is vital that the wording of the question is suitable for the proposed participants. The questions should be worded in a direct and simple manner (Krueger, 1998(3)). The moderator did have problems with one of the questions which was whether radiographers followed infection control methods more or less than other HCPs in different areas of the hospital. This question was an additional question not on the original questioning route. As one radiographer had difficulty in grasping the question, it needed to be reworded. When carrying out the discussion with the superintendent radiographers it was also found that they could not answer the question due to lack of knowledge about other professions working practice.

At different times in the Focus Group meeting, specific types of questions are used. There are five categories of questions:

- Opening Question – This was used to encourage each member of the group to speak and can provide important information about each participant (Krueger, 1998(3)). This question also enabled the moderator to identify each speaker during transcription.
- Introductory Question - This allowed the participants to discuss what they understood about infection control (Krueger, 1998 (3)).
- Transition Question - These questions gain more information about knowledge and attitudes to the need for infection control and lead up to the key questions (Krueger, 1998(3)).
- Key Question - These are central to the discussion. The aim was to discover radiographers' opinion about infection control, specifically, within the radiology department, whether infection control was followed and whether they felt it was important in their areas of work. Infection control training was also considered to be a key question.
- Ending Question - This question brings the discussion to a close by asking if they have anything they would like to add (Krueger, 1998 (3)).

Table 35 shows the question type and questions used in the infection control study.

Table 35. Questions used in the Infection Control Focus Group Discussion.

Type of Question	Question used	Reason for Question
Open question	Could you give your name, grade, how long you have been qualified, and which areas you mainly work in?	This gives radiographers a chance to speak. Allows identification of the speakers when listening to the audio recording.
Introductory Question	What do you think of when someone says "infection control?"	This identifies what infection control means to the radiographers.
Transitional Question	Who do you think requires infection control?	This identifies the type of patients radiographers consider to produce a risk and those they feel are at risk.
Transitional Question	How do you know the status of these patients?	Refers to the patients mentioned in previous question. Discovers how they find out about patients infectious status.
Transitional Question	What do you think are the most important areas of infection control?	This identifies what knowledge the radiographers have with regards to value of certain infection control practices.
Key Question	Who do you think infection control practices benefit?	Identifies who radiographers think infection control benefits. Identifies their opinion of the need for infection control.
Key Question	What do you think about infection control in the radiography department?	Discovers their opinion of infection control in the area they work. Identifies any risks they feel they may have and any risks to their patients.
Key Question	What infection control education have you received?	Identifies the level of training received during their training and since qualifying. May explain their knowledge and attitudes.
Key Question	Do you think infection control measures in the radiography department are followed?	Identifies infection control compliance within the department.
Ending Question	What do you think prevents infection control practice?	Gains insight to what changes could be made to improve infection control
Ending Question	How do you think infection control compliance could be improved?	Gains insight to what changes could be made to improve infection control.

The moderator also made use of probes to gain extra information about a topic or comment made by a participant. At times this was simply to aid the researcher's understanding and on other occasions it was used for additional important information. There were times that probes were used to try to encourage the discussion in this study. On these occasions the probes were directed to the whole group, so avoided the problem of a conversation occurring between the moderator and one participant.

6.7.4 Range of Participant Types.

One of the main criticisms about the Focus Group technique is that one or two people in a group tend to dominate, while the remaining participants add very little to the overall discussion. The input of the other participants may be influenced by the emergence of an opinion leader. On occasions participants may withdraw from the discussion if they feel they do not express themselves as well as the others for fear of appearing stupid. Finally, some participants feel a need to please the moderator and may answer questions in a way they think will meet with the moderators approval, in doing this they do not provide their true feelings (Greenbaum, 1998). As each group contains new and different participants they will all be different. Bringing a variety of people with different personalities has its benefits; however, this range can present an array of problems for the moderator. These are defined in Table 36.

Table 36. Range of Participant Types.

- Experts and influential types – Great value can be added by experts but they can also present problems within a Focus Group. Other members may be inhibited by what they say. These were not present during infection control discussion
- Dominant speakers – These may consider themselves to be experts. Some participants during the infection control discussion were more dominant than others, but fortunately they did not take over the whole discussion.
- Disruptive participants – Occasionally a participant may display behavior that is disruptive for other participants. They can be aggressive, opinionated, intolerant, and disrespectful of others. Fortunately there were no disruptive participants involved in this study.
- Ramblers and wanderers –These individuals like to talk and feel obliged to speak. They can drone on and never get to the point. One student radiographer often rambled during the pilot study, however, she still provided valuable information.
- Quiet and shy respondents – These participants think hard about what they are going to say. They speak quietly and tend to say very little. Extra effort is required to encourage these participants to share their views, they often provide valuable information. During this study there were a number of quiet respondents, to overcome this they were personally invited to join in the discussion.
- Inattentive participants – These have difficulty staying on the topic. They do not seem to hear or understand the question and their answers do not relate to the questions. During the infection control discussions there were no inattentive participants. This was probably due to the respondents all wanting to be involved in the discussion.

(Kreuger 1998(4)).

During the Focus Group discussions there were participants who were more outspoken than others in the group, fortunately, they did not seem to take over

and all other participants were able to take part comfortably. On the whole, the researcher felt that the discussions were well balanced. Once quiet participants were identified, the researcher made a conscious effort to direct questions to them or ask for their opinion about a comment just made. The researcher also observed these participants' reactions to comments made by other members of the group. If they were spoken over or ignored the researcher invited them to have their say. This problem occurred in the pilot group, as one participant was very quiet, she was therefore invited to give her opinion about a comment that was made; unfortunately she did not have anything to say on this subject. The researcher was then concerned that this effort had actually made it harder for her to speak in the future. This turned out not to be the case and she contributed some interesting information later on in the discussion.

6.7.5 Moderating Issues during the Focus Groups.

As the researcher wanted to compare how radiographers from different types of hospitals viewed infection control there was not a choice between the use of strangers or acquaintances so the groups were made up of acquaintances. As radiography is a small profession there would always be the risk, that even if radiographers had been chosen from different hospitals, some of them would have already been acquainted. In one Focus Group there was an issue of friends breaking off into a private discussion regarding infection control, this was an issue Morgan (1998(2)) warned against. To overcome this, the moderator noted what was occurring and once the main group finished their discussion the two people involved in the separate conversation were asked to repeat what they had said. This was very distracting for all concerned.

There were questions presented to the moderator. If these questions related to the moderators opinion, providing an answer could lead to problems as the perception of the moderator's role during the session may alter. Answering the question may also influence other respondents comments (Greenbaum, 2000). However, in all cases these questions were of a factual nature. It was therefore felt appropriate to answer the questions put to her. On occasions another participant answered the question, in these cases the moderator did not feel it

necessary to give an answer herself and allowed the discussion to continue naturally.

6.8 Focus Group Equipment.

Typically, Focus Group sessions are recorded in a number of ways, field notes, flip charts or audio recording devices. Care must be taken not to interfere with the dynamic nature of the group discussion when taking notes. The discussion will not be relaxed or free-flowing if the group has to halt while the moderator finishes taking notes (Krueger, 1998(4)). During the infection control Focus Group discussions, notes were mainly used to help remember participant's names. Prompts were added to the names to remind the moderator of a question to be posed later on in the discussion. The recording equipment used in the discussions consisted of a minidisk recorder and microphone. The minidisk recorder was chosen as it was smaller and less conspicuous than a tape recorder; and the quality of the recording would be higher. Remote microphones such as an omnidirectional Pressure Zone Microphone (PMZ) were chosen, this was due to their extremely clear sound quality and profile. These microphones are quite discreet, lying flat on the table. Two recording devices were used one of which provided a back up. This second device was introduced after a problem occurred with the recording of the first group resulting in a discussion that could not be used. Prior to each discussion the researcher followed advice given by Krueger (1998(4)) and tested the recording equipment once it was all set up. This was found to be beneficial, as it identified any problems, such as the microphones not being turned on and allowed an identification of each recording to be attached.

The researcher agreed with the view of the research ethics committee and other moderators that she had an ethical responsibility to inform participants that they were being recorded. The need to record the discussion was addressed during the introduction to the Focus Group members and the rules of the meeting were explained. The recording equipment was placed on the table in full view of the participants, thus preventing the creation of a needlessly secretive atmosphere (Kreuger, 1998(4)). In addition to introducing the recording device to the group

it is important for the moderator to clearly establish the rules related to the recording equipment with the participants. They include:

- The importance of participants speaking one at a time.
- The need to speak clearly.

These rules enable other group members to hear them and to produce a clear recording (Greenbaum, 2000).

Certain noises in a Focus Group session can make recordings exceedingly difficult to listen to. These sounds may not even be noticed until the recording is replayed and it is discovered that portions of the tape are unintelligible. These are some of the culprits:

- Drumming of fingers near the microphone.
- Tapping of pencils or pens on the table.
- Tapping of feet on table legs.
- Hum of heating or air conditioning systems (Krueger, 1998(4)).

The researcher did find that many noises were found on the recordings. A number of the noises created by fans, seagulls and coffee machines were out of the researcher's control. Fortunately the noises created by the participants only lasted for a short time, so the researcher did not have to address these problems with the group. This was a relief to the researcher as she worried that confronting the participants may have led to them withdrawing from the discussion slightly or even completely. There was also the problem of people taking their lunch out of bags. At the beginning of subsequent Focus Group discussions these problems were mentioned and the participants appeared to be more aware of their behaviour and did not create any unnecessary noise. To overcome the issue of people eating out of bags, the researcher provided lunch for the participants. This actually had two benefits, firstly, it meant that there would be no crisp bags rustling in the background and secondly, instead of participants having to take time to purchase their lunch they could come straight to the meeting, this resulted in extra time for the discussion.

6.9 Focus Group Analysis.

In order to generate new knowledge from the raw data, the researcher must carry out some form of data analysis. The analysis of qualitative and quantitative data are quite different. One important difference is the timing of the analysis. Quantitative data analysis usually occurs once all the data has been collected. Whereas, analysis of qualitative data usually begins after the first Focus Group discussion. The analysis runs side by side with data collection. By carrying out the analysis in this way data collection is also improved. Qualitative data analysis is undoubtedly the most complex and mysterious stage of qualitative research (Thorne, 2000).

Inductive reasoning is usually adopted when carrying out qualitative analysis; this means that the data generates the ideas (Thorne, 2000; Patton, 2002). This is in contrast to deductive analysis where the data confirms an idea. Inductive analysis involves the discovery of patterns, themes and categories in the data (Thorne, 2000).

Qualitative research can produce a vast amount of data; it is a major challenge to reduce the data. In the early stages it is difficult to know which parts of the data are important (Miles and Huberman (1994), as Linacre (1995) points out,

> 'everything looks important, especially at the outset, and the analyst wants to get it all in'
>
> (Linacre, 1995)

Qualitative Data analysis is carefully thought out and planned. The analysis is a sequential and continually developing process (Kreuger and Casey, 2000; Thorne, 2000). This helps ensure that findings will show accurately what was divulged in the group discussions and helps to avoid mistakes or overlooking important issues (Miles and Hungler, 1994; Kreuger and Casey, 2000). Basic analysis of the Focus Group responses was made following the completion of each meeting. At this point the researcher started to analyse the transcripts manually; this was due to the researcher having no experience in the use of

computer assisted analysis software. This initial phase of analysis looked to see if any new information was being drawn from the discussions and comparisons were made between the groups to identify the issues that had been covered.

It is advised that novice moderators schedule Focus Groups allowing time to transcribe the tape from one group meeting before carrying out the next. The writing of a short summary of each group following the questions used is also advised. This allows the researcher to identify any need, there may be, to obtain more information on any particular question. It also aids in the identification of questions that do not yield the type of information required and allows the question to be modified for use in subsequent groups. Writing these summaries (Appendix 15) was found to be very useful and it also allowed for the removal of questions if it was felt there was no new or relevant information being gathered.

6.9.1 Transcription.

Patton (2002) believes that carrying out ones own transcription provides an opportunity to become immersed in the data. This process allows the generation of the emergent insights. Burnard (1991) also feels that immersion in the data allows the researcher to become fully aware of the 'life world' of the respondent. On completion of each Focus Group session the researcher transcribed the audio recording (Appendix 16). Any themes emerging were noted, along with any helpful quotes, surprising comments, and any differences or similarities among the groups.

The transcripts were indexed to generate confidentiality as requested by the ethics committee and as promised to the respondents (Table 37).

Table 37. Indexed Data

DGH1	H1
DGH2	H2
Male	M
Female	F
Superintendent radiographer	Sup
Senior radiographer	Sr
Radiographer	R
Number separates the individual radiogr from the group	1,2,3

Example of indexing H2Supf1 = female superintendent radiographer from DGH2, 1 separates her from the other members of the group.

6.9.2 Thematic Analysis.

Burnard (1991) describes an approach to thematic analysis which is appropriate for use when dealing with semi-structured and open ended interview questions. With this in mind, the researcher followed this form of analysis. Other factors allowing the use of thematic content analysis were the use of audio recordings of the discussion which were transcribed in full.

When carrying out the analysis the researcher had different options; they included long table coding or coding via a computer. Some researchers are critical of the use of computers in qualitative data analysis. They fear that the technology may hold back creativity, emotional engagement and sensitive interpretation of the data. However, computer software packages are unable to perform the actual analysis; they are simply a data management tool that can greatly speed up the tasks associated with labelling and sorting of the data (Clarke, 1999). In either case, the idea of coding is the same, the transcript is read and notes made, sections are coded and categories are developed. At this point of the study, the researcher made use of a computer software program to code the data and aid in the management of the data. Nvivo 2 software package was chosen as it was available on the university network and the researcher was

able to attend an introductory course at the University of Surrey, which was found to be very useful.

Developing codes from the data is known as coding up. Whereas, codes developed prior to data collection are known as coding down. In practice, coding up is the favoured approach, this enables any additional theoretical codes to be included and applied to all appropriate instances (Bowling, 2002). Coding up was the approach utilised in this study. To develop the codes the transcripts were read through and a list of headings was produced which described all aspects of the discussion content. This process of coding is called open coding (Burnard, 1991). The list of headings was then inspected by the researcher and similar headings were grouped together, reducing the number of codes, this is known as axial coding (Wainwrite, 1994). It is possible that some parts of the data will fit into more than one code (Bowling, 2002). It is suggested by Patton (2002) that these codes should be internally consistent, but distinct from one another.

At this point a second person, an independent individual who was a lecturer at the University of Wales Bangor with knowledge of the Nvivo 2 software program, also looked at the data and generated their own list of codes. This generation of an independent list of codes is an attempt to enhance validity and to guard against researcher bias. The two lists were then compared and any differences were discussed and agreement on the list of categories was made. The differences between the two examples were simply that the second person had actually grouped together many of the codes developed by the researcher. After discussion, the researcher felt that at this point these codes should be opened up and not grouped together. A list of the codes used can be found in the results section (6.10, Table 38). Once the list of codes was decided upon, using Nvivo, all the transcripts were worked through and coded accordingly.

These codes were collapsed yet again to form the main categories in the study. As suggested by Clarke (1999) these categories all linked together. Strauss and Corbin (1998) advise that once all the main categories have been decided, a

central category is needed. This central category is powerful as it pulls together other categories to form an explanation of the data. This is shown in Figure 20 at the beginning of the discussion chapter. The central category can evolve out of the list of existing categories as is the case in this study. A report for each hospital was produced using the categories as an outline, again this allowed for similarities and differences to be identified.

The process used in this phase of the study is shown as a flow chart (Figure 19).

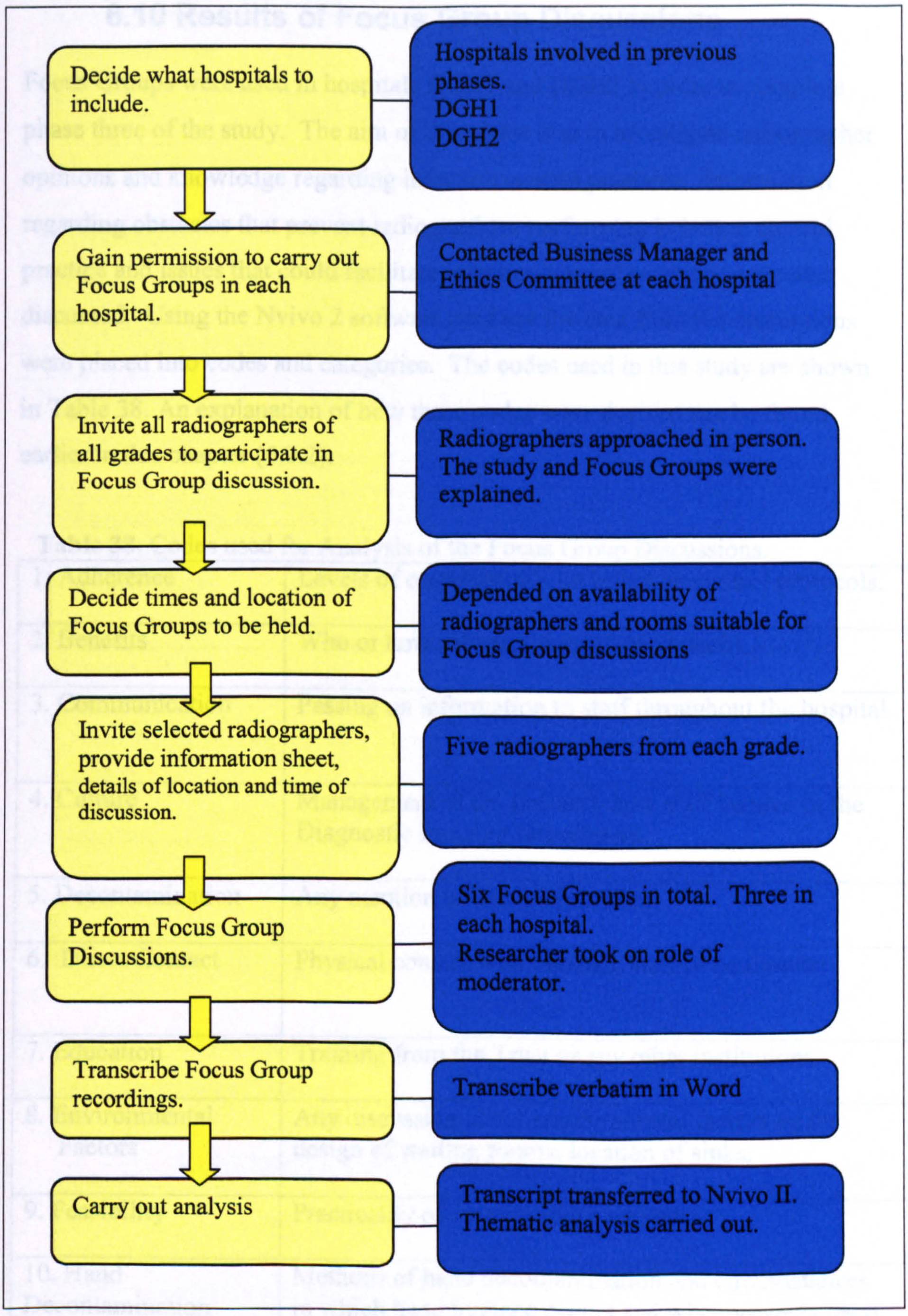


Figure 19. Flow Chart for Focus Group Discussions.

6.10 Results of Focus Group Discussions

Focus Groups were used in hospitals DGH1 and DGH2 in order to complete phase three of the study. The aim of this phase was to investigate radiographer opinions and knowledge regarding infection control practices. Information regarding obstacles that prevent radiographers performing infection control practice and issues that could facilitate infection control practices were also discussed. Using the Nvivo 2 software package the data from the discussions were placed into codes and categories. The codes used in this study are shown in Table 38. An explanation of how these codes were devised can be found earlier in this chapter (6.9.2).

Table 38. Codes used for Analysis of the Focus Group Discussions.

1. Adherence	Levels of compliance with infection control protocols.
2. Benefits	Who or how infection control is a benefit.
3. Communication	Passing on information to staff throughout the hospital.
4. Culture	Management of the hospital, how staff behave in the Diagnostic Imaging Department.
5. Decontamination	Any mention of decontamination.
6. Direct Contact	Physical contact with patients, staff or equipment.
7. Education	Training from the Trust or any other institutions.
8. Environmental Factors	Any discussion about environmental factors eg the design of waiting rooms, location of sinks.
9. Feasibility	Practicality of carrying out protocols.
10. Hand Decontamination	Methods of hand decontamination and circumstances in which hand hygiene occurs and what prevents hand hygiene, including effects on the skin.
11. Instruction	Direction given with regards to infection control protocols. Does this happen? How radiographers feel about instruction.
12. Perception	Opinions regarding infection control practices or risks.

13. Preventing Transmission of Bacteria.	Measures taken to stop the spread of infection.
14. Priority	Any mention of priority.
15. Prompt	Issues that prompt infection control practices.
16.Protection	Any mention of protection, including protecting equipment, staff and patients from contamination.
17. Protective Clothing	Any mention of gloves, aprons, goggles or masks.
18. Protocol	Knowledge and thoughts about the guidelines in place.
19. Resources	Required or present sources to aid infection control.
20. Risk	Knowledge or thoughts of infection dangers to themselves, or others.
21. Responsibility for Infection Control	Who is responsible for infection control practices.
22.Role Models	Who acts as role models? The value of role models.
23. Screening for Infection	Opinion of the use of screening tool to determine infectious status of patients, and staff.
24. Susceptible Patients	At risk patients.
25. Time	Required length of time to carry out procedures and how time effects compliance with protocols.
26. Uniform	Any mention of uniforms.

Full transcripts can be found in Appendix 16.
A summary of each focus group can be found in Appendix 15.

A summary of all the data placed under each of the codes used in the focus groups is summarised below.

6.10.1 District General Hospital One.

6.10.1.1. Adherence.

In all three grades no radiographers adhered to infection control protocols all of the time (H1 Srm6 Line 95). Participants thought that adherence to infection control protocols were lower in DGH1 than in other hospitals. Their heavy workload (H1 srm10 Line 316, H1 Sup13 Line 232) and poor communication between the Diagnostic Imaging Departments and other hospital departments

were reasons given for non-compliance with infection control protocols. It was claimed that information about infectious patients was often omitted from the request forms, thus preventing radiographers from following appropriate infection control polices. Having said that, members of the senior and superintendent groups thought, that if they were following good infection control practices all of the time, as they should be, then the risk of cross infection to patients and staff would be lowered. (H1 SRF6 Line 568) (H1 Sup15 Line 54) '*Just because they don't have that written on the form doesn't mean they don't have it, so it's theoretically, I think we should be following the same practice for every patient*'. The radiographer grade believed that when they were informed of an infectious patient their infection control standards were very high *'I would think in the cases we know about that we are very very good. I would think we are very slap dash generally'* (H1 Srm6 Line 556-557). This was also the case when dealing with neutropenic patients (H1 Rm2 Line 195).

The superintendent in CT stated that when dealing with patient's with MRSA their practices had changed, they now just cleaned the room quickly and no longer left infected patients until the end of the list. This practice was also found to occur in CT in DGH2. When discussing the protocol for dealing with patients with MRSA, some members of the radiographer group were unaware that the examination room should remain empty for 30 minutes following the examination. Without this knowledge they are unable to adhere to the protocol. This was also found during the observations in CH.

The superintendent radiographers thought that adherence to infection control protocols was higher when carrying out examinations in areas outside the Diagnostic Imaging Department *'I always use the one* [alcohol hand rub] *in SCBU they have them down in SCBU and there's a policy there'*. (H1 Sup12 Line 302) During mammography examinations a senior radiographer also claimed to clean the cassette holder and breast plate after each patient.

6.10.1.2. Benefits.

Radiographers of all grades believed if infection control protocols were followed they would be protected from infection. Senior radiographers stated that, although infection control practices protected all patients it was mainly vulnerable patients, such as the very ill, children and the elderly who benefited the most from these measures. According to superintendent radiographers the community at large also benefited, as infected staff and patients have the potential to spread infections outside the hospital. A radiographer thought that reducing the number of HAIs through the use of infection control would result in more resources being available for other areas of hospital care and so benefit other patients.

6.10.1.3. Communication.

When discussing communication between the different hospital departments, with regards to patient's infectious status, it was stated that information should be present on the x-ray examination request form; however, this information was often missing. This was also the case in DGH2. One senior radiographer thought that on the majority of occasions they were informed about infectious patients, others did not agree. One radiographer believed that compared to some other hospitals, communication between the radiology department and other areas of the hospital was very poor (H1 RM2 Line 22).

Radiographers thought that when information regarding the infectious status of a patient was omitted they themselves, along with all individuals in the waiting rooms, were at risk because the necessary infection control precautions were not taken. However, as mentioned earlier, it is argued by senior and superintendent grades that if they were following good basic infection control protocols for every patient then this lack of information would not be such an issue. This was also the opinion of superintendents and radiographer grades in DGH2. Senior radiographers felt that persons requesting x-ray examinations should be responsible for passing on information about infection risks, and those failing to do so should be penalised.

Different ways of gaining information about a patient's infectious status was discussed. It was thought by the radiographer grade that when dealing with In-patients this information was present in their notes, so if these were available and there was sufficient time these documents could be read. It was also thought that in cases when queries were being made on the telephone the nurses had the opportunity to pass on any relevant information.

Superintendents and radiographers were concerned that information on the request form, regarding infectious status, may jeopardise patient confidentiality as other patients may see this information. However, the superintendents also believed that the possibility of risking patient confidentiality should not be an excuse for not passing on this important information. To combat this issue the radiographer group suggested that the referring department could telephone the radiology department to pass on the information. It was also thought that a coding system could be designed to inform hospital staff of the patient's infectious status discretely. A superintendent radiographer stated that information about a coding system, introduced in A+E, had not been passed on to the radiology department, due to lack of knowledge regarding radiographers level of patient contact.

6.10.1.4. Culture.

It was believed that the NHS trust considered waiting lists to be a more important issue than infection control. Along with this, infection control teams were not thought to show much interest in the radiology department, as a result infection control protocols were often ignored.

The senior radiographers referred to a change in practice with regards to the use of protective clothing in the operating theatre. It was believed that protective clothing was worn less in DGH1 than other hospitals. British practice was also compared with standards in the USA. It was stated that protective clothing used in the USA when dealing with trauma situations was far superior to that applied in British hospitals.

One senior radiographer thought that cleaning of equipment after use should always be carried out and eventually it would become routine, as is the case for checking a patient's identification. The same radiographer claims to clean the cassette holder in mammography after every patient, unfortunately, she admitted this was not a practice she maintained in the general department. Senior radiographers discussed the areas that they always cleaned before patient contact, such as dental equipment and the skull unit; this was as a result of a superintendent routinely instructing them to carry out this practice.

6.10.1.5. Decontamination.

Cleaning was considered to be an important part of infection control. Superintendent radiographers explained how the infection control team had provided them with information about dealing with blood spillages, effectively and safely. However, one superintendent did not think a blood spillage kit was available in the Out-patients department.

It was debated whether or not the radiographic cassettes required cleaning after each patient. The superintendent and senior radiographers claimed that the cassettes used in ICU were cleaned after every patient even though they did not have direct patient contact. The radiographer grades discussed the risks of not cleaning the cassettes after use in A+E, it was explained that the same cassettes are used in other areas of the hospital, where they could then be used to examine other more susceptible patients. Senior radiographers agreed and believed that equipment, such as the mobile x-ray machine and cassettes, should be regularly cleaned to prevent the potential spread of infections to many different departments in the hospital. Members of the radiographer group claimed, that in another hospital where they had worked, cleaning of the cassettes took place after every patient. However, it was thought that the workload in that particular hospital was low and so allowed this practice to take place.

A number of superintendent and senior radiographers only considered cleaning to be necessary if the equipment was visibly dirty or had been in direct contact with an infectious patient. This was also the case in DGH2.

A number of the senior radiographers thought that cleaning was a role for the student radiographers. Other senior and radiographer grades thought that the radiographer helpers could assist in this area. One senior radiographer did not feel that a qualified radiographer should carry out the task of general damp dusting. *'you wouldn't find a radiologist damp dusting a piece of equipment'* (H1 srm10 Line 196). However, there were many radiographers, in all three groups, who believed they were responsible for cleaning the equipment. It was recognised by all three groups that the cleaning of the radiographic equipment was not the responsibility of the domestic cleaning staff.

As already mentioned, a mammographer who routinely cleaned the cassette holder after every patient thought that if regular cleaning of equipment was encouraged it would eventually become routine. Senior radiographers stated that they always clean the dental equipment and the skull unit before patient contact. However, a superintendent radiographer did not believe these areas were always cleaned.

A rota to ensure cleaning took place was considered to be a good idea by the senior radiographers. A checklist present in DGH2, is described in more detail later.

Shortage of time was thought to be one of the biggest factors preventing the cleaning of equipment *'you don't have time to do it either, you're just so rushed off your feet you just want them [patients] in and out'*. (H1 RF1 Line 182). Superintendents and radiographers also believed that the lack of cleaning products was a problem *'that's the thing, when you want to clean something you can never find the cleaning equipment. You spend half an hour looking for stuff don't you?'* (H1 RF4 Line 294). The superintendent radiographers discussed the value of alcohol impregnated cleaning wipes, they thought that these

resources would be useful as they would be quick and effective. However, it was explained by another superintendent that these wipes were ineffective when cleaning equipment contaminated with blood.

6.10.1.6. Direct Contact.

It was thought by some of the superintendent and radiographer grades that they are at risk from cross contamination. However, others believed that as they did not have high levels of patient contact and care was taken to avoid contact with blood and body fluids, the risk of contracting an infection was low. It was pointed out that radiographic cassettes in the general department are not cleaned even after direct skin contact. A senior and a radiographer believed that the direct contact made with the cassettes is similar to that of customers handling shopping trolleys or people holding onto hand rails on a bus, therefore the risk of contamination was low and so cleaning was unnecessary. Superintendents and seniors in DGH2 were also of this opinion. Interestingly, there were senior radiographers who claimed that they would not like to have direct contact with the radiographic equipment if they were patients themselves.

As already stated, a mammographer explained how she always cleaned the breast plates after patient contact, but she did not carry out this practice in other settings of the radiology department.

6.10.1.7. Education.

Members of the senior and radiographer groups had received lectures on the subject of infection control, including hand decontamination technique, during their training at university. A number of senior radiographers and a newly employed superintendent radiographer could not remember infection control being included during their induction programme at DGH1; however, many of the radiographer grade claimed that it was briefly included in this session. Not all members of staff had attended an induction programme.

It was claimed that no formal infection control training had been provided by the hospital (H1 Srf8 line 450). All grades of radiographer felt that annual education sessions were necessary in order to keep them informed of established protocols. The senior radiographers believed that these sessions should be mandatory, as is the case for fire, manual handling and CPR. It was considered appropriate to add infection control on to the end of these sessions. A senior radiographer was sceptical about the usefulness of refresher courses, as he believed that practice would only improve temporarily, due to heavy workloads and shortage of time to carry out all the necessary activities. A member of the radiographer grade claimed that only the nurses had received training in hand decontamination. It was his opinion that *'It's probably more important for them because they come into more contact with body fluid and things don't they'* (H1 Rm2 Line 125).

The senior and superintendent radiographers thought that they had sufficient knowledge about infections, such as HIV, to enable them to take the correct precautions to protect themselves and subsequent patients. However, they did not have the same level of knowledge about MRSA and they were unsure about the methods of transmitting this infection, therefore, education and training in this area is necessary. After stating that they had not received any formal training, a superintendent radiographer remembered sessions they had received 10 years ago about MRSA and AIDS and a senior radiographer remembered a presentation about infection control three or four years ago.

Superintendent radiographers thought that it would be advantageous if hospital staff had an understanding about the different departments in the hospital. This was highlighted when a superintendent radiographer was given the wrong advice from a ward sister who believed the radiographic cassettes were disposable. The coding system in A+E for infectious patients, described earlier, was another instance where knowledge about other departments was needed.

6.10.1.8. Environmental Factors.

Senior and radiographer grades thought that the variety of patients visiting the Diagnostic Imaging Department provided a potential cross contamination issue. In the general area In-patients and Out-patients were grouped together and examined in the same examination rooms. This was also considered to be a problem by superintendents in DGH2.

Insects present in the Diagnostic Imaging Department were considered by senior radiographers to pose an infection control risk *'of course it doesn't help when there are cockroaches everywhere'*. (H1 Srm10 line 144).

6.10.1.9. Feasibility.

Radiography staff thought that due to their heavy workload it was not feasible to wash their hands or clean the equipment after each patient. *'We just don't have the time to do it after every patient. We don't even have time to do it every day do we'* (H1 Rf4 Line 236). During busy periods, superintendents and radiographers believed that hand decontamination and cleaning only occurred during high risk situations, such as contact with body fluids or infectious patients.

Many of the radiographers believed that it was not always possible to follow the MRSA protocol, which states that these patients should be left until the end of a session, and on completion of the examination the room should be cleaned thoroughly, and then left empty for 30 minutes. This was because on occasions unidentified infectious patients arrived in the middle of a list, in these circumstances leaving the examination room empty would have a serious impact upon their workload. It was also considered to be difficult to ensure that infectious patients were the last to be examined, due to continuous requests for x-ray examinations.

6.10.1.10. Hand Decontamination.

When hand decontamination should take place was considered, superintendents thought that hand decontamination should occur before and after patient contact, whereas, seniors and radiographers felt it was only necessary after patient contact. However, members of the radiographer group did not feel that hand decontamination after every patient was necessary. All three groups acknowledge that hand decontamination is not carried out as often as it should be.

It was thought by superintendent radiographers that it was simply easier not to wash their hands and this was a reason given for low compliance with infection control protocols. It was believed by radiographers that the liquid soap provided was too harsh and caused their hands to become dry and cracked. They also thought that once their hands were in this condition they themselves were more at risk of contracting an infection. This was also found in DGH2. A superintendent radiographer had an existing skin condition and believed that she would be unable to continue to work if she had to wash her hands more frequently. Radiographers in DGH2 were also found to suffer with dermatitis. It was thought that the use of alcohol hand rub, rather than the traditional methods using soap and water, would make it easier to follow the correct hand decontamination protocols.

A superintendent thought that a reason for low compliance with hand decontamination protocols may be due to radiography staff believing that their practice does not increase the risk of transmitting an infection to a patient. Interestingly, members of the radiographer group thought that failing to decontaminate their hands after each patient, especially the unknown infectious patient, may increase their risk of contracting an infection. Radiographers of all grades also claimed to decontaminate their hands at the end of the day to protect their families from infection.

One of the superintendent radiographers thought it was their responsibility to ensure that all radiography staff washed their hands at appropriate times and followed other infection control protocols.

It was believed that the doctors pens were responsible for the spread of infection, this was due to the timing of hand decontamination. If doctors decontaminated their hands and then used their pens then they would recontaminate their hands making it possible to transfer any bacteria present to other patients.

6.10.1.11. Perception of Risk.

It was the opinion of one radiographer that there was no risk of cross contamination from patients attending A+E with a sprained ankle, because he felt the contact patients had with the radiographic equipment was no different to any other normal every day activity. Superintendents in DGH2 also considered this to be true. Many of the senior radiographers considered feet to be highly contaminated, however, one senior radiographer did not believe any significant infections could be transmitted from a patient's foot; he thought that infection control practices were mainly in place to control specific infections, rather than all general minor infections.

A senior radiographer believed that an assessment could be made about a patient's infectious status simply by observing them. *' If they look a bit scummy you put gloves on, you know what I mean'* (H1 Srm10 Line 67). However, another senior radiographer disagreed and thought *'you're more at risk from the person that, sort of, has come in under normal circumstances than the In-Patient or the A+E patient that you think might have something'* (H1 Srf6 Line 76).

Many of the senior radiographers were of the opinion that if the equipment in the radiology department appeared to be clean, or any dirt that was present could not be seen by the patient, then this was acceptable. They also thought any risk would be limited if no direct contact was made by the patient with the contaminated area. Interestingly, radiographers stated they would not want to have contact with the radiographic equipment if they were patients. One senior

radiographer thought that if they became more aware of their own vulnerability then they would protect themselves more and so in turn protect the patients they examine.

6.10.1.12. Preventing Transmission of Infection.

It was believed that prevention was better than cure. This was also the opinion of all radiographer grades in DGH2. Prevention was considered by some to be especially important in the radiology department, due to the variety of patients examined and because the radiographers move around the hospital. Ways to prevent transmission included appropriate cleaning, hand decontamination and the use of protective clothing. In addition to this, superintendent radiographers thought that more research was required to discover who was responsible for transmitting infection.

The senior and radiographer grades discussed the method of transmission of MRSA. They believed that the MRSA bacteria have the ability to be transmitted through direct contact as well as being airborne. The fact that it was airborne worried them as they felt even with protective clothing they could still contract the infection. It was believed by the senior radiographers that more precautions were taken to prevent the spread of HIV or Hepatitis than MRSA as they knew how these infections were transmitted.

6.10.1.13. Priority.

Infection control was not thought to be a priority in the Diagnostic Imaging Department. One superintendent considered it to be more of a nicety than a necessity, and during busy periods they were likely to cut corners to enable them to examine the patients more quickly. Superintendent and radiographer grades did not believe infection control was as important in the imaging department as it was for nurses, dealing with patient's wounds and dressings. Many senior and radiographer grades simply did not think about the possibility of spreading infections from one person to another. Lack of understanding was another

reason given by the superintendents for not giving infection control a high priority.

It was also thought by a superintendent radiographer that agency HCPs lacked commitment and did not give infection control a high priority. This is interesting as the agency radiographers were not given any infection control training by the NHS trust, but senior radiographers thought that more education was necessary to increase awareness and make infection control more of a priority.

6.10.1.14. Prompts.

Superintendents and the radiographers thought that infection control compliance would increase if the correct information was included on the request form, if more infection control notices were visible and if a responsible individual was present in the department to monitor the situation and reminded them to carry out the necessary infection control practices. The presence of body fluids was also considered to act as a visible prompt to encourage the use of protective clothing and to follow the appropriate infection control procedures.

6.10.1.15. Protection.

Protecting the hospital staff from contracting infections was considered by senior radiographers to be a large part of infection control. However, when information about a patient's infectious status was omitted from the request forms all radiographer grades failed to follow the necessary protocols, so may be at risk of contracting an infection. They also considered this information to be essential to enable them to isolate infectious patients from others in the main waiting rooms.

The senior and radiographer grades discussed the benefits of using special covers to protect the cassettes from contamination. These covers were not available in DGH1, instead the cassette was placed underneath the patient's

sheet or inside a pillow case to prevent direct skin contact. As the linen is porous a senior radiographer questioned the value of these methods.

Vaccinations were discussed by the radiographers as a form of protection from specific infections, such as TB. Even with vaccinations they still believed information about a patient's infectious status was required so they could take additional protective measures.

6.10.1.16. Protective Clothing.

It was thought by the senior and radiographer grades that gloves and aprons were very important, when trying to prevent the spread of infection, especially when examining In-patients. However, the radiographer group stated that plastic aprons were not available in the general department and they had to request them from the ward. They thought this was unacceptable as protective clothing should be readily available.

The senior radiographers stated that when working in A+E they would assess the need for gloves by observing the patient. Radiographers in DGH2 also claimed to do this. It was stated, by all three groups, that on occasions when they had not been informed that a patient was infectious they had not worn the necessary protective clothing. The use of face masks was also thought to be necessary by one senior radiographer when dealing with patients who are coughing or patients with MRSA. The use of masks was thought to only be used when dealing with suspected TB cases. The chest clinic superintendent informed the group that it was the patient suffering with TB who wore the mask, to protect everyone around them, rather than the radiographer. However, the radiographers describe situations when HCPs have worn masks when dealing with patients suspected of having TB. It was also thought that the use of protective clothing could lead to problems with patient confidentiality.

Different protocols used in other hospitals, with regards to the use of protective clothing, were considered by the superintendent and radiographer grades. Some

of the radiographers had worked in a hospital where they were instructed to wear gloves for each patient. This practice was thought to be unnecessary and could lead to a latex allergy in the future. A superintendent radiographer surprised the rest of the group by announcing that ICU had changed their policy and radiographers were no longer to wear gloves *'We won't be wearing aprons next; it's a slow slippery slope'* (H1 Sup11 Line 527-528).

It was thought that too many radiographers of all grades failed to wear gloves when carrying out IV injections. One superintendent radiographer believed that this practice produced a real risk. She thought that as doctors and consultants often carried out IV injections without wearing gloves it made it difficult to convince radiographers that they should be wearing the gloves to protect themselves.

It was stated by a superintendent in CT that in the past they used to wear protective clothing when dealing with patients with MRSA, today however, she feels this is unnecessary as long as they ensure they wash their hands properly after dealing with these patients.

Hospital staff working in high risk areas, such as pathology, were thought to wear all forms of protective clothing and in doing so they reduced their risk of contracting an infection. A senior radiographer thought that if they felt at risk of contracting a serious infection then they would protect themselves more. He remarked on the situation with SARS, whereby face masks were worn for protection.

The issue of feeling protected when wearing gloves and only thinking about oneself was considered. One superintendent described situations where HCPs from other areas of the hospital enter the CT department wearing gloves. They then proceed to touch equipment in the department without removing the contaminated gloves and so potentially contaminate these areas.

6.10.1.17. Protocol.

One superintendent thought that many of the protocols in place would not stand up to scrutiny. It was believed they were contradictory and differed depending on the type of HCP or the department following the procedures. It was thought that these protocols should be examined and developed so all hospital staff follow the same practice.

It was claimed that certain infection control protocols in the radiology department were adhered to. The superintendent working in the chest clinic stated that all members of staff in this department adhered to the protocol for dealing with patients with active TB. A mammographer also claimed that the protocol for cleaning the cassette holder and breast plate after each patient was followed. Unfortunately, the superintendent for CT claimed they no longer followed the protocol accurately when dealing with patients with MRSA due to the high number of infected patients. This policy was still followed by the radiographers in the general department; however, many of the group had not been aware of the full protocol. It was thought by the senior and radiographer grades that infection control protocols were not always followed when dealing with infectious patients as they were not always provided with the relevant information. It was argued that if they were following basic infection control protocols for all patients this lack of information would not be an issue. It was claimed that radiographers of all grades followed infection control protocols more in ICU and SCBU than in the general Diagnostic Imaging Department.

A newly employed superintendent had not been informed of the hospitals infection control policies, but thought the reason for this may be due to the fact that she worked in Out-patients, which she considered to be a low risk area. She was informed, during the discussion, that all the infection control protocols were present in all the examination rooms.

Staff wearing their uniforms outside the hospital was discussed. This is described in more detail under the code of Protocol in DGH2. Many of the

superintendent radiographers were informed that there was a new policy relating to theatre blues stating that they were no longer to be worn outside the sterile environment. This was thought to relate to image rather than infection control.

6.10.1.18. Resources.

Members of the radiographer group did not think that DGH1 provided enough resources to enable them to carry out infection control practices easily. The soap available for hand decontamination was considered to be too harsh and caused the radiographers hands to become dry and cracked. It was believed that alcohol hand rub would be a useful resource. This would save time and may cause less skin problems. Protective covers for cassettes were thought to be a useful resource that they did not have access to. It was considered by many of the Focus Group participants to be cost effective to increase the availability of resources required to enable infection control protocols to be carried out easily. This was also the opinion of radiographers in DGH2.

Senior and radiographer grades believed that staffing levels also had an impact on compliance with infection control protocols. High staffing levels at a different hospital were believed to have led to increased compliance with infection control protocols.

It was explained by some senior radiographers that the sterile examination rooms were used for general examinations in order to reduce waiting times. This caused them to believe that waiting times were considered, by the radiology department and the NHS trust, to be more important than infection control.

6.10.1.19. Risk.

The Diagnostic Imaging Department was not considered by the radiographers to pose any higher risk to patients than the rest of the hospital. However, radiographers and senior radiographers thought interventional radiology did pose a higher risk than the rest of the Diagnostic Imaging Department. Apart from the types of procedures carried out in the interventional areas carrying more risk,

they also considered these rooms to be unclean. When discussing the risk of staff contracting an infection from the patients, the radiographers, in general, did not feel they were at any more risk than anyone else. However, they did think their risk increased during busy periods, when they did not have time to decontaminate their hands after patient contact. One radiographer did think that they had a higher risk of infection than the general public when they were exposed to body fluids.

One superintendent did not consider patients with HIV to pose a risk to staff, as the infection was difficult to contract; she believed it was easier to become infected with Hepatitis B or C. Senior radiographers claimed that more precautions were taken when dealing with these patients, as they were aware of the risks and modes of transmission. However, this was not the case when dealing with patients with MRSA. They also thought that they were not at risk from MRSA as it only affected individuals with open wounds and those who were severely ill. Staff in DGH1 and DGH2 believed when dealing with patients who are known to be infectious they follow appropriate infection control protocols. When following infection control protocols the senior radiographers considered the risk of infection to be reduced. A superintendent and senior radiographers thought that it was the patient with no infectious status details that posed a risk to them, as in these cases they did not usually follow any infection control protocols. As a result of failing to follow infection control protocols a radiographer believed he was likely to be a carrier of MRSA. However, the same radiographer did not consider patients coming to the hospital with a sprained ankle to be an infection control risk. It was argued that these patients could still be infectious and could transmit infection to other vulnerable patients if they had contact with the same radiographic equipment. It was the opinion of one senior radiographer that if dirt was not visible then there would be no risk of cross contamination. All grades of radiographer thought that there was a risk of transferring infections from one area of the hospital to another, due to examining patients on different wards and dealing with a large variety of patients in the Diagnostic Imaging Department. This was also found to be the belief in DGH2.

Superintendent radiographers thought that they put themselves at risk of infection when they do not wear gloves during IV injections. They described an account about a radiology consultant who believed that because they did not work in a third world country they were not at risk of contracting any infections.

Although the radiographers stated that they did not think they were at risk of contracting an infection, they all claimed to wash their hands before leaving the hospital. This was also shown in DGH2. A senior radiographer believed that they themselves were more of a risk to the patients and *'If we were more conscious of our own vulnerability then we would do things that would protect us and that would ultimately protect the people that we are dealing with'* (H1Srf6 Line675).

6.10.1.20. Responsibility for Infection Control.

As shown earlier (6.10.1.5) it was thought that student radiographers, radiographer assistants and x-ray nurses could also help with the cleaning of equipment. It was noted that the x-ray nurses do take responsibility for cleaning in the interventional examination rooms.

Radiographers were unsure who was responsible for cleaning up body fluids. Many of the radiographers felt that if the patient had become ill or bled while they were being examined it was their responsibility to clean the patient and the room. This was also the case when using the image intensifier in theatre. However, some of the radiographers thought that if this situation presented itself outside the examination room then it was not their responsibility. They acknowledged that it would be beneficial if they did know who was responsible for cleaning in these situations.

One senior radiographer believed that it does not take a qualified radiographer to clean the equipment in the department. However, others consider cleaning to be their responsibility, but they maintain that they do not have time to decontaminate the equipment between each patient.

The superintendent and radiographer group thought that having an individual in the department who was responsible for infection control would be beneficial. This person could then remind the staff of the protocols they should be following. Superintendents in DGH2 also considered this to be necessary. In DGH1 a superintendent was considered to be the most appropriate person for the role, as they thought it would be easier for those with more authority to instruct people to carry out infection control protocols. However, a superintendent radiographer informed the group that a basic grade radiographer was going to become responsible for infection control in the department.

Senior radiographers thought that requesting clinicians should be responsible for informing them of the patient's infectious status, so they can then take the appropriate protective action.

6.10.1.21. Role Models.

During a discussion about the use of gloves when carrying out IV injections, a superintendent claimed that she had initially worn gloves to perform this procedure, but stopped using them when she noted that other radiographers did not. Another superintendent stated that as doctors do not wear gloves it does not reinforce the need for other members of staff to wear them.

When discussing standards of another hospital, it was thought that the standards there were high due to one agency radiographer who insisted that the cassettes were cleaned and hands decontaminated after each patient. This suggests that the comments made earlier by a superintendent radiographer, about agency staff, were unfounded (6.10.1.13). Senior radiographers also discussed a superintendent from the past who insisted that the dental equipment was cleaned in front of each patient. This is a practice the senior radiographers claim is still carried out. It was claimed by a radiographer that when working in ICU she was more likely to use some sort of protection for the cassette if another member of staff was present than if she worked alone.

The superintendents also discussed training. It was believed that everyone needed to be trained in a short space of time, as it was thought that those not

trained and so not carrying out correct infection control practices may negatively influence the behaviour of those who had just been trained.

6.10.1.22. Screening for Infections.

Staff in DGH1 had similar feelings to staff in DGH2, with regards to screening staff for infection (6.10.2.23). It was suggested by some that yearly testing may be beneficial, although it was recognised that this would produce an increased workload for other departments in the hospital. However, a number of senior radiographers could not see any advantage in the screening programme, as they thought that a large number of the staff would be found to be carriers. One senior radiographer believed that as he was a healthy individual then even if he was a carrier of the MRSA bacteria it would not present him with any problems.

6.10.1.23. Susceptible Patients.

The knowledge of staff in DGH1, with regards to susceptible patients, was similar to that found in DGH2 (6.10.2.24). A number of senior and radiographer grade members claimed that when dealing with patients with open wounds they would change their practice as they were considered to be an infection control risk (H1 Rr1 line 218; H1 Srf9 Lines 382-382). Others claimed that these patients would often be cleaned and wounds covered before they enter the Diagnostic Imaging Department, this reduced the risk of cross contamination. A superintendent radiographer informed the group that another radiographer had stated that intact skin was the best barrier against infections so gloves were not required as a form of protection. It was argued that it was very difficult to say the skin on their hands was intact, as they were often unaware of small scratches and cuts.

6.10.1.24. Time Constraints.

It was believed by superintendent radiographers that compliance with infection control protocols was low due to lack of time. During busy periods infection control protocols were described as a nicety, and so a procedure that can be

ignored. This was also shown in DGH2. A senior radiographer stated that at least half a day was required to clean all the equipment in the general department. However, another radiographer disagreed, and claimed to clean her ultrasound equipment every morning. It was thought by some senior radiographers that when the Diagnostic Imaging Department was not busy then they should be responsible for cleaning the equipment, but during busy times someone else should take responsibility (H1 Srm10 line 316).

Senior radiographers agreed that in theory it was necessary to always follow infection control protocols, however, in practice they stated it was very different. All grades of radiographer believed that shortage of staff led to an increase in workload resulting in less time for each patient. During busy periods the radiographers thought they were more likely to forget about infection control protocols and that it was at these times they were putting themselves at risk of contracting an infection. Lack of time also prevented the radiographers from examining patient's notes, or contacting wards for information about the patient's infectious status. It is believed that when resources are not easily accessible they are unlikely to carry out infection control protocols because they do not have the time to look for them.

One senior radiographer compared infection control with manual handling practice. He did not believe that there was time to move patients in the correct manner so he did it in a way that was quick; he felt that infection control protocols were the same.

6.10.1.25. Uniforms.

Comments about uniforms are similar to those found in DGH2 (6.10.2.18). A superintendent radiographer informed the group of a new policy about wearing theatre blues, this was described earlier (6.10.1.19).

The male radiographers believed that they should be supplied with uniforms and not made to wear their own shirts and ties. Their ties were considered to be a health and safety issue as well as an infection control risk.

6.10.2 District General Hospital Two.

6.10.2.1. Adherence.

With the exception of one senior radiographer all other radiographers of any grade admitted that they did not always adhere to the hand decontamination protocol *'I confess I don't wash my hands after every single patient'* (H2 SRF4 Line 96). This was also shown in DGH1. They claimed that hand decontamination would depend on the level of contact and the type of patient they were examining (H2 Srm3 Line 102).

It was thought by a superintendent radiographer in CT that it was not always possible to adhere to the hospital infection control protocols. This was also found in DGH1 (6.10.1.17).

The senior radiographers believed that staff working in ICU, SCBU and Theatre complied with infection control protocols more than radiographers in the Diagnostic Imaging Department. However, radiographers were surprised that a number of ICU nurses did not always wear gloves or wash hands between patients, even when dealing with those known to be infected with MRSA. In these cases the radiographers thought that their own adherence to infection control protocols was superior.

As found in DGH1, when dealing with patients known to be infectious it was believed that they followed the appropriate protocols to prevent themselves becoming infected as well as guarding against cross contamination. The practice carried out in a hospital in Australia was described by two radiographers. They stated that all patients on ICU were to be assumed to be infected with MRSA and should be treated accordingly. This meant that they were not relying on referring clinicians passing on information about the patient's infectious status, and they always followed the correct protocol. The superintendent radiographers agreed with the Australian practice. This was also agreed with in DGH1.

The senior radiographers believed that adherence to the infection control protocols reduced their risk of contracting any infectious diseases. This was also considered to be the case in DGH1 (6.10.1.16).

The senior radiographers thought they needed to be more aware of the protocols in place in order to be able to adhere to them. Therefore, education and training were necessary to provide this information.

A new protocol that was adhered to in a different hospital was described by a senior radiographer; this protocol stated that the mobile x-ray machine and cassettes must be cleaned before and after every patient and the cassettes must always be covered. The new protocol was implemented after the mobile x-ray machine and cassettes were identified as the source of an MRSA outbreak in ICU.

Infection control standards in the operating theatre in one of the satellite hospitals were considered to be very high, this was thought to be due to the theatre sister enforcing the infection control practices. The radiographers found it interesting that the surgeons would adhere to the protocols in the outside hospital but did not when working in the main site hospital.

The seniors and radiographer grades described the checklists, for cleaning work surfaces and equipment, which were found in each examination room. The checklists are completed and signed by a radiographer daily and checked by a superintendent radiographer. The senior radiographers thought that the checklist was an important tool and did improve compliance with infection control protocols; however, they still believed that only certain radiographers took the time to complete the checklist. The superintendents considered that having an individual in the Diagnostic Imaging Department who was responsible for ensuring that infection control protocols were adhered to, would be a good idea. This was also the case in DGH1.

Radiographers of all grades believed that time constraints were the biggest factor that prevented adherence to infection control protocols. However, a superintendent radiographer believed that it was the culture of the hospital that affected levels of compliance. It was her opinion that the NHS trust had made it acceptable for the hospital to be left unclean.

6.10.2.2. Benefits.

Comments about uniforms are similar to those found in DGH1 (6.10.2.18). The views of the staff in DGH2 with regards to the benefits of infection control are similar to those in DGH1 (6.10.1.2).

6.10.2.3. Communication.

Communication between the referring clinicians, ward staff and radiographers with regards to infection control, was considered to be important. Good communication prompted the radiographers of all grades to follow the appropriate infection control protocols. However, it was believed that information about a patient's infectious status was not always provided; this was also found in DGH1. Radiographers explained alternative ways of gaining this information; these included the patient's notes or computer records. A number of the superintendent radiographers were unsure if the computer records were up-to-date, therefore, they felt this information was unreliable. Senior radiographers pointed out that computer records were usually viewed once the patient was in the waiting room or examination room, if the patient was found to be infectious they had already failed to follow the appropriate protocols, as these patients should be examined at the end of a list. Senior radiographers believed that they were always informed when a patient was neutropenic.

The superintendent and senior radiographers claimed that on occasions the porters are informed about a patient's infectious status by the ward. The porters then pass on the relevant information to the radiographers.

Superintendent radiographers believed that communication between themselves and the ward staff had improved. They thought this was due to a recent vomiting and diarrhoea outbreak, which resulted in ward closure and many members of staff being affected. The superintendents in CT, MRI and ultrasound thought that they questioned ward staff about infectious patients more frequently. This occurred when they telephoned the ward to arrange appointment times for examinations. Radiographers, working in the general department, claimed that they did not have sufficient time to contact the ward about every patient.

The radiographers believed that more information regarding the risks of specific infections would be useful. A new protocol was in place stating that patients with MRSA in a covered wound did not present a high risk, so could be examined at any time. This sometimes caused confusion.

6.10.2.4. Culture.

Lack of time was a reason given for not carrying out infection control practices. However, a superintendent radiographer believes that the NHS trust does not consider infection control to be a priority. This may result in HCPs not considering infection control to be a priority (H2 Sup2 line 189). She thought that it was considered to be acceptable for the hospital to be unclean.

The radiographers discussed a new notice that was displayed in ICU stating that anyone can ask any member of staff to wash their hands. They believed that this was important and that they would not be offended if they were asked to decontaminate their hands. However, they all agreed that they would be unlikely to instruct a senior member of staff to carry out hand decontamination, but, they may ask senior members of staff to do so if they were visiting a hospitalised relative.

When discussing the impracticality of cleaning the ultrasound probes, one superintendent thought that the NHS trust should increase the examination time to include the necessary time to clean the equipment after each patient. This

would show that the NHS trust recognised the importance of infection control. As found in DGH1 all three groups believed that the hospital placed a higher priority to reducing waiting times, rather than reducing HAI rates.

It had been noticed that the infection control standards in a satellite hospital were far superior to those in the main site hospital. The satellite hospital also appeared to be more inclined to purchase equipment that would aid in the prevention of the spread of infection. They believed this was because of the culture of the satellite hospital, which had always been in place, whereas, the standards in the main site were thought to have diminished over time. The radiographers thought that the NHS trust should look at the cost of HAIs. They argued that money would be saved, in the long term, if the appropriate equipment was purchased, as it would improve compliance and potentially reduce HAI rates. Staff in DGH1 also agreed with this.

The culture of hospitals in other countries were discussed by the radiographers. German infection control practices were considered to be carried out to a much higher standard than Britain (H2 Rf3 line 532).

6.10.2.5. Decontamination.

Radiographers from all groups, in both hospitals, admitted that they did not clean the radiographic equipment after each patient. However, cleaning the radiographic equipment was considered to be an important aspect of infection control. The radiographers stated that the checklists present in all the examination rooms covered cleaning of all the equipment. Unfortunately, it was considered by the senior and radiographer grade to be very time consuming to clean the equipment after each patient. They thought that it would be fine to follow the cleaning protocol providing patients did not object to longer waiting times. It was argued by superintendent radiographers that they would not be able to clean inside the MRI scanner or decontaminate the ultrasound probes, according to manufacturer's recommendations, after every patient, because of time constraints. Therefore, thorough cleaning of these pieces of equipment did not occur. The ultrasound probes were wiped clean and not decontaminated

thoroughly until the end of the day. However, one radiographer thought that they should be cleaning equipment between patients. It was her opinion that you can't do too much (H2 Rf3 line 214). It was also the opinion of some of the senior radiographers that all aspects of infection control needed to be followed for it to be effective. They considered it pointless to ensure hands were clean if the radiographic equipment they were handling were contaminated.

Some of the senior radiographers felt uncomfortable instructing or being instructed to clean their equipment, and they thought that it was better to lead by example, rather than just telling another member of staff what to do. They claimed that some radiographers would take offence if they were asked to clean the equipment; it was thought that it was mainly the recently qualified radiographers with this attitude. However, the radiographer grades claimed that they would not be offended if they were asked to clean the examination rooms and believed that they all worked as a team, when it came to maintaining a good standard of cleanliness in the department.

A senior radiographer claimed the new cleaning wipes, which had become available, increased compliance with infection control protocols as they were easy to use and less time consuming. This was also found in phase one, where, the blue roll was changed more frequently than the plastic mattress cover.

It was stated that the radiographic equipment was always cleaned thoroughly after dealing with infectious patients. The radiographers also believed that it was important to clean the equipment meticulously when carrying out Mobile radiography, especially when examining ICU or SCBU patients.

The radiographers thought that the knowledge of how to clean body fluids safely and effectively was required (6.10.1.5).

The superintendent and radiographer grades believed that over the years the basic standards of hygiene in the hospital had lowered. All three groups discussed how, in the past, the student radiographers were responsible for

cleaning the equipment and changing the linen in the Diagnostic Imaging Department. As a result of this it was thought, by a radiographer, that staff above these grades may think that cleaning was beneath them. Many of the superintendents and the radiographers believed that everybody in the department should take responsibility for cleaning. However, some of the senior radiographers disagreed with this and considered it to be an important part of the students training.

Interestingly, as found in DGH1 some of the radiographers felt that if they were patients they would not like to have direct contact with the equipment, unless they had seen it being cleaned.

6.10.2.6. Direct Contact.

The level of patient contact, along with the type of patient they were examining determined whether or not hand decontamination and cleaning of equipment was carried out. After contact with a patient's hair or skin, particularly a patient's foot, or patients who were considered to be dirty or intoxicated, senior and radiographer grades believed hand decontamination would occur more frequently.

It was claimed that the equipment was cleaned when they knew they were examining an infectious patient. The ultrasound superintendent reported that in these situations they examined the patient on their own bed, to reduce the amount of contact the patient has with the equipment. The senior radiographers also stated that radiographic equipment was cleaned and hands were washed prior to examining any neutropenic patients.

It was thought by the superintendents that staff working in CT have higher levels of patient contact and carry out IV injections more frequently than those working in other areas of the Diagnostic Imaging Department, this could lead to an increased risk of cross contamination. As found in DGH1, it was also thought that nurses had a higher risk of contracting and spreading an infection due to higher levels of direct patient contact.

6.10.2.7. Education.

The NHS trust recently introduced a mandatory annual infection control session for all hospital staff. The session concentrated on general infection control, although a number of issues relating to the radiology department were also addressed. It was thought by some that the general infection control information was sufficient. However, senior radiographers thought that a more specific session relating to the Diagnostic Imaging Department would be useful. Superintendent radiographers thought it may be beneficial if a member of the radiology department was responsible for their infection control training. The mandatory sessions were considered to be valuable as they acted as a good reminder. One of the radiographers thought that it was essential that the sessions were mandatory because she had found them to be quite boring and if she had the choice in the future she probably would not attend. This was also the case in DGH1. However, it was pointed out by a radiographer in DGH2 that Manual Handling was a mandatory session yet some of them had not attended any sessions. One of the radiographers had not yet attended the session; this was due to her starting date within the hospital. With this in mind, it was thought that it would be useful if infection control was included in the induction programme, as everyone attends this when they first start their employment in the hospital.

Many of the senior and radiographer grades had received education about infection control whilst at university. This was thought to be an important part of their training.

6.10.2.8. Environmental Factors.

A senior radiographer described the hospital as '*the most unhealthy place to come into*' (H2 Srf4 Line 129). It was believed by many that mixing infectious patients with those with compromised immune systems in the waiting room could pose the problem of cross infection; this was also the belief in DGH1.

It was thought by some of the senior radiographers that the temperature of the hospital was too high, and in their opinion this was considered to be an infection

control issue. They felt they had become unwell in the past as a result of moving from hot to cold areas. The high temperature of the tap water and the small size of the sink were also considered to be issues preventing radiographers performing traditional hand decontamination technique properly.

One superintendent described her stay as a patient in the hospital and believed that nurses and doctors did not wash their hands between every patient. She thought this was due to their high workload and the location of the sinks, which were placed outside the ward and not close to each of the patient's beds.

6.10.2.9. Feasibility.

As with staff in DGH1, all radiographer grades thought it was impractical to always follow infection control protocols, especially in cases where they were required to leave the examination room empty for 30 minutes (6.10.1.1). The senior and radiographer grades believed it was unfeasible to wash their hands or wear gloves for every patient as it was thought this could result in allergies. Superintendent radiographers also found that time constraints presented problems when trying to clean the ultrasound probes and the magnetic resonance scanner.

6.10.2.10. Hand Decontamination.

Hand decontamination was accepted as the most important aspect of infection control. Radiographers explained that their hands could become contaminated after contact with patients and the radiographic equipment. However, as reported earlier, only one senior radiographer claimed to wash her hands after every patient.

Superintendents and senior radiographers thought that, ideally, hand decontamination should occur after every patient. Whereas, radiographers believed that hand decontamination should occur before and after contact with every patient. When carrying out IV injections superintendents thought that hand decontamination should occur before and after every patient. All three

grades of radiographer believed that they did not have sufficient time to wash their hands after every patient as they thought this level of compliance would require approximately two hours every day. Some radiographers stated that if it became acceptable to increase the patient's waiting time then they would be able to carry out infection control procedures, including hand decontamination, more frequently. It was also thought that excessive hand decontamination could cause skin problems, such as allergies and dermatitis. To combat this they thought that the use of gloves instead of hand decontamination may be of benefit; however, others argued that the overuse of gloves could also lead to allergies. It was noted that hand decontamination after removing the gloves was still necessary.

Some of the senior radiographers claimed that their perception of which patients were clean changed during busy periods. It was believed by all three groups that after dealing with an infectious patient they always washed their hands. Senior radiographers also claimed to always wash their hands before contact with neutropenic patients. It was thought by the superintendent and senior radiographers that an individual in the radiology department charged with enforcing hand decontamination and other infection control protocols would be useful.

Radiographers believed that sometimes hand decontamination and the use of protective clothing made their patients feel uncomfortable so educating the public in the value of these measures would be useful.

As in DGH1, radiography staff claimed to wash their hands before leaving the hospital at the end of the day.

6.10.2.11. Instruction.

Radiographers of all grades thought that being instructed to carry out infection control measures was important as it acted as a reminder, encouraging them to follow the appropriate practice. A senior radiographer stated that he often followed the instructions given by nurses accompanying patients to the

Diagnostic Imaging Department, with regard to protective clothing and the level of risk the patient presented. The senior radiographers were surprised that nurses did not enforce hand decontamination when the radiographers were examining patients in ICU. They also found it strange that they were never told to remove their jewellery when examining neutropenic patients. The superintendent radiographers thought that it was important for a member of the infection control team to visit the radiology department and inform them of what they should or should not be doing.

A notice in ICU stating that anyone can instruct a member of staff to wash their hands, was considered to be very good. However, radiographers did not think that they would feel comfortable instructing senior members of staff to carry out hand decontamination.

6.10.2.12. Perception of Risk.

Senior and radiographer grades believed they could assess their patients visually for infection risk. This was also found in DGH1 (6.10.1.11). A senior radiographer stated that during busy periods, their opinion of who is clean changes and more patients are considered to be clean.

Interestingly, when radiographers from all three grades considered the risk to themselves, their perception of risk altered. Although they did not consider the equipment to pose a risk to patients they stated they would not want contact with the radiographic equipment if they were patients themselves. They were also concerned about transmitting infections to their families; this was also found in DGH1.

6.10.2.13. Preventing Transmission of Bacteria.

When informed that a patient was neutropenic the senior radiographers stated that the equipment and their hands were always decontaminated prior to contact with these patients to prevent transmitting any infections.

6.10.2.14. Priority.

As found in DGH1, the senior and radiographer grades believed that waiting times took priority, this prevented them from following the appropriate infection control protocols. However, it was the opinion of the senior radiographers that infection control practice should be given a high priority in the Diagnostic Imaging Department because of the number and variety of the patients examined in this area. One of the superintendent radiographers disagreed with this and thought that infection control did not require a high priority when working in the general department, due to the low level of patient contact.

As the NHS trust had not increased the number of cleaners or made any provisions that would have financial implications, some of the superintendent radiographers felt that the NHS trust did not give infection control a high priority.

6.10.2.15. Prompt.

Senior radiographers stated that the type of patient being examined was a factor in prompting hand decontamination. They thought that if the patient was unclean they would be more likely to wash their hands. Along with this, all groups stated that if the patient was infectious, or if they were examining certain body parts, such as a patient's foot, they would always decontaminate their hands following the examination. From this, a superintendent radiographer thought if the MRSA infection was visible or had an unpleasant odour then more hospital staff would comply with the infection control protocols. It was believed by many of the superintendent radiographers that because bacteria were not visible they were not concerned about them. However, a superintendent disagreed with this as they take precautions when dealing with radiation, which cannot be seen (H2 Sup3 Line 448-451).

It was believed by senior and radiographer grades that good role models reinforced and encouraged compliance with infection control protocols. The radiographers thought that notices displayed in ICU encouraging people to

instruct hospital staff to wash their hands was a very good idea. It was also thought that the mandatory educational infection control sessions acted as reminders for hospital staff to comply with infection control protocols.

6.10.2.16. Protection.

The ultrasound superintendent explained how they cover the examination couch with disposable blue paper roll, which is changed after each patient. She also stated that when using the ultrasound probes internally they are protected using a condom. This is necessary as the required cleaning process of the probe is not feasible.

A senior radiographer described how, in a different hospital, the radiographic cassettes were covered to prevent contamination. This protocol was introduced after it was found that the cassettes were the source of an MRSA outbreak. Many of the senior radiographers claimed to follow similar practices. *'I don't know if it is policy actually, but we do tend to put them in pillow cases when we go up'* [mobile radiography] (H2 Srf4 line 414-415).

The radiographers were concerned about the method of protection used when carrying out an OPG examination. They cover the bite piece with a cut off finger of a glove. They considered this to be insufficient as some of the gloves are porous making it possible for the bite piece to still become contaminated by the patient's saliva. The radiographers noted that an outside hospital has specially designed bite covers which they felt were more appropriate. This outside hospital also has disposable plastic sleeves to protect the Image Intensifier from contamination with blood (6.10.2.19).

6.10.2.17. Protective Clothing.

As already mentioned the radiographers assessed the need for protective clothing based on the information regarding a patient's infectious status and a patient's appearance.

Some of the senior radiographers were surprised that on occasions the nurses accompanying infectious patients and those working in ICU did not always wear protective clothing such as gloves or aprons.

A number of senior radiographers thought that it was important for the porters to be informed about a patient's infectious status, to allow them to take the required precautions. They also claimed that, on occasions, it was due to the porters wearing protective clothing that they were made aware of a patient's infectious status. The superintendent radiographers disagreed with the need for porters to wear protective clothing due to low level contact. They also felt that over use of protective clothing may make patients feel uncomfortable.

As stated earlier (6.10.2.10) a radiographer thought that it may be easier to wear gloves more frequently rather than having to decontaminate their hands after each patient, but it was acknowledged that over use of gloves may lead to latex allergies. It was also recognised that hand decontamination was still required after the use of gloves (H2 Srf5 Line 88).

6.10.2.18. Protocols.

The radiology department was considered to have a number of good protocols, including hand decontamination, cleaning body fluids, dealing with sharps and examining patients with infectious diseases. The senior radiographers believed that it was important to follow all infection control protocols. They thought it was pointless to follow hand decontamination protocols if guidelines for cleaning equipment or wearing protective clothing were ignored. The daily checklist described earlier was considered to be a good method of encouraging infection control practices.

When radiographers of all grades are made aware of a patients infectious status then all the appropriate protocols are followed. However, they all agreed that they should be following basic infection protocols for every patient and not only those known to be infectious. This was also believed to be true in DGH1.

A new policy was in place which ensured that all members of hospital staff attended an annual mandatory infection control session. These sessions were considered to be important, as it was thought that knowledge of the different infection control protocols was essential.

The superintendent and radiographer grades discussed staff wearing their uniforms outside the hospital. They thought that their uniforms could become contaminated if worn outside and so put patients at risk of infection. Interestingly, they thought a protocol prohibiting the wearing of uniforms outside the hospital was required.

6.10.2.19. Resources.

Hand decontamination was not only considered to be the most effective way of preventing HAIs, but also the cheapest and easiest. Unfortunately, radiography staff felt that due to lack of time they were unable to carry out this practice after every patient. It was thought that the introduction of the alcohol hand rub and equipment wipes was a good move forward in trying to increase compliance because they took less time and made it easier to decontaminate their hands and the radiographic equipment. This was also discussed in DGH1.

The radiographers believed that it was important that stock levels were kept high. They thought if they had to search for gloves or aprons they would be less likely to wear them. This was also the belief in DGH1. The use of the disposable plastic C-arm sleeves and the bite piece protectors were considered to be important and should be available in each hospital. The introduction of new uniforms in the style of theatre blues was considered to be a good idea, as it would enable them to change after contact with high risk patients. It was thought that these issues were not addressed due to financial implications.

A sliding cover is used in ICU to help manoeuvre the radiographic cassettes. These covers are not designed with infection control in mind, but they do prevent the cassette coming into direct contact with the patient. Air powered

mattresses were also considered to be useful, as again the cassettes did not come into any direct patient contact. These were thought to be superior to the sliding covers as the material was non porous.

The superintendent radiographers believed it was important for everyone to follow the appropriate protocols. It was thought that failing to inform them of a patient's infectious status resulted in a waste of resources. Porters try to collect patients only to find they are infectious. In these cases they have to leave the patient on the ward, wasting time that could have been used to collect another patient. The other alternative is to examine the patient in the middle of the list which results in the room having to be left unused for 30 minutes, during which time more patients could have been examined.

6.10.2.20. Risk.

The senior and radiographer grades thought that certain wards, including ICU and SCBU, posed higher cross contamination risks. They also thought that nurses had a higher risk of contracting an infection due to the high levels of patient contact. It was the opinion of some of the radiographers that the Diagnostic Imaging Department was cleaner than many of the wards, so resulted in a lower infection control risk. It was also thought that due to low levels of patient contact the risk associated with the Diagnostic Imaging Department was similar to the risk of contracting an infection while travelling on a bus. Different areas of the radiology department were believed to pose different levels of risk. The interventional suite, CT and Fluoroscopy were considered to pose higher risks than the general areas. However, due to on-call commitments a number of the radiographers claim to become tired and run down, thus putting themselves at a higher risk of contracting an infection. Many of them had experienced a number of colds or episodes of sickness and diarrhoea. Although many thought that the risk of transmitting an infection was low, they also stated that they would not like to come in to contact with the radiographic equipment unless they had witnessed it being cleaned.

As in DGH1, the superintendent radiographers believed that In-patients were more likely to be infectious than Out-patients. Members of all three groups believed neutropenic patients and the patients from the Oncology department would have a higher risk of contracting an infection, due to their lowered immune systems. However, the senior radiographers did think all patients risked infection from the hospital as *'the whole place is a bug factory anyway isn't it'* (H2 Srf2 Line 127).

When staff in the Diagnostic Imaging Department were informed about a patient's infectious status they claimed to follow the appropriate protocols, consequently they believed the risks of contracting or transmitting the infection to other patients were lowered.

A superintendent claimed that she did not always understand the level of risk associated with patients with MRSA. It was thought that there was a lower risk of cross contamination if the MRSA infection was in a covered wound.

6.10.2.21. Responsibility for Infection Control.

In the past it was considered to be the student radiographer's responsibility to clean and stock the examination rooms, however, this is no longer the case. The superintendents and the radiographers believed that cleaning should be everybody's responsibility and not just the student radiographers or the radiographer grades.

Superintendent and senior grades thought that having an individual responsible for ensuring infection control protocols were carried out in the Diagnostic Imaging Department would be useful.

6.10.2.22. Role Models.

The radiographers claimed that during their training and since qualifying they followed the positive example set by qualified radiographers. The senior radiographers stated that when they observed another radiographer washing their

hands or cleaning equipment it often prompted them to follow suit. They also believed this would be the best way to encourage other members of staff to decontaminate their hands and follow other infection control protocols *'you set an example don't you? If you wash your hands then it triggers them to think'* (H2 Srf2 Line 667). A number of senior radiographers thought that newly qualified or newly employed staff may not follow infection control protocols if they do not see other radiography staff following the correct practices. It was thought this may be because they would feel uncomfortable doing it on their own.

One senior radiographer stated that if a nurse accompanying a patient was not wearing protective clothing, then even if the patient was infectious, he may not wear the protective clothing either, although he did think that once they had left the examination room he would still decontaminate his hands and the equipment.

When working alone in the outside hospitals the senior radiographers claimed that they would not want other radiographers to think badly of them so they ensured the examination rooms were kept clean and tidy.

6.10.2.23. Screening for Infection.

A number of senior and radiographer grades had already experienced the process of screening for infection. As found in DGH1, it was thought by some senior radiographers that an annual check would be welcome. Many thought they would want to know if they were infectious, so they could take actions to prevent transmission to their families, other members of staff and patients. It could also reduce the risk of complications to themselves if they ever needed surgery.

If found to be MRSA positive a number of radiographers worried about the stigma attached to the infection. It was thought by a few of the senior radiographers that they would only be happy to be screened for infections if there was a cure, otherwise they would rather not know. Some of the senior

radiographers were concerned about how the results would affect their future employment.

6.10.2.24. Susceptible Patients.

Neutropenic patients and patients from the cancer centre were thought to be the most at risk of contracting an infection. It was believed that they were always informed if the patient was neutropenic and it was described how they always decontaminate their hands and the equipment before examining these patients. The elderly, children and patients on ICU or SCBU were also thought to be susceptible to infection. The risks that open wounds presented was also discussed. A senior radiographer acknowledged that an IV injection created an open wound and so provided a site for bacteria to enter the body.

6.10.2.25. Time.

Lack of time was the main reason given by all three groups for not complying with infection control protocols. The senior radiographers believed that more time was required to enable them to carry out infection control practices to a high standard. The equipment wipes were considered to be useful as they made the process of cleaning quicker. However, a superintendent did not believe lack of time was the reason for low compliance with infection control protocols. She claimed there was no difference in practice if the department was busy or quiet. She believed it was the culture of the hospital and the radiology department that prevented infection control practices being carried out. As already mentioned, under priority (6.10.2.14) it was thought to be more important to examine the patients quickly rather than perform infection control measures.

It was also believed that lack of time may be the reason for ward staff and referring clinicians failing to pass on important information regarding the infectious status of the patient.

6.10.2.26. Uniform.

The senior radiographers thought that their uniform should have short sleeves to prevent transmission of bacteria from one patient to another. Similar comments about uniforms were made in DGH1. All three groups, in both hospitals, discussed the risk of transmitting an infection to their children if they had contact with their uniforms.

The subject of wearing their uniforms outside the hospital was also discussed (6.10.2.18). From this they went on to discuss how in the past the hospitals used to provide laundering services, this prevented HCPs leaving the hospital in their uniforms and from taking potentially contaminated uniforms home with them.

One superintendent thought that changing the style of the uniforms would reduce the risk of cross contamination between patients. She believed that they should have uniforms similar to those worn in the operating theatre; this would allow them to change easily after contact with infectious patients or before examining neutropenic patients.

6.11 Discussion of Focus Group Sessions.

The aim of this phase of the study was to investigate radiographers' knowledge and attitudes towards infection control, and to determine what facilitates infection control practices. The following is a discussion of the Focus Group findings. Where applicable, references will be made to literature to support the findings. Where appropriate the findings from the three phases of the study will be linked together.

As described earlier (6.9.2) the main categories were developed and as suggested by Clarke (1999) a central category was identified around which the remaining categories could be organised. Figure 20 shows all the main categories and how they are linked *i.e.* education can have a bearing on communication, and perception of risk. The link between each category is shown by a corresponding coloured arrow. Many of these factors can be incorporated into the HBM, TRA/TPB models. Culture is the key category and is linked to all the categories. Culture of the hospital and individual departments may be central to improving infection control and prevention practices. Iphofen and Poland, (1998 p11) define culture as:

> 'A set of attitudes, values, beliefs and meanings which are part of our heritage and define our social identity'.

The culture of the NHS trust will affect all other factors that need to be addressed. For example, it will determine whether or not HCPs are provided with adequate education and training in their subject, this in turn can increase the knowledge of the HCPs, including the radiographers, aid in altering their perception of risk and increase communication between the different departments of the hospital. All of these factors may help facilitate compliance with infection control guidelines and reduce obstacles often cited as reasons for not performing infection control practices. Other means to facilitate compliance with infection control guidelines include, increasing availability of resources, such as suitable liquid soap, AHRs, gloves and aprons, these are all factors that need to be addressed.

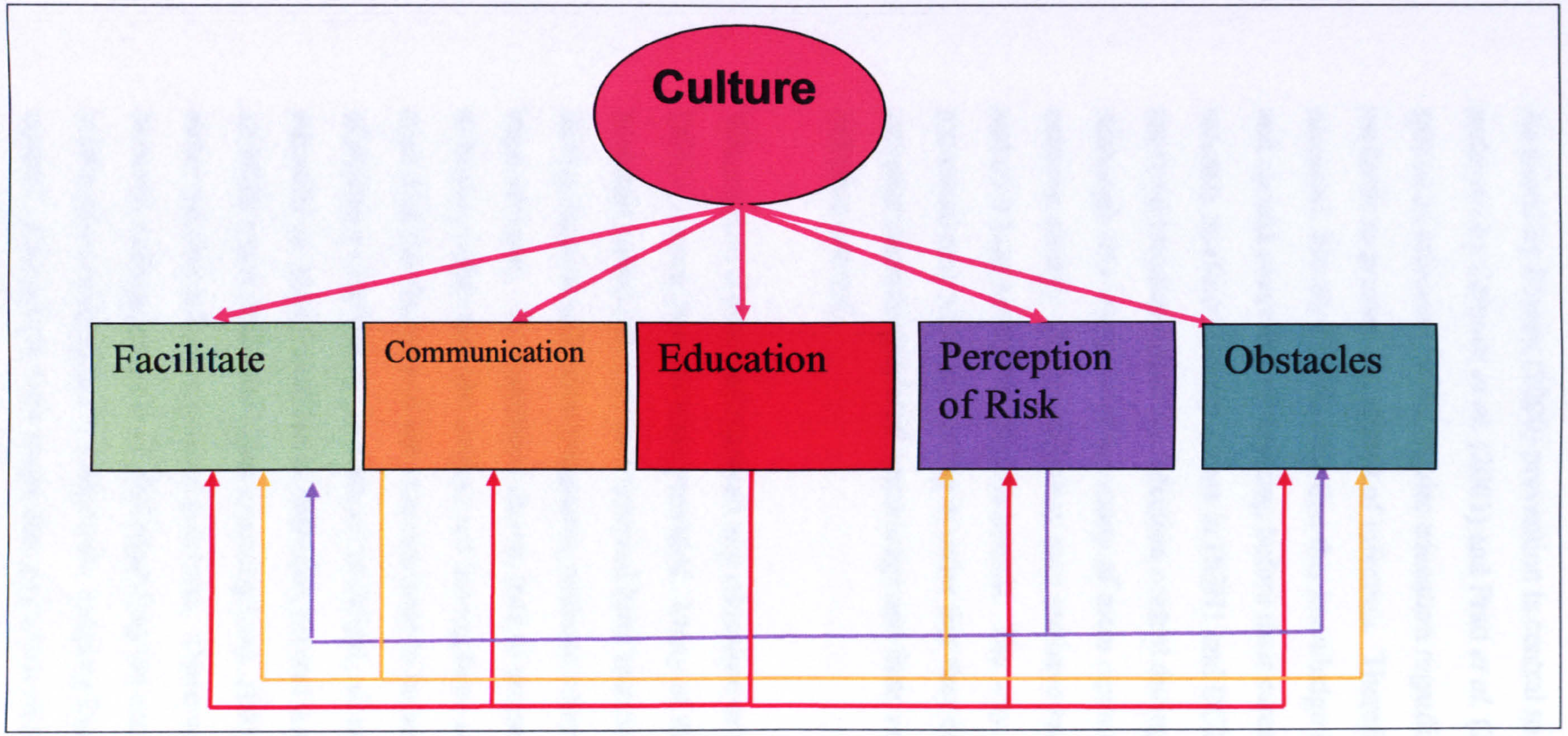


Figure 20. Main Categories Used in the Discussion.

Facilitate: similar to change in behaviour in HBM, TRA/TPB; Communication: similar to Cues to action & Barrier in HBM.
Education similar: to Cues to action in HBM; Perception of Risk: similar to Perceived Threat and seriousness of disease in HBM
Obstacles: similar to unlikely change in behaviour in HBM, TRA/TPB

6.11.1 Education in the Diagnostic Imaging Department.

As stated by Pinney (2000) prevention is central to controlling HAIs, this is also endorsed by Pellowe *et al.* (2003) and Pratt *et al.* (2007). In order to prevent the spread of infection HCPs require education regarding modes of transmission and methods to prevent the spread of infection. Therefore, educating all HCPs is essential. Elliotte (1996) adds that this knowledge is required at an early stage, and should occur during training, before their careers begin. A number of recently qualified radiographers in DGH1 and DGH2 claimed that they had received lectures regarding infection control during their training at university. Although this was promising, many of them cannot recall the content of the sessions clearly. As a result, they may not have learned as much as they could and so it may have been of little benefit. The way in which these sessions are presented may need improving in order that they become more memorable and increase the radiographers' knowledge and their value as contributors to infection control.

When asked if they had received any education or training while working in DGH1, mixed answers were provided. Many of the radiographers in both hospitals stated that they had received brief instructions about infection control during hospital induction programs; whereas others claimed this topic had not been covered. As mentioned above, lack of memory about the session may be to blame, rather than the subject not having been addressed. Again if this is the case then the delivery of the sessions need to be improved and alternative modes of delivery considered. In contrast to DGH1, all members of staff in DGH2 attended an annual mandatory infection control session. This is now the case in all NHS trusts (National Core Learning Unit, 2005). This provides information about general infection control practices. There was a difference of opinion between radiographers in DGH2 regarding the necessity of having either specific information relating to the Diagnostic Imaging Department or general infection control. Comments were made about sections of the session relating to wound care and ward work, these were areas the radiographers felt were unnecessary

for them and resulted in a number of the radiographers not paying attention (H2 Sup, Line 315).

Although radiographers in DGH1 had not been given any form of regular infection control education or training during their employment a small number of radiographers indicated that the infection control nurse had visited the department a number of years previously. The session started with a general approach to infection control, dealing with blood borne infections and MRSA, but due to radiographers questions it became more specific, dealing with situations that may occur within the Diagnostic Imaging Department. Radiographers in DGH1 believed that it was important to have information that was aimed principally at their profession as they believed their work was very different to that on a ward. This and the comments made by radiographers in DGH2 suggests that they feel educational relevance is a key issue. It is felt by Larson *et al.* (2000) that if specific training is only given to the individual departments then fragmentation can occur. Therefore, both general and specific education is necessary for the hospital trust to be able to battle against HAI.

It was believed by radiographers that increased education would increase compliance with infection control protocols as it would increase their awareness of how and why infection control is an important part of their job. In addition to this it would remind staff of best practice. Infection control training was considered by radiographers in DGH1 and DGH2 to be important and they felt that it should receive the same emphasis as the annual fire and manual handling training (H1 Sup13, Line 229, H1 Sup13, Line 232H1 Srm, 6 Line 465). It was argued however, that although they received annual training for manual handling they still do not follow the correct practices, due to shortage of time. This shows a difference between theory and practice. Larson (1982) also found that there was a difference between theory and practice when investigating hand decontamination. However, a number of investigations discussed in the literature review did show an increase in compliance levels once an educational intervention had been implemented (Dubbert *et al.*, 1990; Sharir *et al.*, 2001; Sharek *et al.* 2002). In many interventions, along with education, additional methods, such as feedback and the provision of AHR were implemented. These

methods continue to reinforce the need for infection control practices and so help maintain compliance rates. Larson (2000) found that compliance rose significantly if HCPs were trained appropriately and were required to demonstrate competency in hand hygiene.

At present, the emphasis of infection control seems to be aimed at nurses working in Intensive Care Units and the wards. During the discussion about the hospital induction program in DGH1 it was revealed that nurses alone were given additional training specifically discussing hand decontamination. It would seem that the NHS trust believes it is only essential to provide this valuable training to certain HCPs. This may lead the remaining HCPs to believe that their role in the spread of HAI is very low and their practice does not pose any risk to themselves or patients. However, as radiographers often have direct contact with patients, for however short a period, they are able to become contaminated with bacteria. As shown by Gould and Ream (1993) brief touching can result in the transfer of organisms to the hands of HCPs. Radiographers stated that if they are not educated about these risks, and how to prevent the spread of the infection, it is possible that they can very easily go on to transmit the micro-organisms to more vulnerable patients in any area of the hospital. The lack of education received by some radiographers may explain the extremely low compliance rates, with infection control protocols found in this study. This could be due to lack of knowledge about the infection control practices they should be following, or the belief that their work does not pose a risk of cross contamination, otherwise they would have been provided with this important information to enable them to deal with the problem effectively and safely.

Examples of lack of awareness of protocols when dealing with blood spillages were described by two superintendent radiographers. In both situations the help of the infection control team was enlisted to provide instruction about the appropriate and safe way to deal with blood spillage. This demonstrates that staff working in the Diagnostic Imaging Department must be armed with the necessary skills to prevent the spread of infection. It was considered by the group that this type of training was unsatisfactory and could have led to unsafe

practice, putting themselves and others at risk. They felt that the training should be proactive rather than reactive (H1 Su11, Line 143 and H1 Sup12, line 275). A proactive attitude has been in place in Germany since 1976. The importance of prevention rather than control is highlighted as it has resulted in Germany having low prevalence rates of HAI (Exner and Hartemann *et al.*, 2001). This is also the situation in the Netherlands, which has the lowest MRSA rates in Europe (Department of Health, 2003).

The radiology department in DGH1 is not the only area to miss out on infection control education. A report by the National Audit Office (2000) stated that 10% of infection control teams do not provide infection control education to nurses and health care assistants and less than two thirds provide annual updates. By not implementing these updates and training, staff could be unaware of the appropriate practice they should be following. Again, this lack of training could also lead HCPs, to wrongly believe that infection control is not an important aspect of care; resulting in risks to both themselves and the patients they are caring for (H1 Sup13, Line 482).

Along with HCPs requiring education it was also thought by radiographers in DGH2 that the public needed to be educated about the importance of infection control. Some radiographers felt uncomfortable decontaminating their hands and equipment in front of patients, as they believed they may be offending these patients (H2 Rf7, Line 107). Linn *et al.* (1990) also found that a reason doctors gave for not wearing gloves included fear of alienating patients. It is important however, to remember that these precautions protect the patient and the HCP (Shagham, 1999), this makes it an essential practice. The 'cleanyourhands' campaign (National Patient Safety Agency, 2004) addresses this point, by providing the necessary information to patients. This information aims to encourage patients to request HCPs to decontaminate their hands, but may also offer reassurance rather than offence when HCPs are observed decontaminating their hands.

The mandatory sessions in DGH2 were not in place when the observational audit was carried out; therefore, it is not possible to know whether or not they had any effect on compliance rates compared to the other three hospitals involved in the study. However, increasing knowledge is considered to be an important factor when using the HBM to motivate behaviour change, it is also a major factor involved in the PRECEDE/PROCEED model. When looking at Figure 20 it can be seen that education permeates all other categories used in this discussion.

6.11.1.1 Radiographers Knowledge of Infection Control.

Although DGH1 say no formal education has been provided, they, along with radiographers in DGH2 were found to have good levels of knowledge regarding infection control. This suggests that radiographers have been provided with the necessary information from other means. Radiographers in both DGH1 and DGH2 were aware of the need for infection control protocols, including the importance of hand decontamination, in order to prevent the spread of infection. The radiographers were aware that HCPs' hands were the biggest source of cross contamination and of the ways in which they could become contaminated. The practice of hand decontamination seemed to be considered more important after contact with a patient than before contact. This was a result that was also noted during the observational study in phase one, and by Pittet *et al.* (1999b) and Lankford *et al.* (2000). Although, the bacterial analysis in chapter five showed, a number of pieces radiographic equipment were contaminated with large levels of bacteria, identification of these bacteria was not made. This makes it impossible to state whether or not the contamination was pathogenic or not. However, previous studies have found pathogenic bacteria to be present on the radiographic equipment (Haskin *et al.*, 1970; LeFrock *et al.*, 1978 and Lawson *et al.*, 2002). Therefore, if cleaning of the equipment does not occur then it is important that hand decontamination takes place before examining a patient to reduce the risk of cross contamination.

The need for the cleaning of equipment, before contact with neutropenic patients and those with open wounds, or after contact with infectious patients, was

known. These are all positive findings. Nevertheless, radiographers in DGH1 felt that in most cases equipment only needed to be cleaned if it was visibly dirty, or if a patient was likely to have direct contact with obviously contaminated equipment (H1 Srm,10 Line 251, H1 Srm7, Line 252). Dancer (2004) showed that relying on visual dirt as an indicator for cleaning was not effective. Some 90% of the equipment considered to be clean, using this method, was actually found to be highly contaminated with bacteria. Therefore, although there will always be a degree of contamination, as many departments are not a sterile environment and the main concern would be whether or not the contamination was pathogenic, using a visual check to determine the need for cleaning may leave the patient and radiographer at risk of contracting an infection. In contrast to the radiographers' views, during the observational study in DGH1 there were instances, where the equipment was visibly contaminated or had been in contact with a known infectious patient and no cleaning had taken place. Interestingly, the radiographers thought their shoes may pose a cross contamination problem, yet they had not thought it was necessary to clean areas that the patient was unlikely to have direct skin contact with; in most cases this would include flooring. This leads to the question do they really understand the modes of transmission via in-direct contact and do they have enough knowledge to be able to assess their risk of infection properly.

To the suggestion by some radiographers that infection control practices were not performed as the micro-organisms are not visible, it was pointed out by a superintendent in DGH2, that they take the necessary precautions to protect themselves and their patients against the effects of radiation, even though it is invisible, stating *'Oh I don't know, everybody stays well away from x-rays don't they'* (H2 Sup3, Line 448-451). Radiation is an area in which radiographers are highly trained, they are aware of the dangers of radiation exposure and the fact that anyone can be affected. Many radiographers believe that infectious diseases are only a risk to those with lowered defence mechanisms. These could be the reasons why they pay attention to the appropriate protocols in place when dealing with ionizing radiation and are less rigorous in following infection control protocols.

Areas where confusion arose, with regard to infection control knowledge, included the use of gloves. A radiographer in DGH2 suggested it may be easier to wear gloves more frequently rather than carrying out hand decontamination after every patient. It has been shown in the literature review that hand decontamination is still necessary after glove use (Roberts *et al.*, 1998; Pratt *et al.*, 2007). As this radiographer had attended the mandatory educational session it is surprising that she was unaware that glove use does not replace hand decontamination. It has already been noted that radiographers often stopped listening during the mandatory educational sessions. It was also noted during the observational study and during the Focus Group discussions that despite the radiographers' awareness of the risk associated with body fluids, many radiographers failed to wear gloves when performing intravenous injections (H1 Srm10, Line 636, H1 Sur 13, Line 235). Roberts *et al.* (1998) also found that although HCPs had a good level of awareness of infection control protocols they still failed to comply with hand decontamination protocols. The inadequate practice found in the Diagnostic Imaging Department was felt to occur due to poor role models (H1 Sur11, Line 242, Sur11, Line 250). It was claimed that doctors failed to wear gloves when performing intravenous injections. As doctors were thought not to expect diligent adherence to glove use, radiographers did not feel the need to comply with the protocol. The value of role models has been shown in a number of studies, (Pettinger and Nettleman, 1990; Lankford *et al.*, 2003). This poor practice in glove use may also be due to lack of resources. This may be seen as a barrier towards a positive behaviour and be a reason for not using gloves. Not all radiographers are trained to carry out IV injections, but many are still involved in removing needles from patients. Lack of education in these cases may be another reason for low compliance rates in this activity. Poor role models are an important factor in the form of the subjective norms, when making use of the TRA/TPB model (2.15.2, Figure 7 & 8). Barriers to a behaviour are also found in the HBM, TRA/TPB models.

Radiographers recognised the fact that they are not always aware of a patient's infectious status (H1 Sur15, Line 54, H2 Rf3, Line 127). However, many

radiographers in DGH1 thought that a certain level of infection control was necessary for all patients, but those who were infected or more vulnerable, required extra precautions (H2 Rf3, Line 39). Others stated that they should treat all patients as though they are infectious. Unfortunately, even with this belief infection control guidelines were not always followed. Many blamed this on poor communication from the referring clinician. With this in mind, the researcher thought they may be prompted to take more precautions for all patients to make up for this lack of information. However, Wilkinson (1992) found that HCPs would only follow precautions when they knew the patient was infectious.

6.11.2 Radiographers' Perception of Risk.

It would seem that the radiographers' perception of risk could have an effect on compliance with infection control protocols. The radiographers' perception of risk can be included in an intervention (Figure 21). If radiographers do not see their current practice as a risk to patients or themselves, or perceive the severity of the infection to be low, then they will be less likely to alter their behavior.

6.11.2.1 Risk to the Radiographer

The radiographers had knowledge about many infectious diseases. At the present time they thought MRSA was the biggest problem, with regard to HAIs. They were also aware of Human Immunodeficiency Virus (HIV), Hepatitis, TB, and Chicken pox. Radiographers believed they had an appropriate level of knowledge about the transmission of HIV, Hepatitis and TB to protect themselves (H1 Srm8, Line 641). In DGH1 the radiographers' perception of risk in regard to these infections was interesting, although many felt that HIV was the worst infection to contract, patients with HIV were not thought to be a high risk to the radiographers, as transmission of the infection was difficult. The risk of contracting MRSA was also considered to be low, due to their healthy immune systems (H1 Sup12, Line 124). In addition to this a number of radiographers thought that the severity of the MRSA infection would not pose any real problems to themselves, stating *'but if you got MRSA you'd be like oh well I've got MRSA...'* (H1 Srm10, Line 643). Unlike their level of knowledge

regarding blood borne infections, the radiographers were unsure about the protective issues associated with MRSA. This was mainly due to confusion about the transmission routes of the bacteria (H1 Srf8, Line 645). The need for increased education in this area is, therefore, obvious. Making use of factors found in the HBM and TRA/TPB to alter perception of risk and knowledge of ways to protect oneself, along with perceived severity of the infection, radiographers' attitude towards complying with infection control protocols could be altered (Figure 21).

A number of radiographers in DGH1 only considered their own risk of infection when talking about the infection control practices they follow. It was thought that protective clothing was unnecessary when examining patients with MRSA, this was due to their belief that they were unlikely to become infected. However, it was mentioned by others, that infection control practice was also a method of protecting other patients (H1 Sup13, Line 127). Surprisingly, this comment was made by the same radiographer who only considered herself when discussing patients with HIV

' ... I mean there's nothing awful about HIV, its more blood isn't it' ? (H1 Sup13, Line 85). This radiographer failed to recognise the fact that patients with HIV are more susceptible to infection. With regard to the factor of perception of risk utilised in the HBM model it assumes that radiographers did not feel the need to follow infection control guidelines as they were not at risk of contracting an infection.

6.11.2.2 Risk Assessing Patients.

Radiographers felt they could assess their patients' risk of infection. They claimed to wear gloves more often when dealing with patients considered to be unclean or intoxicated; they also took more precautions when dealing with patients who were coughing. In these cases it would suggest that radiographers perceive a greater risk of infection and so take appropriate measures to protect themselves from these patients. Teare (1999) found HCPs were more worried about head lice than potentially harmful bacteria. Interestingly, earlier radiographers had stated that they only needed to clean equipment if it was

visibly contaminated (*6.11.1.1)*, they now show that they were aware that infectious material may not be visible. The act of coughing may also act as a prompt and radiographers may be worried about droplet contamination.

6.11.2.3 Increase in the Number of Infectious Patients.

The increase in the number of patients with infectious diseases, such as MRSA, seems to have led to a lack of compliance. The radiographers stated, in the past they followed all the correct procedures and took great care when dealing with these infectious patients. Today, they feel there are too many patients with MRSA to be able to follow the infection control procedures correctly (H1 Sup13, Line 123). As already mentioned (6.11.2.1), a number of radiographers consider the risk of infection to themselves to be low. In contrast to this, radiographers who had worked in Australia claimed that Australian staff are encouraged to think of all patients as infectious and to take the required precautions, such as glove use and hand decontamination. The radiographers also believe that a large number of people in the community are carriers of the MRSA bacteria. This may result in complacency due to the feeling that whatever they do it will not make a difference. Radiographers in DGH1 do not seem to be very concerned about these infections. It would appear that infections such as HIV and MRSA may have lost their shock factor (H1 Sup13, Line 123). However, radiographers working in DGH2 did still seem to be concerned about the effects of MRSA. This may be as a result of the mandatory infection control educational sessions they receive.

6.11.2.4 High Risk Areas in the Diagnostic Imaging Department.

Radiographers believed that the In-patient area of the Diagnostic Imaging Department posed the highest risk; this is due to the patients increased severity of illness, along with being hospitalised, and so more likely to have become infected. During the observational study in phase one, hand decontamination was found to occur more frequently in the In-patient department. Interestingly, Pettinger and Nettleman (1991) found that increased severity of patient's illness

did not result in increased compliance rates. Patients attending the A+E department were also a concern to some radiographers, mainly, due to lack of knowledge about the patients' infectious status. A number of radiographers felt that the majority of their work in A+E was of low risk and clean, and the contact patients have with the equipment is no different to the contact they would have in normal every day activities, (H1 Srf9, Line 317, H2 Rf3, Line 232, H2 Sup2, Line 206). So it was thought that these patients did not pose any more of a risk, or that they were any more likely to contract an infection in this area. This led some radiographers to believe, incorrectly, that infection control practices were unnecessary. Radiographers often felt that the Out-patient area of the Diagnostic Imaging Department did not pose a risk so they were less likely to follow infection control protocols. This was also found during the observational study. However, the bacterial analysis found that the equipment in this area was contaminated, so could act as a source of infection. Goodman and Soloman (1991) found that cross contamination between patients in the Out-patient setting can occur. These findings suggest that radiographers are finding reasons to justify their not following infection control practices, especially in A+E and Out-patients. Education is required in this area to ensure radiographers are aware of the risks to themselves and others in all departments in which they work.

6.11.2.5 Situations Prompting Infection Control Practices.

Radiographers felt that infection control was very important when dealing with patients from ICU, HDU, SCBU and theatre, so they frequently followed the appropriate infection control protocols. They also believed infection control was necessary in the Diagnostic Imaging Department when dealing with obvious infection control risks, such as open wounds or patients considered to be unclean (H1 Srm10, Line 67, H2 Rf4, Line 34). This may be due to their belief that by not carrying out infection control practices in these situations the likelihood of cross contamination is high. This is similar to situations regarding the TB protocol and neutropenic patients described later (6.11.3).

Examinations of particular parts of the anatomy, including feet, breasts and faces, seemed to warrant the use of more infection control practices.

'We just always wipe it [mammography receptor] between every patient, because breasts can be sweaty and horrible' (H1 Srf9. Line 292).

This suggests that the mammographer believes sweat, like the unclean or intoxicated patients mentioned earlier, to be highly contaminated with pathogenic bacteria. This is described by some infection control nurses as the 'yuck factor'. It is claimed, without these visual prompts HCPs often fail to consider any infection risks (Camm, 2004).

Radiographers in DGH1 thought that particular areas in the hospital, such as the pathology laboratory, would pose a large risk to staff due to the samples they deal with. However, it was also thought that these members of staff would be more likely to wear protective clothing and follow infection control protocols; this would then reduce their risk of infection (H1 Srm10, Line 531, H1 Rf5, Line 459). Radiographers also believed that nurses should be at less risk of contracting an infection, due to the information they have regarding the patient's infectious status (H2 Sup1, Line 394), this would inform them of the need to follow infection control protocols. This is similar to Gould and Ream's (1994) findings, where nurses who did not feel they were at particular risk of contracting an infection believed attention to infection control protocols, which they linked to high standards of nursing care, effectively reduced the risk of becoming infected. This demonstrates that the increased knowledge of infection control practices, a patient's infectious status and perceived risk of the infection will increase compliance with infection control guidelines. It also suggests that the nurses had incorporated infection control into nursing care, rather than viewing it as an additional task. These factors along with situational prompts, such as patient type e.g. ICU patients, can be addressed using the HBM and TRA/TPB model.

6.11.2.6 Risk of Cross Infection within the Diagnostic Imaging Department.

There was a difference of opinion between the radiographers with regard to the patient's risk of contracting an infection when visiting the Diagnostic Imaging Department. Many of the radiographers believed that infection control practices were of greater importance for the nurses due to the type of work they carry out, as it involves frequent contact with blood and body fluids. Gould and Ream (1994) and Godin (1998) also thought that the perception of infection risk stemmed from the frequent handling of body fluids and high risk patients. Weinstein (1986) suggests that people may feel they are less at risk, by comparing themselves with people who are at particularly high risk. The radiographers were not worried that they were not given the same important information regarding hand decontamination training (H1, Rm2, Line 122 and 125), as '*... we're not changing dressings'* (H1 Sup13, Line 408). This suggests that the radiographers believe that their workload does not pose a risk of cross contamination to themselves or their patients. This was highlighted in DGH2 where radiographers believed that as they kept their environment clean they posed less risk to their patients (H2 Rf3, Line 232). However, findings from the observational study and the bacterial analysis indicated that cleaning did not always occur. This may be similar to Simmons' *et al.* (1990) findings where radiographers believed they followed infection control protocols so this was not an area that needed improvement. Although the radiographers had knowledge of infection control protocols, they claimed not to follow them in all cases, as they did not believe that every patient presented a risk (H1 Rm2, Line 183). They acknowledged, however, that they did not always know a patient's infectious status. It was considered by some that the patients presenting without this information were the greatest risk (H1 Srm6, Line 76). Interestingly, radiographers pointed out that if they themselves were patients, they would not like to have contact with the radiological equipment if they had not seen it being cleaned. This is despite the fact they believed they cleaned the equipment; they have healthy immune systems, which would protect them from infection, and their belief that the department did not pose a risk of infection. This suggests that the radiographers are aware that these pieces of equipment can become

contaminated and they obviously feel they would be vulnerable to infection if they themselves were patients. It is also fascinating that many radiographers from both DGH1and DGH2 believed that it was likely that they had contracted infections or become carriers of MRSA as a result of their work (H1 Rm2, Line 342; H1 Srm10, Line 379; H2 Rf7, Line 429). This presents yet another contradiction in their perception of risk, as at the same time they do not feel that their work would lead to the transmission of bacteria to a patient. These are areas which need to be addressed in order to enforce the value of infection control. This can be achieved by making use of factors, including perception of risk, from the HBM and TRA/TPB models.

There were radiographers who felt that the large numbers and variety of patients visiting the Diagnostic Imaging Department could contribute to the spread of infection, stating: *'which department is the department that have patients from all over the hospital coming to it' It's x-ray isn't it, it's got to be, x-ray has got to be a really big part of the problem hasn't it'* (H1 Sup13, Line 401 and 405).

A number of radiographers also came to this conclusion later on in the discussion. Early on in the session they did not really think that they posed any risk, this may suggest that until then the radiographers had not given the topic much thought. This is another reason why education and training is so important.

Radiographers all claimed to decontaminate their hands before leaving the hospital, in order to protect themselves and their families. This may be similar to hand decontamination after patient contact, however, hand decontamination in these situations would suggest that it is purely for the benefit of the radiographer and their family and has no benefit for their patients. It may protect other members of the community too. In DGH2, during the observational study, radiographers discussed how another radiographer removed her rings once she returned home from work, this was to prevent any risk of spreading infections to her family. It is remarkable that she worried about the risk to her family, but not to the large number of patients she would examine during her working day. The

risk to both the patients and family are removed if jewellery is not worn in the clinical setting. It was found by Lowbury *et al.*(1968); Kelsall *et al.*(2006) that the area under a wedding ring had an increased number of bacterial counts.

It was put forward by a senior radiographer that
'...if we were more conscious of our own vulnerability then we would do things that would protect us and that would ultimately protect the people that we are dealing with' (H1 Srf6, Line 675).

This is a factor described in the HBM and TRA/TPB model where perception of the severity of the issue is considered. This could be used as an intervention to increase compliance. However, the comment about the jewellery being removed at home, does show that the thoughtless or ignorant attitude may in some instances only result in protecting the individual HCP.

6.11.3. Communication.

The radiographers claim that information about infectious or neutropenic patients allows them to take the necessary precautions to protect themselves as well as their patients. This information should be included on the x-ray examination request form. Radiographers in DGH2, stated that the information was sometimes available on the computer system. However, they were not confident about this, as they did not feel it was always updated. Radiographers in CH also believed that once a patient was entered on to the computer as being infectious it was never removed. Unfortunately, this had the effect of radiographers simply ignoring the information. To make full use of this system of communication it needs to be regularly updated and radiographers need to be informed that this is the case. It is interesting that the radiographers complain that they cannot follow infection control protocols because they are not always informed about a patient's infectious status, but it would seem they need to hear it from the requesting clinician or from the ward before they will take any action. This may suggest that radiographers take such communication as a basis on which to make a judgement of 'serious risk'. However, as they are aware that

clinicians often fail to pass on this information it may also be that failure to follow infection control practice is not solely down to lack of information, but is simply a convenient justification for not carrying it out.

In contrast to the information regarding the infectious status of a patient, it was believed by radiographers in DGH2 that they were always informed about neutropenic patients (H2 Srf3, Line 324). This increased communication may suggest that referring clinicians consider this information to be important to the patient's wellbeing. This level of communication was also found to be the case when examining patients with active TB in DGH1. The protocol in this situation is easy to follow, and everyone involved with the patient is aware of it. Other professions ensure that the radiographer is informed about the patient risk, to enable the examination to be performed quickly, and prevent the patient from having contact with other patients. The radiographers felt that infection control was important in this situation as the risk of spreading TB was high. In these two situations the importance of these practices is emphasised by the requesting clinician, ensuring that all the relevant HCPs are aware of the infectious or neutropenic status of the patient. This practice should occur throughout the hospital for all types of patients.

As stated earlier, radiographers working in Australia were to assume that all patients were infectious and infection control protocols should be followed accordingly (6.11.2.3). This is similar to Universal Precautions. The radiographers believed this to be an effective way to increase compliance, as they feel they cannot rely on information about a patient's infectious status being passed on. It is also possible that the referring clinicians are unaware of the infectious status of a patient. However, at present, it would appear that the radiographers in both DGH1 and DGH2 only feel equipped to follow infection control procedures if they are actually informed that the patient is infectious by the referring clinician. Therefore, this method could result in no infection control measures being taken for any patient.

There is an issue about the lack of knowledge other departments have with regard to the type of work carried out in the Diagnostic Imaging Department, and how the images are actually obtained. Radiographers in DGH1 were misinformed on occasions about the appropriate practices to follow, and were completely missed out when important information, that could help reduce cross contamination, was distributed (H1 Sup12, Line 412; H1 Sup 12, Line 419). To prevent this from occurring in the future, more communication between hospital departments is needed. This may be an area in which a radiographer responsible for infection control could help. It is thought that the level of communication between wards and the Diagnostic Imaging Department in DGH2 has increased since a vomiting and diarrhea outbreak resulted in absenteeism of a high number of staff. This may have shown staff the real risk of cross infection.

6.11.4 Culture.

The culture of the department may have an effect on infection control compliance rates. The more value the NHS trust places on infection control, the more favourable the environment becomes to follow the set out protocols. This was considered by radiographers in DGH1 to be the reason for higher compliance rates in a hospital not used in this study. The NHS trust discussed had radiographers who took responsibility for ensuring that appropriate infection control practices were followed. It was also felt that due to more available resources, more staff and fewer patients, radiographers in this hospital had more time to perform infection control procedures (H1 Rf1, Line 559). These factors would remove some of the obstacles thought to prevent the radiographers, in this study, from following infection control protocols.

The theatre found in one of the satellite hospitals connected to DGH2 was said to be more stringent with their infection control measures than the main site theatre. The sister in charge was thought of as an old style matron enforcing compliance with infection control protocols. This resulted in other members of the theatre staff ensuring infection control protocols were followed. The radiographers found it interesting that the surgeons working on both sites would comply more rigorously with the infection control measures in the satellite

theatre than in the main site theatre. This shows the need for HCPs in each department to place a high value on infection control and enforce the appropriate practices, this is of course, how good practice becomes part of the culture.

Radiographers in DGH2 considered jewellery and long sleeved garments to be an infection control risk. A protocol in IDH stated that HCPs were not to wear jewellery, including wrist watches. The researcher was informed that the infection control nurse in IDH took a radiographer, wearing a watch, to the pathology laboratory to take bacterial swabs to show her the importance of not wearing such an item. This seemed to make an impression on many of the radiographers in IDH, and encouraged them to follow the protocols about wearing jewellery. This action may produce similar results to interventions described by Wilson and Jenner (2001) where, Agar plates, showing before and after effects of hand decontamination on bacterial levels (2.9.3 Figure 3), and Camm (2004) where the Glow boxes were used to demonstrate the spread of bacteria. Interestingly, during a conversation between the researcher and the infection control nurse in IDH, it was put to the researcher that the radiography department was a very low risk area, with regard to cross contamination; however, this infection control nurse still felt the need to emphasise the risk of wearing jewellery to the radiographer. This is a positive attitude, ensuring all HCPs including radiographers are made aware of the potential spread of infection.

Radiographers were aware that they were not always given the necessary information about a patient's infectious status. They also acknowledged that they can gain more information about a patient if they contact the requesting clinician. During the observational study it was noted that this practice occurred before radiographers in IDH arranged for individuals to be transported to the Diagnostic Imaging Department. This resulted in high compliance with infection control protocols where patients were found to be infectious. This may be due to radiographers taking ownership of the problem of HAIs. Blythe *et al.* (1998) believed that it was important that HCPs take ownership of the problem of HAIs in order to increase compliance. A similar practice of contacting the ward was

also discussed in DGH2. However, this only occurred in CT, MRI and Ultrasound. Radiographers in the general departments in both DGH1 and DGH2 did not follow this practice. They may have viewed contacting the wards specifically to identify infectious status as an additional task; radiographers in DGH2 claimed that lack of time prevented this from occurring. It may also be felt that it is the requesting clinician's responsibility to provide the correct information. However, the radiographers still have a duty to themselves and to the patient to try and gather this information, if it is not available on the request form. It may be possible for radiographers to adopt the same approach used as a result of the introduction of the IRMER regulations (2000), i.e. if the relevant clinical information is not included on the request form they are returned to the referring clinician for the missing information to be added.

A comparison was made between the cleaning of equipment and carrying out the important patient identification check (H1 Srf6, Line 241). As compliance with the identification check protocols is considered to be high this leads to the idea that infection control needs to be considered important and to be part of the overall examination, rather than an addition to it. Thinking of infection control in this way may lead to increased compliance, as radiographers would have fewer reasons not to do it. Student radiographers from the University of Wales, Bangor, carrying out practical work for assessments, are expected to perform patient identification checks; if they fail to do this they automatically fail the practical examination. This shows that the task is considered to be important and necessary by superiors. It may be possible to include infection control into the practical examination to emphasise its importance.

A number of radiographers felt that the NHS trust does not address the larger issues. It was believed the NHS trust needs to employ and train more cleaners and ensure that facilities are available to encourage infection control. This emphasises the notion that radiographers and other HCPs need to believe that the NHS trust really believes infection control is essential to reduce the spread of HAI.

6.11.4.1 Low Compliance rates.

Lack of time was a reason often provided, during the discussions, for their failure to follow infection control protocols, this has also been found in other studies (Simmons *et al.*, 1990; Kretzer and Larson, 1998; Pittet *et al.*, 2000). This was reinforced by their opinion that management believed reducing waiting times was more important than infection control. As a result radiographers believed it was difficult to carry out the necessary practices and to also have low patient waiting times (H2 Rf, Line 130).

It was thought by radiographers in both hospitals that due the high number of times hand decontamination is required, the total time utilised for this action would prevent them from examining the required number of patients (H1 Sup11, Line 28; H1 Sup 12, Line 295; H1 Sup 11 Line 296, H1 Srm6, Line 95), this was also found by Voss and Widmer (1997). This may suggest that radiographers work in such a way to meet the aims of the NHS trust. This again shows that belief in the importance of infection control is needed by the management of the hospital. Although waiting time targets are important to the NHS trust, as Patricia Hewitt (2005) stated:

> 'it is not acceptable to try to achieve waiting list targets by compromising on patient safety and infection rates'.

Interestingly, it was pointed out by a radiographer in DGH2 that infection control practices did not alter depending on the number of patients waiting to be examined. It was also put forward by another radiographer in DGH2 that they still found time to gather around the processor to talk (H2 Srf5 Line 730 and Line 732). This suggests that the radiographers do have more time to follow infection control practices, but choose not to.

Another reason given for low levels of compliance with hand decontamination protocols was the harsh soap that was provided. This caused the radiographers' hands to become dry and cracked, thus leading to greater risk of infection to the radiographer (H1 Sup12, Line 29; H1 Rm2, Line 363). It was believed that the hospital could provide milder soap and AHRs to make it easier to carry out hand

decontamination. As shown in the literature review AHRs have many advantages, such as being easy and fast to use, inexpensive and effective (Larson *et al.*, 2001; Rochon-Edouard *et al.*, 2004). They have also been found to reduce skin dryness and cracking (Boyce *et al.* (2000), and can result in improved compliance rates.

Lack of resources was mentioned as a reason for low compliance. This included the location and design of the sinks as well as the temperature of the water. These are all issues that are beyond the radiographers' control, and need to be dealt with by the management of the Diagnostic Imaging Department. By not addressing these issues the impression could be given to radiographers that infection control is not valued by senior management. These factors also provide radiographers with reasons for not complying with infection control protocols. It was claimed that the satellite hospitals had more resources available, to the radiographers, than the main site. This suggests that management in the satellite hospitals consider infection control to be an important part of patient care, and appropriate resources may help to increase infection control compliance. In DGH1 it had been announced that the use of gloves in ICU was to be restricted. The radiographers were unsure of the reason behind this, but felt it was a mistake and would eventually lead to increased spread of infection

'*yeah no gloves now, perhaps it's going that way, we won't be wearing aprons next, it's a slow slippery slope*'(H2 Sup11, Line 528).

Radiographers in DGH1 and DGH2 believed the lack of resources were due to cost implications. According to Larson *et al.*, (2000) and Rosenthal *et al.*, (2003) this lack of commitment by the NHS trust can negatively influence HCPs compliance rates. All of these factors act as barriers against performing infection control procedures. According to the HBM and TRA/TPB models these factors need to be addressed in order to change behavior.

6.11.4.2 Compliance Outside the Diagnostic Imaging Department.

It was considered that infection control practices were carried out by radiographers more frequently outside the Diagnostic Imaging Department, in areas such as ICU or SCBU (H1 Sup12, Line 302; H1 Srm10, Line 134; H1 Rm2, Line 195). Radiographers claimed to always carry out the appropriate practices when examining patients in SCBU. It has been shown that paediatric personnel comply with infection control protocols more frequently than other professionals, this could be due to the perception that these patients are more vulnerable to infection and that the effects of the bacterial contamination would be great (Pittet *et al.*, 1999; Heseltine, 2001). Radiographers also claimed to always comply with infection control protocols when dealing with neutropenic patients. This too may be due to expectations that these patients are likely to become infected if infection control practices are not performed. Improved compliance was seen, during the observational study, when radiographers carried out mobile radiography in CH. This was discussed earlier (4.11.2). Radiographers' increased compliance in this area may also be due to the nursing staff, working in SCBU and with neutropenic patients, acting as positive role models. This is similar to the subjective norm found in the TRA/TPB models, prompting a change in the radiographers' behaviour. The value of prompts can also be found in the HBM. The radiographers discussed the ready availability of resources, which may play a role in achieving higher compliance rates within these areas. These findings may suggest that compliance with infection control protocols are linked to the culture of the department.

6.11.4.3 Increase in Infection Control Compliance when Working Alone.

A sonographer in DGH1 claimed to always clean her equipment at the beginning of her shift and a mammographer also claimed to always clean mammography equipment that came into direct contact with patients (H1 Srf9, Line 278). Both of these individuals felt that cleaning the equipment was a very quick exercise. Along with ease of use it is possible that the post graduate training in these areas has emphasised the importance of cleaning. Interestingly, the mammographer

claimed that she did not clean the equipment as frequently when carrying out general radiography, this was also a found during the observational study in CH. Radiographers working alone in the satellite hospitals connected to DGH2 were thought to keep their examination rooms cleaner and tidier than staff who only worked in the main site. It is thought this may be due to the radiographers being solely responsible and taking ownership for their examination rooms. They may also be concerned about the thoughts of other radiographers working in these areas after them. This would be similar to the subjective norm found in the TRA/TPB models.

6.11.4.4 The Need for Infection Control Training.

The lack of infection control education within the hospital was an issue. Radiographers agreed that infection control sessions were necessary and should be given to all staff members on a yearly basis. The fact that newly employed staff and agency staff from DGH1 are not given the appropriate information about the infection control guidelines could lead to non-compliance, as radiographers will be unaware of the procedures they should be following. It also gives the impression that infection control within the Diagnostic Imaging Department is not an important issue. The annual mandatory infection control session in DGH2, shows that the NHS trust considers infection control practice to be an important issue. However, even though the radiographers valued the lectures, they still believed that they required more education. This may be due to the sessions not being specific to the Diagnostic Imaging Department.

For new members of staff an induction program is held, however, this does not take place on the first day of employment, therefore, for a period of time radiographers may be unaware of the appropriate protocols to follow. It may be assumed by the management of the NHS trusts that the radiographers will have experience or training from university, therefore this delay should not be an issue. In many instances this may be true but, as mentioned, radiographers do not recall their education in university and they may have had employment in hospitals where infection control was not given a high priority. Agency staff in

DGH1 were not invited to the induction programs; this could have important consequences as many hospitals make use of agency radiographers.

6.11.4.5 Responsibility for Cleaning.

Radiographers in DGH2 discussed how, during their training, it was their responsibility to clean the Diagnostic Imaging Department before the start of their shift. Although it is good practice to ensure that the department is regularly decontaminated, it should not involve the staff or students carrying out this task outside of their working hours. This instills the notion that infection control is a separate task to the normal radiographic duties. This practice may also imply that the NHS trust does not value the need for a clean environment as they are not prepared to pay staff to carry out the task.

In both DGH1 and DGH2 there was a variety of thoughts about who should carry out the regular cleaning of equipment after patient use. It was the opinion of a small number of radiographers that it was the student radiographers' or the radiographer helpers' role (H1 Rf1, Line 324). Some radiographers believed cleaning did not warrant the time of a qualified member of staff, stating *'you wouldn't find a radiologist damp dusting a piece of equipment would you'* (H1 Srm10, Line 196); This opinion may be due to their individual training that cleaning was the students' role (H1 Srm10, Line 115; H2 Srf5, Line 701). Senior radiographers in DGH2 believed that those who were not responsible for cleaning during their training were less likely to follow infection control protocols once qualified. They also thought that as a result of this training staff who had been qualified for longer periods of time were more likely to follow infection control practices. However it would seem this is not always the case, (H2 Srf5, Line 701) stated *'when they become qualified they still don't know that cleaning is an important issue because they've not been taught it..... I mean we don't do it I know, but as a student I had to do it'*. Showing that although cleaning had been her responsibility as a student, now qualified, she no longer performed this task. Nurses working in a Diagnostic Imaging Department also disagreed, claiming that it was the newly qualified staff who followed infection

control practices more rigidly (Zito *et al.*, 2002). A number of radiographers felt it was everybody's responsibility to clean the equipment they used in order to protect themselves and their patients. This agrees with The Health and Safety at Work Act (1974). Teare (1999) also believes that infection control should be given similar status to health and safety policies, where individuals are accountable for their day to day practices. A way to assist this would be to make use of the checklist available DGH2 (Appendix 3); this required the radiographic equipment to be cleaned every day. The idea of using checklists is a very good one, especially if a date and signature are called for on completion of the task. To make a checklist technique work properly supervisors need to make sure that each checklist is signed off at the designated intervals, this was carried out by Blythe *et al.* (1998). The issue of keeping the environment clean being everyone's responsibility, should be addressed by the management of the department and during the induction programs. Radiographers must be informed that cleaning is not an optional responsibility, as stated by Culmer (1995 p203)

> 'no one should find this task (cleaning) beneath their professional dignity'.

A number of senior radiographers in DGH2 were aware that it was everyone's responsibility to ensure that infection control measures, including hand decontamination, were followed. They acknowledge that, if necessary, they should be reminding other radiographers to decontaminate their hands. This is a contradiction to what they said when discussing the notice in ICU (6.11.4.6), where, they did not feel they would be happy if they were told what to do. This suggests they are happy to give out instructions, but not to carry out the task themselves; this type of action may produce negative role models.

Many of the radiographers thought that having an individual responsible for infection control within the radiology department would be beneficial (H1 Rf5, Line 154; H2 Rf3, Line 509). Ideally, the radiographer responsible should be able to exert a large amount of social influence over the other radiographers. These individuals are known as opinion leaders. Seto *et al.* (1991) found that the use of opinion leaders were very effective at increasing compliance. The

superintendents in DGH1 were aware that they were in a position to enforce infection control, but they thought they would have to continuously remind radiographers to carry out the necessary practices. They felt this would be very time consuming and they did not have the energy to do it (H1 Sup12, Line 353). This is a very poor attitude towards infection control that needs to be addressed as it is an attitude that can quite easily be passed on to other radiographers. Staff must believe that senior members of staff and management value the practice of infection control if compliance is to occur (Larson, 2000). The superintendents also felt it was difficult to enforce practices with consultants (H1 Sup13, Line 131). This highlights a problem that may occur if using a junior radiographer to implement infection control protocols. Superintendents in DGH2 felt they were not the best people to enforce infection control; this was because they were not always in the clinical areas, so would be unable to monitor infection control practices all the time (H2 Sup5, Line 343). Although it would be essential for those responsible for infection control to be present in the department, their presence may not necessarily be required all the time. It may be beneficial if all the superintendents took on the responsibility for ensuring that infection control procedures were carried out. This would mean that on most occasions there would be at least one individual working in the department. Over time, the culture of the department, regarding infection control, would be likely to change; at this point it would not be an issue if the superintendent was not always present. As described earlier (6.11.4) other members of the theatre staff, along with the sister in charge now enforce the infection control practices.

6.11.4.6 Requesting Health Care Professionals to Wash Their Hands.

In DGH2 a notice has been placed in ICU to encourage people to ask any member of staff to wash their hands. This method has been found in the 'cleanyourhands' campaign to be effective and may encourage patients to question HCPs about hand decontamination (National Patient Safety Agency, 2004). Many of the radiographers thought these notices were an excellent idea. The radiographer grades claimed they would not be offended if asked to wash

their hands. However, they would not ask a senior member of staff or a doctor to perform this task. They thought they may feel differently if they were visiting a patient, rather than being present in a professional manner. This suggests that the radiographer may feel they would be penalised in some way in the future if they questioned a senior member of staff. It may be possible that patients and visitors also feel uncomfortable asking HCPs to wash their hands, for the same reasons. This was the case in Sen *et al.'s* (1999) study. It was thought this was a result of individuals not being fully aware of the necessity of this practice and how it may affect them, this was addressed in the 'cleanyourhands' campaign (National Patient Safety Agency, 2004). A similar intervention may be required in DGH1.

Senior radiographers felt the manner in which they were asked to perform infection control practices, would affect how they addressed the situation. They believed that in many cases it would be inappropriate if they were reminded to carry out infection control practices, such as cleaning, on completion of an examination. This is a poor attitude and one which needs to be altered; it is their professional duty to ensure that they provide an environment that is safe for patients. This attitude could go back to the way in which they were trained and believing that cleaning is beneath them. Other senior radiographers felt they would be embarrassed if they were asked to clean, claiming they should have thought about it themselves. This response suggests that they recognise their responsibility for infection control. This is another reason why infection control practices need to become routine, other studies along with this one, have shown that HCPs simply forget or do not give infection control any thought (Pittet, 2002).

6.11.4.7 Protocols.

Management in DGH2 had recently changed a protocol in theatre. This new protocol meant that the radiographers no longer needed to change out of their uniforms for certain tasks. Although radiographers believed this to be a retrograde step in relation to infection control, they still adhered to it. It would

seem that if the protocol is easy to follow and takes little or no effort, then radiographers would comply. This was also shown during the observational study, where compliance with changing the disposable blue paper roll was high.

The NHS trust's attitude towards uniforms was discussed. It was felt that some guidelines, as to when uniforms could be worn, would be useful. Radiographers believed that wearing their uniforms outside the hospital could lead to contamination, which could then be transmitted to the patient. It is interesting that they felt the need for a written policy on this issue to enable them to carry out the practice. It would seem that their own belief is not enough to encourage them to change their practice.

6.11.5 Facilitating Infection Control Practices.

Throughout the Focus Group sessions, many factors that would facilitate infection control practices were discussed. A number of these factors have already been presented in this discussion, these are listed below.

- Prompts including; unclean patients, unclean equipment, anatomy to be examined, increased resources, including alcohol gel, gloves and uniforms
- More education and training sessions
- Checklists and rotas.

Throughout the discussion the use of reminders was commonly acknowledged as a means of encouraging compliance with infection control practices. Radiographers felt that visible prompts associated with their patients, such as bleeding, encouraged radiographers to protect themselves. However, this was not always witnessed during the observational audit. The radiographers also considered other visible reminders including, posters and bottles of alcohol gel to help to remind them of the practices they should be following. These were found to be useful components of the 'cleanyourhands' campaign (National Patient Safety Agency, 2004). However, there were already many hand decontamination posters near sinks and around the department in DGH1 and DGH2. Alcohol hand rub was available in the remaining three hospitals

observed, yet, compliance levels with infection control practices were still low. Having AHR dispensers on the walls, as was the case in DGH2 and CH, may not be as effective as HCPs having individual bottles of AHR on their person. The posters in the departments mentioned were not changed regularly. These factors were all addressed in the 'cleanyourhands' campaign (National Patient Safety Agency, 2004) and resulted in an increase in compliance.

Positive role models were thought to be effective in improving compliance with infection control protocols. Radiographers in DGH2 believed that if they had not trained with compliant radiographers, when working in other areas of the hospital, then they too would not have worn gloves or decontaminated their hands (H2 Rf1, Line 285). It was thought by radiographers in DGH2 that if everybody were to carry out infection control practices, they would prompt other HCPs to perform the appropriate measures. A number of radiographers believed that rather than just instructing other members of staff or student radiographers to clean equipment or decontaminate their hands they should lead by example and perform the task along side them. Morgan, (1996); Connolly (1998) and Lankford *et al.*(2003) agree with this, believing that HCPs learn from their peers so positive role models are essential if good safe practice is to be carried out. Unfortunately, in many instances once these positive role models are no longer present practice seems to revert to lower compliance levels. This may be due to negative role models.

The importance of good communication should be emphasised to the clinicians requesting x-ray examinations. The radiographers believed a big factor in their low compliance with infection control protocols was lack of knowledge about their patients. Some radiographers in DGH1 feel that if the requesting physician fails to give this information they should be penalised (H1 Srm10, Line 594). In DGH1, at present, if radiographers are not provided with the appropriate information, then incident forms are completed. The incident forms would keep a record of inadequately completed request forms. The next stage should be to educate the requesting clinicians about the risks associated with providing incomplete information.

6.11.6 Obstacles to Following Infection Control.

Many obstacles have been found which prevent infection control procedures being carried out. A number of these issues have been discussed earlier, these are listed below.

- Lack of communication
- Increased number of infectious patients
- Resources, including type of soap and alcohol hand gel
- Design of department, including department layout, sizes of sinks and water temperature

Shortage of time was considered to be the main reason for low compliance with infection control practices; this was also found in (Pittet *et al.*, 1999). As already stated (6.11.4.1) the radiographers in DGH2 felt that if they complied with hand decontamination protocols then it would take up too much time and could actually hinder patient care. However, hand decontamination before patient contact only occurred (n=34) 4% of the time, therefore, improvement is required regardless of the extra time needed to carry out hand decontamination.

The lack of resources – for example, no aprons in DGH1's Diagnostic Imaging Department – was thought to be a real problem, making it more difficult to follow the necessary protocols. The lack of resources may also show a lack of concern from the management of the department.

Levels of education have been discussed. The radiographers still fail to take the extra time necessary to protect themselves and patients (H2 Rf3, Line 127; H2 Rf1, Line 130). This may be due to radiographers considering infection control to be an additional task and in doing so may consider it to be something that can be left out (H1 Sup11, Line 352; H1 Sup12, Line 353, H2 Rf1, Line 130). It may be that further training is required, rather than just a lecture. It is possible that although these radiographers did not believe the sessions needed to be specific to the Diagnostic Imaging Department, in actual fact they would be beneficial.

It is felt by a number of radiographers that the NHS trust does not value infection control as they are not willing to take responsibility for the issue such as providing resources or education. This emphasises the notion that radiographers and other HCPs need to believe that the NHS trust really believes infection control is essential to reduce the spread of HAI.

A flow chart (Figure 21) shows a number of factors identified, during the focus group discussions, discouraging compliance with infection control protocols. Ways to rectify these issues are found along side these, followed by the categories addressed from Figure 20.

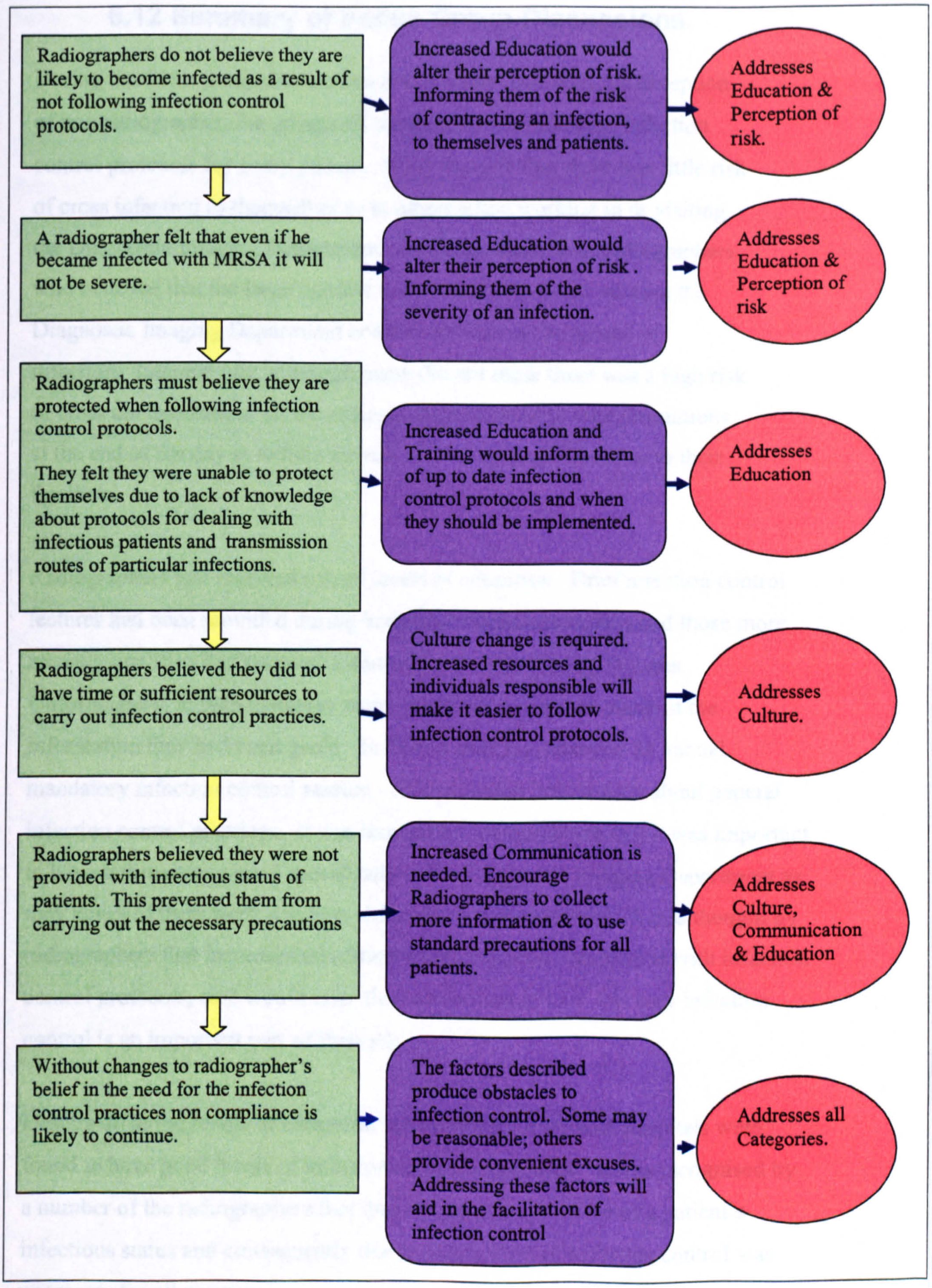


Figure 21. Flow Chart Identifying Factors that Prevent Infection Control Practice and Identifying Ways to Address them. Includes data from the Focus Group discussions.

6.12 Summary of Focus Group Discussions.

During the focus group discussions it was found, that with the exception of one radiographer, the groups all admitted to not following infection control protocols for every patient. Many thought that there was little risk of cross infection to themselves or to others when working in or visiting the Diagnostic Imaging Department. However, there were radiographers who believed that the large number and variety of patients visiting the Diagnostic Imaging Department could contribute to the spread of infection. Interestingly, although many did not think there was a high risk of cross contamination, all the radiographers claimed to take precautions at the end of the day to reduce the risk of transmitting infections to their families.

Radiographers had received mixed levels of education. Brief infection control lectures had been provided during hospital induction programs and those more recently qualified had received information from university lectures. Unfortunately, in both instances many could not remember much of the information they had been given. In DGH2 staff had attended an annual mandatory infection control session. This provided information about general infection control practices. It was thought by radiographers that it was important to have information aimed specifically at the Diagnostic Imaging Department as they believed their work was very different to that on a ward. It was thought by radiographers that increased education would improve compliance with infection control protocols, as it would raise their awareness of how and why infection control is an important part of their job.

Despite differing levels of education radiographers from both hospitals were found to have good levels of infection control knowledge. It was recognised by a number of the radiographers that they are not always aware of a patient's infectious status and consequently that a certain level of infection control was necessary for all patients,

Better communication was considered to be an important factor in increasing compliance rates. The radiographers' claim that information about infectious or neutropenic patients allows them to take the necessary precautions to protect themselves as well as their patients. Unfortunately, they believed they were not always informed of a patients' infectious status.

The culture of the department was thought to play a role in infection control compliance rates. The theatre found in one of the satellite hospitals connected to DGH2 was said to be more stringent with their infection control measures than the main site theatre. This was because the Sister in charge enforced infection control protocols. This resulted in other members of the theatre staff also ensuring infection control protocols were followed. It was also claimed that in instances when radiographers work in other areas of the hospital, such as ICU, HDU, SCBU and theatre or alone in mammography, ultrasound or a satellite hospital then appropriate infection control protocols are frequently followed.

Lack of time was a reason often provided for failure to follow infection control protocols. Interestingly, it was pointed out by a radiographer that infection control practices did not alter depending on the number of patients waiting to be examined. The frequency of required hand decontamination also discouraged them from complying with protocols, due to the effects this had on their skin. Lack of resources, such as gloves and aprons, was another reason for low compliance, as were the location and design of the sinks, the temperature of the water and the layout of the Diagnostic Imaging Department.

Many of the radiographers thought that having an individual responsible for enforcing infection control within the radiology department would be beneficial. Unfortunately, the superintendents, who were in the best position to take on this role, claimed that this would be too time consuming.

7.0 Chapter Seven: Conclusion and Recommendations.

The aims of this investigation were:

1. To determine the frequency and identify the situations in which infection control procedures are carried out within the general Diagnostic Imaging Department.
2. To ascertain the level of bacterial contamination on the general radiographic equipment.
3. To establish the opinions and attitudes of radiographers, regarding infection control within the Diagnostic Imaging Department.

The data collected from the study has shown that radiographers' standard of infection control in all four hospitals and all areas of the general Diagnostic Imaging Department is extremely low. No single hospital performed to consistently higher standards than any other, with the exception of radiographers performing mobile radiography in the CH. The standards in the individual departments were broadly similar.

The literature states that many HCPs decontaminate their hands less than 50% of the required time (Pittet *et al.*, 1999b; Rochon-Edouard *et al.*, 2004). This is considered to be unacceptable; however, during the observational audit in phase one, it was found that the radiographers' level of hand decontamination compliance was, in many cases, even lower. Hand decontamination before patient contact occurred on only (n=34) 4% of occasions. As found in other studies, hand decontamination after patient contact was more frequent. Unfortunately this practice still occurred on only (n=145)17% of occasions.

Interestingly, when the researcher approached a number of infection control doctors and nurses many believed the Diagnostic Imaging Department was an unproblematic area. One infection control doctor claimed that the Diagnostic Imaging Department did not warrant investigation as there was already a hospital wide protocol in place. The doctor also believed that radiographers do

not have contact with infectious or immunosuppressed patients or patients with open wounds. Obviously this doctor was unaware of the procedures and patient types examined in this department and although there are protocols in place they were not being adhered to. With the demonstration of such low compliance rates, the potential to spread HAIs may be greater than infection control teams initially anticipated.

It may be argued, as many of the radiographers did during the Focus Groups in phase three, that hand decontamination is not always necessary between every patient due to the low levels of contact and the type of patient being examined. However, it has been found that contamination can occur after minor contact with a patient (Sanderson and Weissler, 1992). Studies have also identified cases of cross contamination occurring in the Out-patient setting due to poor infection control practice (Goodman and Soloman, 1991). This implies that the low levels of compliance with infection control protocols in the Diagnostic Imaging Department may pose a larger problem than initially thought. Given the large number, and the ill health of many of the patients attending the radiology department there may be a risk that HAIs could be transmitted from the Diagnostic Imaging Department throughout the hospital and into the community.

In contrast to the findings of the observational audit, radiographers claimed that in situations where there was an increased risk of contact with blood or body fluids, and when they have contact with infectious patients, they would take the necessary precautions to stop the transmission of infection. This includes, hand decontamination, and the use of personal protective clothing (PPE). The findings of this study agreed with Simmons *et al.* (1990) in that radiographers think they are following infection control protocols, including decontaminating their hands and equipment, more frequently than they actually do. The implication of this is that radiographers may already believe they are carrying out appropriate and adequate infection control practices and do not need to make any changes to their behaviour. Added to this is the belief, of some of the infection control doctors and nurses, that the Radiology department does not pose an infection

problem. If these issues are not addressed it is unlikely that compliance levels will improve and, more worryingly, over time they may deteriorate even further.

The radiographers in DGH1 and DGH2 claimed to decontaminate the equipment in the instances that they felt were necessary. Again, this was not always witnessed in the observational study. The frequency with which radiographers were observed cleaning radiographic equipment was low, occurring on only (n=30) 4% of occasions. The bacterial analysis in phase two showed that the radiographic equipment could harbour bacteria. Although the equipment was not found to be grossly contaminated, in many cases levels of bacterial contamination were much higher than would be acceptable when using the International Food Agency standard recommended by Griffith (2003) and Dancer (2004), for example the chest stand and the x-ray table were found to have 830 ACC/cm^2 and 2400 ACC/cm^2 respectively. It may not be considered feasible, by some, to make full use of these standards to maintain low levels of bacterial contamination within the Diagnostic Imaging Department. However, the researcher believes that as no other standards, at the present time, are available there should at least be some attempt to meet these criterion. The bacterial analysis carried out in this study showed that prior to cleaning (n=30) 44% of the pieces of radiographic equipment already met this standard. These pieces of equipment would have been cleaned, at the earliest, 15 hours prior to the swabs being taken. The consequence of not resolving the issue of regular decontamination of equipment is that additional recontamination will increase the bacterial loads to even higher levels. An important finding of this study was that simple cleaning measures, using the general purpose detergent already available in the Diagnostic Imaging Department, resulted in a significant reduction in the levels of bacterial contamination. In instances where the highest levels of contamination were found, normal cleaning did not reduce the bacterial load to recommended levels. This demonstrates the difficulty of cleaning highly contaminated equipment and the need for regular cleaning to prevent bacterial build up. If equipment was cleaned after patient contact, as recommended by Pratt *et al.* (2007), then this research shows that acceptable levels of bacterial contamination can be achieved. Maintaining clean equipment would also reduce

the bacterial load that could be transmitted to the radiographers' hands, thus reducing the risk of direct cross contamination to patients. A checklist as described in DGH2 (Appendix 3) to increase compliance would be of value in rectifying the issue of high levels of bacterial load. This would be especially effective if the radiographers are required to sign and date the checklist after cleaning. A radiographer from each department should be designated either daily or weekly to ensure the checklist is completed. This will enhance ownership of the task. It is also essential that the checklist is collected weekly by an individual put in place to take overall responsibility for infection control. This will highlight the need to complete the checklist and stress the importance of cleaning. Without this, completion of the checklist may simply be forgotten.

A number of important issues affecting infection control compliance have been identified during this study, these will be addressed in the following text.

7.1 Education.

Despite poor compliance levels with infection control protocols radiographers' levels of knowledge were good. They were aware that they should be carrying out infection control practices for all patients; unfortunately they chose not to do so. They were also aware of the routes of infection and how these transmission routes could be blocked. However, they often contradicted themselves. They did not feel they were at risk of contamination, or a risk to their patients, yet they did think they were a risk to their families. This suggests that they may be unable to apply their knowledge to their actual work.

Radiographers believed that they needed more education to increase their knowledge and awareness of infection control practices. In DGH2 it was claimed that the infection control lectures were boring and too long; this could result in the vital information not being obtained or quickly forgotten. The lack of confidence in their infection control education may be because of the way in which their knowledge has been acquired in the past, gathering items of

information piece meal in the course of their work. This could explain why they thought the lectures were boring or too long, having difficulty fitting in new information to an already fragmented knowledge base. It would be like missing the vital beginning of a mystery story and trying to make sense of the clues and red herrings as the story progressed. For education to be understood it should be delivered in a structured and complete way. The National Core Learning Unit's infection control programme would address these factors (National Core Unit, 2005). It may be easier to implement infection control education during university training, as infection control could be added to the beginning and ending of every radiographic technique as part of the overall examination, as is the case for identification checks. To emphasise the importance of this activity it should also be included in practical and theoretical examinations. This, of course, is too late for radiographers already qualified, but it could be incorporated into any post graduate training such as dental radiography, intravenous injections and during training in the use of new equipment.

For all qualified radiographers a structured training programme is needed to raise their infection control standard to an acceptable level. As highlighted by radiographers in DGH1 during the Focus Group discussion, infection control training should be provided yearly. In addition to the general education given in a lecture format, the radiographers may benefit from infection control training specific to their needs in the Diagnostic Imaging Department. An individual from this department who is responsible for infection control could be used to pass on valuable information regarding protocols and techniques. The use of an opinion leader was found to be valuable when combined with the infection control nurse delivering lectures (Seto *et al.*, (1991). The use of Glow boxes by Camm (2004) and Agar plates by Wilson and Jenner (2001) have been considered to be effective tools in demonstrating the spread of infection and the need for hand decontamination. A study where the HCPs were shown how to correctly decontaminate their hands and were then examined to demonstrate competency in the practice also resulted in greater compliance with hand decontamination (Larson *et al.*, 2000).

These are examples of interventions that could be used during infection control education and training in the Diagnostic Imaging Department to emphasise the need to decontaminate their hands and equipment along with the need for PPE. By making use of the responsible individual (opinion leader) the effects of these interventions can be maintained, as they would be present permanently and able to remind radiographers about the protocols they should be following. It is important that infection control procedures are not considered to be a separate subject, but an integral part of patient care practices (Seto *et al.*, 1991). When seen as an unconnected issue infection control becomes an additional task and, as such, it is easier to be allocated a lower priority when radiographers believe they are too busy.

7.2 Communication.

Radiographers often claimed that they performed infection control practices to a high standard if they were informed about an infectious patient, such as those that are HIV or MRSA positive. Unfortunately, they felt they were often not provided with this necessary information from other departments in the hospital. This was a reason frequently cited for failing to perform the necessary infection control protocols. To address this issue improvement in communication between the Diagnostic Imaging Department and other hospital departments is required.

It is essential that referring clinicians are made aware of the importance of this information to radiographers. Computerised request forms could be utilised, making use of mandatory fields, which must be completed to allow the requesting clinician to proceed through the form, this would include, infectious, non infectious and unknown infectious status. Radiographers may also benefit from contacting the referring clinician or wards themselves and putting the question regarding infectious status to them. This method was used in IDH and some departments in DGH2.

However, lack of communication may be a convenient excuse not to perform infection control procedures. Pratt *et al* (2007) recommends standard infection control procedures for all patients as a minimum, this is regardless of the information provided regarding infectious status. It is important that changes in radiographer's behaviour occur to comply with this recommendation. Adhering to this practice would reduce the risk of cross contamination. The radiographers need to be more aware that the missing information does not necessarily mean that the patient does not have an infection. In many situations the infectious status of a patient may not always be available to the referring clinician.

7.3 Obstruction to Infection Control Practices.

Institutional barriers including, lack of time, resources, communication, education and the perceived lack of commitment to infection control by the NHS trust, combined with the radiographers' perception that the risk of cross contamination was low, discouraged compliance with essential infection control protocols. Barriers are considered when making use of the HBM, TRA/TPB models and are shown in 6.11.6, Figure 21. These barriers all need to be removed in order to enable radiographers to believe it is possible for them to change their behaviour and remove excuses for not carrying out infection control practice. If these barriers are not removed radiographers may be less inclined to perform the necessary infection control procedures. Failure to alter their behaviour will increase the risk of transmitting infections to themselves and others. A number of these barriers have already been addressed, such as lack of education and a general belief that there is no problem to address in the Diagnostic Imaging Department. Radiographers believed that lack of time was a factor in their behaviour, so it is essential that infection control practices can be performed quickly and easily. Compliance with infection control guidelines was found to be significantly higher for easy-to-perform tasks, such as changing the protective blue paper roll covering the mattresses. In response to this the Diagnostic Imaging Department should consider investing in ways to make infection control as easy as possible to perform. This includes ensuring resources such as AHR, gloves, aprons and cleaning wipes are readily available

so the radiographer does not have to spend time locating them. It is shown in Figure 21 and the HBM, TRA/TPB that if radiographers have to hunt for equipment then they are less likely to perform the necessary activities.

7.4 Culture.

As in other studies the culture of wards, where infection control was insisted upon, had a significant positive impact on the practice of visiting mobile and theatre radiographers. Appropriate infection control practices were observed when radiographers carried out mobile radiography in CH. This could be due to the knowledge of the reduced immunity of the patient. However, even though the radiographers were aware that patients suffering from cancer or HIV would have lowered immune systems, they did not always offer them the same protection from infection in the Diagnostic Imaging Department. Other examples of increased compliance included the radiographer working alone in mammography, ultrasound or a satellite hospital. This suggests that the culture of the department also plays an important role in infection control compliance levels and that the culture of the Diagnostic Imaging Department is not conducive to effective infection control practices. The NHS trust along with the radiology department need to alter the culture regarding infection control procedures.

In the NHS an initiative known as Clinical Governance is in place, this also aims to ensure and maintain safe, high quality care for the patients. Clinical Governance is defined as:

> A system through which NHS organisations are accountable for continuously improving the quality of their services and safeguarding high standards of care by creating an environment in which excellence in clinical care will flourish (Department of Health 2003).

The Department of Health (1998b) stated that for clinical governance to be effective, a change in culture is required. Donaldson (2003) felt this was still the case.

In business and industry a method of successfully changing culture and attitudes in an effort to raise standards has been in the use of quality circles (Robson, 1993a). Quality circles are defined as:

> "A group of workers who meet regularly to discuss the way work is performed in order to find new ways to increase performance".
>
> (Buchanan and Huczynski,1997 p288)

Quality circles could be used to provide ways to improve infection control in the hospital and in the Diagnostic Imaging Department. Voluntary members of each department are included. It has been acknowledged that interventions aimed at individuals to improve compliance with infection control protocols are limited, and that environmental constraints and the institutional climate need to be considered when trying to alter behaviour (Kretzer and Larson, 1998; Boyce, 1999). The Quality Circle technique could address these needs and could be adapted to change the culture of the Diagnostic Imaging Department. The NHS trust could also use this method throughout the hospital to improve compliance rates with infection control protocols and reduce HAI rates.

In the Diagnostic Imaging Department an individual would be appointed as an infection control radiographer, who would be the circle leader, the rest of the circle would consist of up to 10 radiographers (Robson, 1993a). The most persistent problem is addressed first, and through a process of continuous improvement the problem is gradually eliminated. A baseline of compliance with infection control protocols would be established by using observational audit. Data from other hospitals is also useful to allow comparisons to be made. The baseline results would be displayed, in tabular or graphical format, alongside the results found in the best hospitals. The department then aspires to achieve the levels of the best hospital. This can add a competitive element, which may assist in motivating the radiographers. The baseline data could be collected using tools from the Saving Lives program, such as the High Impact Intervention

spreadsheets. These spreadsheets help to minimise unwarranted variation in practice. This is because they provide a way of identifying where compliance needs to be increased and a measure of how often all elements are performed for a specified procedure. The tool allows results to be calculated and quickly fed back to staff.

The results of the observations are then discussed by the circle members and decisions are made about the steps required to improve performance. The group decisions have the advantage in producing wider ownership of the issue (Francis, 1990). As many of the circle members as possible are given a practical function in the implementation of the decided interventions. These could include:

- Performing follow up observations.
- Liaising with other departments e.g. explaining the need for infectious status of referred patients to be given or requesting talks from infection control nurses.
- Researching other hospitals methods of increasing compliance rates.
- Taking responsibility for stock levels.
- Developing checklists and rotas for cleaning.
- Any other things put forward in the discussion stage (Bell *et al.* 1994).

It is vital that interventions are implemented, if any changes in practices are to be seen. When the interventions have been put into place another observational audit can be carried out and the new results displayed for comparisons to be made. The quality circle would then meet again to discuss the results and all other information collected by the circle members regarding their individual duty, such as agreement by referring clinicians to provide details of patients' infectious status. In this example if an agreement has not been reached then it may be that the computerised referral forms discussed earlier (7.2), are introduced. At this meeting decisions on the next step of matters already discussed or any other issue, will be taken. These steps are repeated in a cycle of continuous improvement until the best standards are attained, they are then repeated to maintain or improve on these standards (Robson, 1993a). A visual model of the quality circle that could be used in the Diagnostic Imaging

Department to address compliance with infection control protocols is shown in Figure 22.

Commitment from everyone including hospital management is required for quality circles to be truly successful (Robson, 1993; Bell *et al.*, 1994; Forster *et al.*, 2000). The value of the quality circle is that it can be seen that problems which have prevailed previously are at last being addressed. Radiographers are no longer waiting for someone to solve their problems and they no longer have excuses for neglecting to adhere to protocols. This will address the perceived and actual control factors found in the TPB model.

The quality circle can address issues, and implement recommendations already discussed, such as education, increased resources and communication. By involving radiographers in the quality circle, they will take ownership of the problem which in turn can create a virtuous cycle raising morale and enthusiasm which in turn creates a basis for developing a positive culture in the department (Bell *et al.*, 1994; Huczynski and Buchanan,1997). Quality circles were not used in the Diagnostic Imaging Departments involved in this study.

These recommendations may help to facilitate infection control practices, and emphasise to radiographers and other HCPs that neglect of these protocols is unacceptable. These are important factors in the behavioural change models.

7.5 Infection Control within the Diagnostic Imaging Department.

During this infection control study the Focus Group discussions were found to be beneficial, not only in gathering data for the study but also to the radiographers. A number of radiographers claimed they had been able to discuss their needs and gather more information from the other participants regarding infection control protocols. For example, in DGH1 some participants were made aware of the MRSA protocol to be followed. The value of individual bottles of AHR was also identified. On completion of the discussions many of the

radiographers also claimed to feel more motivated to perform the infection control protocols once they returned to the Radiology department. A number of the radiographers stated that they had appreciated the time provided to think about infection control, this was something they had not done before. The value of the discussions to the radiographers was discussed earlier (7.5). This could be one of the merits of involving radiographers in the quality circle.

Until now, very few studies have addressed the contribution of Diagnostic Imaging Departments and their staff to the spread of HAIs. This study provides an initial step in this process by documenting infection control practice, evaluating contamination levels on equipment and exploring radiographers' views about infection control. Consideration should be given to replicating this study in a wider setting in which the findings could then be generalised.

Large numbers of patients, including those with open wounds, low immunity and infectious disease attend the Diagnostic Imaging Department. These patients are grouped together in waiting rooms and they are often examined by a small number of radiographers and having contact with the same pieces of equipment. These factors together with poor radiographer compliance with infection control protocols and unacceptable levels of contamination on equipment indicate that the potential for radiology services to contribute to infection levels in hospitals and in the community is considerable. Better compliance with infection control protocols achieved through changes in education, procedures and culture in the Diagnostic Imaging Department are therefore vital to protect both patients and staff.

Summary of Recommendations.

- **Education**
  - Increased general and specific education for qualified and student radiographers. This should occur early on in employment and will need to be covered yearly. The mandatory National Core Learning unit's infection control programme will address this.

  - Infection control could be incorporated into radiographic techniques and any assessments carried out by students.

❖ **Communication**

- ➢ Other hospital staff need to be made aware of the need to pass on the relevant information to radiographers.

- ➢ Computerised request forms with mandatory fields.

- ➢ Radiographers should be encouraged to obtain missing information by contacting the referring clinician or department.

❖ **Resources**

- ➢ More readily available resources are required, this includes, protective clothing such as gloves, aprons and cleaning materials.

❖ **Culture**

- ➢ A change in culture in the radiology department and the NHS Trusts is required. This can be addressed by implementing quality circles.

- ➢ Introduction of an individual in the Diagnostic Imaging Department responsible for infection control.

❖ **Further research**

- ➢ This study offers a starting point from which further research into infection control within the Diagnostic Imaging Department can be added.

- Consideration should be given to replicating this study in a wider setting in which the findings could then be generalised.

- Intervention strategies described earlier should be introduced and further studies should be carried out to assess the long term effects.

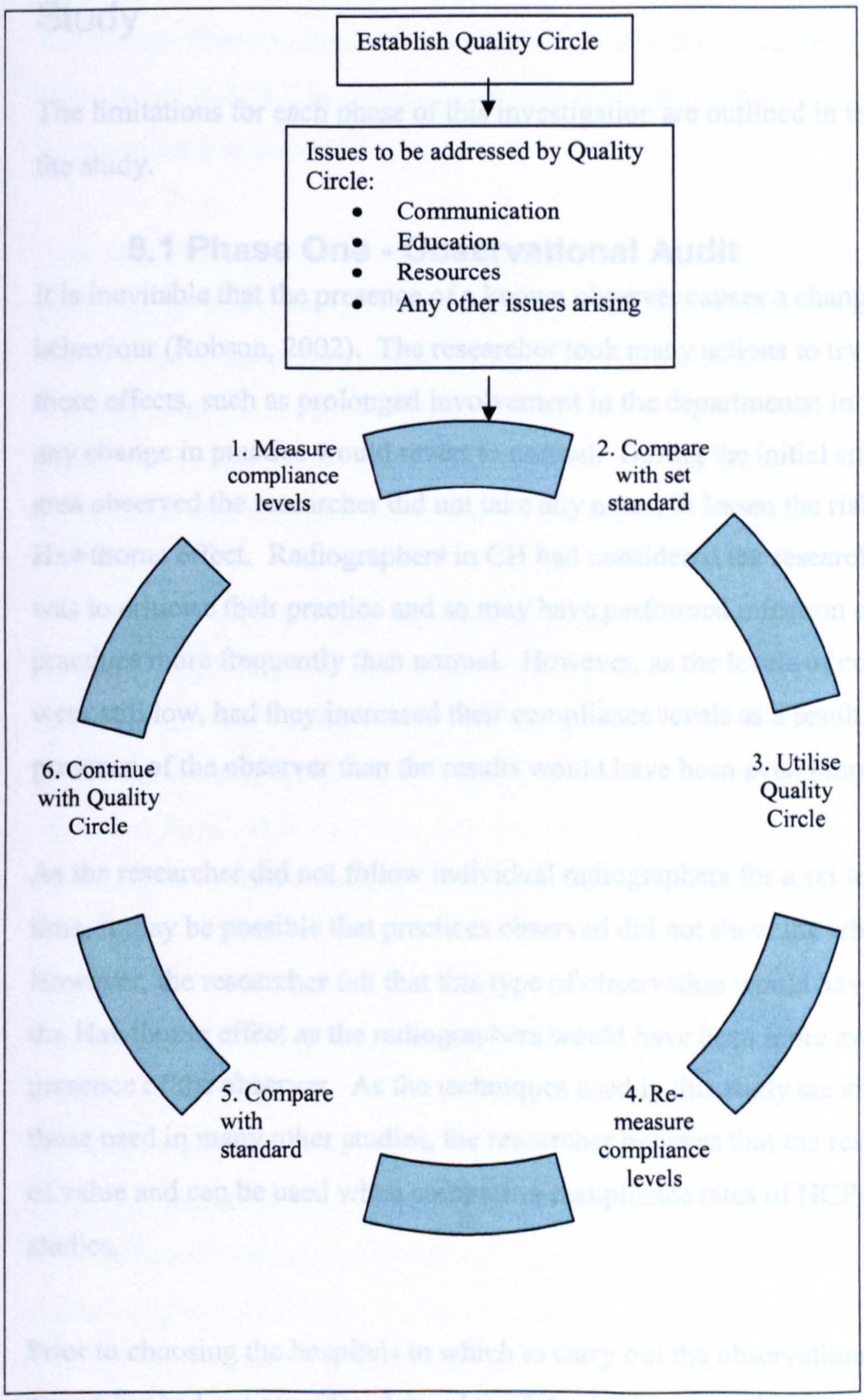


Figure 22. Visual Model of Recommendations.

8.0 Chapter Eight: Limitations of the Study

The limitations for each phase of this investigation are outlined in this section of the study.

8.1 Phase One - Observational Audit

It is inevitable that the presence of a known observer causes a change in behaviour (Robson, 2002). The researcher took many actions to try to reduce these effects, such as prolonged involvement in the departments; in the hope that any change in practice would revert to normal. During the initial stages in each area observed the researcher did not take any notes, to lessen the risk of the Hawthorne effect. Radiographers in CH had considered the researcher's aim was to criticise their practice and so may have performed infection control practices more frequently than normal. However, as the levels of compliance were still low, had they increased their compliance levels as a result of the presence of the observer then the results would have been even more worrying.

As the researcher did not follow individual radiographers for a set length of time, it may be possible that practices observed did not show the whole picture. However, the researcher felt that this type of observation would have increased the Hawthorne effect as the radiographers would have been more aware of the presence of the observer. As the techniques used in this study are similar to those used in many other studies, the researcher believes that the results are still of value and can be used when comparing compliance rates of HCPs from other studies.

Prior to choosing the hospitals in which to carry out the observations the researcher had not considered the plan of the departments, this was due to having experience of examination rooms being divided by the viewing and processing area and feeling this would be the usual design. As the In-patient and Out-patient department orientation in hospital four was different in lay out to the other hospitals it did lead to difficulties observing the radiographers' practice.

This could have led to instances of hand decontamination taking place and being missed or the researcher's presence prompting better infection control behaviour. However, the researcher believes that she did manage to overcome these issues (4.8.2). The results found were also comparable to the other three hospitals used in the study.

This study made no attempt to monitor the quality of the infection control practices, such as thoroughness of cleaning or hand decontamination. This was thought by the researcher to be a difficult practice to observe. It would have required being more obtrusive, which would risk an increase in the Hawthorne effect. It was also felt at this point in the research, that simply monitoring compliance with the infection control guidelines was acceptable.

The timing of the study may have had an impact on the results, as already described, the researcher carried out the observations during the normal working hours and not over the weekend or during the night shift. It may have been found that the practices were different when there was less staff working or at times less busy. This may have had an effect on the overall results. However, the researcher was not looking for these differences so this was not considered to be an issue.

As only small numbers of particular events arose, such as dealing with immunosuppressed or infectious patients, it was not possible to carry out statistical analysis in these areas. This problem may have been overcome if the researcher had spent a longer period of time in the setting and remaining there until sufficient numbers had been collected. This would have been especially useful to determine whether or not these factors did cause practice to change as was initially presumed by the researcher. Unfortunately, time constraints did not allow this. This issue could be addressed in a further study.

The researcher believes that phase one of this study was extremely important to demonstrate radiographers' actual compliance with infection control protocols. It may have been possible to use other methods to obtain this data, such as

questionnaires, or measuring soap usage, however, these methods were not thought to provide such accurate data as the observation audit. Although the results of the observation audit confirmed the researcher's original suspicions, that compliance with infection control protocols would be low, it had not been anticipated that compliance rates would be so poor.

8.2 Phase Two - Bacterial Analysis

It is possible that the radiographers' awareness of the bacterial analysis increased the frequency of equipment cleaning. Had they been unaware of this phase of the study, the equipment may have had higher contamination levels.

Due to the workload in the laboratory the swabs had to be taken at the beginning of the day, over a number of weeks. Departmental cleaning may have occurred in the evening before the swabs were taken. It may have been useful to take the swabs at different times of the day to show more definitely the level of contamination after contact with patients. Had this occurred it is possible that different results would have been obtained.

The bacterial contamination levels may have been different had the radiographers cleaned the equipment rather than the researcher. More thorough cleaning may have been performed by the researcher, resulting in lower contamination levels. However, the bacterial swabs had to be taken before the radiographers started their working day, making it impractical to ask them to clean the equipment. Other issues that may have arisen are the possibility that radiographers would have cleaned the equipment differently to their normal manner if they were asked to clean the equipment specifically for the study. This could have produced different results to what would be found after their normal methods. If the researcher were to take swabs after a piece of equipment was cleaned by a radiographer during their normal working activities she would have experienced difficulties with the laboratory due to their existing work load. It was the opinion of the researcher that the study still showed the value of cleaning the equipment.

It may have been useful to take swabs of the equipment at the beginning of the shift once all the normal cleaning had taken place and at the end of the day to show how much bacterial contamination there was after a certain length of time. Unfortunately, the laboratory would not have been able to accommodate the extra workload.

This phase of the research was considered to produce important findings. As with other studies the radiographic equipment was found to be contaminated. In addition to this the value of simple cleaning was shown and can be used to encourage radiographers to perform this task more frequently.

8.3 Phase Three – Focus Group Discussions

The radiographers may have believed that the information gathered from the Focus Group discussions was for the management of the hospital. It is therefore possible that they may not have disclosed their true opinions about the practice of infection control. It is also possible that respondents did not give honest answers and responded to the questions in ways which they thought were favoured by the researcher. This is known as 'social desirability' (Robson, 2002). To try to overcome this, the researcher made it clear at the beginning of the discussions that the findings were for her own study and not for the NHS trust that they worked for. It was also made clear that the researcher was interested in all opinions both negative and positive.

As only a small number of hospitals and radiographers were included in this study, this limits the generalisability of the investigation. However, the literature review shows that many of the findings from this study, such as the reasons for low compliance, are similar to other types of HCPs in other settings. It may therefore be justified to assert that this study should enhance the understanding of the radiographer's practice of infection control in other hospitals.

It is possible that different results would have been obtained if strangers rather than acquaintances were used in the Focus Group discussions. Acquaintances may have worried about what their colleagues would have thought depending on what they said; this may have prevented them from giving truthful answers. Equally, they may not have wanted to lie in front of colleagues. The researcher had wanted to use the radiographers used in phase one of the study, this made it impossible to use strangers in the discussion groups.

It is the opinion of the researcher that the Focus Group discussions provided invaluable depth to this investigation.

8.4 Investigating Infection Control within the Diagnostic Imaging Department.

As shown, this study was carried out in three phases. Each phase was used to achieve one of the three aims. Had the researcher concentrated on only one of the aims it is possible that more generalisable data could have been collected and a number of the limitations described could have been removed. However, due to the limited knowledge and available literature relating to infection control within the Diagnostic Imaging Department the researcher believes that at this stage all three phases and methods were required. The results from phase one led to phase two and three and the findings from all three phases have been confirmed by one another. Phase three has also been particularly useful in placing the data from the first two phases in to a real social context.

Despite the limitations in all three phases, this research has met its original aims and the findings offer a valuable insight into infection control practices of radiographers and have assisted in identifying ways in which this necessary practice could be improved.

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Appendix 1

Handwashing Audit Checklist

High, medium and low risk observation chart:

If you choose to use this chart, fill in as previously, but note whether the opportunity was high, medium or low risk.

University Hospitals Lewisham observation sheet

Date: Time: Location:

Observer

	Nurses/Stn	Doctors	HCAs	Others
Low risk				
Touching sterile goods				
Making clean bed				
Contact with notes, telephone etc.				
Drugs round				
Other				
Medium risk				
Stripping a non soiled bed				
Patient contact(hand-shake)				
Cleaning beds, furniture				
Setting up O2, Nebulizers				
Observations (TPR & BP)				
Setting up IVI, giving Injections, IVs				
Removing gloves				
Bed bath, washing patients				
Other				
High risk				
Dealing with bodily secretions				
Bedpans, commodes				
Suctioning, tracheostomy care				
Infected wound dressings				
Phlebotomy, cannulation				
Other				

Appendix 2

DGH2 Infection control protocols

INFECTION CONTROL POLICY - X-Ray Department

Equipment	How cleaned	How often
General x-ray equipment table		
X-Ray tube	Damp dusted with g.p. detergent	weekly
Erect Bucky and other hard surface equipment		
Screening monitors	Alcowipe	When vision impaired
Dental room		
Ceph - ear pieces	Alcowipe	Before each patient
nasal marker	cover with disposable finger stalls	"
head clamps	disposable plastic cover & wipe with Alcowipe	"
chin test	Alcowipe	"
Room 3		
Erect Bucky (for sinuses)	Alcowipe	"
Room 6		
Intensifier	Covered with disposable plastic cover - if contaminated see below	After each patient

Equipment	How cleaned	How often
Gamma Camera		
Ventilation masks	Soak in G.P. detergent and dry thoroughly	After each patient
Mammography Room		
Sonograph & stereotactic equipment	Plastic and metal plates — Alcowipe	"
Ultrasound		
Vaginal probes & transrectal probes	Alcowipe and covered condom. If condom splits, soak probe in Chlorhexidine solution 0.5% for 20 mins	"
General equipment Mattresses) Plastic Pillows) covers	Cover with blue roll liner send to laundry G.P. detergent	Changed before each patient weekly
Foam wedges - plastic covers	"	After use
Cups & spoons	"	"
Patient slide	"	"
Bed pan holders	"	"
Clean utility Trolleys	Washed G.P. detergent Alcowipe	Each morning before each trolley is set

This is for routine work. If surfaces become contaminated with blood or body fluids they must be washed with g.p. detergent and wiped with Alcowipe after cleaning.

Aprons and gloves are available in every room and should always be used if cleaning up body fluids/blood to ensure no risk of infection to staff.

Infectious patients - procedure carried out at the end of the list (unless suitable for portable x-rays on Ward). X-Ray room is cleaned afterwards. Precautions taken as stated in Infection Control Manual - Policy for the use of Disinfectant (up in Clean Utility on wall). We are awaiting a new Blood Spillage Policy from Mrs. Eirly Phillips.

Appendix 3

DGH2 Daily Checklist

GENERAL HYGIENE AND TIDINESS IN X-RAY ROOMS

PLEASE COMPLETE THIS CHART WHEN A TASK IS DONE, SO THAT COLLEAGUES ARE AWARE OF WHICH TASKS HAVE BEEN COMPLETED. TASKS SHOULD BE COMPLETED AT LEAST ONCE A WEEK. PLEASE INITIAL AND DATE THE BOXES.

TASKS	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7
PILLOWS AND MATTRESSES CHANGED (INC. PLASTIC SHEET)							
IMMOBILISATION DEVICES/SPONGES INSPECTED AND CLEANED/RECOVERED							
DAMP DUSTING OF ALL SURFACES							
ENSURING NO BLOOD /BODY FLUIDS ON ANY CASSETTES/EQUIPMENT							
FLOORS CLEAN AND DRY							
ROOM FULLY STOCKED WITH GLOVES, APRONS, INCO SHEETS ETC.							
CLEAN SUPPLY OF GOWNS/LINEN							
LEAD APRONS CLEANED AND HUNG UP TIDILY							

Appendix 4

Audit Checklist used in phase one

	Each examination	Each examination	Each examination
Hospital eg,DGH1, DGH2, CH, IDH			
Hospital Department eg A+E, In-pt, Out-pt, mobile			
Radiographer and grade			
Examination, eg chest, foot,			
	Yes=1, No=0	Yes=1, No=0	Yes=1, No=0
Hand Decontamination Before			
Immunosuppressed patients			
Patients with Open Wounds			
Any Patient			
Hand Decontamination After			
Contact with excretion/secretion			
Contact with Blood			
Cleaning room/equipment			
Known Infectious patient			
Dirty patient			
Removal of Gloves			
Any patient			
Hands Decontaminated with			
Soap and Water			
Alcohol			
Water			
Non-sterile gloves worn for contact with			
Excretions and secretions			
Blood			
Contaminated objects			
Gloves worn =1, not worn =0			
Equipment cleaned			
After general patient use			
If contaminated with secretions/excretions			
If contaminated with blood			
Cleaned =1 , Not cleaned =0			
Additional information			
Plastic cover changed			
Direct skin contact			
Open wound/ needle/catheter			

Yes observed practice =1, no observed practice = 0, leave blank if not applicable

Appendix 5

Letters from all four hospitals
about ethical approval

Appendix 7

Notice used to inform radiographers of infection control observations

Infection Control within the Radiology Department

An observational study will be carried out within the radiology department, to get an overview of infection control practices. It will take place between January and February 2002.

No names or other identifying details will be made public and every effort will be made to ensure that all information collected will remain anonymous.

For further details please see:

Carolyn Kelly

Appendix 8

Chi Square analysis and Wilcoxen tables from results in Phase one and Phase Two

The results in Tables I to VIII show the differences in infection control practices between the various hospitals/departments. Locate the first hospital/department on the vertical column of the table and the second hospital/department on the horizontal row. The place where the points intersect shows the phi and p values for comparison between the two hospitals/departments chosen. For example in Table I comparing DGH1 to DGH2, find DGH1along the vertical column, then move to DGH2 in the horizontal row, the result is phi =0.098 and p-value = 0.039.

Table VIX is produced by SPSS 11.5 when using the Wilcoxen test.

Table I. Chi-Square analysis of differences between hospitals [(•)] in Hand Decontamination practice before patient contact.

	DGH1	DGH2	CH	IDH
DGH1		0.098 (0.039)	0.191 (0.00)	0.115 (0.02)
DGH2			0.120 (0.013)	NS
CH				0.110 (0.03)
IDH				

Upper values are the Phi statistics, values in brackets represent *p* values
NS: not significant
[(•)] DGH1: District General Hospital 1; DGH2: District General Hospital 2; CH: Cancer Hospital; IDH; Infectious Disease Hospital.

Table II: Chi square analysis of differences between hospitals [(*)] in hand decontamination practice after patient contact

	DGH1	DGH2	CH	IDH
DGH1		0.174 (0.000)	0.166 (0.001)	0.120 (0.017)
DGH2			NS	NS
CH				NS
IDH				

Upper values are the Phi statistics, values in brackets represent *p* values
NS: not significant
(*) DGH1: District General Hopsital1; DGH2: District General Hospital 2; CH: cancer hospital; IDH; Infectious Disease Hospital.

Table III. Chi-Square analysis of differences between radiology departments in hand decontamination practice after patient contact.

	A+E	In-patient	Out-patient
A+E		NS	NS
In-patient			0.123 (0.003)
Out-patient			

Upper values are the Phi statistics, values in brackets represent *p* values
NS: not significant

Table IV. Chi-Square analysis of differences between Hospitals (*) in the use of gloves.

	DGH1	DGH2	CH	IDH
DGH1		NS	0.150 (0.002)	NS
DGH2			0.128 (0.008)	0.098 (0.050)
CH				0.209 (0.000)
IDH				

Upper values are the Phi statistics, values in brackets represent *p* values
NS: not significant
(*) DGH1: District General Hospital 1; DGH2: District General Hospital 2; CH: cancer hospital; IDH; Infectious Disease Hospital.

Table V. Chi-Square analysis of differences between hospitals [(*)] and Cleaning equipment when dealing with patients with open wounds

	DGH1	DGH2	CH	IDH
DGH1		NS	NS	NS
DGH2			NS	0.258 (0.018)
CH				0.328 (0.004)
IDH				

Upper values are the Phi statistics, values in brackets represent *p* values

NS: not significant

[(*)] DGH1: District General Hospital 1; DGH2: District General Hospital 2; CH: cancer hospital; IDH; Infectious Disease Hospital.

Table VI. Chi-Square analysis of difference between radiology departments in the cleaning of equipment when dealing with patients with open wounds.

	A+E	In-patient	Out-patient
A+E		0.227 (0.005)	NS
In-patient			NS
Out-patient			

Upper values are the Phi statistics, values in brackets represent *p* values
NS: not significant

Table VII. Chi-square analysis of differences between hospitals (*) with regards to changing the mattress protector.

	DGH1	DGH2	CH	IDH
DGH1		0.665 (0.000)	0.164 (0.043)	NS
DGH2			0.833 (0.000)	0.680 (0.000)
CH				0.189 (0.036)
IDH				

Upper values are the Phi statistics, values in brackets represent *p* values
NS: not significant
(*) DGH1: District General Hospital 1; DGH2: District General Hospital 2; CH: Cancer Hospital; IDH; Infectious Disease Hospital.

Table VIII: Chi-square analysis of differences between departments with regards to Changing protective cover between the departments

	A+E	In-patient	Out-patient
A+E		NS	.232 (0.00)
In-patient			NS
Out-patient			

Upper values are the Phi statistics, values in brackets represent *p* values

NS: not significant

Table VIX. Wilcoxon Test for Aerobic Colony Counts/ cm ^{2} Before and After Cleaning of the Equipment.

Ranks

		N	Mean Rank	Sum of Ranks
Bacteria count after cleaning - Bacteria count before cleaning	Negative Ranks	25[a]	15.40	385.00
	Positive Ranks	3[b]	7.00	21.00
	Ties	4[c]		
	Total	32		

a. Bacteria count after cleaning < Bacteria count before cleaning

b. Bacteria count after cleaning > Bacteria count before cleaning

c. Bacteria count before cleaning = Bacteria count after cleaning

Test Statistics[b]

	Bacteria count after cleaning - Bacteria count before cleaning
Z	-4.146[a]
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Appendix 9

Method used in the laboratory for bacterial analysis

MEDIUM: **Maximum Recovery Diluent (MRD) with neutraliser**

SUPPLIER CODE : Maximum recovery diluent Oxoid CM733

VOLUMES NORMALLY PREPARED : Various

PREPARATION :

1) Add			5L 100ml	3L 10ml
	MRD powder	47.5g/L	237.5g	142.5g
	Tween 80	30ml/L	150ml	90ml
	Lecithin	3g/L	15g	9g
	Sodium thiosulphate	5g/L	25g	15g
	L Histidine	1g/L	5g	3g
	Saponin	30g/L	150g	90g
to	Water		5litres	3litres

3) Mix well to dissolve

3) Distribute (**SEE BELOW)**

4) Autoclave at 113°C for 10 minutes

5) Check pH 7.0 +/- 0.2

DISPENSING VOLUME/CONTAINER : 10ml glass universal containers, 100ml Durans

STERILISATION : Autoclave 113°C for 10 minutes

COMMENTS : UKAS requires that the 10ml volumes are accurately measured. This is achieved by:

a) Weigh 3 universals label 1, 2, & 3and set the pump to deliver 10ml into the first bottle

b) Re-weigh the universal and calculate the weight of MRD distributed (final weight less weight of container). For 10ml the weight should be approx 10g.

c) Set the pump so that the weight of MRD at the beginning of the run is 10g. (NB pump settings will vary from batch to batch). Check weight at middle of run (no 2) and end of run (no 3). Re-weigh universals after autoclaving. Ensure average weight is between 9.5g and 10.5g for 10ml

Aerobic colony count

Method based on BS 5763 Part 1 1991 Enumeration of micro-organisms – colony count technique at 30°C

Transfer swab to 10ml Maximum Recovery Diluent plus neutraliser (neat)

Make decimal dilutions to 10^{-3} in 9ml MRD

Add 1ml of each dilution and neat to each of 2 sterile petri dishes.

Add 15ml Plate count agar to each dish, allow to set, and incubate at 30°C for 72 hours.

Count plates with up to 500 colonies at 2 dilutions and calculate the count/cm^2 of organisms as below

$$\text{Count per ml} = \frac{\Sigma c}{(n1 + 0.1n2)d}$$

where c = total count at 2 dilutions

n1= number of plates at first dilution counted

n2= number of plates at second dilution counted

d=dilution factor corresponding to first dilution

e.g Counts at neat = 22 and 20

Counts at 10^{-1} = 2 and 1

$$\text{Count} = \frac{22 + 20 + 2 + 1}{(2 + (0.1x2))1}$$

$$= \frac{45}{2.2}$$

= 20per ml

= 2.0×10^2/swab

= $20/cm^2$

Enterobacteriaceae count

Method based on BS 5763 Part 10 1993 Enumeration of enterobacteriaceae

Transfer swab to 10ml Maximum Recovery Diluent plus neutraliser (neat)

Make decimal dilutions to 10^{-3} in 9ml MRD

Add 1ml of each dilution and neat to each of 2 sterile petri dishes.

Add 15ml Violet Red Bile Glucose agar (VRBG) to each dish, allow to set, overlay with approx 10ml VRBG agar, allow to set and incubate at 37°C for 24 hours.

Count plates with up to 300 colonies at 2 dilutions and calculate the count/swab of organisms as below

$$\text{Count per ml} = \frac{\Sigma c}{(n1 + 0.1n2)d}$$

where c = total count at 2 dilutions
n1= number of plates at first dilution counted
n2= number of plates at second dilution counted
d=dilution factor corresponding to first dilution

e.g Counts at neat = 22 and 20
Counts at 10^{-1} = 2 and 1

$$\text{Count} = \frac{22 + 20 + 2 + 1}{(2 + (0.1x2))1}$$

$$= \frac{45}{2.2}$$

= 20per ml

= 2.0×10^2/swab

= 20/cm^2

Appendix 10

Changes required from the Multicentre ethics committee.

Third Party material excluded from digitised copy.
Please refer to original text to see this material.

Appendix 11

Trust letters allowing
focus group discussions

Appendix 12

Information sheet.

Ref:03/2/102

Hospital Headed paper

Version 2
December 17th December 2003

Information Sheet

Infection Control within the Diagnostic Radiology Department.

You are being invited to take part in a research study. This study will be conducted outside of work hours. There will be no employment consequences whether you decide to part or not. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. If there is anything that is not clear, or if you would like more information do not hesitate to ask Carolyn Kelly.

Purpose of the study.

The purpose of this study is to establish radiographer's knowledge, opinions and attitudes towards infection control policies within the diagnostic radiology department.

Who is being invited.

All diagnostic radiographers in this hospital are being invited to take part in the study.

It is up to you to decide whether or not to take part. If you do decide to participate it is the requirement of the London Multi-Centre Research Ethics Committee that you are given this information sheet to keep and be asked to sign a consent form of which you will also be given a copy. If you decide to take part you are still free to withdraw at any time without giving a reason.

What you will have to do.

Should you decide to take part in the study you along with other radiographers will be involved in the study for approximately one hour. The session will involve a group discussion relating to infection control and more specifically infection control within the diagnostic radiology department. This discussion will be recorded using an audio cassette recorder. The discussion will be followed by a brief presentation of the results of the audit which took place earlier in the study looking at infection control practice. Critical Incident technique will conclude the session. This involves you writing down two good and two bad incidents of infection control practice that you have observed or been involved in. These incidents may have taken place at anytime and at any hospital. You will not be expected to give your name or the names of other members of staff or the hospital name.

PTO

Confidentiality

All information collected during the course of the research will be kept strictly confidential. Any personal details given will remain anonymous. Only the researcher will be in possession of the audio tape and written work provided by you. These will be kept locked away in a locked office. Once the study has been completed the tape will be magnetically erased, paperwork will also be destroyed.

How you will benefit.

From this session your awareness of infection control may be increased. On completing this session you will gain Continued Professional Development credits.

Once all the results have been collected and analysed they will be used to produce a PhD Thesis. Results may also be published in radiography journals.

The University of Wales, Bangor is funding this study. No payment is being made to the hospital to take part in the study and no payment is to be made to the researcher to include you in this study.

The London Multi-Centre Research Ethics Committee has reviewed this study.

Thank you for reading this information sheet.

Appendix 13

Copy of ethical approval

Appendix 14

Questioning route

Topic guide

1 Infection control (What do you think of when someone says infection control)

- Infectious people
- Hand washing
- Cleaning
- Protecting patients
- Protecting oneself
- Universal precautions

2 Do you think there are any particular types of patients who need infection control

- Infectious patients – what sort of infections
- Infections – Hep C, HIV, MRSA C Diff
- Immuno suppressed patients – Cancer, HIV Open wounds elderly, children

3 How do you know the status of these patients?

- Request form
- Judgement
- Patient/nurse/staff informs you
- You may not know

4 What do you think are the most important areas of infection control?

- Handwashing – do you think this should take place before and after or both and every patient, do you think you can do that:?
- Cleaning equipment, what sort of equipment, just that which comes into contact with a patient, or radiographer or both, what would you use to clean it.
- Protective clothing – gloves, goggles, aprons (when do you think that is important)
- Vaccinations

5. Who do you think infection control benefits?

- Do you consider your own health
- Do you consider colleagues health
- Patients undergoing examination
- Other patients

6 What education have you received about infection control?

- Induction- how long was this training, was it mandatory
- University
- Has any been specific to radiography department? Do you think that is needed?
- Any other courses,
- Do you think training is necessary, why

7 Do you think infection control specifically in the radiography department?

- Is it followed
- Is it necessary
- Do you think Are patients or staff in x-ray are at risk of cross infection?

8. Do you think infection control measures in the radiography department are followed?

- Do you think they follow it more/less than other areas of the hospital,
- Do you think they need to follow it more/less than other areas.

9 what do you think about screening patients or staff for MRSA

10 What do you think prevents infection control practice?

- Lack of or badly placed sinks
- Soap alcohol gel
- Time – how could you make more time
- Lack of training
- Not felt necessary

11 Do you think infection control practice could be improved?

- How
- Education
- More sinks
- More staff
- Better role models

Finally do you think there is an infection control risk in the diagnostic radiography deparment.

Appendix 15

Summaries of focus group discussions

Radiographers Focus Group DGH1

Infection control

When hearing the phrase infection control the radiographers gave similar responses as the previous two groups. They also discussed the use of protective clothing and the protection of themselves.

The group felt that compared with other hospitals they were not given enough information about the infectious status of patients attending the diagnostic imaging department. The radiographers claim they are not always given information about infection risk.

Patients requiring infection control practices

The radiographers thought infection control practices were mainly used when dealing with patients in ITU, SCBU, HDU and patients with open wounds. It was also felt to be necessary with In Patients and patients in theatre. Like the superintendents in DGH1, theatre staff wearing their uniforms outside of theatre was discussed.

HIV, MRSA and TB were the main infections that came to mind when discussing infection control. MRSA was thought to be a threat as it could be spread through the air, whereas HIV was a blood born infection.

It was felt by the group that neutropenic and barrier nursed patients required high infection control practice. Infection control is also considered to benefit everybody.

Infectious status and risk

The same information was given regarding communication about infectious patients as reported by the earlier groups. The radiographers also claimed to find the relevant information in the patient's notes, however, they did not always have access to the patient's notes. At times a nurse will accompany a patient to the imaging department, in those cases it is sometimes possible to gain information from them. In some instances, the radiographers contact the wards with queries about the information on the request

form, in these situations the nurses may pass on information about the patients infectious status. It was felt that some hospitals are better than others at passing on this important data. Some hospitals have dedicated wards for infectious patients; this itself can inform the radiographer of the patient's infectious status.

Important areas of infection control

It was thought that the prevention of the spread of infection was the main aim. To do this, handwashing after every patient was thought to be an important element. The use of protective clothing such as gloves and aprons were also considered to be important. Cleaning was another necessary aspect of infection control. The group discussed the lack of resources in the department. It was agreed that there are only a few radiographers in the department who regularly make sure the examination rooms are fully stocked with the appropriate resources. A radiographer described how, at a different hospital, in ITU each patient had a dedicated cover for the cassettes. The rest of the group claimed to use pillow cases or the patients sheet to cover the cassettes. A couple of radiographers claimed that they did not use pillow cases if they are working alone, as they don't have the time to look for them.

Education and training

A few of the radiographers recalled the lectures they received while at university, prior to qualifying. One radiographer who works for an Agency claims that he has had no training or instruction about infection control since working at DGH1. Other permanent staff members stated, they had a small amount of general information as part of their hospital induction programme.

It was felt that each department in the hospital should have a member of staff dedicated to infection control, to ensure that rooms were stocked properly and to keep them informed. It was felt that infection control training should be treated like manual handling, and it should be compulsory. During the hospital induction program one of the radiographers was given a small container of alcohol gel, to use for hand decontamination. At this point

it was questioned whether or not alcohol gel was available in the diagnostic department, to which the answer was no.

Compliance with infection control

The group discussed whether or not infection control practices were carried out in the diagnostic imaging department. The group felt that infection control practice is not always carried out in the diagnostic imaging department. One radiographer described her time at another hospital, where they were very strict about infection control practices and they did clean cassettes after every use. Another radiographer argued that cleaning isn't necessary after each patient, as examining a patient from A+E with a twisted ankle does not really pose an infection risk. He felt that contact, of that type, is the same as holding onto the hand rails on a bus. Another radiographer pointed out that the cassettes used in A+E are used on a variety of patients, including patients in ITU, and there is no way of knowing what infections a patient may or may not have. Therefore, if the cassettes are not cleaned these infections can be passed on to other patients, in other departments.

It was found that the radiographers perform infection control practices in ITU, HDU, SCBU, and theatre. These are all areas outside of the diagnostic imaging department. The radiographers also to ensure claimed that they they wear protective clothing, such as gloves and aprons and clean cassettes prior to contact with neutropenic patients. They also believe that when dealing with patients with open wounds they clean the cassettes.

Necessity of infection control in the diagnostic imaging department

It was agreed by all the radiographers that infection control practices are necessary in the diagnostic imaging department. However, they also feel that the level of practice depends on the situation. A number of radiographers felt that the equipment should be cleaned more frequently, but not necessarily after each patient. It was felt that the equipment needed to be cleaned when contaminated with visible body fluids, or after contact with an infectious patient. They did, however, acknowledge that they do not always know when they are dealing with an infectious patient.

Risk of infection

The radiographers were asked if they felt that patients were at risk of cross contamination in the diagnostic imaging department. Many of the group felt that the patients were at risk, many felt that depended on the type of examination undertaken and the examination room used. Some rooms were considered to be cleaner than others. This started a discussion about resources, one radiographer claimed that there are no cleaning materials available to clean the rooms and equipment.

It was felt by the group that they are responsible for some areas of cleaning, but they also felt that due to high workload there are only so many things they can do in a given time. When they are busy they felt they are more likely to forget about the issue of infection control, so it would be useful to have someone around to remind them and keep an eye on the situation. It was felt that after dealing with infectious patients, it was their responsibility to clean the room, as they were responsible for that patient. They also felt that if a patient was unwell in the examination room then it is their responsibility to clean up any mess, however, if this occurs in the waiting room then they do not think they should have to clean up and felt that the hospital cleaners should be responsible for this.

Some of the radiographers believed that they were at risk of contracting an infection while working in the diagnostic imaging department. One radiographer felt that they are probably carriers of MRSA, due to the number of patients they examine with MRSA without being informed. One radiographer did not feel that they were any more at risk than the general public and other radiographers agreed. It was also felt that due to high workloads they do not have time to wash their hands, this may increase their risk of contracting an infection.

Compliance compared with other areas in the hospital

The group felt that they followed infection control protocols less than nurses working in areas such as ITU and SCBU. It was argued by one radiographer that they would adhere to infection control protocols more if they actually had the resources to do it. A few of the radiographers claim that the soap available in the diagnostic imaging department is

very harsh and has made their hands dry and cracked. They were unable to use a moisturiser, to avoid these skin conditions, as this prevents them from handling the films. They believe cracks in their skin make them more prone to infection.

Other issues that prevent infection control practices taking place, include lack of training and awareness. They felt that more posters reminding them to wash their hands would increase compliance. It was thought by some of the radiographers that radiography is a relatively clean profession, compared to nursing and physiotherapy, as the patients are usually cleaned before they attend the diagnostic imaging department. One of the radiographers disagreed with this and thought that patients visiting the department could still be covered in blood or other body fluids, so they still posed a risk. A radiographer felt there was a risk of cross contamination in the department, as they also work in other areas of the hospital dealing with infectious patients, and then move on to susceptible patients, without changing their uniforms. As in the Senior focus groups in DGH1, shoes were discussed as a potential risk.

Risk to their families

The radiographers felt that they must take bacteria home with them. A number of the radiographers claimed they always washed their hands before leaving the hospital. One radiographer leaves his uniforms at the hospital until the end of the week. He felt that because of this, and his handwashing practice, he doesn't need to worry.

Screening for infection

The subject of screening staff for infections was talked about. One radiographer worried about future employment, if found to be infectious. Other radiographers felt that it may be useful, in case they are carriers of an infection and putting their families at risk. One radiographer felt that annual checks may be necessary.

Barriers to infection control practices

The barriers against infection control practice were discussed, the radiographers felt the same factors described by the senior radiographers in DGH1 were barriers against

infection control. They also thought the new electronic request forms made it difficult to see if the patients were infectious, because nothing on the form stood out. The radiographers did feel that a coding scheme could be developed to show what infections patients had, this would also combat any problems with patient confidentiality. Not having a radiographer responsible for infection control was also considered to be a problem.

Improving compliance with infection control

To improve compliance with infection control policies, it was thought that more resources would be helpful. They also felt that an infection control representative in each department would be useful as then they could be kept up to date with new information and protocols. That person could also remind the radiographers of what they should be doing.

Responsibility for infection control

When talking about having an individual responsible for infection control they felt that superintendents would be the most appropriate, but it would be possible for any grade radiographer to take on the role, as long as they were strict about it. One radiographer didn't think a radiographer grade would be able to take on such a role, it was her opinion that no one listened to the lower grades. In a different hospital it was a radiographer grade who took charge of infection control, but it was felt that the workload in that hospital was low enough to allow for the practices to be followed, that is not the case in DGH1.

Senior's Focus Group DGH1

Infection control

The group felt that hand washing was the most important area of infection control. They considered general cleaning of the radiographic equipment and appropriate methods for cleaning up spillages to be other aspects. Infection control was thought to be the basic prevention of the spread of infection, including MRSA, from one person to another.

Important areas of infection control

It was felt that handwashing should occur after each patient, but felt in practice this did not occur due to lack of time. They felt that all aspects of their practice had to be carried out quickly, so infection control was often forgotten and not performed. The subject of staff uniforms posing a risk to the spread of infection was referred to, stating that uniforms should not be worn outside of the hospital. Not all of the radiographers were aware of this. This then led to a discussion about staff shoes bringing bacteria from the streets into the hospital, and how theatre staff should only wear their theatre clogs in theatre.

The radiographers felt that the equipment within the imaging department could be a source of infection; however, they rarely gave it much thought during their normal working day. It was argued that the task of damp dusting and cleaning of equipment should be given back to students, or radiographer helpers, as it was a job that did not need to be carried out by a qualified radiographer. This view was not accepted by all of the radiographers, many felt that it was in fact the radiographer's responsibility to keep the equipment clean. The use of a rota to ensure that cleaning occurred was thought to be a good idea.

When mobile radiography units and imaging cassettes are taken from one area of the hospital to another, and more specifically when used in ITU, it is accepted that this may result in the transfer of bacteria. It was claimed that the cassettes were cleaned after each patient. When examining infectious patients, it was stated that the cassette was placed into a pillow case for protection. The value of using a pillow case is questioned by one

radiographer. A number of radiographers discussed a different hospitals protocol whereby the cassettes were placed into a special cover for protection then cleaned after each patient. The life span of bacteria on the imaging equipment was queried, and the fact that MRSA lives in the skin cells and dust around the hospital was pointed out. It has been revealed that the hospital has a problem with cockroaches, it was felt that this can not help in the battle to prevent the spread of infection.

Infectious status and risk

The senior radiographers gave the same information as the superintenedents regarding communication about infectious patients. It was also felt that this information was not normally given about patients referred from A+E. However, if these patients looked unclean the radiographers would wear gloves. A radiographer did point out, at this point, that cleanliness of a patient did not rule out many infection risks that may be present. The group recalled a situation in Resus and ITU where the patient was suspected to be suffering with TB, so all staff members were informed and given protective equipment, including masks to wear.

It was argued that they would be more at risk from a patient they didn't know was infectious, than they would be from a patient with a known infection, as this knowledge resulted in radiographers following better infection control practice.

The radiographers felt that if a patient could not see unclean areas they would not complain. They also felt that if the patient, or they themselves, would not be touching it directly then there was no risk. Differing from other areas of the imaging department it was found that mammographers, after every patient, cleaned the breast plate and any equipment that came in to direct contact with the patient. However, the same radiographer claimed she did not follow the same practice when working in the general department. When this practice was questioned further, the radiographers did not know why they did not clean the equipment after each patient. Shortage of time was a factor, along with feeling it wasn't really necessary. They compared the type of contact patients have with the radiographic equipment, with contact people have with trolleys at

supermarkets. However, radiographers did feel that they themselves would not like to place their face, hands or feet on these pieces of equipment if they were being examined, as they knew what had been in contact with them.

Benefits of infection control

As with the superintendent radiographers the senior radiographers felt that everybody benefits from infection control. They also included those who were already ill; children and the elderly were particularly at risk. It was thought that they should consider there own health to be the most important.

Risk of infections to radiographers families

One radiographer stated that since having children she worried about taking infections home to her family. Other radiographers had not really considered the possibility. Another radiographer felt that patients were more at risk from the infections that the staff may bring into the hospital. Concerns were raised more when they had been dealing with infectious patients, but generally felt that the risk of MRSA was only to those with open wounds or those that were already unwell. They also felt that a large proportion of the population were actually carriers of MRSA.

Screening for infection

The radiographers did not see any benefits of being screened for infection, and they worried that it would affect there ability to work. This was seen to be unfair due to the probability of them becoming infected due to their work in the hospital.

Education and Training

Two of the radiographers remembered receiving education at university. These sessions included, correct hand washing procedures and were specific to the diagnostic imaging department. Both of these radiographers had carried out there own research into infection control for their dissertations. The radiographers did not think that the topic was addressed during their hospital induction. One of the radiographers remembered a session many years ago carried out by an infection control nurse. The same radiographer

was also present during a management course, where a nurse performed a presentation on the subject of infection control. The group felt that education into this area was necessary and that it should be mandatory like the fire and manual handling sessions. This would ensure they had up to date information and it would act as a reminder to everyone in the hospital. During this part of the discussion the group also started to discuss pens and neck ties as vehicles of cross contamination.

Risk of cross infection to patients and staff

It was felt that radiographers and patients were more at risk of cross infection than in the diagnostic imaging department than in other departments, they felt that they were due to the number of patients examined in the department each day. They also stated that at present patients in In-patient and Out-patient departments mixed together in the waiting rooms. They also thought that any risk of cross contamination would increase when the department changed so that In-patients and Out-patients were also examined in the same examination rooms. It was also felt that lack of information about patient's infection status increased their risk of infection. Pathology staff were also felt to be of low risk, due to the amount of precautions that they would undertake when dealing with samples. The radiographers also believed that their risk depended on how well they followed infection control procedures.

Compliance with infection control practices

The radiographers felt that when they were aware of infectious patients they followed the correct procedures well, but in other situations, when there was no knowledge of patient's infectious status they were quite slack in following infection control practices.

Barriers to infection control practices

The group thought lack of time, lack of staff and other resources, lack of education and the high workload prevented infection control being practiced. Poor communication was also given as a reason for not following infection control protocols; however it was argued that even without the knowledge of infectious status; they should still be following basic infection control practices.

Improving infection control compliance

The radiographers felt that higher levels of communication were required to improve compliance with infection control protocols. They also thought that requesters not giving the appropriate information should be penalised. Development of guidelines specifically for the diagnostic imaging department would be helpful.

Infectious diseases

Finally, as MRSA was frequently mentioned the group was asked if they felt it was the only infection to worry about. The group felt that MRSA was an area that they needed more information about. They all had the knowledge of how to protect themselves from HIV and Hepatitis B or C. One radiographer didn't think it would be a real problem if he contracted MRSA, it was HIV, hepatitis and chicken pox that he was most worried about. A comparison was made between the protective clothing used in the USA and UK during a trauma, it was felt that HCPs working in the USA were protected far more than health care staff in the UK.

One radiographer felt that if they were more aware of their own vulnerabilities then they would protect themselves and in doing so they would automatically protect their patients.

Summary of Superintendent's Focus Group DGH1

Infection control

The group was asked what they thought of when they heard the phrase infection control. One of the radiographers responded to this question by saying that she thought that many of the policies in the hospital would not stand up to scrutiny. Another felt that the policies were very contradictory as there were different protocols for the various areas of the hospital. Handwashing was discussed, it was claimed that they do not wash their hands after every patient, which they feel they should no matter what area they are working in. It was argued that this practice may not actually be feasible. One radiographer claimed that if she washed her hands between every patient she would not be able to work as it would aggravate an existing skin condition. One of the newly employed radiographer claimed that since starting in the hospital she had not heard anything about their infection control policies so was unaware of the procedures. She also added that as she worked in Out Patients it was not too important. The radiographers talked about filling in incident reports if they haven't been informed of an infectious patient until after the examination. The group feel that in some areas of infection control they are a bit lax.

Infection control protocols

The group discussed protocols for patients with MRSA, handwashing procedures and safe cleaning protocols for blood and other body fluid spillages. A radiographer informed them that there are written protocols present in the department for all of the events mentioned and that each room should have a spillage kit. One of the radiographers talked about her surprise at a new policy in ITU, they are no longer to wear gloves as they have been using too many.

When discussing protocols in ITU it was found that the cassettes are placed under the patients sheet and they are always cleaned after each patient, along with the x-ray machine.

Patients requiring infection control protocols

The types of patients that require infection control are thought to be patients with open wounds and patients with diarrhoea and vomiting. Ideally, infection control practices should be used for every patient, as they do not know which patients have MRSA or HIV. The radiographers thought there was an issue of patient confidentiality when using protective clothing. If they only wear them for certain people then it becomes obvious that these patients are infectious. A protocol is followed when dealing with patients suffering with open TB, this enables the patient to be examined quickly and kept separate from other patients to minimise the risk of cross contamination. The patients in these cases wear a mask to prevent spreading the infection. The risk of contracting TB from patients being examined due to TB contact was discussed; it was felt that the risk was very low, due to the short length of time in contact with them. It was thought by a few radiographers that the environment in which they worked increased their risk of becoming infected themselves. Stories of radiographers and health care professionals contracting infections were discussed.

Infectious status and risk

It was found that information regarding the infectious status of their patients should be on the request forms, however, this information was not always given. One radiographer felt they cannot just assume that if there is no mention of infectious diseases then the patient is free of infection. A radiographer claimed that she had been informed about a patient with HIV earlier that day. To this, one of the radiographers added that HIV wasn't really a problem as it was blood born. Another radiographer added that it was still necessary information in case of contact with blood. Hepatitis was considered to be an important infection to be informed about. The topic of vaccinations against Hepatitis B was discussed. It was argued that the relevant information was usually on the request forms, but it was felt it became a real problem when it was not included.

The protocol for infectious patients was talked about and it was found that CT no longer keep infectious patients until the end of the list, due to the large number of these patients. After infectious patients have been examined the room is cleaned very quickly ready for

the next patient. In the past, MRSA infections have been considered very important and every thing was cleaned thoroughly and protective clothing was always worn. It was felt by some of the radiographers that it is the patients who are at risk from contracting infections and not the radiographers; therefore, it isn't essential for them to wear the protective clothing. A radiographer disagreed with this and argued that the protective clothing actually helps to protect subsequent patients as well. While discussing glove use, a radiographer complained about hospital staff wearing gloves to touch a patient, then touching and potentially contaminating all the other equipment in the department. The main culprits for this behaviour were doctors, this started a conversation about how doctor's pens were found to be responsible for spreading some infections around the wards. It was also felt that enforcement of infection control did not seem to stretch to doctors.

Important areas of infection control practice

The most important aspects of infection control were considered, by the group, to be appropriate knowledge of cleaning up blood spillages. They describe how they were informed by an infection control nurse how to deal with a blood spillage safely. It was found that the domestic cleaners are not trained to clean up these types of spillages. A radiographer questioned the whereabouts of the spillage kits and claimed that in the Out Patient department did not have one.

Benefits of infection control practice

It was felt by the group that everybody benefited from infection control practices. including patients, staff and the community. The subject of staff uniforms being worn outside was talked about, it was during this that a discussion about a new protocol for wearing theatre blues was started. Theatre blues are now only to be worn in sterile environments. This new protocol is thought to be more of an image issue rather than an infection control matter.

Education and Training

A few of the radiographers could not remember receiving any education prior to qualifying, but feel that it must have been covered somewhere. The department does not have any regular infection control training. One radiographer remembered a session, discussing MRSA and AIDS and what precautions they should be taking, this took place over 10 years ago, but, there have been no sessions since. The radiographers felt that infection control training was something that they should have annually, as they do with fire training. It was felt that this would be beneficial, as their standard of practice lowers, due to workload, and it is easier not to carry out infection control practices. One radiographer felt strongly that everyone should be wearing gloves when carrying out IV injections, however, it was felt by some that it is easier to carry out the procedure without them. This problem is increased as consultants do not wear gloves when carrying out IV injections and they act as role models to others.

A radiographer who had just recently started at the hospital could not remember if the topic had been covered during her induction.

A radiographer informed the rest of the group that the department had just assigned one of the senior radiographers to be responsible for infection control in the department, so she will be able to pass on any new and relevant information to the rest of the staff.

Responsibility for infection control

Radiographers thought that it was to have a radiographer responsible for infection control in the diagnostic imaging department. The individual could monitor the situation and remind staff of the practices they should be following. Reminders were thought to be important, due to the busy workload in the department. They did not feel they really had time to think about infection control practices. The radiographers did think the alcohol gel would help improve compliance, as it would be quicker than hand washing with soap and water. When examining patients in SCBU, one of the radiographers claimed to always follow their protocol and use the alcohol gel. One of the radiographers informed the group that soap and water is still required, as the alcohol is not effective if hands or

equipment are contaminated by blood. The group then talked about wipes that could be purchased to clean the cassettes and equipment more easily. It was thought that these types of products would increase compliance, and would be more effective than the alcohol wipes.

Compliance with infection control policies

On the whole the radiographers did not feel that infection control practices were followed in the diagnostic imaging department. Some thought this was terrible as they, the superintendents, are the people who should be implementing infection control policy. It was thought that more should be done in the dental department as the ear covers are not always changed, and gloves are not always used. However, infection control was considered to be an extra task to undertake, and they simply do not have time to do everything. It was also felt that unless they were very strict and present all the time, to ensure that infection control practices were carried out, it would be unlikely to occur. One radiographer described MRSA as a real problem and talked about a new hospital that developed an MRSA problem within two weeks of opening.

Screening for infections

Instances of screening of staff visiting ITU was described, during this time they also had to clean everything with bleach, but the reason for this could not be remember. It was felt by some of the radiographers, that the number of agency staff present in the hospital caused problems, as they thought the agency staff had less commitment than permanent staff. However, one radiographer thought that they are all to blame. She also felt that the diagnostic imaging department must play a large role in the spread of infection, as they deal with patients from all over the hospital. Although one of the radiographers agrees with this, she does feel that the risk is lower than in other areas of the hospital as they have less contact with body fluids. It was pointed out that other areas of the hospital do not know what is involved with taking an x-ray of a patient. A sister in ITU did not realise that the cassettes were reused so was informing radiographers that they did not need to take any precautions with these pieces of equipment. Another incident was described whereby a patient came from A+E with a large sticker on their notes, it was

found that this sticker showed that the patient was HIV. A+E had not felt it necessary to inform the diagnostic imaging department, as they thought that the radiographer would have no physical contact with the patient.

Enforcement of infection control policies

When discussing who should enforce infection control policies, it was thought that it should come from the top, the group did not feel it would be as effective coming from the lower grades. It was felt that everybody would need to agree with the protocols, in order for them to comply fully and that the policies should be the same for everyone in the hospital.

Barriers to infection control practices

Being too busy was one of the reasons for not complying with infection control practices. They felt that while it was quiet they could wash their hands between each patient, but during busy periods this was not feasible. Due to this they felt the provision of alcohol gel would help to improve compliance. The presence of blood on the CT scanner was discussed. It was argued, that as the patient would have no contact with that area, it would not pose a real risk to them. It was thought, by a number of radiographer, that their standards may actually be lower than those working in third world countries and felt that HCPs in those countries would spend more time washing their hands and cleaning equipment. The radiographers felt that they have become quite complacent with regards to infection control. They also thought they were forgotten about by the infection control team. They felt that the infection control team they should give an annual talk or that they should observe their actual practice and offer advice.

Improving compliance with infection control practice

Better communication was felt to be an area that could improve infection control practices and improve awareness. This would include accurate documentation from the wards and other departments stating if there are any infection risks. On the other hand they do worry that if the information was always present, then on any occasion when it was forgotten, they would not be following the appropriate infection control practices.

With this in mind they felt they should really think of all patients as infectious. They discussed the effects of no longer being able to wear gloves in ITU and wondered if MRSA rates would increase because of the new protocol.

Radiographers Focus Group DGH2

Infection control

The main issue regarding infection control was handwashing followed by the prevention of the spread of infection, specifically MRSA. Appropriate cleaning of the environment and more specifically, correct procedures when dealing with body fluids were areas discussed. Safe practice when dealing with sharps was also an issue.

Patients requiring infection control practices

The radiographers felt that patients with MRSA required infection control measures as did patients who were barrier nursed or reverse barrier nursed. They felt that patients suffering with cancer and neutropenic patients were vulnerable to infection, so they also required infection control measures to protect them. It was considered necessary to follow infection control procedures with all patients but extra precautions were necessary for those known to be infectious and for those in certain areas of the hospital such as Intensive Care and Special Care Baby Unit.

Infectious status and risk

The radiographers claimed that on many occasions they did not know if the patient was infectious or not. They often found this information from the referring wards after the completion of the examination. On occasions it was indicated on the request form or the information may be available through the computer records or patients notes. This lack of information was considered to be a major problem, as without this knowledge they did not follow the correct infection control procedures.

Important areas of infection control

It was felt by the group that handwashing was most important, due to the direct contact they have with each patient and with the radiographic equipment, this contact allows the spread of infection to occur. Handwashing was also felt to be the cheapest and easiest way of preventing the spread of infection. However, they also felt that it was not possible to wash their hands between every patient, as this would take too much time and would lead to problems with their skin. One of the radiographers felt that if they could use

gloves more often then this may reduce the need to wash their hands after every patient, but still provide a barrier to cross contamination. They also felt that patients needed to be more aware of the protocols, as they felt that they were offending patients by washing their hands and wearing gloves in their presence.

The radiographers claim to clean the equipment everyday and in between dirty patients. They felt that they should clean the equipment after each patient, but due to time constraints they felt that this was impractical. They would be happy to carry out this practice if it was more acceptable for patients to wait longer for their examinations. There are checklists in all the examination rooms in the diagnostic imaging department and these have to be checked off to say that the cleaning has been carried out. This usually occurs at the end of the day ready for the next morning.

Benefits of infection control practices

It was felt by the radiographers that everybody benefited from infection control practices.

Education and Training

The radiographers had all attended an annual mandatory infection control session. This is described by the superintendent and senior group in DGH2. The radiographers had not attended any other courses relating to infection control. Some may have had lectures on the subject prior to qualifying, but could not remember.

Compliance with infection control protocols

The radiographers felt that they did their best to follow the infection control protocols in the diagnostic imaging department, but felt it was impractical to wash their hands after every patient. They felt their standards were good when dealing with patients with MRSA or barrier nursed patients. In their opinion they had higher standards than the nurses on the wards. This they thought may be due to their being more cautious, as they don't see infectious patients all the time. The radiographers felt that if they were complacent in the diagnostic imaging department then everyone who visited the department or who was examined by a radiographer could become infected. The

radiographers felt that infection control within the area of diagnostic imaging was essential.

Risk of cross infection

Some members of the group felt that they were less at risk of cross contamination than staff from other areas of the hospital due to the small amount of time they spend with each patient. However, other radiographers felt that the high turnover of patients may actually increase their risks. Along with this was the risk associated with frequently not being informed of the patient's infectious status. It was argued by one radiographer that the environment in this department was cleaner than in other areas of the hospital, so providing all appropriate precautions were taken then they would be less at risk. The group felt that they could assess the condition of patients referred from A&E and decide if they needed to wear gloves or not. They would look for the presence of blood or other body fluids. They also looked to see if the patient was dirty or under the influence of alcohol when making this decision.

Compliance compared to other areas of the hospital

The radiographers did not know if staff in the diagnostic imaging department followed infection control practices more than HCPs in other areas of the hospital, as they did not really know what other health care professionals did. Although, it had been noted that when carrying out mobile radiography they themselves would wear protective clothing, where as the nursing staff did not. This was considered to make infection control a pointless exercise, as to be successful everyone must follow the same procedures.

Responsibility for infection control

It was claimed by the radiographers that the behaviour of the nurses did not affect their practice, but they claim that they did follow the same behaviour of radiographers during their training and that this probably affected their behaviour now they are qualified.

A notice had been introduced into ITU stating that anyone can enforce handwashing. This was felt by the group to be a good approach, but felt that they wouldn't ask a member of staff who was senior to them to wash their hands. It was thought that if they

were a patient or visitor of a relative then maybe they would. However, they all felt they would not object to being asked to wash their hands.

The checklist procedure is carried out by any member of staff working in the examination room, regardless of the grade. A superintendent is responsible for ensuring that the cleaning takes place. This is thought to be a good measure, they have all become used to carrying out the cleaning and it is a team effort. The checklists process, as a method of enforcement, has been seen by the radiographers while working in other hospitals, but in those hospitals the task of cleaning was left to the students and radiographer grade. This culture makes the radiographers feel that once promoted to a higher grade cleaning is beneath them, when in fact cleaning is everybody's responsibility and benefits everybody in the department.

Screening for infection

When discussing the value of screening staff members to determine those that are carriers of infection it was considered to be a good idea. Some radiographers have been screened in the past. The radiographers felt that they would want to know if they had been infected, so they could treat the infection and prevent it from being spread around the hospital. However, one radiographer was a little unsure about this as she would worry about the stigma attached to being infectious.

Risk of cross infection

The group felt that due to "on call" commitments they become tired and their immune systems are lowered, making them more susceptible to infections. During time spent in Australia a couple of the radiographers found that as MRSA rates were so high they were no longer informed of the infectious status of the patients, but they were expected to treat all patients as though they were infected. This was thought to be a good idea but it was time consuming.

Risk of infection to their families

One radiographer thought she would feel guilty is she passed any infection on to her parents. They felt that there was a definite possibility of passing on infections to their families at home as they themselves had suffered with many infections since starting work in the hospital. These infections included colds, flu, chest, ear and throat infections along with sickness and diarrhoea.

Barriers to infection control practices

It was felt by many in the group that laziness, time constraints and complacency were the issues that prevented infection control practices being carried out. Shortage of resources was another reason for non compliance. The stocking up of resources in the examination rooms is an item that is on the checklist in each of the rooms. Lack of knowledge on the subject was also another factor in non compliance. The new mandatory infection control sessions were thought to be a very good idea, as they will keep their knowledge up to date and increase awareness. It was thought by the group that it was important that these sessions were mandatory as they can take up a lot of time, and to some, the sessions are boring, therefore, staff members simply would not attend if given the choice.

It was also thought by the radiographers that infection control should be part of the hospital induction; this would ensure that new staff would also be given the relevant information. The radiographers stated that they are encouraged to read the infection control manual.

Improving compliance with infection control practices

In order to improve infection control practice it was felt by the radiographers that more education is necessary, this is required not only by radiographers, but all health care professionals and the public. It was felt by some radiographers that nurses who held degrees were better at following infection control practices than those who did not have a degree. They especially thought that lack of education was the reason why health care support workers had lower standards. The group felt that the public are frightened by the media, and so do not want to come into hospital for operations. When asked if they

would worry about infections if they were coming into hospital for an operation, radiographers felt due to the standard of the wards cleanliness they would be worried. The standards of the theatre were considered to be high. However, another radiographer felt that the theatres standards were not as stringent in this hospital as in other hospitals. She claimed that the lead-rubber aprons were filthy and that the image intensifier was not always cleaned. She also felt, in theatres in other hospitals, the protective clothing protocol was implemented more in strictly. One radiographer discussed the differences in cleaning in hospitals in the United Kingdom compared with cleaning in hospitals in Germany. She claimed that in Germany standards were far higher and time constraints and lack of resources were not an issue. During the discussion of standards, a few of the radiographers admitted that they would not want to lie on the x-ray examination table or put their faces against the erect bucky.

Resources

Along with more education, increased resources are thought to be necessary. They felt that the costs of increased care for patients who have contracted MRSA in the hospital should be looked at and compared to the extra money needed for more staff and practices that ensure everything is cleaned appropriately. One radiographer felt that more could be done with the basic infection control measures already in place, such as handwashing and cleaning. She felt it should not depend on the number of patients in the waiting room, as to whether or not there was time to carry out these basic rules. She admits that this would be hard to do.

The group discussed resources in the outside hospitals and have found that the outside hospitals usually have more resources than the main site.

Seniors Focus Group DGH2

Infection control

The radiographers felt that infection control was in place to prevention of the spread of infection from one person to another. They also stated that infection control looked at how to treat an infection. Cleanliness of equipment and personal cleanliness were discussed this also included handwashing. It was thought that awareness of the modes of transporting infection from one person to another was a factor. It was felt by the radiographers that good working practice provided good infection control.

Patients requiring infection control protocols

The radiographers felt that infection control was needed for patients who have an infection. It was also thought that precautions were necessary for susceptible patients including neutropenic patients. They claimed that patients with these conditions needed more care than those who are considered to be healthier.

Infectious status and risk

Patient's conditions are usually made known to radiographers by ward staff, however, it is stated that they are not always given this information. On occasions the infectious status of a patient only becomes known once they are already in the examination room. Information about a patient may also be found on the computer records. They may also be informed by the porters.

Important areas of infection control

The most important areas of infection control were felt to be the methods of communication between the different hospital departments. This then enables the appropriate precautions to be made and so prevents the spread of infection. However, it was argued that they should be treating all patients the same and assume that they are all an MRSA risk. The need for simple handwashing between each patient was brought up during this part of the discussion. This was something one radiographer claimed to always do. Changing mattress covers and pillow cases between each patient was felt to be an extreme measure, even though the importance of having a clean environment was

accepted. Due to limited time these measures were felt to be impractical. An improvement in resources was considered to be necessary including provision of cleansing wipes, blue roll and gloves. It was felt that these resources would make cleaning of the environment and equipment a quicker process. The shortage of time was felt to be the reason for not carrying out infection control procedures for every patient. Radiographers admitted that they themselves would not like to lie on the x-ray examination table.

Different methods of hand decontamination were discussed. Some of the radiographers felt that hand decontamination becomes harsh on their skin. Most of the radiographers felt that the need for handwashing depended on the activities they have performed and how much contact they have with the patient. They also talked about the amount and type of contact they have with the equipment. Contact with feet, faces and hair results in handwashing or glove use. It was felt by the group that handwashing benefits everybody including staff and patients.

Education and Training

The radiographers stated that they have mandatory infection control sessions every year. This is a new policy that was introduced in the last 12 months. The session included personal hygiene and safe disposal of sharps and linen. Some radiographers felt it was necessary to have a general infection control lecture but this should be followed with a session more specific to the diagnostic imaging department. They considered it to be necessary that staff from different areas should also be aware of practices required in other departments of the hospital. This would ensure that radiographers visiting areas, such as, ITU and theatre would be able to adhere to their infection control practices. Other professionals also needed to be aware of the practices and protocols held in the diagnostic imaging department.

A number of the radiographers claimed to have received infection control training specific to the diagnostic imaging department, during their training. None of the

radiographers can remember if infection control was included during their hospital induction.

Compliance with infection control practices

One radiographer felt that they did carry infection control practices. Another radiographer felt that it varied from radiographer to radiographer, with some being more conscientious than others. One radiographer claimed to listen to what the nurses told him to do and followed their example, but always after dealing with an infectious patient he cleaned the room and washed his hands. It was felt that when MRSA first became a problem radiographers carried out more precautions than they do now. It was considered by the radiographers that infection control was important in the diagnostic imaging department, as a large number of patients from various other areas of the hospital visit the department. These patients include both In Patients and Out Patients. Therefore it is easy to transmit infections from one patient to another.

Risk of cross infection

A radiographer felt that they were no more at risk of contracting an infection than any other health care professional in the hospital. Another radiographer felt that there was more risk for staff on the wards, as they deal with more blood and body fluids. Another radiographer felt that they were less at risk from infection, due to the limited amount of time they spend with the patients. One radiographer disagreed with these feelings and felt that due to lack of communication, and being unaware they were dealing with infectious patients, they may be at more risk of becoming infected Some radiographers felt that they needed to strike a balance when trying to protect themselves. They felt it would be impractical to wear gloves for every patient and that patient's perception of staff wearing protective clothing needed to be considered. If the correct procedures were followed, it was felt that they should not be at risk. A couple of radiographers compared their contact with patients to that of having contact with the public in a supermarket.

It was thought that there were areas of the hospital that did pose more risk. The radiographers felt that certain wards regularly close due to outbreaks of infection. They

felt that the age of patients was also a factor and that the elderly and children were more at risk. They included areas such as Intensive Care Unit (ITU) and Special Care Baby Unit (SCBU) as high risk departments, due to patients being more susceptible to infection. One radiographer mentioned the extra care that they give when dealing with neutropenic patients and it was felt that they were always told if a patient was neutropenic. The radiographers discussed new protocols that have been implemented in the theatres of the hospital and feel that they have taken a step backwards with regards to infection control. The new protocol appears to be far less stringent regarding infection control. They also stated that the new protocol has not extended to the outside theatres. It was thought that one outside hospital, in particular, has very strict infection control policies.

Risks associated with radiographic equipment were discussed. The group felt that the lead-rubber aprons, worn in theatre may pose a risk, as they are unclean. They also talked about the risks that the x-ray cassettes may pose. One radiographer claimed that, at a different hospital, the cassettes and mobile x-ray machine were found to be the source of an outbreak of MRSA in ITU. This finding led to a new protocol stating that this piece of equipment must be cleaned and the cassettes must always be covered and cleaned after each patient.

Compliance with infection control practices

The radiographers were unsure if they followed infection control practices more or less than other areas of the hospital, but as an overall view, felt that the wards were not particularly stringent in their practice. They claimed that they have never been told to clean cassettes between patients they x-ray on the wards. The radiographers did feel that theatres, ITU and SCBU were very good at infection control practice. However, they also felt that staff in these areas did not enforce this good practice on radiographers working in those areas.

Screening for infection

Radiographers gave mixed reactions when discussing screening for infection. These were the same reactions as shown from the radiographer and senior groups in DGH1.

Risk of infection to their families

The radiographers followed the same practices as the radiographers in DGH1 and the superintendents in DGH2 to prevent any risk to their families

Obstacles to infection control practices

It was felt that shortage of time, lack of staff and lack of resources was the main reason for not carrying out infection control practices. The radiographers were more concerned with reducing patient waiting times. Another problem, that was highlighted, was the temperature of the water; they felt it was far too hot to allow them to wash their hands properly. The size of the sinks was also found to be an issue.

Improving compliance with infection control protocols

To increase compliance with infection control protocols, radiographers felt that an improvement in communication was necessary between all the departments of the hospital. They considered it to be necessary for good standards to be enforced by a member of staff, but felt that this would be difficult to do. Education was thought to be vital to increase awareness of the importance of infection control. It was felt that following a good role model would be the best approach to improving practices in the department. Many of the radiographers felt infection control should be included more in the students training, so they can learn the necessity of it and then pass this information on to others. They also stated that when it is quiet in the department both qualified and unqualified staff should be cleaning, rather than standing around the processors talking. It was thought that there was a higher standard from radiographers who work alone in the outside hospitals than those who always work on the main site.

Superintendent's Focus Group DGH2

Infection control

At the beginning of the discussion the group members were asked what they thought of when they heard the phrase infection control. The group gave the same answers as the superintendents in DGH1. The group also referred to protocols that were in place in the hospital, which included handwashing in between each patient and before and after injections. They mentioned covering the examination tables with disposable paper which should be changed between each patient. There is an additional protocol to be implemented when dealing with MRSA patients, which involves cleaning of the examination rooms and leaving them empty for half an hour. It was discussed whether or not this protocol was feasible for all areas of the diagnostic imaging department. The radiographers felt that they needed to be aware of patient's infection status to enable them to separate those patients with infections from those without infections. Like the radiographer grade in DGH1, they felt protective clothing was essential.

Benefits of infection control

As in all of the groups on DGH1 it was thought that everybody benefited from good infection control practice. The radiographers felt that infection control should be carried out for all patients as they are not always aware of the patient's infectious status. The radiographers agree that there are differences in their practice when dealing with known infectious patients. Infectious patients are brought to the department at the end of the examination list. There are difficulties with this protocol. The superintendent from CT described a situation in which a patient with MRSA had been examined and then a patient from Resus needed to be scanned immediately, this prevented the room being left empty for the recommended 30 minutes after cleaning.

It was also thought that by implementing infection control more rigorously and providing a cleaner environment morale would improve. One radiographer felt that the level of infection control needed to be appropriate and that patients should not be made to feel uncomfortable, other radiographers tended to agree with this.

Infectious status and risk

The provision of appropriate information is a concern of many of the radiographers. They claim that they are not always informed about infectious patients, on the request forms, and that the computer records are not always updated. The patient's computer records are usually only accessed when the patient is actually in the examination room, so in many cases it may be too late to implement the correct protocols. In CT and MRI the clerical staff contact the wards, prior to requesting the patient to be brought to the department, during this contact they ask the ward staff about any infections the patient may have.

There are occasions when the radiographer finds out about an infectious patient some time after the examination has been completed. There are times when the patients themselves inform the radiographers if they have an infection. It was thought that there had been an improvement in communication since a severe outbreak of vomiting and diarrhoea, which resulted in many staff taking time off sick and ward closures. It was felt that when radiographers were aware of a patient's infectious status then the protocol was followed well.

Important areas of infection control

The most important element of infection control was considered to be handwashing. Cleaning the department to ensure it was free from dust was also an area of importance along with communication between the different departments. One radiographer felt that the Trust itself did not encourage staff to carry out these measures, as it didn't really place a high priority on the subject. Therefore, the staff in areas such as the diagnostic imaging department felt it was less of an issue. It was felt by the group that there had been huge changes in infection control practices in the last twenty years. Within the diagnostic imaging department the student's role to carry out cleaning had also changed. Some radiographers argued that the role of cleaning should be everyone's role and not just students.

Education

In DGH2 they have a mandatory annual infection control session. All members of this group had attended the session. The radiographers felt that this was necessary and it acted as a reminder to them. They did feel that the session would be better if it was aimed more at the diagnostic imaging department rather than being general in nature. However, they did think that the main issues were covered and that it was sufficient. They also thought that it may have been better if a radiographer gave the talk to them to keep the focus specific and shorten the length of the session.

Responsibility

Having a radiographer responsible for infection control within the department was considered to be a good idea. The group didn't think that is was necessary for that individual to be a superintendent and actually thought it may be better if they were not, as they tend not to be involved with the daily activities of the department. Therefore a radiographer of a different grade would be able to see more clearly what practices were being carried out.

Compliance

Two of the radiographers felt that infection control was not practiced, whereas, another radiographer claimed that when the radiographers were aware of infectious patients then their infection control practice was very good. One radiographer felt that the ultrasound department has the potential to be very dangerous, due to being unable to clean ultrasound probes effectively.

Compliance compared to other areas of the hospital

Compared to compliance with infection control protocols in other areas of the hospital, the radiographers were not sure if they performed better or worse. This was due to a lack of knowledge about other HCPs practice. One radiographer who was recently a patient did not think that nurses washed their hands between every patient, and location of the sinks was thought to be the reason for this. A radiographer felt that the imaging department has some very good protocols that are followed in the general department.

However, lack of relevant information about a patient's infectious status prevents this practice always occurring.

Prevention of infection control practice taking place

Radiographers discussing issues that prevent compliance with infection control state that the shortage of time, poor communication and the culture of the Trust are all to blame. One radiographer does not agree that time is a factor, as she felt there was no change in practice regardless of how many patients are waiting to be examined. Lack of staff was also a reason given for low compliance.

Risk of cross contamination

When asked if the radiographers thought the diagnostic imaging department provided more or less risk than other areas in the hospital, with regards to cross contamination, it was felt that due to the type of work that is carried out, in the general department, that both patients and staff were less at risk from cross infection. However, it was also felt, by some, that due to the mixture of In-patients and Out-patients being examined in the same areas then patients may be more at risk. They thought that it really depended on what sort of examination the patients were having. In CT and MRI, where there is a lot of patient contact and where more injections are given to patients, there may be more risk. It was argued that nurses on the wards may in fact have a lower risk due to their knowledge of the patient's infectious status allowing them to take the necessary precautions.

Risk of infection to their families

One radiographer stated that since having children, she always removes her uniform before doing anything to prevent cross contamination. Another radiographer talked about a story of a child visiting his grandfather in hospital and contracting MRSA. After reading this she did start to worry about risks to her children.

Uniforms

Staff being allowed to wear uniforms outside the hospital and how they should have a clean uniform for every shift was talked about. The subject of staff wearing theatre blues was also discussed. They felt it would be easier to change into theatre blues once in the hospital and how easy it would be to change before or after dealing with high risk patients. It was felt that this again came down to culture of the NHS Trust and money.

Appendix 16

Transcription of focus group discussions

Focus Group Discussion DGH1 Radiographers

2:
3: Focus group 4 radiographer grade hospital 1
4:
5: Rf1 *** qualified 9 months work in A+E
6: Rm2 *** I work for an agency ** just do like in patients out patients, A&E and theatres and mobiles been qualified for nearly three years
7: Rf3 I'm *** not agency work in A&E, outpatients, inpatients, and theatres. I qualified as a radiographer in the filipines
8: Rf4 I'm *** permanent radiographer er I do A& E out patients, in patients, theatre mobiles CT, erm room 3[fluoroscopy] erm that's about it
9: Rf5 ** I do the same as Rf4 which is A&E er inpatient, out patient CT erm Room 3 which is ERCP's barium enemas erm and whatever else I've missed out erm theatre mobiles that kind of thing
10:
11: **Mod ok what do you think about when somebody says infection control to you?**
12:
13: Rm2 erm prevention of the spread of infection really isn't it, or rather control erm so I think of gloves and aprons and handwashing erm cleaning stuff generally
14: Rf3 yeah id go with that
15: Rf5 that sounds about right
16: Rf4 yeah stopping the spread of infection to different wards in the hospital you know different patients in the hospital
17: Rf5 and taking precautions and that kind of thing for yourself
18:
19: **Mod what kind of precautions?**
20:
21: Rf5 like rm2 says you know gloves, aprons and stopping the spread of it from patient to patient when we're doing inpatients cos they're more vulnerable
22: Rm2 although I've noticed here there's not much erm, you don't get told much that the patients MRSA or something
23: Rf5 no
24: Rm2 other places I've worked they've come down with a board on the bed and the porters are wearing gloves and aprons and you're told about it , yeah I mean I haven't really seen that I mean it says the risk factor thing on the request form but I have never seen a risk factor written down, maybe its me maybe I just haven't looked hard enough hey, its just these things don't seem to be well advertised
25: Rf1 yeah I think of MRSA erm yeah mainly that
26:
27: **Mod do you think there are any particular types of patients who need infection control?**
28:
29: Rf1 ITU, SCBU, HDU
30: Rm2 anyone with a wound
31: Rf3 in patients

32: Rf5 in patients yeah, theatre, that kind of thing, do you not think, not walking in with scrubs when you've just been out on the street in scrubs, that kind of thing
33:
34: **Mod what sort of infections do you think about?**
35:
36: Rf1 HIV erm MRSA
37: Rf4 MRSA is the big one isn't it, it's the one everyone talks about
38: Rm2 I suppose that's cos they are the ones that are spread like through the air and some that are blood borne aren't they so you've got like the sharps procedures and stuff
39: Rf3 TB
40: Rf5 yeah you've got TB
41:
42: **Mod ok are there any other types of patients that you need to?**
43:
44: Rf5 those that are on the wards in the little cubicle that have to be separated what are they, whats the name of those patients
45: Rf1 barrier nursing
46: Rf5 yeah barrier nurses those with erm special conditions
47: Rf3 isolation rooms
48: Rf5 yeah they have that special condition, septicaemia, not septicaemia but there's a special condition which they have which means they are not aloud to come down from the ward cos they're more prone to infection
49: Rm2 neutropenic
50: Rf5 yeah that's the word, neutropeanic patients
51:
52: **Mod when you get these patients how do you generally know the status of the patient?**
53:
54: Rf1 to be honest with you we don't really know sometimes its on the form and if its an inpatient we kind of if we have time we look through the notes you know and it may say MRSA or HIV but otherwise we don't really know
55: Rf4 no we don't really get told a lot do we
56: Rf5 or if there is nurse with the patient some of them don't even have a clue anyway
57: Rf4 no that's true
58: Rf5 you know but we just have to find out for ourselves really
59:
60: **Mod so what sort of ways would you find out yourself?**
61:
62: Rf5 I mean if you are querying it you know on the phone you just say is there anything else I need to know that kind of thing or if there's anything or they might just turn around and start saying it's a HIV patient and you think well you could write that on the form you know and that kind of thing
63: Rm2 hmm they don't really do that do they

64: Rf5 they don't, no, so when they start giving you there clinical history, they start saying this is a HIV patient blardy blardy blar and you think
65:
66: **Mod is that the same every where that you've worked that you don't get told?**
67:
68: Rm2 what in other hospitals
69:
70: **Mod yes in other hospitals**
71:
72: Rm2 I have found in most other places they are much more erm sort of clued up on informing you and much more precautions taken
73: Rf1 yeah at *** it was much more stricter compared to here
74: Rf5 yeah it was the same at *** it was a dedicated ward for infcctions
75: Rm2 and at the *** they were pretty good
76: Rf5 yeah
77:
78: **Mod what about you rf3 what was it like in the filipines?**
79:
80: Rf3 yeah I would say it was about the same as here
81:
82: **Mod what do you think are the most important areas of infection control, practice wise?**
83:
84: Rf5 prevention of it I would have thought
85: Rf1washing your hands after every patient, wearing gloves and putting aprons on, those plastic ones if they are available. Yeah and having alco wipes around so we can wipe the cassettes down
86: Rm2 I have to say there's not much in the way of sort of wipes and stuff in this hospital and, like at ** they had a variety of different types, you've got the sort of soapy ones and then they've got the alcohol based ones so you can give things a proper wipe, but I struggle to find any other than those little sachets of alco wipes here you have to improvise and use paper towels and soap and stuff it's a bit
87: Rf5 no you go an ask the nurses, they're in the dirty linen room
88: Rm2 well shouldn't they be like in every x-ray room
89: Rf1 yeah
90: Rf5 yeah they should be but that's up to us they say to stock up the rooms and there's only one person or two people who always stock up the rooms the rest don't bother you know so its down to everybody really its not just one person
91: Rm2 yeah but you're the first person to tell me where they were
92: Rf5 yeah dirty linen room yeah, just look in there
93: Rf4 at** where I trained they had erm covers for cassettes on ITU like each bed had a different cover that you could put the cassette in before you put it underneath the patient but they don't have that here either I haven't seen a single cover. I think they are quite good cos they stay with that patient they don't get moved around unlike the cassettes but they don't have them here either.

94: Rm2 you could just use a pillow case
95: Rf5 yeah that's what they use in *** every single patient has a different pillow case and after use it goes into the linen
96: Rf1 here in ITU they don't even use pillow cases
97: Rm2 don't they
98: Rf5 no it goes in between the sheet and the slidy kind of thing
99: Rm2 I put the cassette in a pillow case here
100: Rf1 if I'm alone then I don't bother if I'm with someone then I probably do
101:
102: **Mod why do you think that is then?**
103:
104: Rf1 because I don't have time to go around looking for pillow cases, its hard enough to get a nurse to assist you moving the patient
105: Rf4 especially when you've got loads to do
106: Rf1 if I've got loads to do I just do it like that
107:
108: **Mod who would you say infection control actually benefits?**
109:
110: Rf1 the patient and the radiographer
111: Rm2 and any staff really, any one who comes into contact, well and even cos if you, when my mother had an hospital acquired infection she was in hospital for erm months and months many months more than she should have been she had like a blood poisoning for ages at *** I don't know who, how whos fault it was or anything so I think it really impacts your stay in hospital can't it you know that's using up resources isn't it.
112:
113: **Mod have you had any education about infection control?**
114:
115: Rf5 we had a couple of lectures on it but that's it really
116: Rf4 yeah that was at university
117: Rf5 here you don't really have much unless on your induction
118: Rf4 I didn't have any on that either
119: Rf5 we had an hour or so
120: Rf4 oh yes we did only a little bit though
121: Rf5 yeah a little bit in the induction and that's it
122: Rm2 cos nurses have like hand washing courses and stuff like that don't they
123: Rf4 yeah we don't really have anything like that
124: Rf5 yeah but they don't usually use it
125: Rm2 its probably more important for them because they come into more contact with bodily fluid and things don't they. But I think people just leave it up to us really don't they
126:
127: **Mod what about you rf3?**
128:
129: Rf3 I just had a little bit in the induction

130:
131: **Mod what about when you were training?**
132:
133: Rf3 no not really
134:
135: **Mod when you did it in the induction was it anything to do with the radiography department or was it a general talk?**
136:
137: Rf5 generalised really
138: Rf4 yeah just general, it was all staff that were starting in the hospital, so it was office staff, nurses yeah everything so it wasn't like radiography specifically it was just sort of general wash your hands wear gloves that kind of thing
139:
140: **Mod do you think it's necessary?**
141:
142: Rf3 yes
143: Rm2 infection control?
144:
145: **Mod training in infection control**
146:
147: Rm2 oh training
148: Rf4 yeah I do
149: Rf5 yeah it is
150: Rm2 absolutely
151:
152: **Mod when would you say you needed it then or how could they give you the training?**
153:
154: Rf5 I think if you had someone dedicated in each department or each area and then they just give you a low down as to you know there responsible for keeping everything stocked and things like this so you know you've got the materials at hand when you need it the most. So yeah I think a dedicated person for each area in the hospital kind of thing
155: Rm2 we get like moving and handling training at university before going into practice so we should have some sort of infection control thing and then erm like for CPR you get like refresher courses don't you, maybe something along those lines
156: Rf4 they should have similar sorts of things like that refresher course
157: Rm2 yeah sort of educate you. Just like half an hour or something would be enough
158: Rf5 yeah, but what they did give us in the induction was one of those little er infection things that every time you touched a patient or anything you just squirt it on your hands and you use it, its like an alcohol based alcohol gel
159: Rf4 I didn't get one
160: Rf1 no we didn't get them
161: Rf5 and its refillable but we don't know where to refill it from no ones ever told us anything about that

162: Rf1 no I didn't get that
163: Rm2 is there any alcohol gel in the department can we get that from dirty utility as well or
164: Rf5 don't know
165: Rf1 no I don't think we have any, No you can't cos *** decided to order it the other day so you can't get it from dirty utility
166: Rm2 where is that anyway
167: Rf1 next to the dark room
168:
169: **Mod so they actually gave you a little bottle of alcohol gel?**
170:
171: Rf5 yeah and you just clip it on and then you just squirt it after you've touched a patient
172: Rf4 we didn't get it at ours
173: Rf3 no I didn't get one either
174: Rf5 they were very limited, very limited they were like scarce every person has to have one, not more than one kind of thing. I was a lucky one
175: Rf4 yeah
176:
177: **Mod do you think in the radiography department infection control is followed?**
178:
179: Rf1 sometimes
180: Rf3 sometimes
181: Rf4 yeah I wouldn't say all the time
182: Rf1 it really depends cos at the previous place I was working at were really really strict see each time you did an x-ray you had to wipe the cassettes down and stuff like that and here no one does that. And you don't have time to do it either, you're just so rushed off your feet you just want them in and out.
183: Rm2 I've got to say in places like A&E where patients are just coming in off the street really you know with a twisted ankle or something you know they're not bleeding or they're not ill in any other way erm you know there may not be much point in infection control you know because people they go on the bus don't they. They come in they've been touching the doors and everything like that you know, so I don't really see much difference between that and them coming in to have an x-ray and to getting on a bus and holding on to the hand rail because there has been thousands of people holding onto the rail
184: Rf4 that's true
185: Rm2 you know whats the difference coming to hospital putting your hands on a cassette that's been touched by some other people it's the same thing isn't it?
186: Rf5 yeah but I would have thought the same cassettes we use in A&E we use for ITU and HDU
187: Rm2 I'm just saying for A&E really
188: Rf5 but its those same cassettes that we do use for a chest x-ray if you've got someone whose bear naked against the cassette you never know

what they might be carrying or where they've been or what ever.but here they don't wipe cassettes often, never seen it done really at all.
189:
190: **Mod what sort of situations is it used in then?**
191:
192: Rf5 I would have thought ITU, HDU. SCBU definitely but they have there own cassettes there anyway so that's less of a risk to anybody else [outside that department] anyway
193: Rf3 in recovery
194: Rf5 like when you go to those neutropenic patients I mean they're susceptible to any kind of infection if we're just spreading it by using this film that film without even wiping down
195: Rm2 but if I go to, sorry if I go to any neutropenic patient then I always give it a good scrub with some hard surface wipe
196: Rf5 yeah but how many others do that
197: Rm2 I haven't done it here but I haven't been to it here so.
198:
199: **Mod when do you scrub the cassette down when dealing with these patients?**
200:
201: Rm2 oh before dealing with the patient. At *** and *** you wear your gloves and gowns and spray the cassette and then give it a wipe with alcohol
202: Rf5 yeah but not many of them tell you it's a neutropenic patient until you get there
203: Rm2 so there's no dedicated ward for it here then
204: Rf5 no its just in any of the places really in the side rooms, where ever you find a spot
205: Rm2 oh ok
206:
207: **Mod all the areas that you've mentioned that you say it is followed are outside the x-ray department?**
208:
209: Rf1 yeah more or less
210: Rf4 yeah
211:
212: **Mod so does it not get carried out?**
213:
214: Rf4 what in the actual x-ray department
215:
216: Mod yes
217:
218: Rf1 no I don't think. No not really, if I was examining a person with an open wound then I probably would I definitely would clean the cassette otherwise I wouldn't bother
219: Rf5 but even on wards, you don't see many of the patients[think she meant to say nurses] who've just touched and cleaned other patients go washing there hands afterwards, they sometimes go on to another patient, like if they have a cardiac arrest or something like that,
220: Rf4with the same gloves

221: Rf5 how often are you going to go and start hand washing and everything like this and change apron and gowns and you go across to the other patient how often do they do that though. I've seen that done a couple of times
222:
223: **Mod Do you think it's necessary to have infection control in the radiography department?**
224:
225: Rf1 yeah
226: Rm2 to some extent yeah definitely. It just depends on the situation really doesn't it I think cassettes should probably be cleaned more often but i don't think its necessary to clean the cassette every time you get someones hand on it
227: Rf3 yeah
228: Rm2 its just like over kill
229:
230: **Mod how often would you say then?**
231:
232: Rm2 erm well obviously any time there's any sort of like visible fluid or anything like that then you need to give it a good clean erm or if they've got some sort of infection that you can... I don't know I wouldn't be able to put a figure on it, just every so often.
233:
234: **Mod what does anybody else think?**
235:
236: Rf4 erm I guess I only clean the cassettes if like if you know they've got MRSA which like we said earlier was a problem but if you do know then you do tend to clean them as rm2 said you don't clean the cassettes after every single patient I mean even in inpatients you don't do that and you know they could have anything really catching and we just we don't have the time to do it after every patient we don't even have time to do it every day do we?
237: Rf5 no, but in inpatient I do think that if you you do see MRSA written on the form then you do try and leave it until the end of the day so then you can clean it and the nurses do say that you leave it half an hour after if you've cleaned it before you bring in another patient in there they only told me that recently though
238: Rm2 how feasible is that though in inpatients
239: Rf4 its not very
240: Rf5 not very not at all and that's depending on whether you, you're told its an MRSA patient or not
241:
242: **Mod Is that practice followed when you know?**
243:
244: Rf5 well I do it cos I've just been told about it, but I don't know about anybody else
245: Rf4 no I didn't know about it
246: Rf1 no I didn't either
247: Rf4 no I just knew that we had to clean everything

248: Rf5 cos a staff nurse came up to me I asked her what solutions have you got to clean MRSA stuff you know and she goes well just use normal soapy water, luke warm water and just leave it for half an hour after you've cleaned the room, I said what you supposed to clean, she said everything you've touched
249:
250: **Mod did you just say you didn't know about that? [directed to rf1]**
251:
252: Rf1 no I didn't know about that, I would just clean with alco wipes and continue x-raying other patients
253: Rm2 yeah me too
254: Rf4 yeah I would do that as well, cos obviously you can try and do that but if its inpatients, it can be difficult, half an hour of leaving a room empty, its not really realistic, that's why I suppose you try and do it at the end of the day
255: Rf5 hmm, but then you don't
256: Rf4 it may not be the last patient
257: Rf5 that's right how do you know its going to be your last patient, its like these pre-ops just keep turning up
258: Rf4 exactly
259: Rf1 or whether that porters going to bring that patient down right at the end of the day
260: Rf5 and the porters don't know if its MRSA or not I caught one of them bringing one down the other day and I said didn't you wear gloves and aprons and he goes no one told me about it
261: Rm2 I can't remember seeing a porter here with gloves or aprons on
262: Rf5 no
263: Rf4 I've seen them once the other day and they had masks on
264: Rf5 in ITU, I've seen them in ITU
265: Rm2 a mask on?
266: Rf4 cos the patient had TB, that's the only time I've ever seen them, they don't even for ITU do they?
267: Rf5 some of them do yeah, I've seen them when they go to CT, they wear gloves and apron some of them
268: Rf1 cos once what happened I had to go to resus to do a chest x-ray, took the chest x-ray and then they wanted another one again half an hour later and I did the chest x-ray and when I came back they, all of them were wearing masks and stuff like that and on the form it was written query chest infection right and it came back the patient had TB and I was in so much close contact with that patient, cos I had to actually lift him up to put the cassette behind him and no one told me that they were querying TB
269:
270: **Mod are you covered with the TB vaccination?**
271:
272: Rf1 yeah they work, but still every one else was like so protected why didn't they think to tell me
273: Rf5 yeah its just nice to know these things you know, cos you don't know, you could have a child waiting in the waiting area whose not even been vaccinated or anything yet and they're still while the patients waiting

there to go back they could be running around and that guy could be coughing his guts out all over the place or whatever not wearing a mask or anything cos you don't know
274: Rm2 are they still giving the BSG now?
275:
276: **Mod they stopped it, but they may have started it again i don't know**
277:
278: Rm2 why was that then?
279:
280: **Mod because they thought they'd eradicated it**
281:
282: Rm2 but then it came back with a vengeance did it
283:
284: **Mod do you think patients are at risk in the x-ray department?**
285:
286: Rf5 I do
287: Rm2 yeah, but just about as much as anywhere else
288: Rf4 yeah, possibly, yeah I don't know
289: Rm2 any where in the outside world
290: Rf1 I think in room 3 especially, cos that room is so dirty and they are doing like internal procedures
291: Rf5 room four[cardiac] is totally cleaned out all the time the nurses do clean it, but then no one seems to care about room 3 kind of thing
292: Rf4 the nurses don't
293: Rf5 I mean we do so much work in the department I don't see why the nurses can't also just keep an eye out on everything else cos they are x-ray nurses as well I mean they should also provide the right material for cleaning and stuff like this and make sure everything's all right in each area not just left to us
294: Rf4 that's the thing when you want to clean something you can never find the cleaning equipment you spend half an hour looking for stuff don't you, like a mop, where do we keep our mops
295: Rf5 dirty utility
296: Rm2 oh I've found a mop before
297: Rf1 no they don't have the mops there cos I needed a mop the other day cos someone vomited and it wasn't there, they didn't have any heads just the sticks.
298:
299: **Mod you were just saying about the nurses cleaning whose responsibility do you think it is for to clean cassettes and clean rooms?**
300:
301: Rf5 some stuff relies on us but ,then also there is only so much we can do when we're busy running around doing stuff. I mean you sometimes forget these things and you just want someone there to you know just not pick up the pieces but ,just keep an eye and say don't forget to do this or this kind of thing

302: Rm2 does [helper] clean cassettes, I can imagine her doing it
303: Rf5 no, she's got nothing better to do
304: Rm2 well she's always very busy with something so I thought perhaps
305: Rf4 I think she does
306: Rm2 yeah
307: Rf5 now and then she does when she gets a chance
308: Rm2 does she clean the screens you know when it says last cleaned on 2nd of January 74
309: Rf4 yeah yeah
310: Rf5 yeah she does so when she does the processor
311: Rm2 is that the screens or the outside
312: Rf4 no that's the screens
313: Rm2 right, does she clean the outside at the same time
314: Rf4 oh I don't know
315: Rf5 that's a good question
316: Rf4 probably not, I don't know you'd have to ask her
317:
318: **Mod when you're saying that you think it's the radiographers responsibility for some stuff, which stuff?**
319:
320: Rf5 erm
321: Rf4 well I think its probably if we've x-rayed the patient with MRSA then it is our responsibility to clean the cassette cos I was responsible for that patient therefore I'm responsible for cleaning up afterwards you know.
322: Rf5 yeah I mean
323: Rf4 if your patients sick then you're responsible for cleaning it up
324: Rf1 yeah that's fine right if you're in the x-ray room I don't mind but if its in the waiting room and they're pucking their guts up and I haven't x-rayed them then I don't think its my responsibility I think they should be the cleaner or someone else to clean it up
325: Rf5 the other thing is like when they have to go to the toilet its always us that has to come out take them to the loo, I know that's got nothing to do with this but, well you never know what's coming out from the other end do you
326:
327: **Mod what does anybody else think about which part is your responsibility and what's not?**
328:
329: Rf5 cleaning the tube and the doors and anything you have touched I think
330: Rf3 yeah I would say that's ours
331: Rf4 yeah door handles, yeah
332: Rf5 control panel button that kind of thing, I think that's ours
333: Rf4 I wonder when that's ever been cleaned, the button, probably never
334: Rf5 we did that last time do you remember
335:
336: **Mod do you think staff in the x-ray department are at risk ?**

337:
338: Rm2 yeah definitely
339:
340: Mod why?
341:
342: Rm2 well as I said before erm you get MRSA patients along, I mean I must, I'm convinced I must have MRSA carrier. I mean we probably all are because the amount of patients I have x-rayed and then I think about my time at *** and frequently they would come down with a warning, but they don't come down with a warning here so its probably worse than there and yet theres like should I be wearing gloves and apron for every patient perhaps but erm so yeah I think we're definitely at risk and not just from that but from other things as well
343: Rf5 but then again I don't think its just gloves and aprons you need masks and everything like rf1 said it was just query chest infection and he was coughing up TB that kind of thing
344:
345: **Mod what about anybody else?**
346:
347: Rf4 I don't know we are but not a huge amount more than a general member of the public that's walking in
348: Rf1 no I don't think so
349: Rm2 that's right, cos peoples families come in don't they and they never seem to
350: Rf4 yeah, I don't know if we'd be any more at risk than them
351: Rf1 I think we probably are cos we have more contact with them and stuff and we sometimes we're just so rushed off our feet we don't wash our hands between patients so there's a higher risk that probably
352: Rf4 yeah maybe , it depends on the thing really, it depends like MRSA or TB it depends what the illness is really, the infection I suppose some must be more worse than others but in general I don't know if we are.
353:

354: **Mod do you think infection control measures are followed more or less in the X-ray department than other areas of the hospital?**
355:
356: Rm2 less I'd say
357: Rf4 less. Certainly than ITU and places like that and SCBU they follow them much more than we do
358: Rm2 I'm sure they do on the wards as well
359: Rf5 but I'm sure if we had the facilities we'd all, we'd all abide by it anyway like simple hiby scrub, not hiby scrub the thing that you squirt on
360: Rm2 alco gel
361: Rf4 alco gel
362: Rf5 yeah alco gels and things like that, I'm sure if we had that we'd all use it, but if we don't have it how are we supposed to remember you know do this do that its always there visibly to remind you to do it
363: Rm2 I've got to say the soap is really harsh I've got really bad skin on my knuckles I've got cracks that suddenly appear
364: Rf5 yeah mine are really dry as well
365: Rm2 so that's not really erm
366: Rf4 and mine as well
367: Rm2 and the problem with the moisturising cream is that it makes your hands really greasy and you can't pick up cassettes. I wash my hands quite frequently here and that's why they're in really bad condition and I think that's I'm more open to infection and things, because its chapping they need to have that softer soap or the alcohol gel as well, you can buy softer soap in the same range I've seen it
368:
369: **Mod apart from you were saying not having the facilities about what else do you think would prevent you from practicing less than other departments?**
370:
371: Rm2 back to the er lack of training I think
372: Rf5 the awareness of it and stuff like that
373: Rm2 yeah
374: Rf5 I'm sure if we had colourful posters and things like that hanging around you know we would all look at it and say oh you know we should try and do this sometime you know at least once is better than none.
375: Rm2 I think radiography is relatively clean compared to the other professions like nursing and physio and stuff because we don't really they tend to have been you know cleaned up a bit before we get them generally
376: Rf5 do you think?
377: Rm2 well generally yeah because its not
378: Rf1 sometimes
379: Rf5 I don't think so, not in like in A&E if you've got someone who has just had a glass wound or something
380: Rm2 oh yeah but they dress it don't they
381: Rf5 no not all the time

382: Rf4 I had someone I had a man it was quite late on in the night er he'd been stabbed and he was virtually covered from head to foot in blood I mean it had dried on him but he was covered they didn't clean him up before he came up to me
383: Rm2 you get that sometimes, but what I mean is we don't have to directly deal with the cleaning off the blood and things like that do we
384: Rf4 no but its still there
385: Rm2 we don't have to wash patients and change them
386: Rf4 but we still have to deal with them don't we
387: Rf5 but we are at risk by putting the cassette in and stuff like this so if you do touch the patient
388: Rm2 yeah I know but well perhaps less so than nursing that's what I'm trying to say
389: Rf4 yeah
390: Rf5 hmm
391: Rm2 and then you know people who have had operations they've been sewn up and dressed and
392: Rf5 actually I would have said more so because of the fact that we go around each and every area we don't know we could be walking into a MRSA ward or going to SCBU stuff like this we're just walking around the whole hospital we don't change our uniforms everyday do we that kind of thing we wear the same shoes every day and we're just spreading infection as we're going that kind of thing
393: Rm2 hope they don't tread on the babies
394:
395: **Mod what does everybody else think to that point rf5 made?**
396:
397: Rf4 yeah its definitely true, definitely on your shoes I never really thought about that before
398: Rm2 yeah I walk to work in my shoes and then I walk around the hospital, but then its not like I er suppose your face gets washed everyday doesn't it but you know potentially you know I might go home and not have a bath for a week, not that I do I have a shower every day
399: Rf5 but then sometimes I'll wear my uniform to travel home and then wear it in the next day
400: Rm2 I don't do that in case there's a cardiac arrest on the train and people go your in uniform help
401: Rf5 no but if your driving in to work
402: Rm2 that's true
403:
404: **Mod do you ever worry about taking any infections home with you?**
405:
406: Rm2 I always wash my hands in the changing rooms before I leave
407: Rf3 I think about carrying out proper handwashing and perhaps taking a bath after work
408: Rf4 but we must we must take stuff home on our clothes though mustn't we

409: Rf5 I think we do
410: Rm2 I leave my uniform at work until I take it home to wash and I wash my hands before I go out the door anyway so I don't think its too bad. Its quite rare that anyone touches any part of your body apart from your arms and hands isn't it
411: Rf5 yeah but what about the soles of your feet you could have walked into something
412: Rm2 that's possible but then what's on the street outside anyway
413: Rf5 exactly
414: Rm2 dogs mess and stuff which is definitely an infection control risk
415: Rf5 yeah and then we're bringing it in here
416: Rm2 yeah well yeah you know the world isn't a clean place is it
417:
418: **Mod some hospitals have a screening programme for staff to see if they are MRSA carriers**
419:
420: Rm2 I would be surprised if I wasn't a carrier
421:
422: **Mod what would you think about that, about being screened**
423:
424: Rm2 it depends on what barrier you had on employment really
425: Rf5 I think they should have it cos we don't know what we're carrying I mean if someone in your family could have new born baby and you just go up to them and start cuddling and everything and things like that, I mean you're passing it on and you don't know what you're carrying its nice to know if you have got something you're not going to pass it on to somebody else like chicken pox or something like this
426: Rf4 yeah
427: Rf5 yeah but its true isn't it cos you didn't know you had it and at the end of the day when she knew she had it she had to be treated, but its nice to know if we had something else you know that we might be carrying something like MRSA or anything
428: Rf4yeah I agree
429: Rm2 yeah but as long as they employ you first and then screen you because you know otherwise they'd be like oh no we can't start your pay
430: Rf5 yeah but that shouldn't be held against you should it
431: Rm2 exactly that's what I mean they should employ you then say right now we'll screen you
432: Rf5 but they should treat you as though you will be fresh when you start you're all cleaned up and everythings out of your system
433: Rm2 yeah
434:
435: **Mod would you say that was a thing just for when you first started at the hospital or would you say it should be a continuous check**
436:
437: Rm2 maybe they should do yearly checks I dunno, it would give occupational health a bit more work to do

438:
439: **Mod in the x-ray department what would you say prevents infection control practice?**
440:
441: Rm2 what here
442:
443: Mod anywhere
444:
445: Rm2 not knowing where the cleaning products are, erm
446: Rf1 not having cleaning products available, erm time
447: Rf4 yeah
448: Rf5 awareness
449: Rf4 time is a big factor I think, definitely
450: Rm2 yeah its just not at the forefront of your mind is it its, unless its em a high risk patient
451: Rf4 yeah, its not really on your mind all you're thinking about is get them in, get them done and get the next one in
452: Rm2 yeah
453: Rf4 you're not really thinking well ooh I might spread infection
454: Rf5 but if it was wrote up on the form big letters saying this is this patient is MRSA or whatever then you would take extra precautions
455: Rf4 yeah you would but normally
456: Rf5 you wouldn't
457: Rf4 in general you don't really think about it the infection risk, well I don't
458: Rm2 you know I think those sam [electronic] forms are really bad for this because nothing stands out on them its just like erm a thing of text and you its quite small writing and I think it says risk factors and if is says well it says no risk factors usually doesn't it and if it said MRSA would you really notice it if you were just scanning, you know you look at the clinical details and date of birth and the name don't you really I know its not particularly. I don't think they are particularly eye catching
459: Rf5 I mean when I worked in the pathology lab I know its got nothing to do with radiography when we used to get HIV patient and things that were and blood taken from other hospitals or say other doctors surgery they always used to put a sticker on there hazard sticker in a bag in a bag in a bag to prevent the risk and the same kind of thing should apply here then you have a dedicated unit you go in to a separate area where you go and process the blood you're not mixing it in with every other blood so you know you're not gonna you know mix it up or anything like this which was made clear but here you don't know
460: Rf1 yeah and as well many times we are dealing with dental x-rays for all we know the patient probably has HIV and we don't know and there's no like cos I remember at *** we had in big writing HIV and once they didn't and the radiographer flipped
461: Rm2 is that ***
462: Rf1 yeah
463: Rm2 oh yeah she was really good at infection control so a lot of that got drummed into me when I was there

464: Rf1 yeah, but here they don't even do anything like that you take them in and that's it we have gloves on but still we are messing about with patients saliva
465:
466: **Mod so they actually used to write HIV on the form**
467:
468: Rf1 yeah
469: Rm2 yeah
470:
471: **Mod could that be a problem, if you're writing HIV could there be a confidentiality problem if they say dropped there form?**
472:
473: Rf1 not really who are you gonna
474: Rf5 it depends really cos some of them come down electronically if they do then that's not a problem but if they're bringing the forms down they should it should be known they should at least make a quick phone call saying look this patient's coming down with this and speak to someone directly so you know how to deal with it and then you take all the precautions from there but yeah I don't think it should be written on the form in big letters
475: Rm2 perhaps they could have boxes that just had A,B,C,D,E and then that could correspond with things that we knew about
476: Rf5 but they don't
477: Rm2 but the patient wouldn't be able to tell what it was
478: Rf1 or a colour coded scheme
479:
480: **Mod can you think of anything else that prevents it**
481:
482: Rf1 yeah who's responsible for cleaning what cos like the cleaner won't clean blood or vomit or stuff like that and the radiographer's can't be bothered cos the can't see why they should do it and the nurses says its not in their job protocol so it just gets left like that until someone decides to do it
483: Rf5 a helper
484: Rm2 yeah
485: Rf5 helpers don't do any of that non of the above except *** maybe cleaning the cassettes but that's only one and two then you've still got the other areas as well that no one does.
486:
487: **Mod how would you say that you could improve infection control practice**
488:
489: Rf1 how we can improve it, just having more facilities available, having a representative like Rf5 was saying erm a health and safety person
490: Rf4 they could go around drumming it into us
491: Rm2 who is the Health and Safety rep here
492: Rf5 dunno
493: Rf1 isn't it ***

494: Rf5 I think it was *** before she left and then er someone else has taken over
495: Rf1 I think its *** I'm sure it is
496: Rf5 yeah but he can't officially be a health and safety rep until he's been on the course
497: Rm2 so there isn't one at the minute
498: Rf1 no not at the moment
499: Rf4 certainly more cleaning equipment would help definitely, more gloves I have to go hunting for gloves quite a lot
500: Rf1 yeah
501: Rf5 hmm
502: Rf4 I can never find small enough ones for me
503: Rf5 and aprons, there's never any aprons anywhere
504: Rf4 yeah you're right there' never any
505: Rf5 in our department there isn't any you have to ask the wards to bring it down for you, and yellow bags maybe you know just to put all the dirty linen you know anything that's a health hazard where do we find them, I don't know
506: Rm2 I think erm slightly off the point but er I notice all the bags in x-ray are yellow and what you generally put in there is blue roll how wasteful is that because how much does it cost to incinerate the yellow bags quite expensive isn't it and it isn't necessary to incinerate this paper that's kind of clean but there's no, there should be black bin bags and stuff.
507:
508: **Mod you were saying about health and safety representative who else would you say would be best at encouraging better practice**
509:
510: Rm2 superintendents, anyone in charge, they need to sort of pass the message on to the ranks don't they
511: Rf5 and its not just by sticking up a piece of paper on the viewing box saying read this at your leisure not that kind of thing its got to be a nice little discussion maybe you know just 10 minutes or 15 minutes you know we should be doing things like this, this is the awareness that we should be getting things like that
512:
513: **Mod I think you mentioned that you had infection control drummed into you at *** where you trained do you think it could work from the bottom up**
514:
515: Rf1 it probably could yeah because ermm there the radiographers were really really strict you had to wear gloves on every patient clean the cassettes but here
516: Rf5 but that was during dentals wasn't it
517: Rf1 no everything
518: Rf5 really
519: Rf1 yeah
520:
521: **Mod so you had to wear gloves for every patient**

522:
523: Rf1 for every patient
524: Rm2 what even just for knee
525: Rf5 or a hand just normal general patients
526: Rf5 where was this
527: Rf1*** that's why I hated it
528: Rm2 I think that's a little bit of overkill isn't it really
529: Rf4 yeah that's just
530: Rf5 that's a waste of resources cos then when all the other kind of money could be spent on say instance alcohol gel or something like that or some proper cleaning facilities
531: Rm2 yeah and you're just gonna, you'll develop a latex allergy as well on your hands eventually won't you using gloves all day
532: Rf5 mmm
533: Rm2 so that's er unless they use non latex gloves of course, which are expensive so there you go
534:
535: **Mod does anybody have anything else they would like to add?**
536:
537: Rf5 Do we get a report of this back at the hospital once you've done it
538:
539: **Mod yes a brief report may be given to *****
540:
541: Rf5 it would be nice to let them know what we all think and would really appreciate in the department that would be quite nice
542:
543: **Mod do you think that would help?**
544:
545: Rf5 yeah
546: Rf4 yeah I do
547: Rf5 cos the amount of times we keep saying it but no one listens cos we're only basic radiographer you know
548:
549: **Mod do you think that's what it is**
550:
551: Rf5 I think so, if it came from a senior they would take it a bit more seriously if it came from a superintendent oh it has to be done if it comes from a basic its ohh we'll think about it, but, that's how I think don't know about anybody else
552:
553: **Mod so if that is what the attitude is then that would make it difficult for the change to occur coming from the bottom up**
554:
555: Rf4 possibly yeah
556:

557: **Mod why do you think your practice has actually changed, there was a few of you said that you had really strict measures in certain hospitals and then you've come here and there's not**
558:
559: Rf1 at *** we had like 16 radiographers one casualty room and nothing to do so they had a lot of time on their hands here its just like two of us in casualty and so many patients
560: Rf3 sometimes only one radiographer
561: Rf4 so I think that's a major factor its just we are so short staffed
562: Rf5 yeah staffing levels definitely
563: Rf5 it would be nice if they do do something about this after we've discussed all this with you and they do take up on our offers you know like simple cleaning methods, like alcohol gel and aprons and gloves it goes much appreciated in the department you know which they don't think, its not that much money, but it's a little bit that goes a long way
564: Rf3 yeah
565: Rf4 yeah definitely
566:
567: **Mod thank you very much**
568:

Focus Group Discussion DGH1 Senior Radiographers

9:
10: SRF6 Qualified just under 30 years, and I'm a senior one sonographer
11: Mod And what areas do you mainly work in?
12: SRF6 ultrasound
13: Mod OK thanks
14: SRF7 I've been qualified nearly three years I'm acting senior one for angiography and cardiac I kind of mainly work in kind of main X-ray, CT and room 4
15: Mod what is room four
16: SRM7 it's the angiography suite
17: Mod Thank you
18: SRF8 I'm *** I'm senior two erm I mainly work in CT and main X-Ray I've been qualified for nearly three years
19: SRF9 I'm *** I'm senior one am I yes I'm senior one, I've been qualified nearly 30 years and erm I work in the outpatients and mammography.
20: FRM10 I'm *** I've been qualified 8 years I'm senior one for CT and I work in MR and room 4
21:
22: **Mod Lovely, ok thanks. Right I think we will start with if somebody says infection control to you what do you actually think about.**
23:
24: SSRF6 Handwashing
25: SRF9 Clean equipment
26: SRF8 Yes
27: SRM7 Hmm
28: SRF8 preventing infection spreading
29: SRM7 MRSA
30: SRM10 that's probably the main thing isn't it. MRSA is the only thing you flag up
31: SRF9 erm infections on people, patients, staff
32: SRF6 Cleaning up spillages
33: SRF8 hmm
34: SRM7 yeah there you go
35:
36: **Mod anything else?**
37:
38: SRF9 are we missing something vital
39:
40: **Mod not really. Do you think there's any particular patients or people who need infection control?**
41:
42: SRM7 ITU. HDU, SCBU are the three main ones that you've got to worry about.
43: SRF9 Theatres

44: SRM7 Yep. Erm also people that erm are infectious themselves
45: SRF8 Any open wounds in A&E
46: SRF9 any MRSA patients
47: SRF6 coughing people in chest clinic
48: SRM7 Yeah
49: SRF9 Yes
50: SRM10 yeah
51: SRM10 you've got Hep C haven't you as well Hep C HIV
52: SRM7 Yeah hep C and HIV
53: SRM10 MRSA. Can't think of anymore

55: MOD How do you generally know about the status of the patients then?
56:
57: SRM10 It should be on the request form shouldn't it but
58: SRF9 they often don't
59: SRM10 You tend to find out at some point
60: SRM7 I guess you kind of rely on who ever is requesting it to make sure they've put it down, that there is some sort of infection risk on there. They don't always obviously
61: SRF8 no they don't
62: SRM7 but I think in the majority of cases they do, if they do know someones MRSA positive or do have some sort of infection risk, I think they do most of the time put it down
63: SRF6 (shakes her head in disagreement)
64: SRM7 No you disagree
65: SRF9 if they come in from A&E though you won't know
66: SRM10 hmm I think the only thing you do if they come in from A&E if they look a bit scumy you put gloves on you know what I mean
67: SRF8 yeah
68: SRM7 yeah
69: SRM10 but then that doesn't rule out loads of things does it
70: SRF9 coughing
71: SRM10 it doesn't rule out a whole load of stuff does it. Like coughing and guess you should put a mask on then
72: SRM7 we did have a guy with suspected TB in resus and they anyone who went close they put they said you've got to wear this [a mask] so quite good I suppose
73: SRF8 that happened in ITU as well recently
74: SRM7 yeah still quite good
75: SRF6 but isn't it the usual thing though that you're more at risk from the person that sort of has come in under normal circumstances than the in patient or the A&E patient that you think might have something.
76: SRF9 cos you don't know you mean
77: SRF6 cos you don't know yeah
78: SRM7 yeah you're right
79: SRM10 that's how SARS spread isn't it
80: SRM7 yeah
81:

82: **Mod ok you went though at the beginning about the things you thought about with infection control, which do you think are the more important areas?**
83:
84: SRM6 always being told that handwashing is probably the most important way to stop infection I think that's everywhere really is that what you mean
85:
86: Mod Yeah
87:
88: SRM6 yeah I think that's its like everyones how important handwashing is and how that's the most the biggest carrier of infections from one place to another I suppose
89:
90: **Mod when do you think handwashing should be done then?**
91:
92: SRM6 when should it be done after every patient
93: SRM10 you could say that in theory couldn't you
94: SRM6 in theory yeah. In practice it's a bit different. Only because you don't have time. You know I'll put my hand up and say of course I don't, you know I don't wash my hands after every patient, I should do but I don't. And it is literally because of time and just trying to get things done quickly and not really thinking about it I suppose.
95: SRM10 it could be on your clothes as well infection you shouldn't be wearing your clothes outside the hospital
96: SRM7 shouldn't you?
97: SRM10 no
98: SRM6 oh
99: SRM10 but I recon I mean you shouldn't have to have your own clothes at home anyway from the hospital the hospital you should be able to come into work and the hospital should have a supply of uniforms you put on to go and work in
100: SRF9 but you could say the same about shoes couldn't you because you are walking in the dirt off the street
101: SRM10 well yeah
102: SRF7 yeah but then every one is including patients
103: SRM10 its like theatres they have clogs and whatever just for theatre
104: SRF9 yeah but then they shouldn't really wear those shoes outside theatre should they
105: SRM6 they do though
106: SRF9 hmm I know
107: SRM10 yeah they do
108: SRM6 cheeky monkeys
109: SRM10 imagine I'll do my garden and then come to work
110:
111: Mod What about the cleaning of the equipment, you mentioned that earlier?
112:

113: SRF9 oh yeah that's a that's probably a big source of potentially spreading the infection but you don't think about it
114: SRM10 I think you should have a renewed thing that you get the students to damp dust like we had to
115: SRF9 yeah and clean the cassettes and table tops
116: SRM7 do not get me started on the students. Students are not there to damp dust but that's a whole other story
117: SRM10 but they should be cleaned I mean
118: SRM7 yeah they should be but I think
119: SRF9 they were in my day [students used to clean]
120: SRF8 there should be a rota or something shouldn't there, theres no cleaning rota in place
121: SRM6 exactly your right. But I think X-ray plates like x-ray cassettes and things like that I think especially when you go to ITU, I know at other hospitals they actually cover each plate, each cassette before they put it behind the patient and I'm not even sure that you know that same place actually cleans the cassette with alco wipe between you know like taking it out from the patient like you know
122: SRF6 Do we not put them in pillow cases anymore
123: SRM10 no because they don't slide properly
124: SRF8 They tend to put them under the sheet now
125: SRM10 but you can buy plastic covers specifically designed for x-ray plates
126: SRM7 there are material covers that actually slide
127: SRM10 oh right
128: SRM7 I've seen them at the ***
129: SRM10 I know you can buy specific stuff
130: SRF6 disposable ones
131: SRM10 yeah, but ITU we do clean, well you are meant to clean the cassettes after every use, wash them down
132: SRM7 yeah, but we do uses pillow cases when its like an infectious person, like there's a guy in the side room, like you know they are highly infectious or whatever, then we probably put it in a pillow case but only not like routinely
133: SRM10 but how good at stopping infection is it, the pillow case
134: SRM7 as good as any I suppose
135: SRF8 but how long does infection last on the equipment, how long can it stay alive for? Has there been any research done on that?
136: SRM7 I don't know
137: SRF9 well can't the MRSA sit on the window sills, I mean that's sort of where it lives, doesn't it live in the dust on the window sill
138: SRM7 really
139: SRF9 I'm sure I heard that
140: SRF8 it lives in the skin cells
141: SRF9 yeah it lives in the skin and dust and it can spread from there
142: SRM7 eww I didn't know that
143: SRM10 I didn't know that either, of course it doesn't help when there are cockroaches everywhere.
144: SRM7 hmm
145: SRF8 Yeah that's true

146: SRM10 there was another incident this morning
147: SRM7 you had another one this morning
148: SRM10 yep there was a cockroach in room 4
149: SRM7 room 4
150: SRF8 that's supposed to be the cleanest room in the department
151:
152: IDENTIFYING INFORMATION REMOVED
153:
154: SRM10 so theres [cockroaches] another source of infection
155: SRM7 hmm hmm
156: SRF9 that's true
157:
158: **MOD when you're talking about damp dusting what sort of equipment needs damp dusting or do you think should be damp dusted?**
159:
160: SRM7 not by students
161: SRM10 everything
162: SRF9 all the x-ray equipment
163: SRF6 X-ray and ultrasound equipment because theoretically the cleaners are not supposed to touch that
164: SRF8 yeah
165: SRF9 the cleaners are supposed to damp dust the rooms they've got a rota haven't they for cleaning rooms certain jobs to do each week
166: SRF6 but the equipments not their responsibility at all
167: SRF9 that's true
168: SRF8 I remember once when I newly qualified taking a mobile from down the corridor to x-ray this patients chest and this big bit of dust fell on to this patients chest.
169: SRM7 no way
170: SRF8 yes he was like he's just been rushed in to hospital
171: SRM10 I mean mobiles should be more regularly cleaned because you are traipsing them all over the place to every where really
172: SRF8 yeah they go everywhere
173: SRM10 apart from the scbu one which should just stay only for scbu
174: SRM7 again that's all well and good in theory but its all about time as well isn't
175: SRM10 and who's going to do it
176: SRM7 yeah and who's going to do it
177: SRM10 and like you say when
178:
179: **Mod Who do you think should do it?**
180:
181: SRM10 helpers and students
182: SRM7 well no I think radiographers should do them
183: SRF8 yeah I agree with that
184: SRM7 if you're using that machine
185: SRF9 everybody should do it
186: SRM7 yeah exactly

187: SRM10 well yeah if its dirty after you've used it or you've made it dirty you should clean it, but for general damp dusting, just general dusting radiographers shouldn't have to do it.
188: SRF8 just for maintenance yeah
189: SRM7 why not
190: SRM10 because we're not there to go round cleaning things
191:
192: SRM7 yeah buts its your, but the thing is you're the one using that equipment
193: SRM10 just like we're not there to go around doing the clerical side of things are we
194: SRM7 no but I think the thing is if you've got time then definitely its your responsibility to do it cos you're using that equipment you need to make sure its clean
195: SRM10 you wouldn't find a radiologist damp dusting a piece of equipment would you
196: SRM7 yeah well no but that's them isn't it you know what I mean
197: SMF6 well that's up to them isn't it
198: SRM7 if you're using something and its dirty then you've got to like make sure its clean do you know what I mean, and thats down to you. But the thing is if you've got time do know what I mean, I think the thing is you've got to have time, you've got to be able to put half an hour or whatever a day to make sure everything is clean, but you sometimes don't have that. That's the only thing it is all about time constraints and stuff and we just don't have the time to do that kind of stuff. Which is why I think ** say oh we'll get students to do it. Students aren't there to do it they are there to learn.
199:
200: SRM10 well alright then helpers, you don't need a qualified radiographer to go and clean the machine.
201: SRM7 its not about qualified or not qualifed,
202: SRM10 yeah it is
203: SRM7 its all about you know
204: SRM10 well you wouldn't use it if, I mean yeah if you've got it covered in blood you tend to clean it afterwards but still
205: SRM7 its like in theatre with the II if its covered in blood you would clean it
206: SRM10 yeah you should clean it
207: SRM7 well why not if you're down in a room in the general x-ray
208: SRM10 well yeah if you get it covered in whatever you clean it up, but for general damp dusting
209: SRM7 why don't you think qualified radiographers should clean then
210: SRM10 well its not my job to go around cleaning and damp dusting rooms no chance
211: SRM7 fair enough
212: SRF9 but you could look at it as you know this is your equipment you're using, you're responsible for so its you're responsibility to keep it clean and reduce the risk of cross infection
213: SRM10 mmm

214: SRF6 I do in ultrasound when I go into a room and I'm going to start I pull off a few of those wipes and I wipe the probes and the leads that I'm going to use I wipe the screen and whatever and just the bit around in the patients eye line very often theres a ledge and I'll wipe so they're not looking up at a load of dust and whatever and because I'm going to be using that machine for the day and I want to sit an look at something that I can actually see the screen on so, but I do that for me not for you know not for anybody else.
215: SRM7 do you not have a student to do that for you
216: SRM10 no of course you do anyway your doing it for yourself
217: SRF6 I would expect the student if that to make sure that the room was how they wanted it before they started that's up to them
218: SRM7 yeah
219: SRF6 I do it for me I don't do it for anybody else, I do it because I want to sit there and I want to know that the lead that and the equipment that I'm going to pick up is free from gunk from the last person that used it and that the screen I can see the screen without having all finger marks and whatever on it you know.
220: SRM10 so you should be able to walk into a room and have it all done for you. You shouldn't have to do it, that's what I'm trying to say
221: SRF6 but I do what is relevant to me
222: SRM10 yeah you do it for your own
223: SRF6 but also the patient eye line I think its really bad for a patient to be lying there looking at the back of the machine that is just covered in dust, that is just awful and really it takes
224: SRM7 seconds
225: SRF6 30 seconds
226: SRM10 that applies to everything doesn't it
227: SRF6 and now we've got those pots of alco wipes in every room I mean its not rocket science
228: SRM10 no, I'm not saying it is, I'm just saying it should be, I mean you've got enough to do, you shouldn't have to do the cleaning side of things as well
229: SRF8 its time consuming isn't it.
230: SRF9 does anyone dust on top of the CT
231: SRM7 no
232: SRM10 oh jese no
233: SRF8 oh when you angle it and it all falls off
234: SRM10 it is something that needs doing yes I was thinking about that the other day
235: SRF8 I don't think that ever gets cleaned
236: SRM7 you are so going to clean that when you get back
237: SRM10 I saw that and I was going to say (Junior)with us she can do it
238: SRM7 no but you do see it and you're like I must do that, I must get on and do that and then you just get busy doing something else and you just completely forget about it and then the next time you see it you say I must give that a clean you know and you just and again you just forget about it.
239: SRF8 yeah that's what it is you get distracted and then forget about it

240: SRF6 but it becomes a habit the same as you now we've got into the habit I mean we never used to call check patients ids did we you know or never ask them there dates of birth
241: SRM7 didn't you?
242: SRF6 this was many years ago but now we do and its habit, we all just get the patient in call the id and the same as if you just whip off some alco wipes and wipe the bit you're using before you start it just becomes habit, its like anything that you do, if you do it every time you don't even think about it. You know and you just whip round and its done.
243:
244: **MOD there's a few of you have mentioned bits that patients don't see like the top of the CT scanner and there eye line, are the bits that they can't see not very important then?**
245:
246: SRM6 ooh
247: SRM10 its important there's a source of infection there but
248: SRF9 they probably are
249: SRF6 I think they are
250: SRM10 but if no ones going to see it then no ones going to complain about it are they
251: SRM7 that's the thing if no ones going to see it and patients aren't really going to be touching it, but then there the thing of MRSA might be sitting up on top of there waiting to say hi
252:
253: **MOD do you think that's it if the patients not going to touch it and you're not going to touch it?**
254:
255: SRM7 in my head yeah that's kind of like
256: SRF8 as long as it looks clean to them
257: SRM7 as long as it looks clean to where they are looking and I'm not touching anything that's dirty erm then yeah
258: SRM10 ideally it should be clean
259: SRM7 yes of course
260: SRM10 but again when has the radiographer got a chance to rip the room apart and clean behind everything and put it back together
261: SRM7 yeah so yeah yes its important but in my head its if they can't see it out of sight out of mind kind of thing so if they're not going see it and I'm not going to see it and I'm not going to touch it let it go for a bit but obviously ideally
262: SRF8 it would be done
263: SRM7 everything would be done and it would be clean
264:
265: **MOD do you think that's what most people think?**
266:
267: SRM7 yeah, I mean nobody wants to work in a dirty room do you know what I mean but yeah its just this
268: SRF6 and also its, I tell you what its really embarrassing when an engineer comes to do a machine and they pull it out and it is just filthy

behind there I mean you, its just so embarrassing and you say this machine isn't working, its not surprising it is its embarrassing.
269: SRM7 yeah it is
270: SRF6 I mean we can walk behind our machines [ultrasound machine] so its not that difficult to sort of whiz round and wipe the ledges and get the worst of it off you know but
271: SRM10 do your machines have ventilation like holes in the back, like CT got ventilation at the top
272: SRF6 yeah ventilation holes and that's really bad
273: SRM10 so equipment wise its not just infection control reasons to keep it clean I suppose
274:
275: **Mod How does it work in mammography?**
276:
277: SRF9 er we do wipe over the plate every time between every patient and I think since I've been here in three years I've cleaned the machines once where I gave it a good old blitz
278:
279: **Mod but the actual plates are cleaned between every patient?**
280:
281: SRF9 the actual cassettes go into a slot so there's like a plate where the breast goes so we wipe that cos they, but the cassettes themselves don't actually come into contact with the patient so it is cleaned
282: SRM10 that's quite intimate contact with a patient isn't it its not just like a patients clothes or what ever
283: SRF9 and the plastic compression plate we wipe that, we wipe all the bits that touch the patient
284: SRF6 but your hands touch the patient which then pull the cassette out
285: SRF9 yeah, I know and I suppose the arm the top of the cassette touches the patients arm yeah but we don't wipe it all down.
286:
287: **Mod why do you think then that that gets cleaned between every patient but a cassette that say somebody has put there foot on doesn't?**
288:
289: SRF9 yeah I don't know I think er it is a good point
290: SRM10 which then is used to put someones head on
291: SRF9 but then we don't wipe it in front of the patient necessarily. We just always wipe it between every patient, because breasts can be sweaty and horrible
292: SRM10 so can feet
293: SRF6 yes where as I would prefer it to be wiped in front of me
294: SRF8 so you know its been done
295: SRF6 so that I could see that its clean
296: SRF9 yeah well patients never think about that they they don't expect it to really be wiped
297: SRF6 its like on the orbix I would not want to put my chin up against something that I didn't think that I hadn't seen being wiped

298: SRF9 yeah but we know that but the average patient doesn't
299: SRM7 that's right
300: SRF9 I know when *** was here she used to say wipe the dental the OPG in front of patients which I tend to do
301: SRF8 yeah that's how I do it
302: SRF6 and the orbix
303: SRF9 yeah in front of the patient, but I don't with mammograms
304: SRM7 I was just wondering about what you were saying like erm like in A&E that you could use an extremity 24.30 to do someones foot take it out and then use it straight away to do someones hand you know what I mean
305: SRF9 yeah
306: SRM7 you don't really think about that much really cos you just kind of once it goes in the processor and it comes out again its clean
307: SRF8 you assume its clean
308: SRM7 its got a clean film in it but then its just clean then you know what I mean and that's it.
309: SRF6 cos what ever yeah its gone into the processor then next films[cassette] following it into the processor so at what stage in this process should we be wiping it, as soon as we take it off the patient
310: SRM10 but then how many things are on peoples feet that can be spread are going to cause significant disease
311: SRM7 yeah well
312: SRF8 its just the thought of it someones sweaty foot
313: SRM10 yeah its just the thought of it I suppose
314: SRM7 so because they're not going to get MRSA
315: SRM10 no I'm not saying you shouldn't clean it I'm just saying in general how many, I mean A&E is very busy you haven't got time to do the patients let alone clean the room and clean the cassettes every time
316: SRF9 if you think of the trolleys in supermarkets I mean how many peoples hands have been touching that and nobody's wiping those are they
317: SRM7 oh yeah that's a good point cos they actually get sticky don't they
318: SRM10 and we won't mention the toilet handles public toilets
319: SRM7 that's an elbow jobby that is
320: SRM10 so yeah its everything at the end of the day we're meant to be making sure that specific infections are kept under wraps
321: SRM6 yeah I think its all to do with specific rather than general
322: SRF9 I suppose a few germs are good for you
323: SRM6 oh yeah I agree it puts hairs on your chest
324:
325: Mod well who do you think infection control is here to benefit?
326:
327: SRF9 those most at risk of catching an infection the most vulnerable patients
328: SRM10 well anyone
329: SRF8 well everyone really us as well
330: SRM10 specifically the ill, children, the elderly
331: SRF9 well everybody really

332: SRM7 well everybody in that environment so staff patients cos we don't want to get anything from patients and I suppose we don't want to give patients anything either you know germs money anything at all.
333:
334: **Mod how important do you think your own health is then, with regards to dealing with your patients?**
335:
336: SRM7 as a smoker I would say very important
337: SRM10 well yeah it is obviously you know if you're ill you can't work surely your own health should be more important than anything else you know definitely at the end of the day
338: SRF9 I suppose we are at risk from the patients.
339: SRM7 they're trying to kill us
340: SRF9 That must be a big part of infection control as well protecting the staff
341:
342: **MOD do you ever think about taking it home?**
343:
344: SRM10 yes, ever since I've had kids I do
345: SRM7 I've never really thought about it
346: SRM10 I always think about it
347: SRF9 no I haven't
348: SRM10 especially when we've x-rayed people with chicken pox and stuff always thought about the fact I could take it home
349: SRM7 I mean like some people have said oh you smell of a hospital you know that kind of smell and I was like and that's the only thing you know when you think about having stuff on you I mean the thing is I do get changed for work and all I wear is my shirt to and from work but other than that I do get changed so I don't know I suppose yeah
350:
351: **Mod What about you SRF6?**
352:
353: SRF6 yeah I suppose I yeah, you more tend to think about bringing things in and like in ante natal you know if you been erm with children that have had chicken pox you're not supposed to work cos of giving infecting pregnant women with chicken pox ands stuff so you tend to sort of think of it the other way round rather than taking stuff home.
354: SRM7 yeah
355:
356: **Mod what do you do then just tell somebody you've been in contact with chicken pox and they move you?**
357:
358: SRF6 yeah
359: SRF9 for a set period
360: SRF6 yeah
361: SRF9 even if you've had chicken pox
362: SRF6 apparently so, apparently so yeah. it's a high risk certain things there's a high risk if you're not sure of the risk then you ask for advice you ask one of the consultants or whatever.

363:
364: SRF9 when did *** catch her chicken pox
365: SRF8 it was from her nephew
366: SRM7 yeah
367: SRF9 oh was it
368:
369: **Mod Well on that then what about if you've been in contact with somebody whose say got MRSA or something?**
370:
371: SRF9 what if you know they've got it
372:
373: MOD Yeah
374:
375: SRF6 well that happens all the time here having contact with people who are infected
376: SRM10 that happens all the time and we don't know
377: SRF9 you're supposed to take extra care
378: SRF8 you do take extra precautions then don't you
379: SRM10 but isn't a large percentage of the population carriers of MRSA anyway, that's what, I saw it on tv that something like you know most of us a lot of us especially probably us as you work in a hospital you're probably carrying MRSA anyway in our noses or something I don't know so we've probably already got it
380: SRM10 its only a problem if its in the severely ill
381: SRF9 its only if it gets into a wound isn't it
382: SRM10 yeah it's the wounded patient
383: SRM9 it causes problems of non healing
384: SRM10 but then if they were that wounded you'd be having people with gloves and stuff on anyway wouldn't you cos you wouldn't want
385: SRM7 but isn't it airborne as well though
386: SRM10 yeah
387: SRM7 so you could breath it in, if you've ok say you've got an MRSA patient and you've you know gloved up you know apron on and stuff but you could still snort it up couldn't you
388: SRM10 thing is if it's not as infectious as some other things
389: SRF9 but while you haven't got any open wounds you're not at risk contradiction
390: SRM7 yeah I suppose you're not at risk no
391: SRM10 its not as infectious as I mean chicken pox is you know extremely infectious and is dangerous in pregnant women so you know
392: SRM7 oh ok
393: SRM10 well its dangerous in anybody you can get some nasty stuff from chicken pox
394: SRM7 scars
395: SRM10 no you can get nasty pneumonia and stuff like that
396: SRM7 can you
397: SRM10 yeah god yeah you don't want that
398: SRF6 and shingles
399:
400: **Mod some hospitals screen their staff for MRSA?**

401:
402: SRM7 what benefit would that have though?
403:
404: **MOD in some hospitals they don't let you work if you got it?**
405:
406: SRM10 You've probably got it after the first day working in a hospital though.
407:
408: **MOD What do you think about screening?**
409:
410: SRM7 if they told me that I couldn't work because I was a carrier of MRSA I would be very annoyed because I probably got while I was at work anyway do you know what I mean, or well probably so no
411: SRM10 MRSA doesn't affect healthy people does it though. I mean if you had Hep C and you passed it around the hospital or you were HIV or whatever that affects healthy individuals and makes them ill whereas MRSA doesn't MRSA only affects people who are already ill it just makes them iller so screening, I mean if you screened everybody in the NHS you probably wouldn't have any bloody people in the NHS cos everybody would be would have MRSA
412: SRF8 but then you could say that its your fault you've got it for not taking the right precautions
413: SRF9 oh no
414: SRm7 but that's the thing you've got a cold for not taking the right precautions you know what I mean it could just be someone on the bus kind of walks past and coughs and you can get it you know that's not your fault for not wearing a mask
415: SRF8 I suppose if its airborne yeah
416: SRF9 with MRSA it's a naturally occurring, its always been around hasn't it its not something new
417: SRF6 so is it a level of infection that they put you off work or any
418:
419: **Mod In one of the hospitals it was just if you were found to be carrying MRSA they just put you in the clerical side, they just kept you away from patients until you had a negative swab?**
420:
421: SRM10 I think that's probably more to do with the media hype on MRSA than the actual physical effects of it.
422: SRF6 I suppose as an exercise is would be interesting thing to have done to see what the statistics were.
423: SRF8 it would be interesting to see.
424: SRF9 but if 50% of the staff have got it
425: SRF6 oh yeah you couldn't do anything about it
426: SRF9 then 50 % population's probably got it we're not any different to anybody else around ***
427: SRM7 yeah exactly
428:

429: **MOD Through out your training and your careers have you had any education about infection control?**
430:
431: SRM7 yes
432: SRM10 what
433: SRM7 I think it was, I think what we had was a one kind of three hour session where it was called preparation for practice or something and they went through the whole in those three hours they went through not only infection control they also covered stuff like oxygen use and suction so it was all kind of like getting ready for the hospital
434: SRF9 what was that in your induction?
435: SRM7 no it was in our first year at university but, I'm not, I don't think there was anything else after that, was there?
436: SRF8 no maybe it was repeated in the third ycar
437: SRM7 I think there may have been one other three hour lecture on infection control about hand washing and where the areas of the hand you know people miss and that kind of stuff, but there was like probably yeah a three hour session on that in the three years one that was it.
438:
439: **Mod what about since you've been qualified?**
440:
441: SRF8 no
442: SRM7 no
443: SRF9 there haven't been any day courses, like the fire and manual handling are mandatory, but theres nothing like that
444: SRF8 there's an email out about MRSA at the moment if anyone hasn't checked their email
445: SRF6 there was a lecture from an infection control nurse about three or four years ago one lunch time about various, like how to deal with various scenarios, spillages and stuff that I remember and also I went on like a erm some kind of management course and everybody had to prepare a presentation and someone did it on infection control, one of the ITU nurses I think, but apart from that nothing other than that
446: SRM7 I've just remembered I actually did my dissertation on infection control
447: SRF8 oh god I did too, I don't remember any of it
448: SRM7 yes I just remembered so yeah I have done that
449: SRF8 I've not done anything since starting here
450:
451: **Mod is it included in your induction at all?**
452:
453: SRM10 not that I can remember
454: SRM7 no
455: SRF8 I don't think so
456: SRF6 don't ask us we didn't have an induction, I didn't even have an interview did you
457: SRF9 I had an interview but no induction
458:

459: **Mod you just said the Fire and manual handling is mandatory do you think infection control should be or not?**
460:
461: SRF9 I think it should be yes
462: SRM7 I think more and more now especially with like recent media attention around it all I think people are more aware of it and are asking more questions about what are you doing to stop it so
463: SRF9 it would keep you more up to date
464: SRF6 I think it could be tagged on when we have to do the fire and the CPR, could it not, an hour or whatever it would take be tagged on to that day
465: SRF9 like an update, yes
466: SRM7 like a manual handling refresher course
467: SRF6 yeah
468: SRM10 yeah you don't need a whole afternoon for fire training do you
469: SRF6 no, no you don't, you could sort of tag it on to the end of something
470: SRM10 If there's a fire sound the alarm and get out, add infection control on there you don't need the whole afternoon.
471: SRF6 at least it would be logged who had gone cos *** logs who's gone to what, what days and that hasn't she and if its tagged on to one of those its. Then we couldn't say we didn't know, if we had attended that day
.
472: SRM10 we should have regular updates cos then everyone would remember and then you wouldn't get people coming down with MRSA and not knowing about it cos hopefully people would say oh no we went to that course last week we have to tell them
473: SRM7 again theory and practice are two different things like
474: SRM10 oh yeah exactly but
475: SRM7 but if you look at the manual handling you're supposed to go to a refresher course every year or whatever two years or whatever it is but you go there and they tell you you shouldn't be lifting patients you know this is the way you lift them and probably about a day and a half after you probably do it that way and then you're like oh sod it just pick the patient up get it done cos I haven't got time to be fafing about with slidy sheets and rolling beds and do you know what I mean, just get them on and that's it you know so yeah its great yeah and probably having this infection control update wouldn't be any different you'd go there and yeah very good must clean everything do this a week later it would be oh sorry I haven't got time just get on with it and just do it
476: SRF8 it would raise awareness though
477: SRM7 it would yeah but theory and practice are two different things
478:
479: **MOD when you've had any of your training then has it been specific to x-ray?**
480:
481: SRF8 yes yes it was and like how some different studies have like shown there was still loads of germs on x-ray plates and even the x-ray

button the exposure button and that kind of stuff, yeah it was all related to radiography and hospital in general aswell.
482: SRM10 there was a study that showed that these [picks up a pen] are one of the major causes of infections
483: SRM7 ties
484: SRM10 that's why you shouldn't be wearing shirt and tie, we should try and get uniforms sorted out
485: SRM7 or wear scrub like yours
486: SRM10 no we should have proper uniforms, not shirt and tie, cos you did just say it was an infection risk
487: SRM7 yeah but I tuck it away when I handle any patients
488: SRM10 oh right, it's a health and safety risk as well cos if someone grabs your tie they could strangle you, especially in this area
489: SRM7 it looks good though
490:
491: Mod do you think patients and staff in the x-ray department are any more or less at risk than the rest of the hospital?
492:
493: SRM7 more
494:
495: **MOD why?**
496:
497: SRM7 cos you've got we've got more of a through put through here, do you know what I mean, cos like we've got people like out patients coming in and you know in patients coming in and there's people from all different bits of the hospital coming in through us all the time, where as other places like I suppose A&E is probably another bit, its like A&E when you've got loads of people coming in but erm I think here [x-ray] probably cos you know cos like we have such a variety of people who come through you know you have expecially the main x-ray where you have inpatients mixing with out patients and all the kind of infections and stuff that can go on that way
498: SRM10 which is going to be made worse when inpatients and outpatients will be x-rayed in the same rooms
499: SRF9 they'll also be in the same waiting room as well
500: SRM7 oh they'll be fine
501: SRM10 yeah I don't care, I'll be fine
502:
503: **Mod what does everybody else think about whether they are more or less at risk?**
504:
505: SRF9 the staff are more at risk
506:
507: **Mod well both, sorry were you saying you thought the staff are more at risk?**
508:
509: SRF9 no I was just wondering if that's what the question was
510:

511: **Mod oh sorry , yes we can start with staff, do you think staff are more or less at risk**
512:
513: SRF9 the x-ray staff compared to the rest of the hospital
514:
515: Mod yes
516:
517: SRF9 no, I wouldn't have thought so
518:
519: **Mod why not?**
520:
521: SRF9 cos it's the same patients we are dealing with, it's the same hospital. I guess it depends on how good you are at your own infection control
522: SRF6 aren't we masters of the no touch technique
523: SRM10 we are probably more at risk than some staff aren't we
524: SRF9 perhaps the hearing department
525: SRM10 well we're more at risk than the clerical staff cos clerical staff don't touch patients do they you know
526: SRF9 no
527: SRM10 I mean pathology I would have thought would take have more precautions in their department
528: SRM7 hmm
529: SRF9 but their samples don't move
530: SRM10 yeah but I mean they should be wearing gloves and everything should be sealed up so surely they should be at less risk
531: SRM7 but everything is sealed away and vacuumed bottles and stuff
532: SRM10 doctors got no risk cos they don't touch patients, I mean you're are very hands on you know
533: SRF8 you are touching everyone basically
534: SRF9 sheer volume
535: SRM10 do you wear gloves for mammography
536: SRF9 you can't do mammograms with gloves on
537: SRM10 I don't know I've never seen one done so I wouldn't know
538: SRF9 its only if they are really foul patients or they've got some you know
539: SRM10 but do you wash your hands after every patient
540: SRF9 well I should do but well I use the alco wipes [to clean equipment] so I kind of think well you know that's done it that's done the job
541: SRM7 yeah, but why can't you use gloves when you do mammograms
542: SRF9 because you've got to lift the breast up and the gloves, your hands slip you've got to get a really good grip of the breast and they slip
543: SRM10 so we're more hands on aren't we really compared to a lot of other staff
544: SRF6 yeah
545: SRF9 yeah
546: SRF8 even the ward sisters and nurses are confined to the same patients and not loads

547: SRM10 but then if they've got something nasty they've got gloves to put on any way supposedly
548:
549: **Mod are infection control measures followed in the radiography department?**
550:
551: SRM10 we're not as bad as some places surely
552:
553: **Mod which places do you think are worse?**
554:
555: SRM10 well if we're told the patients are MRSA , I know in room 4 the nurses will take care, they double bag everything, everything goes in red bags linen goes in red bags, the place is wiped down all the rest of it
556: SRF6 I would think in the cases that we know about that we are very very good I would think we are very slap dash generally
557: SRM7 yeah
558: SRF9 yeah, yeah I would agree with that
559:
560: **Mod what would you say prevents infection control practice?**
561:
562: SRM7 time, time and resources as in people you know its like you know one we're staff levels are low two our work load is sky high so we've just kind of like with the two things we just don't have time to like put those infection control practices in to practice. We've just got to get them in do them get them out and get the next one in.
563:
564: **Mod anything else?**
565:
566: SRM10 lack of communication, you don't know the patient's infected so you can't put your practices into place, but then lack of communications universal
567: SRF6 but I suppose you could argue that if our basic practices were good it wouldn't matter whether we knew whether they were infectious or not we'd be doing the same for each patient
568: SRM7 yeah true
569: SRF6 maybe there ought to be a big push you know more erm awareness
570: SRF9 specific guidelines
571: SRF6 yeah whether we'd follow them or not is another matter
572: SRF9 yeah cos the IRMER guidelines are there in place and they are mandatory but they don't all follow them because some people don't know what they are, you read it once but you forget and er and then you're in a hurry and you're tired
573: SRM10 that comes along with education doesn't it you know your guidelines cos you know when we had the chicken pox case I asked two different people and got completely different answers as to what, and I'm like well how infectious is it what do I need to do is it airborne I mean I don't know, I didn't know anything about chicken pox and no one seemed

to know they just wanted the x-ray that's all they cared about so I sent the patient back and told them I'm not doing it. Cos I wasn't willing to risk it, at the time I had a four month old baby at home, I thought I'm not willing to risk it
574: SRM7 but have you had chicken pox
575: SRM10 I don't know
576: SRM7 you don't know
577: SRM10 I don't know, my mum doesn't even know either so I don't think I have
578: SRM7 oh ok
579: SRM10 you don't necessarily, I mean my brother had it and I never got it, so would I get it from somebody else. It was just the fact that as I was saying you just don't know somebody could come up with something else
580: SRM7 but if you've already had it are you still infectious if you've like if you've had it years ago and you come into contact with sort of the new case can you pick it up from them
581: SRM10 I don't know that's what I'm saying I don't know
582: SRM7 right ok
583: SRM10 like in chest clinic I would say the most you do is query TB chest perhaps you should have masks on for all of them cos how do you know which ones have got active TB and which ones haven't ok you might have been vaccinated against it but you know
584:
585: **Mod how would you say that the practice could be improved then?**
586:
587: SRF10 how long have you got, another hour. Communication
588: SRM6 definitely
589: SRF9 yes
590:
591: Mod Between who?
592:
593: SRM10 well everywhere, the departments. There are bits on the request forms where they can write MRSA but they won't or they don't. or communication but with penalties if its not communicated so it should go back to whoever's in charge and they should be penalised for not letting us know.
594: SRF9 but also the guidelines within the department to have a general reduction in infection like we should have a clean the cassettes and equipment regularly and it should be done and er
595: SRM10 recorded proved
596: SRF9 yeah
597: SRF8 it used to be didn't it
598: SRF9 it could be almost like going back in time to sort of tell everybody what to do its like going back to school but
599: SRM10 it is quite slack here though by comparison to other places
600: SRM7 I just think it is to do with like time and you know people just don't have time
601: SRf9 why what do other places do, I've never worked any where else

602: SRM10 well like in room four, I mean room four should be, you should be in scrubs with you know clogs on you shouldn't be in normal clothes in room four because it's meant to be a sterile room
603: SRM7 really?
604: SRM10 but then on top of that you shouldn't be doing barium swallows in room four because its meant to be a sterile room
605: SRM7 they do HSG's in there
606: SRM10 yeah but that's a sort of semi sterile procedure
607: SRM7 oh right ok
608: SRM10 I mean we won't do enemas in there, but you shouldn't be doing general out patients trapsing in in there normal clothes having swallows we're only do it because there's no other room, cos the waiting lists are far more important than infection control
609: SRF6 but then again the nurses are wondering in and out from room to room in exactly the same clothes
610: SRM10 which they shouldn't be doing, but in theatres here I mean at *** theatres if you went into any theatre you had a, you had your hats on but you had to have a mask on doesn't matter what you went into the theatre for, you had to have a mask on
611: SRF6 it used to be like that here
612: SRM7 it hasn't been since I've been here
613: SRF6 it used to be like that here, I can't remember when it changed but I remember when I used to do theatre regularly sort of many years ago you weren't even allowed to open the door and stick your head in and say is Dr so and so in here without a mask and everything on and I was really quite surprised, it may have been when I came back to work in the late 80's after having some time off that the practice was completely different and I was really quite amazed at how it had changed in that seven years
614: SRM7 I think its got something to do with some research I might be wrong here but something about those masks not actually working after a certain time and there's no point having the mask on and I think its really half an hour
615: SRM10 there is something about yeah you should change them every three or four hours
616: SRM7 no apparently no its shorter than that it's less than that its less than an hour that you have to change them and its like what would be the point of putting them on
617: SRF6 but isn't a token effort better than no effort at all
618: SRM7 yep true true but it think that's probably why the thing has changed. I mean I agree with you I think we should have them on but I think that's why we don't
619: SRF6 or invest in masks that are better quality
620: SRM7 but that's money
621: SRF6 yeah but how much money is MRSA an infection costing
622: SRM10 look at the gowns we've got though talking about quality. Those stupid plastic gowns what stops it going up your arm you should have full, we used to have erm again at ** we used to have full sleeved gowns, cuffs full size for all infectious patients not these cheap plastic things cos it's a money saving

623: SRF6 it used to be like that many years ago it used to be a real fag gowning up for theatre wasn't it you used to have to, even to go to recovery you used to have
624: SRM7 recovery
625: SRF6 yeah
626: SRF8 oh my god
627: SRF9 are you talking about *** that's the only time I did theatre
628: SRF6 no here as well you used to have to yeah it was a real bind you know you couldn't even you never just did something quick you know it was all gown up and everything
629: SRM7 what was the work load like though back then, I'm not trying to , I mean was it as busy as you are now cos I think that's the
630: SRF6 yeah but once you're up in theatre, you're up in theatre aren't you
631: SRM7 but you see you can't even now if you're up in theatre and you finish you come back down cos we need your help back downstairs again cos its so busy
632: SRF6 yeah it was the same then
633: SRM7 but I do think our work load is a major factor in to how we practice
634: SRF6 cos in *** the theatres were right up on the top floor and the processing was down in the x-ray department so you used to have to take your stuff off wander all the way down process your film wander all the way back up again put your stuff back on again take them into theatre
635: SRM10 the number of times you see people doing IVs without gloves on that kind of thing it happens
636:
637: Mod just quickly since you've mentioned that I know you've [srm10]mentioned hiv and hep c a couple of times but nobody else really has is it just MRSA that people consider as a problem?
638:
639: SRM6 I think people take ohh I don't know, people take a lot more care about HIV Hep B Hep C cos they're kind of blood borne kind of or blood products and body fluid type products that you get it from I'm not sure exactly how MRSA is airborne I think that's why you're worried about it a bit more cos theres not those things in place where as you know if people are more aware of you know getting contact with peoples bodily fluids in the hospital do you know what I mean but erm people don't worry about MRSA cos you don't know
640: SRF8 yeah I think with HIV the knowledge is there
641: SRM7 yeah exactly
642: SRM10 but if you got MRSA you'd be like oh well I've got MRSA, but if you got Hep C from somebody you'd be like you know, you know you're going to be ill, you know its going to make you ill, HIV you know is going to make you ill isn't
643: SRF9 its going to ruin your life
644: SRF8 I think people are very wary of body fluids as well, the knowledge is there rather than not so much as for MRSA

645:
646: **Mod how do you think the knowledge is there more for HIV than general infections?**
647:
648: SRF8 just more notices around more
649: SRM7 its just in your face more
650: SRF8 its just brought up a lot more
651: SRF6 yeah you're not going to touch any body that's gucky without gloves on are you
652: SRM10 no you're not
653: SRF8 no
654:
655: **Mod is that what it is then when its visual so you can see it?**
656:
657: SRF8 yeah maybe
658: SRF6 yes I think that's what it is, I think it is a more visual thing yeah definately
659: SRM10 i would say it is yeah, but I always think when you watch some of these American things like ER the documentary type programms they've always got gowns masks gloves on every patient, every trauma patient we don't do that here
660: SRM7 no
661: SRM10 we have gloves but we don't have full trauma outfits, I mean even on ER they, you know you've got your green trauma outfits and everything, we don't do that over here
662: SRM7 yeah they wear goggles and everything don't they
663: SRM10 even the anaesthetist they sit there with there face in front of the patient face and you know they're doing their intubation don't they they don't have a mask on in case the patient splutters in their faces or whatever
664: SRM7 what here you mean
665: SRM10 yeah
666: SRM7 yeah you're right
667: SRM10 when was the last time you saw an anaesthetist intubating someone with any form of protection on their face
668: SRM7 never, never
669:
670: **Mod so who do you think is right then?**
671:
672: SRM7 the Americans
673: SRM10 surely it's better to be safe than sorry surely, if you're trying to protect yourself, and in protecting yourselves you don't pass it on to anybody else so you are protecting everybody else
674: SRF6 I think if we were more conscious of our own vulnerability then we would do things that would protect us and that would ultimately protect the people that we are dealing with
675: SRM7 mmm
676: SRF9 mm yes you're probably right

677: SRM10 it would happen if there was, I mean look at SARS I mean everybody there went out in masks, so if something came along like that it would happen
678: SRF6 I think we ought to be more selfish about our own erm health
679: SRM10 I've just come back from Japan and they do, there are some people who still wear masks when they're out, on the tube and they still wear them.
680:
681: **Mod ok well that's all I have to ask, does anyone have anything they would like to add.**
682:
683: Thank you

Focus Group Discussion DGH1 Superintendents

9:
10: My name is sur11 I'm a superintendent in charge of outpatients. I've been qualified 20 plus years I don't think you need to know the plus years,
11:
12: Hi my name is sur13 I'm a super three for the CT scanning and I've been qualified 20 years
13:
14: I'm Sur12 and I've been qualified for 30 something years and I am in charge of A&E x ray
15:
16: My name is sur 15 and I work in the chest clinic I'm a super four and I've been qualified for nearly thirty years
17: **Mod Thank you that's great,**
18:
19: **Mod the first thing I'd like to talk about is what you think about when somebody says infection control to you**
20:
21: Sur13 I find it quite scary because we have a lot of practices in the hospital that do not, would not stand up to scrutiny
22: Sur12 I think they are very contradictory incredibly contradictory on what they what some do want and what others don't want and how you approach patients who's infectious what they expect you to do
23: Sur15 the first thing that comes into my mind is all this washing of hands really when somebody says infection control and that is exactly what came into my head when you just said infection control
24: Sur11 I must admit since I've been at hospital one I haven't heard anything about infection control apart from doing this discussion, like these are the procedures that we follow here or anything. All though that you know obviously with in patients I'm not involved in and that's MRSA and stuff erm I suspect that I don't know I have heard rumours that we've had to fill in incident forms in occasionally for people not er being told radiographers not being told that the patients were MRSA, is that correct
25: Sur12 yeah
26: Sur11 erm so they haven't taken any precautions at all which obviously is quite scary erm I get the impression we are a bit lax at hospital one I don't know if that's the truth or not
27: Sur12 well in some places we are and some places we're not but basically we should be washing our hands before and after every patients which we don't do, in patients out patients CT wherever
28: Sur11 erm that isn't feasible though is it really
29: Sur12 no I don't think it is, personally I don't think it is. I would have to stop working my hands couldn't take it [this radiographer has dermatological problem on palms of hands]
30:
31: **Mod you were just saying about protocols to follow. What sort of things do you think that would improve?**

32:
33: Sur11 well procedures for MRSA erm the procedures for handwashing procedures for clearing up any spillages erm blood or otherwise erm I'm sure they've got, have I got them in my department [question directed to other members of the group]
34: Sur12 yep they are actually there. There is procedures written in all the books in all the policy books. And when MRSA became very prevalent, we actually had people come down and talk to us about it about what to do.
35: Sur11 oh right
36: Sur13 there's a new policy that you, it will be on your email for MRSA.
37: Sur11 oh ok
38: Sur12 yeah its just come out, its an MRSA sheet
39: Sur11 oh that's good
40: Sur 12 but what surprises me is that erm in ITU because the hospital has been using too many gloves we don't wear gloves to do ITU patients anymore, this happened yesterday
41:
42: Mod you're not allowed to wear them or just?
43:
44: Sur12 we're using too many gloves so we don't have to use them in ITU anymore and before each patient
45: Sur13 what about the cassettes do the cassettes have to be covered up or
46: Sur12 no well the cassettes generally aren't covered up actually because they go under the sheet now they don't go under the patient and we always clean them with a medi wipe afterwards and the machine but we don't, we are not to wear gloves because we are using too many now. I haven't been over to query that one I'm afraid but I would like to
47:
48: Mod where did you get that information from?
49:
50: Sur12 the radiographers coming back from ITU
51:
52: MOD do you think there are any particular types of patients that you need to be aware of infection control with?
53:
54: Sur15 yes patients with open wounds and patients with diarrhoea and vomiting erm but potentially every patient is an infection hazard and if you don't know I mean patients come down from the MRSA or HIV but just because they don't have that written on the form doesn't mean they don't have it so its theoretically I think you should be following the same practice for every patient I mean we don't but you should be following the same practice for every patient. And there's an issue about discrimination as well. Whereas with an HIV patient if you only ever wore gloves and stuff for HIV patients then everybody would know that they had HIV and there's an issue there with confidentiality. But that's a whole other subject
55: Sur13 I know in the chest clinic the open TB cases are kept apart which is very far and few between anyway but if they need an x-ray I am told before hand that it is an open TB and they want to bring the patient in and then out

56: SUR15 oh that's good
57: Sur 11 do you wear a mask
58: Sur13 the patient wears a mask but not every [not every one else] and that's the best way to control it anyway so
59: Sur12 so what about the TB contacts that you do
60: Sur13 the TB contacts they are just coming in and out they don't its very rare to catch TB that quick anyway dealing with TB contacts
61: Sur11 right
62: Sur12 oh right ok do they find TB actually in any of the TB contacts
63: Sur13 I haven't found any yet
64: Sur12 right
65: Sur11 touch wood
66: Sur12 yeah true
67: Sur13 well I've been there nearly four years now
68: Sur11 and nobodies contracted
69: Sur13 no *** never come back to me and said oh this has been a TB contact, unless their family members and they are living in the same house in which case yes but yeah you know when I say TB contacts I don't mean somebody in the hospital or kids at school or hospital contacts you hear about, I've never found any.
70: Sur11 I must admit when I was working in **** one of the radiographers got TB I don't know whether that was from work, she never knew it was quite you know scary the fact that she did contract it you know
71: Sur12 the thing is when you're working in that environment it wouldn't matter whether it was TB or something else we could you're in a position that you could you could catch it
72: Sur11 mm and I do know somebody that did and she was quite young and fit you know don't know how she caught it I was quite shocked.
73: Sur12 one of the endoscopy guys had it
74: Sur13 did they
75: Sur12 yeah and they didn't know that he had it for a long time he just wasn't well but he had a very strange strain of it that only affected something that didn't show up on X-rays and he was off they didn't actually find it until they did a, they went in and did an actual biopsy I think it was quite involved
76: Sur13 gosh
77:
78:
79: **Mod you talked about people with open wounds and HIV and how do you generally know about the status of these patients about whether they are infectious or not?**
80:
81: Sur11 on the forms usually, hopefully
82: Sur12 yeah
83: Sur11 we had one this morning that was HIV positive it was on the form
84: Sur12 they should put something , they should but they don't put it on
85: Sur11 so then I knew I just had to you know wash my hands. I mean theres nothing that awful about HIV, its more blood isn't it
86: Sur13 yeah

87: Sur11 and spillages
88: Sur13 well its actually relatively difficult to catch isn't it
89: Sur11 yeah, well I would imagine
90: Sur13 its hepatis that's the big thing really isn't it
91: Sur11 yes yes
92: Sur13 more than HIV
93: Sur11 and were all covered for that aren't we when we come and have a test
94: Sur12 yeah but we're not covered for [hep]C I don't think
95: Sur13 no
96: Sur11 oh are we not
97: Sur12 no we're only covered for [hep]B
98: Sur11 right
99: Sur12 and [hep] C is the bad one well [hep] B is the bad one, but [hep] C is the really bad one
100: Sur11 see I think they test for that now, wasn't it [hep]B and [hep]C they test for when I got my results back from occupation health I'm sure I got two
101: Sur12 they may well test for [hep]C but they can't really you know vaccinate against [hep] C
102: Sur11 no but they test your immunity
103: Sur12 I don't know, do you know about [hep]C
104:
105: **Mod no i don't know about what they test you for, i don't think there is a vaccination though.**
106:
107: Sur15 no I didn't think there was a vaccination against it
108: Sur12 no there isn't no there isn't a vaccination against [hep]C
109: Sur13 but yeah its usually on the form. And you can see if they've got open wounds
110: Sur12 you hope its on the form
111: Sur13 yes
112: Sur11 that's the only trouble when it isn't
113: Sur13 well you can't assume can you, you can't assume because we all know that time when they didn't
114: Sur11 and do you try and bring them down last thing of the day or something, the MRSA patients
115: Sur13[shakes her head to say no]
116: Sur11 no is it at anytime
117: Sur13 its just so prevelant that can't
118: Sur12 you just clean
119: Sur11 oh really, at *** we used to bring them down last thing of the day, for CT and general, sort of four o'clock onwards, I don't know just so you could give the room you know give it a good clean afterwards
120: Sur13 yeah
121: Sur11 but no you don't do that here
122: Sur12 its just very quick cleaning, when you go into the cleaning mode its just, theres three of you and you go you do this and you do that, and you just finish it you just do it

123: Sur13 when I first came ten years ago it was a really big deal here when you had an MRSA patient very big deal and you had all the granules and the everything and everything was moved and everything was you know, we wore aprons and gloves and everything whereas now its just its not at all I don't know if that's just because there are just so many patients that have it we've become
124: Sur12 its not us that's at risk it's the patients that's at risk
125: Sur13 oh yeah yes
126: Sur12 so I mean we don't really need to be gloved and whatever we need to just clean ourselves and everything that they've touched afterwards
127: Sur 13 yes, but you don't want to pass on the infection
128: Sur12 no
129: Sur13 so you want to protect yourself in that respect
130: Sur12 yeah granted, but erm
131: Sur13 there's one really huge issue I have with gloves huge issue, and it happened yesterday with an ITU patient the people come down from ITU and they've all got gloves on and that's all fine we all glove up and then they walk around and they come into the control room and they are touching everything and you think your protecting yourself but what about everybody else it really bugs me that people put gloves on and then they think that means its alright some how, its very hard when it's a consultant anaesthetist
132: Sur12 well make an issue out of it, I would
133: Sur13 yeah
134: Sur12 I'd just say look you know if you want to come in here and touch things take the gloves off
135: Sur13 yeah
136: Sur12 plain and simply. Make him stand up and take, cos the worst people to, they've found the worst people to spread all these things are the doctors on pens
137: Sur11 I was going to say that, its always rumoured that the doctors are the worst ones cos they just seem to think they are above all these you know
138: Sur13 yeah
139: Sur11 and they are the, yes they are very busy and they you know that's not the point is it and somehow they, whereas anyone else gets in trouble doctors get away with things I don't know. They just irritate me sometimes, you know the rules don't apply to them but of course they do but they just seem to get away with it.
140:
141: **Mod which would you say were the most important areas of infection control?**
142:
143: Sur11 well cleaning up after a spillage if there has been a spillage like in CT we used to get some ghastly things sometimes, so kind of really cleaning up properly you know spillages of blood er after that to make sure everything is erm and it was amazing at *** we didn't seem to know anything we didn't know where any of the cleaning stuff was or I think it was after one incident when we didn't know what to do, it was ridiculous really but er sort of highlighted the situation and er then we got the infection control person to come and talk to us and say what should we do should we cos you know one of the doctors said just get the cleaners in you know and

they were saying no you can do it yourself and have you got the right stuff and you know and checking everything
144: Sur12 the cleaners won't touch it
145: Sur13 no
146: Sur 11 no but
147: Sur12 no they won't
148: Sur11 they won't touch it?
149: Sur 12 no there, if there's any bodily fluid
150: Sur11 its up to you
151: Sur12 yeah its up to us
152: Sur13 cos they're just domestic cleaners aren't they
153: Sur12 yes
154: Sur11 at *** the cleaners used to do it if you asked them, they'd have all the right stuff and everything
155: Sur12 no they won't here. Well if we get one of their supervisors to come down then they'll do it cos they've had training, if its just the domestic ones they won't touch it, it's up to us, but there's spillage boxes in all the rooms
156: Sur11 right
157: Sur12 if you know where to look for them and the granules
158: Sur11 what they're in all the rooms?
159: Sur12 they should be
160: Sur15 yeah I've seen them, the nurses are very good about it anyway
161: Sur11 we don't have any in out patients but I mean we don't really get spillages
162: Sur12 I'm sure, well there was one over there
163: Sur11 where is it? I've never seen one and I've been through all the cupboards
164: Sur12 well its just a plastic box with a lid on it
165: Sur15 it might actually be in the cupboard where the films are kept
166: Sur12 cos they did put them all around when we had the big issue about five years ago
167: Sur11 and they're granules,
168: Sur13 yes there is
169: Sur12 there's granules and there's
170: Sur11 basically you put granules
171: Sur 12 if there's a dry spillage I think if it's a dry spillage you have to wet it and then put the granules on and leave it two minutes cos it takes them that long to neutralise any of the bugs. The granules won't work on a dry spillage so you should put some water on it and then use them
172: Sur11 oh right
173: Sur12 cos you can't get it out, but if it's a wet spillage you just put the granules on and it neutralises any thing within two minutes apparently
174:
175: **Mod who would you say infection control benefits?**
176:
177: Sur11 everyone, the patients, the staff erm who else have we got in this place
178: Sur12 yeah everyone patients and the staff
179: Sur15 really it's the patients and the staff

180: Sur12 it protects you and it protects the patients
181: Sur13 and the community at large cos we are all going out aren't we into the community
182: Sur11 hmm true. I mean some places they don't let you go out in your uniform
183: Sur13 no
184: Sur 11 you should change if you want to go out. We weren't allowed at the *** to go out in our uniform
185: Sur13 no you weren't at ***
186: Sur11 are we here
187: Sur 12 yeah everybody goes out in their, the only thing anybodies ever said about uniforms is what *** said in the staff meeting about not wearing blues
188: Sur11 oh right
189: Sur12 you weren't here for that, no more blues if you're in blues and you go to the canteen they won't serve you
190: Sur11 right. Or in the department
191: Sur12 in the department she doesn't want to see blues either
192: Sur11 so when sometimes when they people come in
193: Sur12 they're making an issue out of it
194: sur and they've forgotten their uniform or something
195: sur12 they're making an issue out of it she wants to see the guys in shirts and ties and
196: sur11 oh right
197: sur 12 its coming from the top its not just *** its coming from the top about that
198:
199: MOD why is that?
200:
201: Sur11 its awful actually when you think about it, people come from theatre and they sit in the canteen in their blues its not very nice
202: Sur12 why is that it could be image
203: Sur11 image[laughs]
204: Sur12 erm it could be er basically I think its image I think
205: Sur 13 I think I agree with you yeah
206: Sur12 I think its image cos blues aren't the most smart thing that you've ever had on in your life they're comfortable because they're sloppy but they're not nice looking and you know they're, they are designed for one particular thing which is theatre or any area where you're working in that sort of environment where you put on the uniform that's already been well washed and you're going in to a clean environment erm and we are not using them as that basically
207:
208**: Mod so do you think its more to do with image than as sur 11 said it not being very nice wearing them in the canteen?**
209:
210: Sur 12 well yes, they have said if you have a white coat on then they will serve you obviously cos you're obviously coming from theatre, that

was the stipulation you have to wear the white coat, so *** is sitting there with his white coat
211:
212: **Mod have you had any education about infection control either when you were training or since then?**
213:
214: Sur11 I can't remember when I trained
215: Sur15 it wasn't in my training I don't think there was anything
216: Sur11 there must have been in hospital practice or whatever
217: Sur12 yeah
218: Sur13 oh I suppose hospital practice yeah
219: Sur12 yeah probably in hospital practice
220: Sur15 I can't remember any
221: Sur11 they did do a bit on infection control
222: Sur13 I can't remember all those years ago
223: Sur11 its not worth asking us what we did in our training
224: Sur12 I remember someone coming to us down here at ** but I mean its not usual
225: Sur13 we have haven't we
226: Sur12 yes since you've been here. It started with MRSA and then some other issue and we were all a bit concerned about how the, what they were doing about it or what we were supposed to be approaching it, I think AIDS was one of them and so they came down and did talk to us they had a couple of three or four meetings but that was a good
227: Sur13 oh it was years ago
228: Sur12 yeah
229: Sur 13 theres nothing regular, I feel it would be good to have something an annual thing like the fire because
230: Sur12 yes
231: Sur15 yeah I agree
232: Sur13 cos I think that we just get very sloppy cos we're all so busy and its easier not to do it than to do it
233: Sur11 hmm
234: Sur12 yeah
235: Sur13 like washing your hands between each patient, its easier not to. And the number of people who don't wear gloves when they're doing IVs is my biggest bug bear
236: Sur11 oh really
237: Sur13 yeah that really drives me mad
238: Sur11cos some people hate it don't they
239: Sur13 well get on with it
240: Sur11 if they haven't trained with them. Do you wear them [directed to sur12]
241: Sur12 no I don't, no I don't
242: Sur11 no I mean I started wearing them but then nobody wore them at the ** and I just thought it was easier without them so cos you can't feel
243: Sur13 its only easier until you get used to doing it with them on
244: Sur11 is that right

245: Sur13 I mean I always always wear them and I just think you don't know that you're gonna, you're gonna drop the needle or whatever and there's blood everywhere
246: Sur 11 or get a needle stick
247: Sur13 you don't know what the patients got or even if it says nothing on the form you don't know
248: Sur11 although a needle stick can go through a glove anyway possibly
249: Sur13 yeah
250: Sur 11 a lot of doctors don't use them
251: Sur13 no, now that is what the problem is none of the consultants wear gloves. In fact *** [a consultant] once said to a different consultant why do you always wear gloves. Oh I suppose you have to where you're from because of the infection [other consultant from Africa]
252: Sur11 oh my god I can't believe she said that
253: Sur12 oh that's believable from ***
254: Sur13 but her attitude was very much that in Britain in our country you don't have to worry about it because there aren't
255: Sur15 it's a third world country problem as such
256: Sur11 oh I see
257: Sur13 yeah and you think you're living in cuckoo land you know. And I had a radiographer tell me the other day well now you know that the skin is the best barrier you can have so if you've got no cuts it doesn't matter
258: Sur12 who said that
259: Sur11 a person
260: Sur12 oh right well its no barrier, you don't know where you're putting your hands do you
261: Sur13 well if you can guarantee you have absolutely no scratches no cuts no nothing
262: Sur15 and being a house wife you just never know
263: Sur13 exactly and you don't know its not going to go down inside your nails and its not you know.
264:
265: **Mod when they came down to talk about AIDs and other infections was it specifically to do with the X-ray department or was it a general talk?**
266:
267: Sup12 it started out as a basic talk in general to inform us about the disease or whatever it was because we were all a bit hazy about it and then I think it did progress to being specific to the x-ray because we were all asking questions with regard to how we as x-ray would approach situations and I yes I think it covered the lot, as I said it must have been 10 years ago easy
268: Sup13 oh yes it was soon after I came here and I've been here about ten years
269:
270: **Mod have you had any training since you've been here? [directed to sup 11]**
271:
272: Sup11 no,

273: Sup12 did they not mention anything in the induction, was that part of your induction cos you went for a day
274: Sup11 I don't think we did have any on infection control at the induction, I can't remember but I haven't got, I'll have a look at my notes but I don't think we did. The thing I remember about infection control is this *** thing because we'd sort of called them because of an incident
275: Sup12 which is what we did as well here
276: Sup11 that's not the best way of doing it
277: Sup12 no it should be preventative rather than a catch up type thing
278: Sup11 I do think that those hand erm alcohol gel things would be good, what do you think
279: Sup12 well apparently they brought two for A+E they put them on the side for people to use and they immediately vanished we have no idea where they are but er what was interesting today, the nurse, there starting a health and safety infection control thing and *** has just agreed to become part of it
280: Sup13 oh great
281: Sup12 today *** has just come along and given her a sheet that she has signed and she will go along to the thing and I think maybe it will progress from there hopefully
282:
283: Mod is that like a link nurse type thing?
284:
285: Sup12 yes but also I think its to make you aware and bring it back to the department and make them aware whatever somebody whose in charge of infection control basically the nurses are very busy they can only do so much but unless, and we've had such an up heave with our nurses you know we don't know whose doing what when and how and *** really is only temporary erm she's catching up from way back so you know she hasn't had time to do to put any of this in place. Hoefully when they get their G grade then maybe they can
286:
287: Mod do you think that's important having a radiographer involved in infection control?
288:
289: Sup12 yes, somebody who keeps an eye, reminds you, that's what you need, reminding because you get very slack
290: Sup13 yeah you do you forget about it
291: Sup12 you're too busy or what ever
292: Sup13 oh well this patient's all right, and this patients all right
293: Sup12 yeah and especially when its lets say A+E you don't know what's coming in that way
294: Sup15 no that's right you don't
295: Sup12 but do you have time to do all the things that you should do with a waiting room full of patient
296: Sup11 which is why I think the alcohol gel might be better than you know a couple of
297: Sup13 yes exactly but we lost them
298: Sup11 well not even the hand ones even just a couple on the walls, just one in each room

299: Sup12 I mean that would be handy
300: Sup13 I don't know, how effective is that
301: Sup15 its quite effective I believe
302: Sup12 I always use the one in SCBU they have them down in SCBU and theres a policy there when
303: Sup11 and I think you don't have to actually wash your hands and dry them you can just quickly you know
304: Sup15 I tend to just use the alcowipes
305: Sup13 yeah that would be good
306: Sup11 I think that would be much better, who do we have to contact about that
307: Sup12 the nurses, they supply these things
308: Sup11 if we sort of suggested that that might be a good idea one in each room do you think
309: Sup15 yeah
310: Sup13 yeah
311: Sup12 yeah I think that would be better than the individual ones, because
312: Sup11 they just go missing
313: Sup12 the individual ones should be on your person and if they leave them lying around because they haven't got, I mean where would I put one I would have to clip it on, I don't have a belt or
314: Sup13 and then they run out don't they
315: Sup12 yeah and you have to get it filled, it would be better to have big bottles like you have the hibiscrub around, cos that's what they have in scbu, they've got hibiscrub and this alco rub in dispensers you know the ones where you just slash the things down and that's how you clean your cassette clean your hands whatever
316: Sup11 yeah we had them in *** and think people did use them much more than you know handwashing
317: Sup13 yeah
318: Sup12 but the question is if you've got blood it doesn't get rid of blood particles
319: Sup11 no
320: Sup12 so you still need soap and water for that
321: Sup11 you probably need a bit of information usually we don't get blood on us [out patients]
322: Sup13 well you don't but we do
323: Sup12 yeah we do
324: Sup11yeah I don't, well occasionally yeah from bleeding patients
325: Sup12 yeah but that's something I, has anybody ever heard of anything that incorporates alcohol and soap in one, cos that's what I would like in A+E something that they don't actually have to wash the cassettes physically with soap, cos I went and asked them in pharmacy about that and they didn't know of anything, that was they were all alcohol based and alcohol based stuff doesn't get rid of blood products.
326: Sup15 we used to use ones that were like erm like they baby wipes but not, they were just soapy wipes
327: Sup12 oh I asked them about that and they apparently have got oh the baby wipes yeah but they don't order baby wipes here

328: Sup15 yeah but they're not baby wipes, but they are that kind of thing
329: Sup12 that would be what we would need either baby wipes or or something that's on the wall, I think baby wipes would probably be better. I pursued it for a while but I came up against so many walls and then something else came up and you know you just it goes by and comes back to you prior to this some other time about six months later and
330:
331: Mod do you think that would make a difference then?
332:
333: Sup12 well yes, most definitely in A+E just to wash off the skull unit and wash off the cassettes
334: Sup13 mmm
335: Sup12 because taking the cassette and physically putting it under the tap with soap it really is a time consuming and
336: Sup13 and getting water inside then your absolutely
337: Sup12 yeah getting water inside it and getting it dry but a baby wipe would be perfect
338: Sup13 it would wouldn't it, there we go we should just nip down to the shops and get it from petty cash
339:
340: Mod in the radiography department do you think infection control practice is followed?
341:
342: Sup11 no
343: Sup13 no
344: Sup12 no
345: Sup13 that's awful isn't it and the thing is we are the people who should be implementing it
346: Sup12 that's right
347: Sup13 it should come from us
348: Sup12 its very sporadic
349: Sup11 even in the dental room actually, I mean you know we probably need to tighten up on you know the glove wearing and the changing the ear things you now cos I think especially out patients you get so busy that you just all the little kind of niceties goes out the window
350: Sur13 same here
351: Sur12 that's right
352: Sur11 its just like the straw that breaks the camels back isn't it, you know sort of having to put on gloves you know then erm changes those ear things you know and cut the gloves to use them [ear protectors] its like oh no
353: Sur12 yeah well this is it, there's always one more thing and you start pursuing it and you never have everyone there at the same time so what to do when you're trying to propagate what you want them to do you've only told about a third of the people the rest of the people come along they don't know anything about it they just carry on as normal and so the people you've told they just think well they can do it I can do it and you're back to square one again. And I think that's very very awkward you know you have to either be a real tarter about it and you know put huge signs up and great explanation marks and come down on people that don't do like a ton of

bricks or it just doesn't get done and do you have that energy to do that all the time and I'm sorry but that's what it would take all the time
354: Sur13 it would
355:
356: Mod you've just described the infection control thing as a nicety is that what it is?
357:
358: Sur11 well it shouldn't be especially now with when they say MRSA has absolutely gone up through the roof hasn't it and I think that's very worrying that you can't really come into a hospital and have a minor op and not have the er that you've got the problem of will you catch MRSA or not you know because I've known one of in fact one of the staff dark room techs at *** came in for a fairly minor op and went back went home with MRSA erm. I think it's a terrible problem actually I don't know if theres enough research being done on it as to who is you know passing this on, how we can control it I mean like at the *** for instance obviously brand new hospital with no MRSA within two weeks er
359: Sur12 you had MRSA there?
360: Sur11 yeah two weeks well they're gonna bring
361: Sur12 well cos the doctors and people would have brought it in
362: Sur11 two weeks
363: Sur12 did the doctors come from other hospitals?[this was a private hospital]
364: Sur11 well I'm sure there was a little bit of that and you know within two weeks and now they've got a big problem within eight months or whatever it is
365: Sur12 oh god
366: Sur11 so you can see how
367: Sur12 it isn't a nicety
368: Sur13 no
369: Sur12 its more of a, as far as implementing it from our point of view cos its our problem about that it's a huge problem because of propagating what you know and making sure that its followed cos the minute you walk out that door you have no way of knowing what's happening. You can make sure its done while you're there but you can't
370: Sur13 no
371: Sur12 you can't make people do things when you're not there no matter how hard you try
372:
373: Mod you were just saying you needed more research to find where it comes from and things like that?
374:
375: Sur12 and who's spreading it
376:
377: Mod yes there are hospitals where they have screened their staff?
378:
379: Sur11 mm
380: Sur13 oh right

381:
382: Mod what do you think about that?
383:
384: Sur11 try it on those doctors that go into ITU out again and in again you know, I don't know
385: Sur12 they had a screening now just a minute, they had a screening in ITU they did one here before they started doing all the gloves and the aprons which we use and change before each patient they had a really big push to try and get MRSA out of ITU here and we all had to be tested we had to have our breath tested and our noses tested
386: Sur11 oh no
387: Sur12 where they came and took swabs as we went in and out but I don't remember I don't remember hearing anything about that but I do no that they found pens that the doctors were writing with were the biggest
388: Sur13 the pens
389: Sur12 yes the pens
390: Sur 13 of I suppose cos you pick them and write stuff after each patient
391: Sur12 that's right they wash their hands but they've already used the pen before that. The pens that was the big thing, it was the doctors pens
392: Sur11 not doctors coats
393: Sur12 I know what it was it wasn't MRSA it was a do you remember about a year or so ago we have a very virulent strain of
394: Sur13D+V
395: Sur12 no it wasn't D+V it was something else in ITU and they didn't know where it came from
396: Sur13 I do, I do
397: Sur12 and we had the, they cornered this area of the ward off you couldn't go near it without washing without aprons, without anything and we had to wash everything with alcowipes so I'm trying to think no we had to wash everything with bleach they had bleach and we had to wash everything with bleach they couldn't do that for very long because it would mutate and it would be resistant to bleach so they were only allowed to do that for a short period of time and they were hoping that they found, but they don't know how it got there but I have a funny feeling that it definitely had something to do with the doctors pens. But it was really serious it wasn't MRSA it was something much worse than that
398: Sur11 and the problem is apparently there's loads of agency staff here nursing staff and I'm not saying they're not you know reliable or that they're not going to follow procedures but it is a fact that if you just come in and you go and you do the odd shift
399: Sur13 they haven't got the same commitment
400: Sur11 no, there's not the same commitment and probably its last thing on their list
401: Sur13 the only thing is I would love to be able to blame other people but
402: Sur11 but we've all been there
403: Sur13 but A we've all been there and B which department is the department that we have patients from all over the hospital coming to it
404: Sur11 true

405: Sur 13 and its X-ray isn't it, its got to be x-rays has got to be a really big part of the problem hasn't it
406: Sur12 its very much x-rays problem
407: Sur11 although we don't have loads of sort of bodily fluids sort of spilled I mean in CT the occasionally and in A+E occasionally
408: Sur13 no, no that's true we're not changing dressings
409: Sur11 where as on the ward its kind of all the time
410: Sur13 no were're not changing dressings and that sort of thing, but I do think we just yeah
411: Sur11 but yeah we are I take your point yeah
412: Sur12 well I had when they had er I'm not to sure if it was about this particular problem but it was I phoned up by the head of the ITU about what we were going to be required to do when we, yes it was when we had this problem and I said to her now what are we going to be required to wash do you want us to wash thoroughly wash the cassettes? Oh no you don' t have to wash the cassettes, and I stopped and I said why? Well you only use them once
413: Sup13 ohh noo
414: Sup12 and I went no I said that cassette is used from patient to patient to patient I said we only use the film inside once but not the cassette and she went oh and this was the head of ITU and I went ahh
415: Sup15 its actually amazing that we don't know anything about other peoples areas, you know like we don't know anything about ITU
416: Sup15 that's right, its funny isn't it
417: Sup12 and because of that you get this odd. That made me stand still for a bit, I mean she's seen us do things we always take a new cassette out of the machine, but she must think we go back and discard them and start all over again
418: Sup11 throw them away afterwards, that's quite funny
419: Sup 12 there was another incident like that erm it was, there was some patients notes coming down with the patient with stickers all over them. I we didn't know what the sticker was for, when I talked to the doctor he said it was to show the patient had HIV but we didn't need to know that cos we don't have any contact with the patient
420: Sup13 no contact, how do they think we x-ray patients
421: Sup12 yeah that's what I said, he had no idea what we did
422:
423: Mod just before you said that you thought that you were the people who should be implementing this what did you mean by that?
424:
425: Sup12 I just feel that I'm not saying that we're at the top but I think it has to come from the top and part of the problem is like wearing gloves for doing IVs the consultants don't wear gloves so lots of other people don't wear gloves because they think oh well **** **** doesn't wear gloves so why should I wear them erm, and we are the people who can go around who have a degree however small of authority that can say look I'm sorry but you're not doing that until you've washed your hands or did you wash your hands just then or why didn't you we can pull people up on it whereas a junior radiographer can't turn around to me and say, oh well sadly they can

and do, but no its more difficult for someone who is newly qualified to turn around to a superintendent and say you haven't washed your hands have you, you know and its.
426: Sup12 it does, anything like this does have to come down from the top
427: Sup13 it has to come down from the top
428: Sup12 and to make it work you have to have consensus of opinion
429: Sup13 yeah
430: Sup12 across the board so that it becomes a written in gold policy because that is the only way that it will ever be implemented properly. You can't have it sort of say oh yeah well we sort of don't do that here but you are going to have to do it over there it has to be something that's agreed on and written down and you know its not going to be sort of, you know we always say its not written in stone but it really should be written in stone I mean there shouldn't be any exceptions
431: Sup13 and it has to be something that everyone's kind of not bought into but you know that feels they have ownership of otherwise the radiographers won't do it, they you have a need to
432: Sup12 yeah have a consensus
433: Sup13 yeah as you say a real consensus to get everyone to agree to it and explain to everybody why it's so important that they do, which is as important as radiation protection, probably more so
434: Sup12 but even that can be a sketchy thing, so you know I think it really does have to come from the top
435:
436: Mod what do you think prevents infection control practice?
437:
438: Sup12 sloppiness
439: Sup15 too busy
440: Sup13 yeah I think you're right there busyness
441: Sup11 pressure, pressure of work really
442: Sup13 you cut corners, you cut lots of corners
443: Sup11 yes
444: Sup13 and this is just one of them
445: Sup11 something has to give and that unfortunately is, so in other words although that's not an excuse it is in a way cos how something has to give in a very busy situation we can all wash our hands like you know at lunch time in out patients that's fine you might only have about four patients you know fine, we can all do you know, but during the mornings can you imagine having to wash your hands between each patient, absolutely no way.
446: Sup12 no, it's the same in A+E, I mean we do if we have bodily products, but we don't for every patient
447: Sup11 I mean the alcohol gel perhaps
448: Sup13 I think that's a really good idea, I think the alcohol gel is a really good idea
449: Sup 12 but you see with blood alcohol, that alcohol stuff won't work anyway, you would have to use soap and water, now baby wipes
450: Sup11 it doesn't it really doesn't, there was a student he came around and it was very telling it was part of his dissertation he was doing it on

infection control and all he did was go around he had a pack a specially prepared pack which he went around all well I don't know how many hospitals he did, but I know it was a good number in *** and he went in and he tested the orbix and we had all, I had gone I knew he was coming and I had gone in there with an alco wipe and I had cleaned the orbix and I think every hospital had done the same and he came in and every one had blood products on it cos alco wipes don't touch it and he did a paper on it and he's published it and its really frightening cos you think how clean are we, I have yes I have cleaned it and you see the kids going in there with their alco wipes after bloody patients cleaning it off religiously but you know that there is blood products still left on it.
451: Sup11 could that blood product actually
452: Sup12 it only goes with
453: Sup11 transmit anything once its completely wiped by an alco wipe
454: Sup12 yep
455: Sup11 it could
456: Sup12 yep and you have the next patient going on there with their face up against it having their necks x-rayed facial bones after a fight
457: Sup13 errr it doesn't bare thinking about really
458: Sup12 no you're right it doesn't bare thinking about, but that's a fact, it is definitely a fact
459: Sup13 actually how many times in CT do you put a patient on the table and think oh s**t there's a splash of blood on the scanner a wonder if they've noticed it can I just sidle round and wipe it off before they notice. Cos as you say they are in out in out
460: Sup11 conveyor belt
461: Sup13 yeah
462: Sup12 but they're not actually touching it though are they
463: Sup13 no
464: Sup11 unfortunately you know it seems like we all are almost working at third world standards here sometimes because we are we have got that pressure of, and why are we any better
465: Sup12 what would be very sad to go to one of these third world places and they spend a lot more time washing their hands and cleaning up than we do
466: Sup11 they probably do
467: Sup13 yes
468: Sup12 because you get some of the nurses coming in and they are quite surprised at how slack we are
469: Sup11 oh really
470: Sup12 yes
471: Sup11 so perhaps we have just become really sloppy
472: Sup13 we've got nobody no people from the top to implement it
473: Sup11 I do feel sorry for the nurses cos I imagine on the nurse level it is so important you know
474: Sup13 yeah
475: Sup11 you know dressings and to wash your hands thoroughly between each patient I think radiographers got a bit more blasé because we think it probably doesn't make any difference cos we we're not dealing with those sorts of things

476: Sup13 no we're not dealing with dressings
477: Sup11 I think we are a little bit do you think complacent
478: Sup15 yes yes we are
479: Sup12 yes we are
480: Sup13 and I think as well I mean as we said we haven't had anyone from infection control for 10 years
481: Sup12 well it must be at least that
482: Sup13 and its almost as if infection control kind of don't really think much about us, and perhaps if even if it was just a talk once a year or it was a and they came and looked at what we do, but I don't even know the name of the infection control
483: Sup12 no I don't either and I think if they get this thing going that **** was talking about today its an on going thing its not a just a one of thing, and we have someone representing the department then maybe we can do something about that, encourage *** to give talks and things
484: Sup11who do we er, do we have to check with *** if we can ask about getting these alcohol dispensers gel
485: Sup12 no ***
486: Sup11 oh we just go to ***, ** doesn't have to ok it cos its money isn't it
487: Sup12 I don't think so, its money but I don't think, I don't think its one of those, I don't think that would be a particular problem, because ** * got two of those bottles of gel for us
488: Sup11 it would kind of be a compromise our little bit towards trying to be improve standards
489: Sup12 oh yeah
490: Sup 13 I think that's a good idea, I mean if that's effective just wiping, rubbing it in, then that would be a really good start
491: Sup11 well apart from blood
492: Sup12 except for blood
493: Sup13 but then we should be wearing gloves
494: Sup11 it would be good for MRSA
495: Sup15 in outpatients it would be sufficient anyway
496: Sup11 yeah
497: Sup13 yeah
498:
499: **Mod other than the alcohol what else would you say could improve practice?**
500:
501: Sup11 communication isn't it
502: Sup12 awareness
503: Sup13 yeah communication and awareness
504: Sup11 perhaps have like you say once a year get all the radiographers to have another lunch time meeting
505: Sup13 yeah
506: Sup11 they're going to love that aren't they, or another part of the staff meeting
507: Sup12 yeah bring it up, have a talk
508: Sup11 say you know we think this has got a bit lax

509: Sup12and communication having proper documentation from the wards, you know for every patient or anywhere, whatever patient comes down to the department, have it written clearly on the request form. To heck with the discrimination
510: Sup13 but does that make you blasé because I remember they did er a cardiac catheter on a patient and they later discovered had HIV and they hadn't known at the time and you think if we say its always written on the form so it doesn't matter and there are patients who it later transpires did have then should we just not be treating everybody as if they've got HIV and MRSA and hepatitis
511: Sup12 oh well granted yes, but communication in that respect would certainly help
512: Sup13 yeah if we can afford the gloves
513: Sup12 yes if we can afford the gloves I mean I just can't believe that
514: Sup13 no I can't believe that either and on ITU
515: Sup12 and that was *** who is now the junior matron there, that said that to the radiographer
516: Sup11 I've been quite shocked at different sort of standards in ITUs in different places, and also like on the radiation protection side, but erm as far as infection control some places you don't wear aprons, you don't wear gloves you know you don't clean the cassettes down, nothing and you know that was the standard thing at ***
517: Sup12 until a couple of years ago we didn't either
518: Sup 11 no lead aprons nothing they didn't bother with them
519: Sup12 oh goodness
520: Sup11 yeah so amazing you go to some places and you think goodness this is a bit easy you know, even though you know to be honest when you know if you stand at the back you don't get any radiation anyway so half the time its probably a good idea
521: Sup13 any way that's not infection control
522: Sup11 and then you come here and its gowning up again and its I don't know, nobody told me why I do that, you know and I think I probably didn't go to put a gown on because you know I come from somewhere that didn't
523: Sup12 they come and hand it to you
524: Sup11 yes here they did, or they say oh the gowns are there, so that was good, so here isn't as bad as some places
525: Sup12 no its not
526: Sup13 that's comforting
527: Sup12 except we don't wear gloves now
528: Sup11 yeah no gloves now, perhaps its going that way, we won't be wearing aprons next, it's a slow slippery slope
529: Sup12 well it'll be interesting to see whether MRSA increases
530: Sup11 it sounds like its really bad in this hospital MRSA
531: Sup12 I don't think its any worse than any other
532: Sup11 isn't it
533: Sup12 I don't think so
534: Sup 11 but it has got to
535: Sup12 epidemic proportions, yeah, but I don't know, they were containing it in ITU quite nicely

536: Sup11 were they
537: Sup12 so it'll be quite interesting to see whether it starts up again, all because of the people above saying we are wearing too many gloves.
538:
:

Focus Group Discussion DGH2 Radiographers

4: 2RF1 Hello my names 2RF1 *** I'm basic radiographer so I cover all general radiography I just work part time here
5:
6: 2RF2 XXX2RF2 erm I'm basic radiographer so I just do the general bit and I work full time
7:
8: 2RF3 my name is 2RF3 I'm also a pleb radiographer and I do all aspects of general radiography including sort of theatre work as well and screening
9:
10: 2RF4 ok I'm 2RF4 I'm also full time basic grade and I do all aspects of general radiography aswell
11:
12: 2RF5 2RF5 exactly the same general radiography theatre portables you name it anything that comes along
13:
14: 2RF6 I'm 2RF6 XXX I'm a basic grade radiographer and I work in all the general areas
15:
16: 2RF7 I'm 2RF7 XXX full time basic
17:
18: Mod Ok that's great if we could start the discussion just basically if you can tell me what you think about when people say Infection Control to you.
19:
20: 2RF1 Washing hands
21: 2RF3 Trying to stop the spread of MRSA
22: 2RF4 cleanliness
23: 2RF5 body fluids how to clean them appropriately
24: 2RF6 clean the rooms
25: 2RF7 dealing with bodily fluids stuff like that
26: 2RF2 make sure needles are put in the correct places
27:
28: Mod make sure what sorry
29:
30: 2RF2 needles so like to avoid needle stick injuries and things
31:
32: Mod Do you think there are any particular types of patients who erm needs infection control?
33:
34: 2RF4 MRSA, Barrier nursed patients and reverse
35: 2RF7 cancer centre patients they are more vulnerable to these types of things
36: 2RF4 mmm neutropenic patients
37: 2RF6 all patients need it
38: 2RF5 yeah all patients
39: 2RF3 I guess there's a certain level that you have to apply to everyone no matter who they are but then obviously you do have to take extra

precautions to the MRSA and the reverse barrier and people who are susceptible to certain things
40: 2RF1 also when you go to do portables like ITU its important that we clean, clean our hands and have gowns before we xray the patient and also after, after we've x-rayed the patient to clean down the screens cassettes if we've used them and wash our hands, different wards we have different sort of criteria don't we again on SCBU as well
41:
42: Mod so there's a different procedure for?
43:
44: 2RF2 yeah
45: 2RF1 yeah we're more cautious if we're on SCBU and ITU than if we just go to a general ward theres different things that we do.
46:
47: Mod you mentioned patients who are MRSA and you were saying about the cancer patients being more vulnerable, How do you know that these patients are infectious or neutropenic?
48:
49: 2RF1 a lot of the times we don't know do we
50: 2RF2 no
51: 2RF3 no
52: 2RF1 They come down and its usually after we've x-rayed them that we'll get erm that the ward will ring and say oh by the way
53: 2RF4 sometimes its indicated on the form or on the notes or on the screen
54: 2RF1 but a lot of the time it is afterwards
55: 2RF4 yeah it can be
56: 2RF1 and if you've not dealt with that patient with the correct procedure then
57: 2RF7 it should be on the computer as well and patients on the ward should be in the side room if possible
58: 2RF5 not all the time They don't tell us all the time
59:
60: Mod so you quite often get phone calls afterwards do you?
61:
62: 2RF2 yeah
63: 2RF5 yeah
64: 2RF6 yeah we do
65:
66: Mod you talked earlier about what you thought about when someone said infection control to you, which of those sort of areas do you think are the most important?
67:
68: 2RF4 sorry I missed part of that
69:
70: Mod sorry when erm earlier on I asked you what you thought about infection control?
71:
72: 2RF4 yeah
73:

74: Mod erm what came to mind?
75:
76: 2RF4 mmm
77:
78: Mod which of those areas that you all mentioned do you think are the most important?
79:
80: 2RF4 probably handwashing between patients
81: 2RF1 handwashing yeah handwashing, cos that's where you, you're touching equipment and patient and so its spreads most quickly on your hands isn't it. Then obviously if it's on your hands and you're touching yourself the patient other equipment even and just spreading it. So that's the most basic sort of thing that we can do and the cheapest thing we can do and the easiest thing that we can do.
82: 2RF2 you can't really wash your hands between every single patient do you
83: 2RF1 no, no not between every single patient no
84:
85: Mod why do you think that?
86:
87: 2RF3 Because we'd spend half a day a couple of hours a day just washing our hands
88: 2RF2 it's a bit impractical really
89: 2RF6 its not practical
90: 2RF3 its like if you wash your hands like 40 times a day you're going to end up with a nasty rash
91: 2RF2 and allergies
92: 2RF3 you know an allergy to the soap
93: 2RF1 and some of us do have that, allergies to the soap and the gloves
94: 2RF3 I have
95: 2RF4 I get dermatitis from it yeah
96: 2RF3 I have a terrible problem with my hands. Its amazing that even though you say think that you are keeping your hands clean I think we've probably all had some sort of bug over the last year that we've picked up from work
97: 2RF2 its amazing what actually goes round
98:
99: Mod and actually suffered from the bug?
100:
101: 2RF3 yeah
102: 2RF6 yep
103: 2RF3 we've all had vomiting and diarrhoea and this that and the other.. We're all right now, you'll be handling those forms with tweezers.
104: 2RF1 probably easier than washing your hands all the time is if we could wear gloves more if I mean there are some radiographers that do have allergies to the gloves but that would be easier than washing your hands all the time.
105: 2RF4 we've got that disinfectant gel as well haven't we which is a bit quicker and disinfects your hands as opposed to just washing them.
106: 2RF1 yeah.

107: 2RF7 I think if there was more awareness then and like patients didn't look at you funny when you had the room open and free and you were washing your hands you know it would be a bit easier.
108: 2RF2 you feel awkward sometimes don't you, when you're putting your gloves on, putting your aprons on
109: 2RF1 yeah you do you do feel a bit like that don't you
110: 2RF7 if they knew the reason that you were doing it and the importance of it, It would help
111:
112: Mod why do you feel awkward when you're putting the gloves and aprons on?
113:
114: 2RF2 I don't know its just the way they look at you.
115:
116: Mod patients?
117:
118: 2RF2 yeah
119: 2RF3 they think that you're treating them like some sort of kind of
120: 2RF7 different
121: 2RF2 yeah
122: 2RF7 like theres something wrong with them
123: 2RF3 it doesn't stop us from doing it though
124:
125: Mod what about the cleaning of the equipment, that was mentioned earlier?
126:
127: 2RF3 we do it every day and between manky patients, I guess we should do it between every single patient though shouldn't we?
128: 2RF1 yeah but that's another thing its time consuming
129: 2RF4 its not practicle
130: 2RF1 which on the one hand ok we wouldn't mind doing as long as you know patients are going to wait, we're not going to be able to do as many patients if we you know are cleaning equipment and our hands and everything between patients especially with casualty its going to be you know a long waiting time. So it's trying to fit everything in but we can't do everything I don't think
131:
132: Mod so when you say the equipment is cleaned everyday, what equipment is cleaned everyday?
133:
134: 2RF3 well there's a check list in every room so we cover everything
135:
136: Mod everything
137:
138: 2RF3 yeah
139: 2RF4 yeah
140: 2RF2 we change mattresses [plastic cover] wipe the room down
141: 2RF6 sponges
142: 2RF2 yeah make sure that everythings got no blood on them stuff like that.

143:
144: Mod is that done at the beginning of the day or the
145:
146: 2RF2 no at the end of the day so that its ready for the next morning
147:
148: Mod does that get done?
149:
150: 2RF2 yeah
151: 2RF4 yeah
152:
153: Mod who do you think actually benefits from infection control?
154:
155: 2RF6 everybody
156: 2RF5 everybody
157:
158: Mod who does everybody include though?
159:
160: 2RF5 patients, staff
161: 2RF7 visitors
162: 2RF5 yeah visitors coming into the hospital
163:
164: Mod have you had any education about infection control?
165:
166: 2RF2 yeah
167: 2RF6 yeah, its mandatory we have to have it once a year, is it once a year or is it once every six months
168: 2RF2 its once a year isn't it
169: 2RF6 once a year yeah someone from infection one of the infection control nurses comes and gives you a lecture on handwashing
170: 2RF2 that's right cos it was three hours
171:
172: Mod was that specific to the radiography department?
173:
174: 2RF6 not really it was just general,
175: 2RF2 just general
176: 2RF1 general
177:
178: Mod do you think it would have been better or not to have it specifically aimed at the radiography department?
179:
180: 2RF2 its not really necessary as all the bits were covered, it was general generally for the hospital really
181: 2RF6 it covered everything
182: 2RF2 I mean you need to do the same as everyone else in the hospital so
183:
184: Mod what about any other courses on infection control?
185:
186: 2RF2 No
187: 2RF6l No

188:
189: Mod what about where you did your training?
190:
191: 2RF2 I don't think we did, did we, just washing our hands
192: 2RF6s did we get any in patient care, did we do it in patient care or not
193: 2RF1 it probably was in patient care but it wasn't like, it wasn't a great amount just like very basic
194: 2RF6 very basic yeah
195:
196: Mod do you think that infection control is actually followed in the radiography department?
197:
198: 2RF6 erm we do the best that we can. It isn't followed cos it is impractical to wash our hands after every patient and clean the room after every patient but I think if we do it the patient that's got MRSA or barrier nursed then we always will clean the room.
199: 2RF2 I think we do it to a better standard, nothing against the nurses or anything, but when you say MRSA they're not too bothered by it, they don't seem to take
200: 2RF1 yeah that's true
201: 2RF2 where as we like shut the room down and make sure its cleaned
202: 2RF1 we do have one clean person and one dirty person and you know we usually theres three of us or sometimes more we can work on one patient so we I think we're more cautious and careful maybe because we don't come across it every single day like nurses do maybe its more routine for them but I think were quite careful
203: 2RF2 like if we say MRSA they say its ok its only in like that little cut , so they're saying as long as you don't touch that little cut you'll be ok .
204: 2RF1 but we treat the whole patient and the whole room and all the equipment and everything don't we
205: 2RF6 we treat it as if it's the whole patient got
206:
207: Mod why do you do that?
208:
209: 2RF6 its better to be safe than sorry I suppose
210: 2RF3 I think x-ray is one of those places if we were complacent then basically everyone would just come down our way to get MRSA wouldn't they, cos we're you know we use the cassettes for every patient
211: 2RF1 we use yeah we use a lot of the same equipment don't we
212: 2RF3 that's why we have to be a little bit over cautious
213: 2RF1 yeah
214: 2RF3 I don't think you can be over cautious that was the wrong word to use you can never be too clean can you.
215: 2RF1 yeah I don't think really you can be over to cautious really
216: 2RF3 no.
217: 2RF1 cos the more precautions the more steps you take and the precautions we take it'll be better really its not going to be worse is it, it'll be better.
218:
219: Mod so do you think its necessary in the x-ray department?

220:
221: 2RF1 definitely
222: 2RF4 mmmm
223: 2RF2 yeah
224:
225: Mod would you say that patients or staff are more at risk of picking up an infection in the x-ray department or less at risk?
226:
227: 2RF2 than where the wards?
228: 2RF6 Yes
229: 2RF7 less because of the amount of time they spend down here
230: 2RF6 but then we do have a big turn over of patients
231: 2RF4 also we're not always informed if the patient has got an infection as well. We've had patients haven't we from A+E with MRSA we only found out once they've left. Cos you did one didn't you 2RF3?
232: 2RF3 yeah I suppose it depends where they are coming from. We keep our environment. Well I think we'd like to think that our environment is cleaner than the wards so I suppose if you stayed in x-ray all day with our precautions you'd feel a bit safer. But I mean at the end of the day you can go to the canteen and sort of come across people there that haven't you know haven't paid too much attention to their hygiene and we're just as likely as anyone else then to pick things up. So if that's what you meant in the question. I can't remember what it was.
233:
234: Mod it was do you think you are more or less at risk of picking up an infection in the x-ray department?
235:
236: 2RF3 but then again we're in the front line when it comes to A+E patients. And they get so busy down there sometimes that they don't they just forget to mention that you know they are hep C positive or they're MRSA or you know what have you and we then and then we tend to sort of you know
237: 2RF1 I think even if they don't tell us those things and working in erm casualty we can immediately assess the patient and decide well we'll use gloves or can't we really. And I think we're quite careful and cautious.
238:
239: Mod what sort of things would make you wear gloves or not wear gloves, when you say your assessing the patient what do you look for?
240:
241: 2RF5 spilled blood
242: 2RF4 blood
243: 2RF1 well yeah any sort of blood or bodily fluids, then I feel I am quite cautious I wear gloves quite a lot that's my personal opinion I think erm so I would
244: 2RF2 I wear gloves if they look a bit dirty
245: 2RF7 yeah if they look a bit dirty
246: 2RF1 yeah yeah even if they do its an awful thing to say but if they're a bit dirty or drunk or they look like that type, not, that type sounds awful to say that but i don't know everyones got there personal opinion of how they would assess that patient and I'm quite cautious for myself and the patient

and so I do tend to wear gloves quite a lot when I work in casualty erm but like I said everyone has assess their patients to their own standard
247:
248: Mod 2RF4 you were just saying that in A+E you have patients coming down that you don't know are infectious?
249:
250: 2RF4 yeah
251:
252: Mod so would you have said that put you more at risk or not?
253:
254: 2RF4 that would, that incident would, but generally I think we're probably less cos like 2RF3 was saying we do try to keep on top of the cleaning and that sort of thing but that's about the only time I think that we're more at risk cos we are unaware of the patients history
255:
256: Mod so you think that your hygiene measures that you have in the department protect you?
257:
258: 2RF4 as much as they can. As much as we can yeah
259: 2RF2 like from the wards though they only come down for a few minutes and then they're out, but when they are actually on the ward the nurses have to like clean, change the beds, clean the patients and stuff so they are more at risk than we are just from like a few minutes contact with the patient.
260:
261: Mod so do you think that infection control measures are followed more or less in the department than other hospitals?
262:
263: 2RF3 in x-ray here as opposed to x-ray in another hospital
264:
265: Mod no sorry in x-ray here as opposed to the wards here, well actually if you've worked in other hospitals as well then?
266:
267: 2RF4 I think we'd have to spend more time on the wards to comment
268: 2RF1 yeah that's difficult to answer as we don't really know what they do on the wards really you know
269: 2RF3 although I am sometimes surprised when I. I was always trained to approach an ITU bed in gloves and gown erm but the nurses up there sort of they don't seem to worry about that they just sort of grab hold of the patient grab hold of the tube and stuff whether or not they have washed their hands before or after and then they go and then they do go on and do something else afterwards. I mean I have seen people do things and I think well even with MRSA patients as well. I'll be there with my gloves and my gown on and they'll be there with no gloves and no gown so it sort of defeats the object really. If one person does one it and nobody else does
270: 2RF2 yeah cos when I was a student and I was on the ward and a MRSA patient was in the side room and erm we were like dead paranoid about MRSA you know when you've first started and stuff and theres a nurse up there she had no gloves on nothing the patient was MRSA and she

just ripped all the sheets off and like no protection whatsoever. I just thought that was quite bad really.
271:
272: Mod does that influence your behaviour at all?
273:
274: 2RF6 in what way to copy them
275:
276: Mod yeah
277:
278: 2RF1 No not really
279: 2RF6 No
280: 2RF4No
281: 2RF3 No
282: 2RF2 No I think it depends on yourself how aware you are
283: 2RF1 yeah cos I think theres like, like I said before you know I think there's a personal, theres the general erm infection control that everyone knows about, but personally you can do a bit more or some might do a bit more and some a bit less, everyone I think does
284: 2RF2 I think you do tend to follow what other people do don't you. It's like when we first started as like students we followed, like you know what qualified people were doing like with the gloves and then gowns and I think if we'd started as students and
285: 2RF1 other radiographers yeah yeah .
286: 2RF2 they hadn't put gloves on I think we would have just followed their trend.
287: 2RF1 yeah
288:
289: Mod so where do you think that that needs to the encouragement needs to come from then?
290:
291: 2RF2 I think its good erm, when you approach ITU now there's a notice implying that anybody can enforce somebody else to wash their hands or use the alco gel before entering ITU so I think that's a good tactic really. So when ever the parents or you know carers of somebody on ITU could walk in and tell the doctor to scrub his hands or whatever, I think that's the best approach
292: 2RF6 yeah
293: 2RF3 which I think it's a good thing cos I live in a student erm nursing accommodation and I think doctors should wash there hands more, and generally be more hygienic. No names
294:
295: Mod on the basis of that notice then do you think you would be comfortable telling not necessarily a doctor but somebody more senior than yourselves to wash there hands?
296:
297: 2RF6 no
298: 2RF2 no
299: 2RF7 no
300: 2RF1 not really
301:

302: Mod No
303:
304: 2RF5 No
305:
306: Mod but how would you feel?
307:
308: 2RF2 I think perhaps if it was a relative and it was your relative then yes then you would tell the doctor to wash their hands but like as members of staff telling our seniors or our doctors then no
309:
310: Mod ok what about the other way round then, how do you feel if a senior member were to tell you, I don't know if this has ever happened to you, to either clean pieces of equipment or to wash your hands?
311:
312: 2RF2 I think I would.
313: 2RF1 well we do don't we, we do get senior members of staff telling us to clean equipment
314: 2RF6 make sure our check lists in our rooms are done
315: 2RF1 and we do respond to that yeah
316: 2RF3 its routine though, you know you won't be in the middle of doing a patient and they won't stomp in and say clean that.
317: 2RF1 yeah, its all quite friendly
318:
319: Mod who does the check list then, is that radiographer grades or anybody who is working in that room?
320:
321: 2RF6 anybody
322: 2RF3 it doesn't matter who you are, whoever is in the room a senior and a basic or what have you then you are all responsible for it
323: 2RF1 doesn't usually XXX come round though and check
324: 2RF2 yeah she comes round and checks
325: 2RF3 she usually checks
326: 2RF1 she's a senior to us she usually checks that we've all checked the room
327:
328: Mod do you think that is a good thing?
329:
330: 2RF1 yeah
331: 2RF7 yeah that's a good thing
332: 2RF1 cos I mean we work
333: 2RF2 it used to be once a week didn't it like cleaning the rooms, but like its only just recently that its been changed to once every day, and I think it's a good measure to take and it should
334: 2RF1 I think we all get quite used to it cos we're so used to working in a team and together that we're used to saying like oh well like I'll say to 2RF6 we can all say to each other have you done this or have you done that
335: 2RF2 yeah
336: 2RF1 we don't take offence at it, we work together and its best if its all done cos then everyone is benefiting from something that's been done so yeah

337:
338: Mod Has anyone seen that happening in any other hospital?
339:
340: 2RF7 yeah
341: 2RF1 what cleaning the rooms?
342:
343: Mod Having a checklist in the rooms?
344:
345: 2RF1 yeah when I worked in XXX they had them as well
346: 2RF3 I have worked in some places where it just wasn't done and the grime just built up and one day someone sort of cleaned a tiny area of something with an alco wipe and then discovered it was you know shiny underneath so they just blitzed it but there was never any check list and I have worked in hospitals where it's the students and basic grades that have been sort of made to sort of you know, its been beneath everyone else you know they've been made to do it sort of meticulously sort of everyday you know every hour of everyday, you know I've seen the two extremes. It defiantly varies from hospital to hospital
347: 2RF1 I've worked in, when I was a student in XXX it was very much the students came in early they cleaned you know and the radiographers checked the students had cleaned everything. It was the students job.
348: 2RF1 that's changed now
349: 2RF4 yeah it was like that when I trained as well, yeah
350: 2RF3 its not like that here though is it
351: 2RF1 no we don't do that
352: 2RF3 everyone mucks in here
353:
354: Mod what do you think about those methods then where they're saying it's the students or the basic grade?
355:
356: 2RF3 old fashioned
357: 2RF1 I just think its
358: 2RF4 you're supposed to be a team aren't you everyone should help
359: 2RF1 yeah its team work, its lack of responsibility for the radiographers and I think they are just being lazy basically
360: 2RF7 its something that benefits everybody so everybody should join in and help really
361: 2RF3 yeah
362: 2RF1 yeah
363: 2RF7 it shouldn't be left to certain people to do
364: 2RF1 and at the end of the day if its not being done correctly be the students responsibility falls on the radiographers doesn't it so its up to them to do it really its not up to the students its up to the radiographers cos they're the ones that are qualified to make sure everything done properly
365:
366: Mod there was an item on the news the other week, about comparing infection rates of different hospitals in different countries and one of the erm countries screened their staff, actually a few hospitals here screen their staff when they start for MRSA How would you feel about that?

367:
368: 2RF4 when I was a student I actually was for MRSA because I was in contact with it so I had to have a nose swab, its just common sense really isn't
369: 2RF1 I've been screened when I was working here erm I think it was about two years ago there was a case of MRSA on SCBU and myself and another member of staff we had to be you know tested for MRSA.
370:
371: Mod Why was that?
372:
373: 2RF1 erm we'd been in contact with this baby erm and they were wondering where this MRSA, why this SCBU child had got this MRSA from they were finding out where and who had been in contact with it so I had been in contact so they were just testing if I had it, I don't know.
374:
375: Mod How did you feel about doing that?
376:
377: 2RF1 fine
378:
379: Mod if that was done routinely do you think that would be of any benefit?
380:
381: 2RF2 I think I'd want to know if I had it
382: 2RF1 well exactly , I don't take offence to take this screening cos if I did have it then it would benefit me too and I could sort it out for myself and also not come in to hospital and spread it so it wouldn't bother me.
383: 2RF3 I don't know I think it's a dicey area, as much as I'd like to know if I had it I wouldn't want to be treated any differently by people
384: 2RF2 you'd be dead paranoid then about touching
385: 2RF3 yeah I think there's definitely a stigma attached to MRSA and erm like any other virus
386: 2RF2 imagine like going home and telling your family you had MRSA, they'd like run a mile from you
387: 2RF3 I don't think people understand, I mean you're more susceptible to MRSA aren't you if you're on a , if you've got a low if you're sort of tired and what have you to picking it up
388: 2RF4 after on call
389: 2RF3 we are sort of prime candidates I mean everyone I mean theres are a lot of people I avoid in the NHS but I think that if er you if everyone knew that you had MRSA erm then you'd definitely be treated differently.
390: 2RF7 don't they do it somewhere is it Australia or something
391: 2RF6 I don't know
392: 2RF7 I think you apply for your job and then you have your screening for MRSA
393: 2RF2 we went to austrailia and they don't actually tell you. MRSA apparently is quite bad over there a lot of people have it due to like immigration and like the and erm when we went on wards you were never told if a patient had MRSA you just had to assume that everyone had it

394: 2RF6 yeah for every erm portable you went to do you would wear gloves and apron for everyone and change it for every single patient no matter what they had.
395: 2RF2 and every patient that came in as an outpatient and they looked dirty you were told to put gloves on
396:
397: Mod so do you think that's a good or a bad thing to be told you've just got to assume everybody has it?
398:
399: 2RF2 it's a good thing
400: 2RF6 its good in one way
401: 2RF2 but it was very time consuming we were on the wards for hours doing portables. You'd go up and do the whole of ITU which is about 16 beds and you'd be there for ages because you'd have to change and wash your hands between each patient yeah it did take a long time, but then it was benefiting everybody
402: 2RF7 we do that here we do the whole of ITU regardless of what they've got.
403:
404: Mod you mentioned earlier if you found out you had MRSA and you went home and told your family members do you ever think about taking infections home?
405:
406: 2RF2 yeah
407: 2RF6 yeah
408: 2RF4 yeah I do
409: 2RF3 my first port of call is the shower when I get home, I get out of my uniform and get in the shower
410: 2RF6 yeah I do
411: 2RF1 I didn't used to think about it as much until I had erm a little baby and then I was I found myself really cautious that I'd been cos I'd go home and make sure I'd always make sure I washed my hands before I leave the hospital but as soon as I get home I'm just like touching him and I'm at the beginning I was very cautious do you find that 2RF5 my attitudes changed I did find that my attitude changed that I wanted to make sure I was clean before I left because by the time I'd got home I know I'll be touching him, usually he would be the first thing I would touch and especially if we had erm barrier nursed patient would come down
412: 2RF5 yeah or an MRSA patient
413: 2RF1 Yeah MRSA patient really make sure
414: 2RF5 yeah I would all ways have a shower first
415: 2RF1 I was conscious about my clothes, about everything so it changed my attitude
416:
417: Mod what about anybody else?
418:
419: 2RF2 Erm I always get changed as soon as I get home and have a shower
420: 2RF4 yeah so do I
421: 2RF6 yeah

422: 2RF4 just to get the uniform off
423: 2RF2 you'd just feel so guilty wouldn't you if you passed it on to your parents
424:
425: Mod do you think there is a risk of that?
426:
427: 2RF1 yeah I think there is yeah
428: 2RF2 yeah
429: 2RF7 you can pick up so many things in the hospital, I've had colds, flu
430: 2RF2 and it does pass on doesn't it, its like the rest of it
431: 2RF4 I haven't picked up anything touch wood I must have a high resistance
432: 2RF3 I've been here for two years and I've never had as many infections
433: 2RF6 really
434: 2RF3 chest, throat, ear
435: 2RF4 gosh
436: 2RF3 D&V
437: 2RF2 you've had it all now you won't get it again
438:
439: Mod what would you say prevents infection control practice taking place?
440:
441: 2RF7 laziness
442: 2RF6 time
443: 2RF1 complacentness, people get complacent don't they.
444: 2RF4 lack of time
445: 2RF2 I don't know perhaps if some hospitals haven't got the , you know like if a box of gloves runs out or something you can't be bothered to go and get it.
446: 2RF1 resources
447: 2RF3 yeah
448: 2RF2 tying to make sure like that all the resources are like filled every evening and stuff
449: 2RF1 yeah
450: 2RF2 so that there's enough for the next day
451:
452: Mod does that come under part of the check list?
453:
454: 2RF2 yes
455: 2RF1 lack of education, like we have these we have the course well we said it was once a year didn't we you know and it's important that we keep things like that and so we keep being refreshed you know and its brought forward to peoples attention all the time otherwise it's, it is an area which can be you we can not use correctly we can quite easily say oh I won't wash my hands or I won't do that, but if its kept on top all the time people are always aware about it, I'll keep awareness up.
456:

457: Mod just going back a little bit, do you think its important that the infection control sessions are mandatory?
458:
459: 2RF1 yeah
460: 2RF2 yeah
461: 2RF4 yeah
462: 2RF2 cos they can be quite boring and I think if people had the choice though they just they just wouldn't go
463: 2RF4 they wouldn't bother
464: 2RF1 yeah
465: 2RF2 cos its quite a long time three hours sat there without a break, or did we have a break.
466:
467: Mod what happens for new staff then if they've just missed that session?
468:
469: 2RF2 luckily for me it came up just after I'd started so, I think you just have to wait for the next one comes round
470:
471: Mod what do you think about that then?
472:
473: 2RF4 it should be part of your induction I suppose really shouldn't it. They cover everything else don't they.
474: 2RF1 yeah even if its just like basic you know not like the three hours
475: 2RF4 yeah like handwashing or something
476: 2RF1 you know they just had something that would be part of the induction programme
477: 2RF4 there is an infection control folder in the department so technically you could read that up but who does
478: 2RF3 they do enourage you to read it don't they. Manual handling is part of the mandatory training and I mean we get that.
479: 2RF6 we don't do that I haven't had that since I've been here
480: 2RF3 so its all very well written down on paper but in practice it doesn't to happen
481: 2RF4 yeah
482:
483: Mod we are coming to the end now then. What would you say would improve infection control practice then?
484:
485: 2RF4 probably more education
486: 2RF7 definitely
487:
488: Mod is that for general education or specifically for the x-ray department?
489:
490: 2RF4 well everybody really yeah
491: 2RF7 more awareness to the public
492: 2RF6 yeah yeah
493:

494: Mod why do you think to the public?
495:
496: 2RF7 because they well for MRSA they see it as this big superbug and nobody really, the public don't seem to understand what it is cos they're not educated about it at all they think they've got this horrible big but and
497: 2RF2 I did this woman in one of the outside hospitals and she desperately needed a knee replacement but she was too scared to have it because of what she'd heard about MRSA and she was scared of catching it. So she wouldn't have her operation. I think like recent well more recently its been in the paper a lot more about people having to have limbs removed and stuff
498:
499: Mod would that worry you coming into have an operation?
500:
501: 2RF2 I don't know. I've seen some of the standards on the wards
502: 2RF1 it might do a bit, it probably would actually
503: 2RF4 theatres are ok aren't they
504: 2RF1 yeah
505: 2RF4 its more the wards
506: 2RF1 it's the wards isn't it because it is true patients come in with a chest infection and then before they go home
507: 2RF3 they've got MRSA
508: 2RF1 they go home with MRSA and so they go home worse than they came in and that happens all the time doesn't it
509: 2RF3 we are led to believe that in the olden days they had like matrons and stuff and the wards were spotless so maybe that you know we need more people to direct and make sure its going one. You know someone responsible
510: 2RF4 they have separate cleaning teams don't they now that the nurses don't feel that they can tell what to do where as before the nursing team wasn't it
511: 2RF2 I don't, I think like the nurses that you know got a degree or diploma they're quite good I think its more the health care support workers, they're the ones that I've seen that seem to have a lower standards. They don't really seem too bothered about it. So I don't know whether they get the same training as the nurses the qualified nurses.
512: 2RF7 I don't think standards in theatre in this theatre in this hospital are as strict as else where
513:
514: Mod they're not did you say?
515:
516: 2RF7 no not from my experience
517:
518: Mod what have you seen done differently?
519:
520: 2RF7 dare I say. Just erm the lead aprons are absolutely filthy that are taken into theatre. I don't think the intensifier's cleaned and stuff all the time
521: 2RF4 but that's our responsibility though isn't it really

522: 2RF7 yeah I'm not sure whose responsibility the lead aprons are though
523: 2RF4 yeah that's true
524: 2RF1 that should be there responsibility
525: 2RF4 yeah if they wear them then they should clean them
526: 2RF1 they are separate from us cos they buy them they're theirs so they should clean them
527: 2RF7 and things like they used to have this surgeon in XXX that made us wear the hair nets and the the male hair net you know the kind that covers the beard sort of thing, yeah so erm so you know he was strict and if you walked in with your fringe hanging out you were sent out of theatre until you learnt how to dress properly sort of thing. Where as here you know its all about sort of fashion isn' it .
528: 2RF3 the scrub nurse will have a fringe from the crown of her head, yet she'll tell you to tie your pony tail up
529: 2RF7 yeah and some people will wear face masks and some people won't
530: 2RF2 yeah, it depends how close they are to the patient doesn't it
531: 2RF7 especially anaesthetists and they're really close to the patient
532: 2RF3 I think British standards are generally lower. A friend of mine that I trained with she was she came over from Germany and er she'd worked as a health care assistant in Germany and she used to tell me that once a patient had finished with the bed in what ever way they had finished with the bed whether they'd died or got better and gone home or what have you that bed would be taken out of the ward taken down stairs into the cleaning part, it would be stripped completely all the bedding would be you know everything mattress everything would be cleaned the bed frame would be sprayed with disinfectant and then it would be returned to the ward and I mean I think we could probably learn from that.
533: 2RF7 we would never dream of that happening
534: 2RF6 no
535: 2RF2 no
536: 2RF3 but that I think generally our standards are just a bit crap really, not mine what I mean is generally yeah you know. We can do so much as individuals but you know, I'd like to think that any bed I had had been cleaned properly not just ooh quick change the sheets next person on I think that's bad
537: 2RF7 its interesting when you think of you know would we want to lie on it, the x-ray table and would we want to put our face against the vertical bucky
538: 2RF2 no
539: 2RF4 no I wouldn't
540: 2RF7 you know maybe if we thought more like that then
541: 2RF3 that's the thing if you put yourself in the, its easy to say or I know I can only speak for myself but erm I sit on a trolley for like two minutes and I'm uncomfortable and I need to get off or on a bed anything and I have to get off it, not just cos of cleanliness cos I don't want to be the patient. It's hard to put yourself in their shoes and as 2RF7 said I don't know how I'd feel pressing my nose against the erect bucky. I'd be their with my alco wipe, can you clean that bit first.

542:
543:
544: Mod so other than erm education then really do you think there are any other things that you could do to improve infection control practice?
545:
546: 2RF4 well its resources as well isn't it but this is the NHS isn't it so. I mean what you said happens in Germany is fantasitic but would it be done here because of resources, it wouldn't would it
547: 2RF2 yeah the cost
548: 2RF3 yes but whats the cost of nursing MRSA patients afterwards
549: 2RF4 yeah but they don't look though do they, they don't look at that
550: 2RF1 I think we should spend more time doing basic things cos that doesn't cost that's what we all can do so its erm just spending more time on infection control, you know everybody can do that can't they you haven't got the resources but we have got soap and water.
551:
552: Mod when you're saying the basic things what are you referring to there?
553:
554: 2RF1 just erm washing hands and making sure that the area is clean erm but which is just time, if, that's why I think a lot of things get missed because we haven't got time for that next patients coming in next trolley next this next that but if we say no we're going to stop and take two minutes to do this you know then that would help I think but it is a matter of thinking right we're going to just stop we might have ten patients outside but that's ok, we'll just stop do this and then the next patient you know rather than one after the other, which is difficult, it is difficult to do cos we do we are very busy and it is, it is difficult to say right lets stop and lets clean this and clean that cos we want to get the patients sort of x-rayed as quickly as we can really.
555:
556: Mod going back a bit you were saying about the surgeon, saying you have to double up on the hair gowns do you think that was necessary?
557:
558: 2RF7 erm well no I don't , but I think he was just setting his standards and you know making everybody else do the same thing. I don't think its necessary to wear two hair nets, I think if you wear one net properly I don't think its necessary.
559: 2RF6 cos you've got your face mask anyway haven't you
560: 2RF7 yeah that's right
561: 2RF7 its interesting what you say, you know like about education and stuff . I've heard somewhere that that the erm face masks are only effective for is it 15 minutes or something so therefore you know
562: 2RF2 why doesn't everybody change them
563: 2RF3 they can be on there for three hours
564: 2RF7 yeah, therefore is there any point in wearing them and things like that, and also our infection control person told us that erm we had to be

within a metre of the patient to need an erm mask so therefore you know if we're stood back
565: 2RF2 its like the dental things though as well isn't it, those gloves, they're not latex ones they are these other ones and we put them on the dental bite so that they can stop like saliva and things going through apparently them type of like gloves don't
566: 2RF6 they're permeable
567: 2RF7 yeah you have to wash your hands after wearing the gloves
568: 2RF2 but nothings really been done about that has it we're still using them
569:
570: Mod so when they are biting, their saliva can still be going through?
571:
572: 2RF2 yeah, what did she say about them
573: 2RF6 there are special bite covers you can get
574: 2RF1 oh I didn't know that
575: 2RF6 we were told when you remove gloves you have to wash
576: 2RF7 yeah it's the vinyl gloves, she said the vinyl gloves are permeable but we can't use the latex ones because some people have got an allergy, but we haven't been supplied with anything else, so we have to keep using the vinyl ones.
577: 2RF3 or else use Milton in between or bleach, which I've seen in some hospitals and not in others
578: 2RF2 its another thing that comes under resources isn't it.
579: 2RF1 and time
580: 2RF7 its because we can't afford the proper dental bites so we have to cut gloves don't you
581:
582: 2RF3 they have dental bite covers in ***[outside hospital].
583: 2RF7 do they
584:
585: Mod so they have the correct equipment in one of the smaller outside hospitals?
586:
587: 2RF3 I think so yeah just those little pieces of plastic you put over the bite
588: 2RF6 what is it?
589: 2RF7 just tiny covers I don't know what they're made of.
590: 2RF3 yeah I don't know what they're made of actually I might
591: 2RF7 I don't know if they're permeable
592: 2RF3 they're what came with the machine cos its new
593: 2RF2 so when they run out, it'll be they had a packet of ten and that's it.
594:
595: Mod well that's pretty much all I need to ask does anybody else have anything else they would like to add?
596:
597: Well thank you very much
598:

Focus group Discussion DGH2 Senior Radiographers

1:
2:
3: Srf1 hi my name XXXis I work in the general department and mammography department I'm a senior two.
4: Srf2 I'm XXXI'm a senior two and I also work in the general and mammography department
5: Srm3 XXXsenior two three and bit years qualified
6: Srf4 XXXsenior one radiographer qualified 6 years
7: Srf5 XXXsenior two 10 years
8:
9: Mod thank you
10:
11: Mod ok the first thing I think we should start with is if you could tell me what you think of when somebody says infection control to you?
12:
13: Srm3 restricting the known diseases and, and unknown diseases from travelling from person to person through use of cleanliness.
14: Srf1 preventative measures you know like trying to avoid infection in the first place, and how to treat infection isn't it.
15: Srf4 it ranges from personal hygiene and personal care as well as obviously how you treat other individuals from patients to other staff that you deal with ie erm from washing hands etc or if you have jumpers on rolling up the sleeves, it's a very erm known mode of transporting infections, just to be careful really.
16: Srf5 I just agree with everybody else
17: Srf2 so do i
18: Srf5 I think they've said every thing.
19: Srf4 its just good work practices, don't be sloppy, always clean things thoroughly so that there isn't blood and guts their in the first place.
20: Srm3 taking the time to do it as well. Not rushing to get on to the next patient and avoiding cleaning the one surface that every one has missed by accident due to the rush of four trolleys outside and every thing like that
21: Srf4 yeah
22:
23: Mod do you think there's any particular types of patients that need infection control.
24:
25: Srf4 everybody
26:
27: Mod every body?
28:
29: Srf4 anybody who has anything really. Some people might cough and splutter more and so it might seem more apparent, that they'd be more likely

to have an infection but then they could have things that your none the wiser about
30: Srm3 because we have the cancer centre here as well you also get the neutropenic patients which are probably the people that you need to look after more than any of the others and erm not that you don't do it for the other people but you do have the cases where there are individuals on the, in this hospital which are susceptible to anything, let alone the normal things that we would just pass over as a cold.
31:
32: Mod how do you generally know about the infectious or susceptibility of these patients then?
33:
34: Srf2 the wards usually inform us.
35: Srf4 yeah sometimes your told but not always
36: Srm3 faith that they will tell you
37: Srf5 yeah, or if
38: Srf1 or if they've got MRSA they tend to put it on the form but there are occasions when they don't
39: Srm3 and you find out when they come down
40: Srf1 which is a bit you know annoying cos you know we tend to do those patients at the end of the day don't we if they're not too urgent we usually use a separate room
41: Srf5 we don't always know about the hep C patients
42: Srf4 see sometimes its put on the computer if they have a known disease then it flashes up when you put there details in so its not necessarily on the form you might find it on the computer as well but as srf1 the forms are not necessarily written down anywhere
43: Srf2 the porters sometimes tell you as well
44: Srf4 yeah
45: Srf2 they sometimes bring a patient down and say do you know hes blah blah blah. No thank you for telling us
46: Srf1 but I think the porters should be told as well cos they're the ones bringing the patient down but you know if I've got a patient with MRSA I worn the porter to wear gloves when he goes to fetch the patient, but the porter doesn't always know
47: Srm3 sometimes that's the first you know is when the porter
48: Srf1 yeah
49: Srm3 comes down with gloves on
50: Srf1 that's it
51: Srm3 and you're going well why have you got that and they've gone, and its not on the form at all.
52:
53: Mod the first question I asked you was what you thought about infection control, which do you think out of those things you talked about are the most important areas?
54:
55: Srf2 communication, between us the wards, the patients whoever. If we don't know they've got some health problems then how are we going to be able to take measures so that no one else gets it.

56: Srf5 really though we should be treating everybody as though they are an MRSA risk cos you don't know
57: Srf1 how far do you take that though, do you wear gloves for every patient or
58: Srf5 no you just follow infection control procedures
59: Srf1 cos all you need is good hand washing don't you after each patient
60: Srm3 yeah
61: Srf1 that's just, we do that anyway
62: Srf2 you could go to extreme of changing the plastic covers after every patient, changing pillow cases after every patient
63: Srf4 I think its important to clean your room though isn't it
64: Srm3 yeah
65: Srf1 yeah
66: Srf2 yeah but you can go over board
67: Srf4 plus I know it doesn't excuse it but it isn't really practical is it either at times
68: Srm3 they are trying to design things to help us do it quickly though cos we've got the
69: Srf4 things like the blue roll and gloves
70: Srm3 yeah the blue roll and we've got those new big tubs of erm equipment cleaners now
71: Srf4 oh the wipes
72: Srm3 not the patient ones and the alcohol rub for the hands things are trying to improve the speed at which we can do it because they, they do understand theres the time
73: Srf4 I think that's been the issue isn't it, the time element of it. But I think it is important to have a clean room though cos if your rooms all dirty and what have you regardless of whether you've had good infection control measures from like the patient coming down to your room, if the rooms all manky when they come there then it defeats the purpose really of having your gloves and gowns and everything else
74: Srf1 we wouldn't want to lie on it would we at the end of the day
75: Srf4 no
76: Srf2 its not just the room though is it, its things like the cassettes and would you want to put your face on the cassette
77: Srf4 anything that they come into contact with really isn't it
78: Srm3 mmm
79: Srf1 mmm yeah
80: Srf4 yeah can you imagine if somebody's feet have been in contact with those cassettes and then you put your face up against it afterwards, I mean if it was your own feet you wouldn't want to do it really would you.
81: Srf1 no its not nice is it.
82:
83: Mod you just mentioned about handwashing after every patient, does that occur?
84:
85: Srf1 its just automatic with me after every patient I just hand wash
86: Srf5 I use the gel
87: Srf1 yeah do you?

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84:
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86: Srf5 I use the gel
87: Srf1 yeah do you?

88: Srf5 I wash my hands after I've used gloves or dirty patients, but I tend to use the gel
89: Srf1 do you use the gel?
90: Srf2 I alternate between the gel and giving my hands a good old
91: Srf4 scrubbing
92: Srf2 yeah scrubbing
93: Srm3 after five goes on the gel I have to wash my hands
94: Srf4 that's when it gets a bit harsh doesn't it
95: Srm3 yes I think yeah
96: Srf 4 it's a bit harsh on your hands. Its quick. I confess I don't wash my hands after every single patient
97: Srf1 no. I do you know its just automatic you know.
98: Srf4 after every single one
99: Srf1 I've always been like that
100: Srm3 no I don't no I
101: Srf4 it depends on what I'm doing and how much I've touched them
102: Srm3 and the degree of the patient as well I think, there are patients that people will automatically wash before during afterwards just cos of the nature of the patient and their look as well
103: Srf4 mm not every single patient, it depends how much I've touched them, if I haven't touched them much then I don't or if I haven't touched them cos sometimes I do them without touching them then I don't.
104: Srf2 yeah if you've just done a chest and your only contact is to move their arms forward then you wouldn't
105: Srf4 no then I wouldn't
106: Srf2 but then if you'd been
107: Srf1 just if you've had a lot of contact then I always do
108: Srf4 if theres skin, if I've touched skin then I do
109: Srf1 yeah. But clothing
110: Srf4 but if I've just touched there gown or what ever then I don't
111: Srf2 If I've touched smelly feet then I do
112: Srm3 oh yes
113: Srf1 and the cassette as well with feet
114: Srf5 and their faces sometimes, you know when your positioning
115: Srm3 yes
116: Srf2 I wear gloves for that
117: Srf5 my hands in their hair, I just
118: Srf2 I put gloves on if I'm going to be touching faces and things
119: Srf1 yeah
120:
121: Mod who would you say infection control is there to benefit?
122:
123: Srf4 everybody
124: Srf1 all of us
125: Srm3 everybody
126: Srf4 staff and patients alike. Cos if some patients, they're gonna be nice and clean and whatever but the staff aren't then its just gonna go from one member of staff to another, so it benefits everybody I think
127: Srf2 the whole place is a bug factory anyway isn't it

128: Srm3 mmm
129: Srf4 yeah, it's the most unhealthy place to come into isn't it really
130: Srf1 it is yeah
131: Srf5 its too hot
132: Srf4 I know that's the thing
133: Srf5 so that should be an infection control issue as well
134:
135: Mod the what should sorry?
136:
137: Srf5 the warmth of the room the temperature
138: Srf4 yeah cos you can have that its too cold, there's a thing isn't there that if its too cold to work that you could go home if its below a certain temperature but there's not if its too hot
139: Srf5 no
140: Srf1 oh right
141: Srf4 there isn't anything
142: Srf1 really
143: Srf4 yep, cos I remember we had to do it when we were in college yeah
144: Srf5 and the staff go from air conditioned rooms that are freezing cold to warm areas to cold areas no wonder we're so ill all the time
145: Srm3 yeah
146:
147: Mod what sort of education have you had, or have you received any education about infection control?
148:
149: Srf5 we have. We have erm an infection control tutorials.
150: Srf4 its mandatory now that we have, everybody has an annual top up session to do with infection control
151:
152: Mod and has everybody had that?
153:
154: Srf2 mm mm
155: Srm3 yes
156: Srf4 yep I think its only in this last year that its come about in the trust that its mandatory for everybody to have the training, so it goes from erm obviously personal hygiene while you are in the room and what have you, and to safety disposal of sharps and linen and what have you.
157:
158: Mod How long does the session last for that?
159:
160: Srf2 three hours
161: Srf4 I was going to say its about two or three hours
162: Srm3 three hours
163: Srf1 mine wasn't that long, it was about an hour and a half
164: Srf2 you're lucky Interesting how they think it was lucky
165: Srf1 that was in the outside, you know community hospital
166: Srf4 I did mine for two hours here [main site]
167: Srf5 I did mine in XXX it was about
168: Srf2 I did mine in XXX

169: Srf4 yeah it was about two or three hours. It depends how many people were in the session as well I think, but on average two or three hours I think
170: Srf2 yeah
171:
172: Mod was it specific to the radiography department?
173:
174: Srf2 no
175: Srf4 no it was general, hospital wide. It ranged from theatre and
176: Srf5 cleaners
177: Srf4 and cleaners as well.
178:
179: Mod does it take place in the radiography department?
180:
181: Srf5 no we go to the educational centre
182:
183: Mod and are you mixed with other health care professions?
184:
185: Srf2 yes
186: Srf4 I had just radiographers in our session, I think there was about 20 of us, it was just radiographers
187: Srf2 I had district nurses
188: Srf1 nurses we had a lot of nurses
189: Srf5 physios, outside physios, paediatric nurses everybody
190:
191: Mod do you think its necessary to have it specifically aimed at the radiography department?
192:
193: Srf4 I think both really, cos you need a err an individual one for your department so that you know whats important and how to deal with things in your own department, but I think its important that you have other issues as well so that you can appreciate it when you go and work in other areas. You know what their policies are as well for example theatre, and ITU and what have you. You need to know what their infection control policies are so you can adhere to them as well when you're in their areas.
194:
195: Mod How important do you think it is for them to know what goes on here as well?
196:
197: Srf5 yeah very
198: Srf2 they need to know
199: Srf4 yes cos they send their patients down here quite often so they need to know, obviously if they do need to barrier nurse their patients or again its communication is the main thing, before they send them down, what they need to know and what we need to know before they send the patient down.
200: Srf5 its very important if their patient has got an infection that they won't come down then to us til the evening afternoon, late afternoon. And

they need to know why that's happening, because at the moment they don't and they ring up and hastle us about getting the patients down then
201: Srf4 as well sometimes, if the infection is like contained into a wound quite often they will just put down, say for example MRSA and then you think well they'll have to wait until the end of the list, but if its just contained in a wound and the wound is covered then you, its not an issue to get them down before hand, but if its just got MRSA on there and they haven't told us where or what have you then quite often we could get them down much sooner and the patient doesn't have to wait for how ever many hours if they rang down first thing in the morning.
202:
203: Mod do you have a specific policy here for x-raying MRSA or any infectious patients?
204:
205: Srf4 it is in the infection control book folder
206: Srf2 yeah its in the folder
207: Srf4 and that's kept in the viewing room
208: Srf2 there is a leaflet you can get from the society of radiographers for infection control
209: Srf4 is there?
210:
211: Mod do you have any other or have you had any other training in infection control?
212:
213: Srf4 I did some when I was at university
214: Srf5 yeah so did I, I think it was just part of our courses wasn't it
215:
216: Mod and was that training general or specific to the radiography department?
217:
218: Srf4 yeah more to do with radiography
219:
220: Mod is it included in your induction when you start working here?
221:
222: Srf2 I never had an induction
223: Srm3 I never had any
224: Srf1 I didn't have one either
225: Srf4 I don't remember
226: Srf5 no I can't remember
227: Srf4 I think they do mention it, I think don't quote me on that though
228: Srf5 we may go through it with XXX in the office don't you. There are certain things that you do with XXX in the office and there are certain things like fire you go around with XXX don't you and
229: Srf4 it might be now though that because they've done it that its trust wide that its mandatory that it might change if it wasn't before that it might be now.
230: Srf5 I think it was you know[in the induction]
231: Srf4 yeah I have a feeling it was but as I said don't quote me on that.

232: Srf2 I'm such a dinosaur I never had one.
233:
234: Mod Do you think then that the infection control policies within the radiography department are followed?
235:
236: Srf1 from our side, but sometimes you find an MRSA patient comes down with a nurse and they don't take any measures. At times they don't have a pair of gloves on.
237: Srf4 I think it varies from radiographer to radiographer
238: Srm3 yeah
239: Srf1 yeah it varies
240: Srf4 some are much more conscious than others and some would follow, where others wouldn't as much
241: Srm3 I think if you listen to the nurses as well cos sometimes they come down and they say its MRSA in the wound that's covered and erm and you don't need to worry about it and I don't know I feel I trust their opinion, granted it depends on the grade of them as well but that's being very cruel to them but if you know in a, a trained nurse told me that the MRSA is in the wound, we've covered it, its fine you can do the chest x-ray I tend to listen to them. I still clean everything but not , if they've not got gloves on I tend to just wash my hands afterwards. Especially as it tends to be in an ulcer well the ones that I have done, tend to be in an ulcer on the leg and if I'm just doing a chest on a bed but I don't know. I do wash stuff after.
242: Srf1 I think when it first came out, when we first heard about it we had masks on, gloves on, you went over the top, aprons on and now I think we're not as like you said you know if its contained and its covered
243: Srm3 yeah
244: Srf2 but you still get nurses down and when you ask them about the site of the wound or whatever the nurse will turn around and say oh I don't know I don't know this patient, so you're still in the dark. So then you have to gown up and glove up cos you just don't know. Its like they sent down a patient for an OPG with MRSA in the mouth and they don't bother telling you, which I had last week.
245:
246: Mod how did you find out about that case?
247:
248: Srf2 err a patients relative came down
249: Srf4 it's a good job they did I suppose, I suppose they tell you afterwards don't they
250: Srf2 but the nurses also don't realise what we actually do to get our pictures they don't realise that for an OPG they do have to put the equipment in their mouth.
251: Srf5 its just a term isn't it OPG they're not aware
252: Srf2 they don't always realise that the patient has to actually touch our equipment, therefore they don't bother telling us cos they don't think we need to know.
253:

254: Mod do you think infection control is important in the radiography department?
255:
256: Srf2 yes I think it is
257: Srm3 yeah I do, its an area where a lot of people come to from every department, you've got out patients, you've got A+E you've got In Patients and you are, yes there are different rooms but there are radiographers that move in between the rooms inside the department as well and if you've got this on the wards coming down to this room its very close to the room that the GPs and out patients come to, so you've got a lot of moving about of susceptible people that will be carrying if they've not washed or if they've missed one bit its likely to not only travel to the room that they're working in but to other rooms as well and all over the hospital really.
258: Srf2 you can also get patients from nursing homes who are bug ridden and you haven't got a clue and they sit in amongst everybody else in the main waiting room, so you have to be careful.
259:
260: Mod do you think that patients or and staff in the x-ray department are more or less at risk of cross infection?
261:
262: Srf4 more or less at risk from who?
263:
264: Mod well each other, just of picking up an infection in the x-ray department than anywhere else?
265:
266: Srf1 no more than anybody else on the ward or anywhere
267: Srf4 sorry can you say that again I can' get my head around that one?
268:
269: Mod do you think when patients and yourselves, do you think when you're in the x-ray department you're more or less at risk of picking up an infection?
270:
271: Srm3 I think you're more at risk here than walking around tescos or shopping in the high street.
272: Srf1 I think you're more at risk on the ward aren't you cos you're dealing with body fluids a lot more, like changing catheters and things like that. So I would say the nursing staff on the ward are more at risk, I don't know
273: Srf5 we don't do long term care though do we? We only do
274: Srf1 no there just in and out we're doing an x-ray and we're not involved with touch, you know so much involved with that type of thing.
275: Srf5 we're probably less at risk than the patients are more at risk, I don't know actually
276: Srf4 I don't know you see cos there's the infectious patients that we never no about
277: Srm3 there are procedures down here that we are bringing, I'm trying not to be absolutely revolting but when you're doing barium enemas and stuff like that we are bringing what can only be an area of high infection out

into the open if only just to a yellow bin erm in room 4 [A+E] as well I've been in and trolley patients coming in and they do throw up and there are areas where we are at high risk of infection even if nobody else knows what's wrong with the patient. Its where you are and what you're doing, there are different rooms
278: Srf4 your more susceptible really aren't you
279: Srm3 where I mean other than the patients cleanliness if you were in room three which is the GP and out patient room and providing the patients are clean, you know clean themselves its less risk to room 4 or 7[fluoroscopy] or room 1[ward] or room 6[intervention].
280: Srf4 yeah I'd agree with you
281: Srf1 yeah you're right
282: Srf4 I mean I don't know how much at risk venflons and butterflies are because you are you have literally opened them at that point but bacteria is the size of you know billions on the end of a pin, it doesn't take much of an open wound let alone a butterfly needle to be done wrongly. I don't know but then you're scared of everything aren't you and you can't really work in the department gowned up in a plastic bag.
283: Srf2 no
284: Srf1 no you're right you can't wear gloves all day long can you
285: Srm3 and I don't think patients would appreciate darth vador going out to them and x-raying them every five minutes would they.
286: Srf1 no
287: Srm3 you have to strike a balance between clean and unclean
288: Mod sorry could you just repeat what you were just saying (directed at srf4 and srf5)
289: Srf4 sorry we were just saying if you follow the right procedure then you shouldn't be more at risk
290:
291: Mod sorry did you say you should or shouldn't?
292:
293: Srf4 shouldn't
294: Srf5 XXX just came into my mind
295:
296: Mod what about patients then do you think they are more or less at risk in the x-ray department?
297:
298: Srf2 I think they are at about the same risk where ever they are
299: Srf4 I'd say they were about the same
300: Srm3 yeah
301: Srf4 cos people could be coughing and spluttering in tesco as they could here, ok granted you're more likely to have more patients here together cos they are here for a reason and they've come obviously with signs and symptoms of something probably to be here in the first place where as if they are just going around the shop doing their shopping and what have you they're not going to be so many people in one area at one time.
302:

303: Mod what about compared to the other wards or departments in the hospital?
304:
305: Srf4 again it depends on the ward and the department really
306: Srf5 if you come up to visit somebody on the ward you're not going to go and run your hands under somebody's mattress and go near body fluids and then on to the next patient are you, they are only visiting the one person, the only contact they have is that person and the nurses maybe other relatives so they are at no more risk than sitting next to jo bloggs whose come from the doctor from there GP and has got MRSA and hasn't told anybody so the same risk really.
307:
308: Mod which areas would you have said had more of a risk then in the hospital?
309:
310: Srm3 you do get certain wards regularly closing admissions to them due to erm outbreak on them.
311: Srf5 the general surgery wards
312: Srm3 yeah and erm
313: Srf5 like D+V's and
314: Srf1 geriatric wards
315: Srf4 geriatric wards
316: Srf2 care of the elderly
317: Srf4 yeah they tend to be more prone
318: Srm3 yeah
319: Srf4 but I suppose though that's
320: Srf5 that's their age though
321: Srf4 I was going to say that means they can't fight it off in the same way as well isn't it really. They don't have the immunity in the same way do they really.
322: Srf5 paediatric wards are a risk as well, SCBU and things like that and ITU you know they're the places where they just can't fight off infection.
323: Srf4 and again like srm3 said earlier neutropenic patients obviously they're more susceptible. A different kind of category really but they are obviously going to be more susceptible so obviously x-ray is going to be much more hazardous to them than their own environment like in the cancer centre and in the ward their.
324: Srf5 is suppose the nice thing is we are always told about neutropenic patients aren't we so we are always more careful, we take that extra precaution.
325: Srm3 I believe that that's one of the most said things to us is the neutropeanic patients cos they're the most likely reasons for a portable x-ray and you do almost try your best even more to be clean before and not necessarily after cos you've come out of that environment but
326: Srf5 you almost would rather go in in your bra and pants to make sure that you didn't take germs in with you on your tunic
327: Srm3 that depends on the individual [laugh]
328: Srf4 I worked in the bone marrow transplant unit and you had to go through a separate door, you had to go through three separate doors before

you could actually go into the individual department but you went in in your own clothes so even though you had to kind of remove all your jewellery and scrub your hands and your arms
329: Srf5 see I think that's a risk isn't it watches
330: Srm3 yeah jewellery
331: Srf4 cos initially you had to put green gowns on and you had to put a hat on your head and a mask on and then for some reason they abandoned that because their theory was there were so many changes of air there that if there was something then it, if it was on your shoes it would have been stamped out by the time you went through the third door and then with the so many changes of air then if it was airborne then if would have gone through the system by then, but then they did change it that you just had to wash your hands remove your jewellery and put an apron on, you just had to cover the majority of your clothes. And there they were kind of they were in individual cubicles because they couldn't even be up on the wards together
332: Srf5 I find that really odd, yeah you know with the neutropenic patients when we go up and do them portably we're not made to take jewellery off, we're not made to you know cover our clothes are we to, I just find that really odd
333: Srf1 its like in theatre now isn't it we are allowed now to walk in the theatre corridor as we are, you know we don't have to change do we, I all ways feel bad when I do that.
334: Srf4 to go in the anaesthetic room we do
335: Srm3 its very bizarre
336: Srf1 I just can't get over it
337: Srm3 cos in XXX[outside hospital] you daren't go in their without changing
338: Srf5 no
339: Srf1 I don't understand
340: Srf5 you're right in XXX you just don't go in there without changing
341: Srm3 no
342: Srf1 I don't understand that at all
343: Srf4 I don't either, it's only the actual anaesthetic room and the theatre itself now that you have to be scrubbed or you have to be
344: Srf1 changed
345: Srf4 in theatre clothes
346: Srf5 but they come out with their theatre greens and theatre shoes on and we're walking in with
347: Srf1 with our normal shoes
348: Srf5 with our normal shoes and normal clothes on
349: Srf1 to me I always feel, like I only do that
350: Srf4 I don't understand that , I'll never since they changed that policy, I've never understood it
351: Srm3 they say at XXX its because it's a replacement you know erm joint replacement
352: Srf4 but even so they've opened up the patient
353: Srm3 but we do open reductions and internal fixations here and I would imagine that that's still the same
354: Srf5 if you're opening someones abdomen from top to bottom
355: Srf1 yeah I don't understand that

356:
357: Mod so the policy is not the same in one of the satellite hospitals?
358:
359: Srf1 no
360: Srm3 no
361: Srf4 no
362: Srm3 XXX you daren't go passed the changing room in anything
363: Srf5 my god you'd be
364: Srm3 you'd be killed
365: Srf1 really
366: Srf5 you would die, yes
367: Srm3 but then here erm I don't know
368: Srf4 was it in the last year they changed it or is it a bit longer than that
369: Srf5 about 18 months.
370: Srf1 you would work like this you know when you're doing a portable in recovery, you know cos you're allowed to go into recovery like this [in uniform].
371: Srm3 you would actually see the doctors stick their head into the theatre rooms here and their clothes as well, when they come up from casualty with films to show the orthopaedic surgeon, I've seen them quite often put their head round the door and they're still fully clothed and that's completely broken every barrier they haven't even gone even through the anaesthetic room they are in the single door to remove trolleys
372: Srf5 but now they've locked that single door, they come in through the plaster room and where the scopes go for sterilisation
373: Srm3 if that doors locked sometimes its not
374: Srf5 but then we could also talk about their aprons cos they never clean their aprons up their
375: Srm3 no
376:
377: Mod are you talking about lead aprons?
378:
379: Srf5 yeah
380: Srm3 I got asked to give one of the doctors one of our aprons and I refused I said sorry but we maintain ours, I wouldn't you know some, the way they cover themselves in so much rubbish
381: Srf1 they look appalling don't they
382: Srm3 I would never give them one of ours cos I know that we do clean ours
383: Srf4 they do look a bit manky don't they
384: Srf5 they are really nasty
385: Srf1 it would be good to do a test on them wouldn't it, just to see what they were harbouring
386: Srf4 you know I bet if you did, there would be a lot of infection growing on those aprons
387: Srf1 it would be interesting I think they need checking the lot of them
388: Srf5 because the only barrier that a lot of them have is their greens, but if it's the surgeon he's covered in blood

389: Srf1 they just look so manky, you don't even want to put it on you do you
390: Srm3 no, the worst thing that I find is going up and ours aren't on the side
391: Srf1 and having to put one of theirs on
392: Srf4 yeah
393: Srm3 I go around picking them up and saying to the nurses they're ours and cleaning them afterwards, I don't know if its that one thing
394: Srf1 I think they're disgusting
395: Srm3 if you'd seen some of the doctors you wouldn't want to put them on after they've sweated in them
396: Srf1 they're screened aren't they for holes and for radiation purposes
397: Srf4 but that's our responsibility isn't it
398: Srf1 but are they screened for infection
399: Srf5 yeah but I think it's the same as for cassettes you know I don't think
400: Srf4 yeah they're kind of the bug harourers aren't they
401: Srf1 yeah
402: Srf4 you know those corners and little cervices aren't they
403: Srf5 it was actually proven in XXX where I worked that the x-ray cassette cos we had three ITUs the x-ray cassette was the source of the MRSA
404: Srf1 no
405: Srf5 yes
406: Srf4 the front of our mobile we had it, we had it on the front of our mobile
407: Srf5 because we did 35 ITU portable chests everyday first thing in the morning and then they came down and they just got put back in the slot that was where the MRSA was coming from and you knew it was cos ITU would get it then the cardiac ward would get it, then the thoracic, cardiothoracic ward would get it and it was all the wards with the patients who had had a portable x-rays, and it was proven that it was the X-ray cassettes
408:
409: Mod what did they do to stop that transmission?
410:
411: Srf5 they made us clean them, it was up to us to make sure they were clean and we actually started with erm using you know the err the bin bags, they actually started to make us use pillow cases and bin bags if the pillow cases weren't there, but we had to use a pillow case on every film that we did. Discard the pillow case, wipe the film down.
412:
413: Mod do they have any policies like that here?
414:
415: Srf4 I don't know if its policy actually but we do tend to put them in pillow cases when we go up
416: Srf1 we do we when we go to ITU don't we, but now they have like a holder that we put the film in there don't we to save them lifting them, the patient, its like a slide type thing
417: Srf2 when does that get cleaned

418: Srf4 well I actually, the nurse erm refused, I went up to x-ray a patient, it was only a couple of weeks ago actually and the patient was basically they couldn't control his bleeding and she would not put a film underneath a patient without using the slide, but on this occasion she actually refused to use the slide cos she said she didn't want to ruin it for future patients, by infecting it with the blood yeah, so she said this is the only time that I'll ever lift a patient again, but I don't want you to use that cos I don't want to ruin it again for future patients
419: Srm3 I don't know how they can avoid it though, that is held together and the handle itself is material. Its absorbent, there are areas that once its in it I doubt you'd be able without bleaching it.
420: Srf4 there's no way of washing it is there
421: Srf1 no
422:
423: Mod and is that same slidey cover used for every patient?
424:
425: Srf4 it actually goes under their sheet
426: Srf1 yeah under the sheet
427: Srf4 so it has to go under, you can never go directly under the skin it goes underneath the mattress and the sheet.
428: Srf5 I used to thing the air power beds were the best ways, you know the ones that you can inflate and deflate, so the cassette doesn't actually ever touch the patient. Its hard work to get the cassette in and get it in the right place but infection control ways its better, cos it doesn't have any holes. We had those in XXX
429: Srf4 have we got them here
430: Srf5 yeah
431: Srf4 oh I didn't know we still had them
432: Srf5 they're usually used in the side rooms. In XXX they brought those beds in for us cos we used to have to stand on steps to get high enough to push the cassette in otherwise we were doing that [hands in air]
433: Srf4 oh no you can't be doing that
434: Srf5 and the nurses were having to stand up on steps as well
435:
436: Mod do you think, again back to a more or less question. Do you think the X-ray department follows infection control practice more or less than other hospital departments?
437:
438: Srf4 I don't know cos I don't know how other areas follow them to be honest, or how stringently they follow them
439: Srf5 they don't seem to be that stringent when we go up do they, with us you know you don't see them saying you cant take the cassette out unless you've wiped it after using on a MRSA bed or its hard enough to find a nurse to help you lift let alone tell you what you should and shouldn't be doing.
440: Srf1 yeah this is it.
441: Srf4 I think certain areas are, such as SCBU
442: Srf1 yeah

443: Srf4 they're very
444: Srf5 ITU are as well aren't they
445: Srf4 yeah but they are noticeably, but as for how should I put it, general wards then I wouldn't like to say to be honest
446: Srf5 ITU and SCBU are good aren't they?
447: Srf1 and Theatre are good
448: Srm3 It becomes such a common occurrence people don't even notice they do it, they just do it, right next patient wash hands come back to them.
449: Srf5 but you can, ITU you can go up and you can do three patients and I never see one of the nurses
450: Srm3 inform you
451: Srf5 yeah you could walk from one to the other and not wash your hands once or alco wipe your hands once and they, don't think any of them approach you and say anything
452: Srf4 no
453:
454: **Mod On that point then, going back to what you said about theatre in XXX who enforced it, you know you said you just wouldn't walk through theatre who enforces that?**
455:
456: Srm3 there is one, there are a few head nurses and I think everyone else immediately says oh don't do that because you know who'll find out and it, its not from
457: Srf5 its from the sister in charge
458: Srm3 yeah but its just a known thing you don't do it because you will get killed, if she he whatever spots you that's it
459: Srf1 that's good in a way
460: Srf5 I think you just wouldn't dream of
461: Srf2 no it just doesn't enter your head
462: Srf5 its an old style theatre and it's run old style
463: Srm3 yeah
464: Srf5 and you just wouldn't dream of walking in in anything other than greens, hat on your head and your theatre shoes on
465: Srf2 you don't even think about walking in without a mask on
466: Srm3 no
467: Srf2 even if its empty
468: Srf5 not in the theatre you don't
469: Srf2 you don't walk in
470: Srf5 I do in the main but I don't go in to the theatre
471: Srm3 those doors, the doors into the main rooms, once the patient is in there you are not allowed to walk in there at all
472: Srf2 no you have to go in the other door
473: Srm3 I didn't know this at one point and I was gowned and masked and everything but my god was I shouted at when I went through those doors wrongly and that's it, the doctors will, I've never known them to be so stringent with how they come in because its ran to protocol
474: Srf5 they're different aren't they
475: Srf4 which is interesting though because they are the same ones that work here, it's the same surgeons

476: Srm3 and you can notice the complete laxity of it here but is it because the stringency isn't in this theatre I don't know
477: Srf2 do you think it's the fact that its run in more of an old fashioned way that you, that the sister has ultimate control
478: Srm3 yeah, oh god yes
479: Srf5 I did find that in that theatre, I mean they do clean in here[theatre], they get the mop and bucket out and clean it but its such a high turn over of patients here that you tend to find if you stand still long enough you get a mop in your face and where as in XXX the whole theatre is cleaned and the table its all done properly
480: Srf1 really
481: Srm3 top to bottom the skirting and everything
482: Srf1is it?
483: Srf5 yeah top to bottom between patients
484: Srf2 the table is taken out so that you can clean underneath every inch of the floor
485: Srm3 and the odd thing is they've got that theatre room that's got like erm a lowered glass portion in the middle which apparently that box underneath there is having completely clean free air blowing downwards and there's a yellow tape on the floor and if you go in there once the surgeon you are not allowed past that yellow line you're in this grey area around the side and that is completely sterile and again if you step into that woe betide you. Its but here no you can put your head over it you know hair popping out the side of your cap
486: Srf5 oh yeah if you haven't got your fringe on show you're not allowed in
487: Srm3 but the amount of fringes you see out up here sticking out hair every where there no every hair is stuck in and
488: Srf4 well it should be really cos that's the purpose of having the hats on isn't.
489: Srf5 See that's what makes me laugh, like they're scrubbed up nurse has her fringe on show yeah she has a visor on but that's not going to stop a piece of hair dropping into a piece of equipment is it
490: Srf2 or the patient
491: Srf5 yeah or into the patient
492: Srm3 and the kind of caps, you've got the single solitary caps that just go around the top of your head but once they're scrubbed in XXX they've got the one that goes all the way around every potion of the head
493: Srf1 really
494: Srf4 oh I know the ones you mean
495: Srf5 and they have these little space man suits do they still have those
496: Srm3 yes
497: Srf5 to keep them cool
498: Srf2 yes they've got the Velcro at the front
499: Srf4 oh that's good though
500: Srf5 its they have a cold air blower basically isn't it and it keeps them cool
501: Srf4 oh I haven't seen them
502: Srf2 they have connections up to the ceiling
503: Srf4 oh so that's what they do oh I've seen those

504: Srf5 the x-ray machine, I don't know if it's the same now with the new one,but they had plastic that goes on the C-arm
505: Srm3 yes they still do
506: Srf2 yes
507: Srf5 it just clips onto the C-arm, so that you don't get blood
508: Srm3 they've covered the top, the bottom, the image intensifier they've covered the x-ray tube and the C-arm itself
509: Srf5 and the C-arm itself
510: Srm3 and that is literally the only bit that's allowed into that yellow area
511: Srf5 yeah
512: Srf4 how do you move your C-arm then if its got all this plastic on it
513: Srf5 it does move it just clips
514: Srm3 there are handles it is
515: Srf5 it just sits over the top
516: Srf4 oh right
517: Srf5 it just sits over the top so you very rarely get any and its , its not a theatre that has a lot of blood in it really that we go in so the cross infection with the image intensifier is very low
518:
519: **Mod the plastic covers are they changed for?**
520:
521: Srm3 for every patient
522: Srf5 every time, every patient
523:
524: Mod are they disposable or?
525:
526: Srm3 yes, they're from the company that did the, who made the erm image intensifier and they spend the money to get the plastic covers for it
527: Srf5 theatres spend the money
528: Srm3 yeah
529: Srf1 they should do that here, though shouldn't they, there's no reason why they can't do it here
530: Srf5 costs, that's what it comes down to, they won't because its money. I mean we don't even have proper covers we have erm quite often just a green sheet with towel clips
531: Srf1 the whole thing is never covered is it, the intensifier
532: Srf4 we had plastic ones clear plastic where I worked before and it was great cos you could see where you were [position of x-ray tube], but they don't do them here.
533:
534: Mod how would you feel about being screened for MRSA?
535:
536: Srf4 I'd be happy to
537: Srf1 yeah I would
538: Srf4 I personally wouldn't have any problem with that
539: Srm3 it depends is there a way of curing it cos if its one that will refrain you from working

540: Srf1 from working yeah or infecting
541: Srm3 but then again if you've got it and you know you're the source of MRSA
542: Srf4 yeah exactly then you've got to sort it out
543: Srm3 you would need to take
544: Srf5 you would just need to take extra precautions, its like Hep C, you know you've got Hep C so you're careful with what you do
545: Srf1 yeah
546: Srm3 yeah
547: Srf5 you would just do the same thing, you'd be more aware that you were carrying an infection
548: Srm3 or refrain from going to areas where you would be an imminent danger to them
549: Srf4 its just the same like even when you're in employment though if you're being, If you're in close contact with MRSA patients then you'd have to be screened then. Cos I know in certain areas, in certain hospitals you would need to have to have a test to see if you're the source
550: Srf1 yeah
551: Srf5 we were all screened in XXX
552: Srf4 yeah I've been swabbed for MRSA
553: Srf1 yeah
554: Srf4 cos there was an MRSA outbreak and they couldn't work out where it was coming from so all the radiographers had to be screened as well to make sure they weren't the source
555: Srf5 we did swabs and that's when we found out it was the cassettes
556: Srf1 did you have the nasal swabs
557: Srf4 yeah, I don't know where you stand with that really would you have the right to refuse if you didn't want to, I don't know
558: Srf5 I suppose you'd have the right cos you have the right to be
559: Srf2 legally you can't be forced to do anything
560: Srf5 you have the right to be tested for everything else don't you
561: Srf4 yeah
562: Srf2 but you can't be forced into taking a test
563: Srf4 I don't have any problem pre-employment, you'd need to know anyway wouldn't you anyway
564: Srf1 yeah I'd want to know
565: Srf5 it wouldn't bother me having a yearly check, at least you'd know where you stand then, you'd know if you were carrying anything nasty
566:
567: Mod would you like to know?
568:
569: Srf1 yeah so it could be treated
570: Srf4 yeah
571: Srf5 yeah, cos you never know when you're going to need an operation or something and if you're carrying MRSA its going to harm your wound so it would hold your healing up are you
572:

573: Mod does anybody ever think about taking infections home with them?
574:
575: Srf4 yeah
576: Srm3 hmm yes
577: Srf4 I always wash my hands before I go into my car
578: Srm3 yes
579: Srf1 yes
580: Srf4 before I leave here
581: Srm3 the first place I go before I go home is my grans and
582: Srf4 you don't want to take anything back to her do you
583: Srm3 well no, cos you know how old she is and you could, I could, you could bring anything home so
584: Srf5 I make sure my cardigan is fastened, although have my cardigan on I make sure its fastened when I pick my son up so he's not up against my uniform and I wash my hands
585:
586: Mod few of you have said that you're department is good with infection control anyway, but what would you think would prevent infection control practices being carried out?
587:
588: Srf4 time
589: Srm3 time
590: Srf1 that's the main factor really
591: Srf4 time and lack of staff I think to be honest, cos if you've very short staffed then anyway you are going to be rushing around more and you're not, you are going to be more likely to be slightly hap hazard about things like infection control
592: Srm3 hmm
593: Srf4 its not going to be your priority then which it should be but its not going to be on a realistic basis you're going to be more concerned about getting your patients through for them not to be waiting too long
594: Srm3 your consideration of whose clean and who isn't changes completely, you do just, you do just wash when you really think you should and
595: Srf4 you tend to dodge people yeah
596: Srm3 then the rotation just changes the whole
597: Srf5 like you say that also depends on which room you're in
598: Srf4 yeah
599: Srf1 yeah
600: Srm3 hmm
601: Srf5 how much touching you do
602:
603: Mod anything else other than time and lack of staff?
604:
605: Srm3 the material to do it with and the time it takes to do that you know I mean we have the err, we now have those erm
606: Srf4 wipes

607: Srm3 equipment wipes that you know have got all of the liquid in it so you don't have to mix any bottles or spray any mix the spray bottles every morning, they are fresh every one you take out and the alco rub providing they are provided in each room your reasoning behind not using them
608: Srf5 I find sometimes though you know the er with the hot water taps, if somebody's used it before you can't wash your hands its too hot
609: Srm3 they've been doing temperature tests because apparently if you wash in, if you put your hands in anything above 48 degrees celcius for eight seconds or more you will get burn scolds
610: Srf5 those taps were 78
611: Srm3 these taps were 57
612: Srf5 they weren't below 70
613: Srf4 they have to be over 40 though doesn't it they, it has to be over 40 for legionnaires doesn't it
614: Srm3 mmmm. And you can't wash in them cos anything above 50 two seconds and you've got a scold. Anything more and you've got deep bruise cos you know how can you wash with that I don't know. And they're not mixer taps in some rooms so at least with the mixer tap you can put the cold water to it but sometimes I mean in the gents toilets for definite they're separate taps
615: Srf5 they are in room four as well [a+e] which is the rooms that you probably need them
616: Srm3 hmm yeah
617: Srf1 theres a hopeless little sink in there as well haven't they
618: Srm3 oh yeah
619: Srf1 its abysmal
620: Srm3 one hand can fit in it that's about it. You try and wash some of those sponges and you can't do it in that sink
621: Srf1 in a tiny little sink
622:
623: Mod do you think that makes a difference?
624:
625: Srm3 mmmm
626: Srf1 I think you need to you know, yeah I think so
627: Srm3 if you're gonna wash you need something to you know splash about in
628: Srf5 yeah you're causing more complications aren't you if you've got a little sink and you're spilling water on the floor
629: Srm3 true
630: Srf5 you're actually causing more hazardous conditions really
631: Srm3 with that sink you can't wash up to your wrists at all
632: Srf1 no its ridiculous
633: Srm3 cos you're out over the side and everywhere
634:
635: **Mod finally what would you say could improve the practice of infection control, other than the things you've already mentioned of time and staff?**
636:
637: Srf4 communication between er departments

638: Srm3 hmm
639: Srf4 I think are the bigger things from like the er wards to the porters to ourselves, I mean it goes both ways do you know what I mean from us back to them as well but we need to, and what we'd like as well as them communicating back to us what they have, what they don't have, and what they need as well, cos its not always kind of what we want down here
640: Srm3 stringency, but it almost needs to be there before, introducing stringency is more difficult than it already being there. XXX never lost it its always been like that, here has lost it and to get it back to that state is gonna be a battle and I think if our department was stringent from the out set anybody coming in would feel themselves oh well ok perhaps I am not washing my hands enough but because everybody is like that its you know difficult to enforce.
641:
642: **Mod who do you think that should come from then, if you were going to bring that back in?**
643:
644: Srm3 it would be difficult you can't do it from a basis of if you don't do it we'll come down on you heavily and cos people wont it'll be, it needs to be coming from someone who will explain why its important and everything like that keep reminding
645: Srf5 but we go to those infection control meetings for that don't we
646: Srf4 yeah its like lead by example isn't it really
647: Srm3 yeah it is, its from everybody
648: Srf5 you've got to be wanting to do it yourself
649: Srm3 yeah. The best way is if everybody did it like that from the beginning, everyone would then back everybody else up, but this group doing this bit, that group doing that bit, that group it it gets a bit funny. It ends up who you are working with and what are they like
650: Srf4 yeah cos as you've just said in theatre now theatre have lost that now haven't they really
651: Srm3 yeah
652: Srf1 mmm mm
653: Srf4 where as well I think it is i'm not sure infection control is a thing on the induction now and so then all new members of staff if they go into their areas of work and they think well joe bloggs that's been here for twenty years they don't do it so why should I do it or I'm going to look a bit stupid and neurotic if I kind of wash my hands or if I change this sheet after every single patient I'm going to look a bit silly if they don't do it then I don't need to do it. So its quite difficult as you said to get it back really isn't it cos how do you then, I suppose re-educate the ones that are not doing it isn't it.
654: Srm3 A hospital wide immediate enforcement of not enforcement cos that's that's too much but a consciousness immediately all at once that everybody at least tries and then providing everyone is keeping up to doing that every it will back everybody up I, it'll make you think oh perhaps I should be doing that now cos I've just noticed her doing it whereas because you don't or rarely see it, its only it's all in the back of your head, its not really something you're conscious of , I don't think it's a conscious thing it is to start with but as soon as it becomes routine that's it you've cracked it.

655:
656: **Mod would you have a problem with anybody what ever grade they were telling you to wash your hands after a patient? Not you personally do you think staff in general would?**
657:
658: Srm3 the way that they said it
659: Srf4 I was just going to say
660: Srm3 I'd do it
661: Srf5 yeah it would depend on how they said it
662: Srm3 I could have someone coming in saying wash your hands now [stern voice]. I'd be there going who are you to say that
663: Srf4 but that's the way it should be really that's what they say isn't it if you notice that somebody hasn't then you are to tell them aren't you
664: Srf5 yeah
665: Srf4 I wouldn't like to though
666: Srf1 no me either
667: Srm3 but in my experience it would be oh you are going to wash your hands[softer voice] I'd do it, I don't know, it's the way you say it and I, I don't know
668: Srf2 you set an example don't you, if you wash your hands then it triggers them to think oh I
669: Srm3 yeah, that's true
670: Srf2 I've quite often done that
671: Srm3 don't just say it, wash your hands in front of them and it'll go, all you need is them to think possibly I should and you'd see how many do it. Because I think its one of those things whenever
672: Srf5 have a thing on every form, have you washed your hands?
673: Srm3 its one of those things if you've x-rayed a patient whose itching, for five minutes after wards it's a psychological itch that you have yourself and if you notice someone else washing their hands its psychological that you think I might be dirty cos I haven't and its its getting that, I think it wouldn't necessarily be saying it it would be the other person, if you had say the seniors or people who are continually washing their hands in front of other people I think psychologically it will influence people to think I'm not as clean I will wash my hands so its odd. There you go get a psychologist in.
674:
675: **Mod you've had changes now haven't you with erm checklists and things?**
676:
677: Srf4 well to be honest the checklists have been there for years
678: Srf5 but now XXX collects them on a Friday and tells you off on a Monday.
679: Srf1 it was like you know clean the room once a week but now its changed to everyday
680: Srf4 a daily thing, they have been there, its just that people kind of I think, like everything to start off with they filled them in but the longer

they're there for the more lax people get and then its just forgotten in the end
681:
682: Mod but they are monitored now are they?
683:
684: Srf4 yeah
685: Srf1 yeah on a daily basis now
686: Srf4 its everyday now
687:
688: **Mod and hows that been taken in the department?**
689:
690: Srf5 some people just carry on as they did before
691: Srf4 I think it's the same people from what I gather though that does it on a daily basis to who used to do it on a weekly basis. And the ones who didn't used to do it, still don't do it
692: Srf5 I think as well its part and part of training like now when I trained I had to be in the department at quarter to nine and I had to have every sheet changed every pillow case changed, every cassette in the right room cos they were all labelled which room they were in, they went into, cleaned them down ready to start work for nine o'clock. That room had to be spotless for nine o'clock. At the end of the day at quarter to five I had to go around and empty every linen bag
693: Srf1 yeah they don't do that now
694: Srf4 no they don't
695: Srf5 I had to make sure there was a clean gown in every cubicle
696: Srf1 they don't even think about it now
697: Srf4 they just sit there and watch
698: Srf1 we do it and they watch
699: Srf5 make sure that the room was tidy again and make sure that the on-call room was ready to go. That was my job as a student. They wonder in now at ten past nine hi which room am I in today and then at quarter to five oh can I go. Where are they learning that the cleaning is an important issue in the rooms. You know they're not
700: Srf1 we end up doing it don't we
701: Srf5 and so then when they become qualified they still don't know that cleaning is an important issue because they've not been taught it or they they don't you know its not we're not making it stringent enough to say you are in here at nine o'clock and the first thing you do is you change your sheets and you clean your cassettes. I mean we don't do it I know but as a student I had to do it so my theory is if I had to do it as a student I can do it but now as a qualified, but if a student is there then they should be doing it too and learning it.
702: Srm3 I think that's more it doing it too. For my personality I couldn't
703: Srf5 so now I grab a student and say come on lets go and clean the room
704: Srm3 yeah that's it
705: Srf4 They're horrified
706: Srf5 yeah
707: Srf4 and they're absolutely horrified
708: Srf5 yeah they're like me, clean a room

709: Srf4 yeah
710: Srm3 That's more like it I could do that before I could order someone to clean the room cos id have to do it as well with them
711: Srf5 you wouldn't order somebody to be in a room you'd just say lets go and clean the room
712: Srf4 yeah that's fair enough and its done then isn't it
713: Srf5 and at nine o'clock its leaving it a bit tight isn't it
714: Srf1 XXX just comes round and reminds people she says it in a nice way doesn't she
715: Srf4 what was that sorry
716: Srf1 you know XXX in charge she'll come round and check that we've done this that and the other she says it in a nice way
717: Srf5 see I don't think that I, I make sure when I've got a student I make them go and do it with me
718: Srf4 I'm not being funny though I think that's right you see, I think they should
719: Srf1 I think they should do it in a way you know if every one does it in the morning it just gives you time to you know concentrate on the other things like seeing what patients you've got and getting them ready but gone are the day when you can just expect them to do it or ask them to do it you know
720: Srm3 coming from XXX as a student I was surprised we don't damp dust as often as we did at XXX.
721: Srf4 that's what I mean cos here I'd have no quarms in saying to a student can you clean. I would think nothing of it.
722: Srf5 yeah they've got to learn haven't they, if you've got to do it as a qualified you've got to do it as a student as well
723: Srm3 yeah
724: Srf5 otherwise where are you going to get your basics from for being a qualified
725: Srm3 and do it with them otherwise you to in order to avoid them thinking we're always giving them the sxxxxy tasks
726: Srf1 yeah
727: Srm3 so if you just do it with them
728: Srf1 yeah do it with them
729: Srf5 I mean they don't have to go and change linen and stock linen up because the health carers do that
730: Srf4 that's right
731: Srf5 so that sort of issue of dirty linen hanging around isn't a problem but if you've got quiet rooms, like often you know, you know what its like we all sit don't we around the processor
732: Srf4 not for long now
733: Srf5 hello lets go and clean some cassettes that's what I'm going to start doing, lets get in there and clean some cassettes
734: Srm3 yeah there won't be any processors to lean on soon
735: Srf4 we've got a month of loitering left
736: Srf5 I know but we'll still have cassettes. But then people say I don't want to work with me cos she makes us clean cassettes and clean rooms.
737:

738: Mod do you think that's what happens?
739:
740: Srf5 mmm mmm
741: Srf4 yeah it is
742: Srf5 yeah if you make, if you say come on lets go and do this and they know they're not going to get away with, its all students are the same, I was the same I'm sure we all were all the same
743: Srf4 yeah there are certain people its oh I can have a laugh and a chat with that person
744: Srf5 yeah, or they'll make me clean
745: Srf4 or they make me do some work kind of thing
746: Srm3 as a student you slightly change your time line and come in a bit later and go oh I was just speaking to de de de deder because the cleaning times gone
747: Srf1 I was like you [srf5] we had to come in you know twenty to nine and get the room ready it was expected of you, there was no
748: Srf4 it was, it was just something you had to do, you had to stock up the room so that everything was there
749: Srf1 and for screening it was you that got the barium ready and everything else but not here
750: Srf4 as a student I was the one that came in early to do it
751: Srf5 that was part of my job as a student
752: Srf4 I think we're wrong here aren't we
753: Srf1 by nine o'clock it was all ready, ready to go
754:
755: **Mod how do you think it would be if when you were working with other qualified radiographers and you said come on lets go and clean the room?**
756:
757: Srf4 some would look at you as if you had 10 heads
758: Srf1 I wouldn't be offended, I would just think yeah
759: Srf4 there would be a lot of people here who would look at you as if you had 10 heads
760: Srf5 you would know you could approach a certain radiographer and say shall we go and change that, will you come and give me a hand doing that
761: Srf4 yeah
762: Srf5 there are certain radiographers who would go what me. And you that the people who have been qualified a bit longer. Excuse me srm3. people who have been qualified a bit longer would perhaps say yeah come on lets go and do it but the newer qualifieds because they haven't had to do it as a student particularly the ones who've trained here I mean and we are, we are all at fault for that aren't we. Particuarly the ones who've trained here would look at you as if you were asking them to go and dig six foot to find a dead body
763: Srm3 except for me
764: Srf1 that wouldn't bother me, I'd think good idea I should have thought about that, I'd be a bit annoyed that it hadn't entered my head to think of it you know to clean the cassettes and that sort of thing

765: Srf4 yeah
766: Srf5 you know the other thing that upsets me is they do mill in at ten past nine and then sort of you lose them your looking for them at about quarter to five and hello where have they gone. And over an hour lunch, you know when they start work they can't do that so why should they do that as a student, I know you don't get paid as a student but that's where your all your ethics and all your time keeping should be coming in.
767: Srf1 that doesn't happen any more though does it cos you can be in screening and
768: Srf4 they can be anywhere in the department can't they
769: Srf5 as a student I used to be in the department at twenty to nine, so now if I'm any later than twenty to nine I think oh my god I'm late. Cos to me I had to be in for twenty to nine
770:
771: **Mod as you are the newer qualified member of staff here[srm3] what do you think about that?**
772:
773: Srf5 yes since I've had my say
774: Srm3 It's a lot to do with personality because I think, I would I do
775: Srf5 yeah in fairness you do
776: Srm3 but I do understand where its all coming from its it is in the other collegues I know that round my point
777: Srf4 to do it or not to do it
778: Srm3 not to do it, well when asked the face comes, they'll do it but the face comes first whereas me I'll have started to walk towards you when I'm in the room helping without any face
779: Srf1 it's the manner in which some people tell you to do it as well, cos some people here that will come you know I've been qualified a long time and they'll come in the room and the way that they speak to me erm have you cleaned the room
780: Srf4 it just gets your goat up straight away doesn't it
781: Srf1 and that straight away gets my back up
782: Srm3 yes
783: Srf1 the way that i'm told I think to myself I've been qualified all this time and I will clean the room I will clean it today cos I know I have to clean it but if someone asks me to do it in that manner then I am offended
784: Srf4 not being funny yeah and as well though you'd be well I don't know cos I'm just stubborn and pig headed probably but I'd be more inclined not to do it then you see out of principle
785: Srf1 yeah, that offends me
786: Srf4 because of the way they've spoken to me
787: Srf1 yeah
788: Srf4 instead of
789: Srf1 but you've got every intention of doing it
790: Srf4 actually thinking about why they've asked me in the first place, do you know what I mean. But like you said you think well I am going to do it when I have time or when I'm going to do it or whatever
791: Srf1 but you do get that as well and that I do find that annoying
792: Srf4 yeah
793:

794: Mod what about the people who've been qualified for a very long time then, are they any different?
795:
796: Srf4 it depends
797: Srf5 generally people who've been qualified for a long time in the department are pretty good but you tend to find that people who work in the outside hospitals because it is there sole responsibility with there room are definitely more atuned to doing it
798: Srf4 definitely more
799: Srm3 definitely more
800: Srf1 oh yeah
801: Srf5 because they have to do their own because that department is theirs for a fortnight and that responsibility is soley on them then
802: Srm3 when I go out to the XXX or XXX by myself I have to say its spotless cos I am so conscious. Same with the quality of your x-rays like you said when you go and work by yourself
803: Srf1 yeah and you're sharing it with another radiographer and you don't want them to think badly of you, you've got to keep it even more so there
804: Srf4 yeah that's true actually you can tell who works where in how they how they maintain their room cos say now for example out side hospital you'd always be in a room and your room would always be tidy, where as somebody not naming names but somebody here would work in the department would work in the department all the time not anyone in this group by the way. You could guarantee you could walk into a room after them and it would be things would be everywhere and it wouldn't necessarily be clean either
805: Srf5 I know you can walk in after like srf1 and the pads would have been put back the tube would be over the table ready to go the pillows and the mattress would be straight and that room would be ready for anybody to bring a patient straight in and do their x-ray, because that's how you work in the outside hospital, everything gets put back as you've used it and that rooms ready to go
806:
807: Mod so is it quite often if you are the only person to do it?
808:
809: Srf4 that yeah, it's a case of having to really
810: Srf5 yeah
811: Srm3 yeah, I mean then you get then labelled as being pernickety and, and but I think no lets try and get everybody bloody pernickety you know everyone should be like ooh I've missed that bit of the floor you know
812: Srf4 its something that has to be done, yeah
813: Srf5 you've got to have a word with them haven't you. You can tell who you've been following and who you're working with you know where they predominately work
814: Srf4 yeah
815: Srm3 it's a trait
816: Srf4 definitely and how clean they work really isn't it, you can tell

817: Srf5 where I trained all the radiographers were over 50 I didn't have a 24 30 I had a 12 10 [sizes of cassettes] so for me they were extremely, they were both they were all dual qualified as well cos it was the erm
818: Srf4 oh right
819: Srf5 when they qualified it was all the time when you trained for both so they were very old school radiographers
820:
821: Mod and were they good?
822:
823: Srf5 oh yeah they were good at their rooms and they were good at their work. They were quite, cricky, if you left anything on the side it was whipped off and thrust in your face "whats this doing here"
824: Srf4 which it should be here cos its like
825: Srf5 yeah, you know like I carry my bottle around with me if I tried to do that in XXX I'd have had no
826: Srf4 now I think that's wrong you see
827: Srf5 yeah I do but do you know, no I do but do you know what I when I was pregnant I got into the habit of having to have a drink with me and it still hasn't gone and that's perhaps why I have a drink with me.
828: Srm3 I don't like to say it, buts its almost as if the pride of work in X-ray has gone
829: Srf4 yeah its just not there
830: Srf5 don't get me started on film packets
831:
832: Mod Well unless anybody else has anything more to say?
833:
834: Srf4 no
835: Srf5 I think I've said enough
836:
837: Mod Right well thank you very much its much appreciated.
838:

Focus Group Discussion DGH2 Superintendents

4:
5: Sp1 XXXsuperintendent for mammography, so I work in mammography, nuclear medicine and the general department. And I have been qualified nineteen years
6:
7: Sp2 Hi I'm XXX I am superintendent in charge of reporting I'm a non reporting reporting radiographer and I've been qualified for 15 years
8:
9: Sp3 I'm err XXXI'm superintendent for MRI and I also work in CT and interventional and I'm afraid I've been qualified for 24 years
10:
11: Sp4 I'm XXXIm acting superintendent in CT I work in MRI as well and angios and I do barium enemas and I also work in the general department, I must have been qualified for 17 years then
12:
13: Sp5 I'mXXX I'm superintendent for ultrasound and I live in ultrasound all the time erm I've been qualified since I think 1975 so that's what 29 years
14:
15:
16: **Mod ok thank you**
17:
18: **Mod if we can just start the discussion by you telling me what you think about when somebody says infection control to you?**
19:
20: Sp5 cleaning up everything I think
21: Sp1 yeah prevention of passing infection from one person to another. Sort of controlling it within the er you know containing it not letting it spread
22: Sp3 yeah
23: Sp1 basics is that what you mean
24:
25: Mod yes what ever you think of is what I'd like to know
26:
27: Sp3 well just as sp1 said not spreading infection from patients or staff
28: Sp5 yeah just cleaning everything
29: Sp1 handwashing
30:
31: **Mod so what sort of measures would you take to prevent those sorts of spreads, that you've just mentioned?**
32:
33: Sp1 we've got lots of things in force really haven't we
34: Sp4 yes
35: Sp1 lots of protocols like you say handwashing
36: Sp4 handwashing
37: Sp1 I think that's the most important isn't it

38: Sp4 yeah. We cover the table with paper and discard it after every patient
39: Sp2 knowledge
40: Sp5 awareness aswell isn't it if there's a patient with a specific condition then you try to erm, we don't integrate them into the middle of the list and things like that do we really.
41: Sp2 cleaning
42: Sp1 yeah cleaning with appropriate with detergent
43: Sp2 gloves and aprons, leaving the room for half an hour after so that it doesn't get used by someone else coming down for an x-ray
44: Sp1 what was the question again, precautions?
45:
46: **Mod what sort of things are in place to prevent the spread of infection?**
47:
48: Sp3 handwashing between patients,
49: Sp4 yeah
50: Sp1yeah
51: Sp3 before and after injections
52: Sp1 you wear gloves anyway don't you
53: Sp3 regular cleaning
54:
55:
56: **Mod do you think there are any particular types of patients that you need to be carrying out infection control for?**
57:
58: Sp3 I suppose it should be for all patients
59: Sp1 yeah
60: Sp4 yeah you should with all cos you don't know what they've got do you I mean
61: Sp1 no you don't always know
62: Sp4 you'll be lucky if you know that they've got MRSA, but there's an awful lot that have probably got it that you don't know have got it aren't there
63: Sp5 very often you're told afterwards aren't you
64: Sp4 after the case yeah
65: Sp1 so if you've done the good practice then it doesn't really matter
66: Sp5 mmm
67: Sp1 you know it shouldn't make a big difference
68: Sp5 its just that you wouldn't choose to put, if you knew someone had it
,
69: Sp1 no you wouldn't
70: Sp5 you wouldn't choose to out them with, especially someone you know who has had perhaps a high risk of
71: Sp1 yeah
72: Sp3 I mean generally speaking you would assume that most of the in-patients are a higher risk than
73: Sp4 yeah a higher risk than the out patients

74: Sp3 and having a low
75: Sp5 I think we have a mixed waiting room and you think
76: Sp3 yeah
77: Sp5 some people have perhaps come from oncology where their resistance is quite low and you wouldn't choose to have someone else there would you at the same time as them if you could avoid it
78: Sp1 but if we know someone's got it
79: Sp5 yes we prefer then
80: Sp1 we've got a protocol that says we do them at the end the day, when the room can be left and that kind of thing
81: Sp5 yes. Everyday practice isn't, its difficult to segregate totally isn't it.
82: Sp4 yeah
83: Sp5 I'm just thinking in our unit its very open
84: Sp4 it is your right
85: Sp5 I don't know perhaps an [general] x-ray room is a bit easier, where you can just have the one waiting room empty, probably, can't you and just have one patient in there at the end of the day
86: Sp4 we tried to do that last week though and then ended up with a err collapse in A+E coming up
87: Sp5 oh right
88: Sp4 and we'd got someone with MRSA in their sputum that we were just taking out and that's very difficult in that situation you can't wait, you've got to do the patient but
89:
90: **Mod so that was taking an emergency patient in straight after?**
91:
92: Sp4 yeah straight afterwards but you've got no option, you get somebody into resus with a GCS of 6 you can't say oh I've got to wait half an hour before I bring them into the rooms so they're crossing over in the corridor really.
93: Sp5 well I can't think what you would do
94: Sp4 so that's quite difficult
95: Sp5 also I'm never quite sure from the wards really, they'll tell you they've been treated for MRSA but they've stopped now because perhaps its in the sputum or something like that, they don't think it seems to be a high risk anymore. I don't really know if that still is a high risk then or not
96: Sp1 or it'll be down on the computer but it will have been when they were last admitted and things like that
97: Sp4 yes
98: Sp1 so you don't really know if they've still got it
99: Sp5 yeah so you don't know if its current do you
100: Sp1 its more information isn't it, and quite often you send a porter up and he comes back down saying they have been barrier nursed and not necessarily MRSA it could be anything.
101: Sp5 I think its generally getting better we've had cases where the porter isn't informed when he goes up, very often he is, its just erm you know he's not been made aware on the wards and so he's not protected in a way. and erm but I think I'm finding I would say that its improved recently really. Seems to be better communication really between them

102: Sp4 I think that's since that D+V, that
103: Sp5 is it
104: Sp4 well it seems to be yeah. I mean that was
105: Sp5 what because it infected staff
106: Sp4 I think because it, yeah because it had such a huge impact on the hospital really I think they've improved
107: Sp3 they had to shut down wards
108: Sp4 yeah one or two wards wasn't it yeah. So I think communication has improved
109: Sp5 hmm and there were times during that outbreak that the portering staff were down to two on the floor wasn't it really, some afternoons and things so perhaps they have
110: Sp1 that shows how important it is then doesn't it. If it spreads like especially if it like spreads through you know patients have to stay in longer and staff are going off sick and you have no one to er you know and they are closing and containing wards
111: Sp3 yeah
112: Sp4 yeah
113:
114: **Mod how do you normally know the status of these patients then?**
115:
116: Sp3 mainly we rely on the ward staff
117: Sp2 ward staff
118: Sp3 yeah them phoning you
119: Sp5 we're informed on our erm, our clerical staff phone up the wards to give the preparation for the patients coming down and they wholly rely on them and whoever's on the other side of the phone telling them that this patient is being treated for MRSA its very rarely on the form itself
120: Sp4 yeah
121: Sp3 as I was saying as you said earlier its on radis or something but you don't know that that's a current condition any way so
122: Sp1 no
123: Sp3so I take that with
124: Sp2 and you don't usually know that until you've got the patient in the room if you're checking on radis as well
125: Sp3 yeah that's true
126: Sp4 its only if you've looked up a previous history on it to see why we are doing it
127: Sp2 yeah
128: Sp5 but you don't ring the wards if you're doing a whole list of in patients do you
129: Sp2 no
130: Sp1 erm the porters, you know if it wasn't, quite often it will be on the form or if not you know the porter would inform us as they come down but then there's obviously those that slip through the net
131: Sp4 yeah we often find that they'll ring and say oh the porter just collected so and so do you know that they've got such and such and they're on their way down then and
132: Sp3 and your list is happening

133: Sp4 and your list is happening around them yeah
134: Sp5 its an awful waste of time and everything isn't it if they've, if the porter goes up for a patient and it turns out they have MRSA and they can't bring them down do you know what I mean
135: Sp4 yeah
136: Sp5 it's a lot of probably over half an hour wasted in all that really isn't there where a porter could have erm fetched somebody else
137: Sp1 quite often, well not often but sometimes the patient will tell you themselves if they've got something like Hepatitis B if you're going to give them an injection then they'll, they're quite you know those who have that sort of thing
138: Sp3 yeah
139: Sp1 erm condition will tell you that they've got it, so there's that as well it comes from the patients side
140:
141: **Mod so is it the case that your told more often than not when they've got an infection or the other way around?**
142:
143: Sp1 you don't know
144: Sp3 no we don't know
145: Sp2 we don't know if we haven't been told. Its those ones that are worrying
146: Sp but there are occasions when like you say its been very close isn't it you know when you don't know or somebody tells you after the patients been examined
147: Sp4 after the event yeah
148: Sp3 or as the patients on the table
149: Sp2 they're the ones that tend to stick aren't they
150: Sp3 yeah, I mean that doesn't happen that often, but as we say you don't know when you haven't been told at all do you
151: Sp2 no
152: Sp4 but I suppose if we all worked as we should do and good practice was in place it wouldn't matter would it. Necessarily.
153: Sp3 I suppose for some its important
154: Sp4 I suppose for sputum contact and things like that it does
155: Sp3 yeah
156: Sp4 but erm no
157: Sp1 it would help if we had information of like whether they've got MRSA cos it can be specific if they could actually say where, you know like if its in the sputum
158: Sp4 yeah definitely, if its in a covered wound
159: Sp1 yeah
160: Sp4 then its not a problem really is it
161: Sp1and if its in a wound that's covered then its not really, no not really
162: Sp3 yeah you do find if the wards are quite good if you ring up cos we well CT and MR will usually ring to give them a time and then they will actually tell you that oh yeah they've got MRSA but that's all they'll say and then we'll I think we are getting better at asking well
163: Sp4 where is it

164: Sp3 where is it, is it in a wound, is it in the sputum or where is it do you know what I mean
165: Sp4 and for room 6 [interventional] it matters a huge amount
166: Sp3 and then you can take you know different precautions really
167: Sp1 hmmm
168: Sp5 if its in a closed, if its in a covered wound you could you erm select that as a different item that in the sputum then
169: Sp3you would feel that if it
170: Sp4 if it
171: Sp3 if it is covered then its less risk
172: Sp4 if its contained its less risk isn't it but if they're coughing and spluttering it all over your room I think you
173: Sp5 I think we just go for the general MRSA
174: Sp3 and clean the inside of the magnet before you put another patient in, you know your're definitely going to have to do it at the end of the list
175:
176: **Mod when you were talking before about the ways you go about protecting well carrying out infection control practices which would you have said were the most important?**
177:
178: Sp4 handwashing
179: Sp1 yeah I'd say that
180: Sp4 definitely
181: Sp2 an awareness of patients
182: Sp4 and cleaning just basic cleaning
183: Sp2 mmm
184: Sp4 just making sure it is you know if there' dust cos its harboured in the dust isn't it
185: Sp2 the situation in the hospital is that it doesn't encourage you all or give you, the culture that this is what you should be doing because if its not being carried out by the hospital as a priority then it takes less you know the staff see it as err a less less of an issue don't they
186: Sp4 they don't take it on board yeah
187: Sp2 yeah you know it and the big the big, er the definites are definites and that's fine but the culture for the intermediate area which is it is compounded by radiology because I mean we do know more than you would say if you were serving them at asda sometimes the way you you know touch you know patients you know there clothes, you're only touching their hands or or you know there arms theress nothing hugely contacted I mean that is sort of like the bread and butter of what we do, which then sort of implies well non of that really actually implies to the main bit of what we do so that down grades what we do in the first place and then if the hospital, no I mean what we feel about infection control,
188: Sp5 yeah yeah
189: Sp2 and then if the hospital aren't taking it seriously or applying it to radiology you can just lose all of that information you know in the stresses and the strains of the things you've actually got to cope with during the day
190: Sp4 yeah

191: Sp2 and I think you know it's the bigger picture and the culture that's missing and that culture isn't being instigated by the hospital as much as they like to give it lip service when it comes down to it
192: Sp4 yeah
193: Sp3 yeah
194: Sp5yeah
195: Sp2 you know you've got the nurses doing all of this but you haven't got the cleaners doing all of what they should be doing and I think that's where the big difference is they'll pay a couple of people twenty grand a yeah
196: Sp3 to come round and tell you what you should be doing
197: Sp2 to come and tell you what you should do but they won't pay the people in the first place
198: Sp4 and don't you think even the basic hygiene, the basic way of life from the wards and in the department has changed such a lot in the last twenty years as well. Nurses used to do basic little bits of cleaning and things, they don't do it, we used to as students come in and clean pads and clean tables and sort out the linen and that was something that you did and you don't, students don't do it any more its been taken you know its not a students role sort of thing. And I agree its not a students role its something that should be taken on board by everybody
199: Sp2 yeah by everybody
200: Sp4 but then its not taken on board in the same way
201: Sp2 and up on the wards they'll have a statement of you know you cannot have flowers because of the contamination but don't clean behind the beds
202: Sp4 no that's right
203: Sp2 and its like a complete double standard
204:
205: Sp4 don't check in the locker and see whose clothes are in there
206: Sp2 and the whole thing of you know so you have an MRSA patient and the whole system works and you know what you're doing but the films and the notes are put on the end of the bed. Its ridiculous you know but how else do you get them down [notes]do you have an MRSA sack on the back and somebody else slips them in you know, it, the whole thing is lost really isn't it and erm I think it's those big things that need addressing and also the fact that you know it the culture isn't there and the importance isn't there which down grades it and then in our department because most of what I see I mean its completely different for what you're doing cos it is interventional you know its like well you know could be on a bus for what you do and what you touch. You know theres probably more germs on there money than there are on them sort of thing so its getting the balance right
207: Sp1 well they say in London that there is so much cocaine now on ten pound notes
208: Sp5 this fellow came around to ultrasound the other day he had erm a when I called him from the waiting room he should as if he was in chains you know when he was walking along all you could hear was this rattleing but he was only in a gown and his socks and that was where he kept all his money in his socks underneath his foot cos he said that he lived in a rough area and people would steal your money.

209: Sp1 its probably nothing to do with the questions that we've answered so far but also theres this, you've got to get it right when it comes to infection control you don't want to make the patient feel you know like
210: Sp2 mmm
211: Sp3 yeah
212: Sp1 if you suddenly there all gloved and gowned up and everybody's doing this
213: Sp4 oh they'd feel that they'd got something awful yeah
214: Sp3 that's a big issue really isn't it
215: Sp4 they've got to be comfortable of as well
216: Sp1 you've gotto do what is efficient really without going over board
217: Sp4 which is back to what you were saying with the portering really. How much contact unless, I mean porters don't lift patients or anything like that anymore, if they are coming in in a chair they get in it themselves so you know with porters needing gloves on and everything if they wash their hands before they collect patient wash their hands after they've delivered them they probably don't need gloves and an apron and all the garb that they are given to put on on the ward before they bring people down.
218: Sp5 do you think they have, do they wash before and after
219: Sp4 no but that's part of what they keep saying about the culture
220: Sp5 do you think they do, I don't think they do
221: Sp4 oh I'm sure they don't
222: Sp5 so you just think that, but is there someone there who whoever employs them, cos theres a lot of new ones being employed now isn't there
223: Sp4 telling them to wash there hands yeah I don't know
224: Sp5 you just think it doesn't start there does it
225: Sp2 yeah but I mean as much as we're told to wash our hands in between patients it's the whole you know it's the whole of that picture and then you know then you justify what you're doing or what you're not doing by the bigger picture of what the hospital is actually doing and its like well what is the point in me washing my hands you know
226: Sp4 if the next 12 people are not doing
227: Sp2 and when they're not cleaning behind the beds and doing the bigger you know the bigger issues. We are the icing on the cake in spreading it there are huge you know I know that we have a big impact in spreading it not we but staff but there are bigger issues as well that you know really should be addressed and stopped and its addressing those big issues that will make the peripheral issues you know more cohesive together and cos you can make a little bit of a difference by doing what you are doing but the big bit should also be addressed but they are skirting round the edges and addressing all the
228: Sp4 all the liitle bits
229: Sp2 yeah and not the well actually you know hands up we're clean
230: Sp4 lets just get some bleach on the floor
231: Sp1 yeah cos its all about cleanliness isn't it
232: Sp2 yeah
233: Sp3 you can you can leave I mean there are some important rooms in x-ray like the interventional rooms and you can come in the next morning after doing a list the day before and you know the floor hasn't been cleaned
234: Sp4yeah

235: Sp2 or swept mopped or
236: Sp3 yeah, you've cleaned up what you've spilt but you know that nothing else has been done
237: Sp4 and should you go onto the floor and clean a bit of the floor because you've spilt blood on it the muck that comes off you can't believe
238: Sp2 yeah that's it
239: Sp5 presumably now that's not classed anymore as a ermm you know they had these different levels didn't they because we are not cleaned ultrasound used to be cleaned every evening but we are not any more and so presumably erm room 6 doesn't
240: Sp3 is that how its is that how the cleaning system works is it?
241: Sp5 well because the staff room isn't cleaned is it its not a sort of patient area
242: Sp2 yeah but patient, clinical areas are meant to be done daily and then weekly would be staff rooms and offices but you know the all clinical floors should be cleaned daily.
243: Sp5 I think they've erm I think they've now stepped down from I don't know when the staff room is done anymore because erm
244: Sp4 well they were doing it when I came in not last night the night before
245: Sp5 oh right cos, but when does room 6 get cleaned then in the evening still
246: Sp4 in the evening yeah, with the rest of the main department
247: Sp3 yeah
248: Sp5 ultrasound doesn't you see I think they still come to CT in the evening don't they
249: Sp4 yeah they do but they don't come down on that corridor
250: Sp5 no no the corridors not done any more, they don't do ultrasound anymore
251: Sp1 I think also they are like erm restricted in what they can clean cos theres lots of big equipment I think they are quite frightened of what you know what they can touch and not touch
252: Sp5 I think if they're under strict err time restrictions aren't they. They're only allowed I don't know what it is in this area
253: Sp4 there just aren't enough cleaners are there
254: Sp5 and then they've got to move on to another area
255: Sp4 like there aren't enough porters are there. You know they'll pay a chief executive for a huge amount of money but instead of getting rid of one of them and employing twenty cleaners they
256: Sp5 it's the top tear isn't it
257: Sp2 and you know it all falls down there doesn't it the whole system
258: Sp4 absolutely if the bottom isn't properly staffed everything collapses doesn't it
259: Sp2 yeah
260: Sp4 back to you can't get your patients cos there isn't enough porters and your hospital is filthy because they're not paying enough cleaners
261: Sp2 yeah
262: Sp3 hmmm
263:
264: **Mod who would you say infection control benefits?**

265:
266: Sp4 everybody
267: Sp2 everybody
268: Sp3 yeah hmmm
269: Sp2 patients staff, visitors
270: Sp3 yeah people outside as well that have been in contact with them
271: Sp5 everybody who has contact isn't it
272: Sp4 it improve morale as much as anything you know if you're working in a clean hospital when infections are not an issue its better for morale of staff as well as anything else you can be more proud of where you work
273: Sp5 does anybody know what the infection rate is here, what is it here I don't know
274: Sp4 its quite high
275: Sp5 I shouldn't think anybody would really say what it is. I don't even know what's released
276: Sp4 well I know that erm we scanned a patient last week and he's waiting to go to XXX[another hospital] and he's also got chrones and he's got MRSA in his abscess rectal abscess anal abscess and erm XXX won't touch him until he's clear for three MRSA screens and then there is something written in that he'd contracted it here
277: Sp5 oh right
278: Sp4 XXX won't have him
279: Sp5 but presumably here would take somebody on board
280: Sp4 they must yeah
281: Sp2 yeah
282: Sp3 they won't have him because of this
283: Sp4 because of his MRSA
284: Sp3 is that a risk to him if he has surgery then or is it just because of the spreading of the infection
285: Sp4 I don't know or whether they just won't have it in the hospital because of I don't know
286: Sp5 I suppose XXX being specialised where as here is a district general you can't
287: Sp2 no you can't really enforce it
288: Sp5 no you can't really enforce it can you
289:
290: **Mod have you had any education about infection control?**
291:
292: Sp3 yeah
293: Sp1 yeah we had a lecture
294: Sp2 its mandatory stuff
295: Sp3 yeah the trust have has employed people to tell us all what it is that we should be doing
296: Sp5 we all had to attend didn't we
297: Sp1 yeah
298: Sp4 yeah mandatory training isn't it
299:
300: **Mod do you think that's necessary?**

301:
302: Sp5 it's a good reminder isn't it
303: Sp3 theres nothing wrong with reminding people but its like you said it should be appropriate
304: Sp2 yeah it should be appropriate
305:
306: **Mod was it specifically to the radiography department or was it just a general lecture?**
307:
308: Sp1 no
309: Sp3 no
310: Sp2 they addressed radiology problems but on a very you know general
311:
312: **Mod do you think it would have been better to have it specific to the department or was a general outlook ok?**
313:
314: Sp1 she covered the issues didn't she
315: Sp2 yeah general principles are general principles aren't they but then they do sort of dwell on the whole ward environment which does sort of like you know turn you off slightly doesn't it and they you just sort of like you know don't listen to that bit cos its sort of all about you know its not that isn't necessarily what you're doing so you know you tend to lose what they're saying so I mean I think, I think they should be general principles full stop and not appropriate to ward and open wound in particular
316: Sp4 yeah particular places
317: Sp2 rather than it being an hour of you know everything about the wards it should be twenty minutes about general principles you know and that's it not just radiology.
318: Sp4 you just wonder as well if its not, well it is mandatory but like everything else, we used to do manual handling within the department but we don't any more that's been taken out and it has to be done by the manual handlers but you think well infection control could easily be dealt with within the department and cascaded down
319: Sp2 yeah it could
320: Sp4 and you just wonder if it would be
321: Sp5 more effective
322: Sp4 more effective yeah if somebody in the department was responsible for it
323: Sp2 yeah
324: Sp1 I think manual handlings more to do with erm sort of like like legal issues
325: Sp4 litigation type things
326: Sp1 yeah if someone hurts there back you know, and if they've had a proper you know training, I'm not saying our training
327: Sp4 no I know what you mean yeah
328: Sp1like a trust training rather than

329: Sp4 but then you feel that infection control would probably be better off dealt with within each specific area and have someone responsible for it within each specific area really
330:
331: **Mod who would you say would be the best person to be responsible then?**
332:
333: Sp4 I don't know really, anyone who would take it on board really. Well no because if somebody was going to take it on
334: Sp2 the last person to step back
335: Sp4 but that's the case with anything really
336: Sp1 as long as they're well informed
337: Sp4 as long as they're informed and then they yeah
338: Sp1 the central core and then
339:
340: **Mod so you don't think it would have to be a superintendent or**
341:
342: Sp4 no not at all
343: Sp5 you sometimes need somebody more involved in things really to see
344: Sp4 whats going on yeah
345: Sp5 to see we are not washing our hands in between everyone or we're not perhaps doing as we should be. Whereas I think a lot of us are probably more remote from whats actually going on in a lot of places aren't we?
346:
347: Mod do you think the infection control practices are followed in the x-ray department?
348:
349: Sp1 probably not no
350: Sp4 sometimes
351: Sp2 I'd say on the good patterns they are you know when you are told when you know and it starts at the beginning it tends to be followed though to the end as you say to the point that everybody's gloved and gowned up you've got your clean person you've got your dirty person and your talking well you be around the patient and having plastic aprons on and gloves clean people dirty people and you know the patient's hearing and seeing all of this and I think there are those things and the system when it starts does go through to the end and work but there are also lots of you know grey areas in the system as well to not knowing and not doing to knowing and doing it properly to delving in and out as much as you can and restricting it for what ever reason, you find out half way through, you put the notes on the end of the bed when you've finished you know its all
352: Sp5 I think we're potentially in ultrasound potentially quite dangerous most of the time because the probes are in direct contact with every person you know
353: Sp4 yeah

354: Sp5 every individual that comes in I don't know twenty a day to a room something like that, if you think of, and they're cleaned afterwards but you can't immerse them in anything you can only wipe them
355: Sp2 and its how far you go isn't it cos its how far that chain goes
356: Sp5 you can only go so far on every patient in the time constraints let alone anything else and sometimes with the vaginal probe which you'd worry more perhaps even and you think you may be the first patient and have a very clean probe because its been perhaps could have been overnight immersed no its true though isn't it and you could be the tenth person although its been wiped in between it hasn't can't that's
357: Sp1 they must be happy with that practice though cos otherwise they wouldn't let you carry on
358: Sp2 or they haven't had any adverse outcome
359: Sp4 absolutely that's
360: Sp5 we have carried out trials here where and they've come and done spot checks from infection control and they wipe them and everything, we've never had anything horrendous back but you know, its that's, been accepted nobody delves to far into it do they. Cos you think its accepted you haven't got the time to immerse erm the probe head for twenty minutes in between every patient have you
361: Sp4 no
362: Sp1 no. Your examinations are very intimate really aren't they like you say
363: Sp5 yeah theres you in contact the lead let alone the probe head and whoever designed these probes now theres a rubber coating with a grove and there are notches on the probe for direction and things like that so it doesn't matter what you do there are little areas where you're not getting into every time
364: Sp4 but then it should be trust and directorate related that this examination takes this long because the examination takes four minutes but the cleaning of the probe and the putting it aside takes 20 minutes so you have a twenty minute slot and you know if that's the recognition that the trust and the directorate should be giving infection control
365: Sp5 well I just feel that very often when I've been to infection control and I've asked about the vaginal probe it oh just immerse for twenty minutes so that's great if you're number one but if you're number 10
366: Sp1 immerse in what
367: Sp5 you have to immerse it in solution erm chlorohexidine mixture and you have to out you can't immerse the whole, ideally all these probes should go into gluteradhyde but you can't. we don't have it in x-ray departments anymore because so there are I think erm the equivalent of CSSD have it but its actually has to go into a tank well you can't do that because of the electronics so erm although all the manufacturers erm the erm manuals that come with the machine still write this down as being how you should clean them its no longer practical so you have to do what you erm what you can and this is the other side of it that you can immerse the head only
368: Sp1 they should only write down and recommend what is feasible
369: Sp5 when XXX XXX [infection control nurse] was here we went through a lot of work to get in touch with XXX [manufacturer] and they've said you know they've churned out the same erm cleaning instructions for

years on end really and its never been looked into really and I don't think they've changed yet, but erm its just things like that cos the rubber is perishable so you can only immerse it some of them they say you shouldn't put alcohol wipes near them and so a lot of things and I can't remember now from the infection control but the alcohol wipes only last a very short time don't they its very short life span they have of being effective.
370: Sp1 you use condoms though don't you?
371: Sp5 oh yeah you do everything you can I'm just saying that you'd wonder about what you harbour.
372: Sp1 but theres a programme I didn't watch it but it was a panaroma report the other night on condoms and someone was saying
373: Sp5 oh that your better off without aren't you
374: Sp1 oh was it I didn't watch it is that what they said
375: Sp4 oh really
376: Sp5 on some because of erm
377: Sp1 they're not offering the protection are they
378: Sp5 no. I saw the follow up of that I didn't see the actual programme so I saw it being discussed further on some of the points being raised on it. It was one of these debates programmes
379:
380: **Mod do you think that staff or patients are more or less at risk than other parts of the hospital?**
381:
382: Sp2 I'd say less because we're doing, I'm just speaking for the general areas because we don't do anything hugely awful to them and just be definite you know we're adequate at what we do and we do it in a very low risk area so I'd say from that point we are less at risk .
383: Sp5 do you in CT
384: Sp3 at the same time though
385: Sp4 I'd say more
386: Sp5 we've got a mixture of in patients and out patients often in the same area, and you don't know what people off the street are bringing in.
387: Sp1I think
388: Sp5 so in some ways we are perhaps more at risk but as like you say
389: Sp4 it depends on what your doing
390: Sp5 if your doing low risk procedures but
391: Sp5 you can have quite a lot of contact in CT can't you
392: Sp4 yep we're sticking venflons in nearly everybody yeah
393: Sp5 CT more than anywhere else probably aren't you
394: Sp1 the staff on the wards they're informed and so then they have that sort of starting point cos they've got the results cos everyone gets swabbed aren't they so if they're doing high risk procedure then they're well they should follow good practices but you know they're more aware whereas I think because we have the lack of information I think you tend to be more at risk especially if you don't follow good practices.
395: Sp4 yeah.
396:

397: **Mod do you think that the infection control measures are followed more or less in the X-ray department than other parts of the hospital?**
398:
399: Sp4 I really have no idea how well they're followed in other parts of the hospital I would say I really don't know. I think we we do try
400: Sp2 as an outsider
401: Sp1 having been recently
402: Sp4 yeah you've been a patient recently what do you think
403: Sp1 they don't wash erm just thinking back now they don't wash there hands in between contact between patients I think mainly because they do ward rounds and they go round. I didn't take any notice of the doctors handwashing practice so I'm just thinking about the observation of the nurses cos the sinks are placed outside the bays they do go round they might wash just before or just after but they don't certainly in between you like that. No which was one thing I noticed and there was like you say swabs under the bed you know. Your being admitted and there's that and things in your locker.
404: Sp3 that happened to XXX mother didn't it.
405: Sp5 whats that
406: Sp3 she changed wards
407: Sp4 she went to ITU
408: Sp3 and went back to the ward and another patients things were still in the locker that her things had been put in with someone elses
409: Sp1 so her clothes had been put on top of someone elses
410: Sp4 yeah they'd just been put on top
411: Sp1 that's just basic things isn't it you know clearing the room
412: Sp4 how could they not
413: Sp5 but somebody had to do that somebody has had to physically put
414: Sp4 yeah somebody has had to physically put those things in and they must have noticed them
415:
416: **Mod sp2 you were going to say something?**
417:
418: Sp2 erms yeah compared to outside I think they got some very good principles that you possibly don't see that they do erm there is the whole sort of like, they do try and use, again this is just in the general area that I can speak about, a dirty and a clean person when they know about it erm and aprons and gloves which you know were always used previously but they do try and keep that whole doing patients at the end of the day leaving the room after block doing you know a couple of MRSA patients so I've seen all that being done so you know there are things they do by standards just automatically go on
419: Sp3 it all goes back to the fact if about information doesn't it
420: Sp2 yeah
421: Sp3 and if, if we are informed then we do have good practice and we do carry it out
422: Sp5 I think if we've done, cos years ago when people, do you find the err, you know in x-ray in main x-ray now if we can get away with it we do

everybody on their own bed really so that you wouldn't have to move them at all
423: Sp3 that would be easy for me
424: Sp4 yeah that's out of the question for us [sp3 + sp4 mri and ct]
425: Sp5 just things like that that you just make life easier for yourselves. There's less contact with your main equipment so you restrict it, you limit it really as much as little as you can.
426: Sp4 yeah
427: Sp2 yeah
428: Sp1 yeah I can do that in gamma camera to an extent
429: Sp5 we do it always I think if we know they are MRSA we just ask for them to come on the bed and then you just think it doesn't involve the couch or anything else
430: Sp1 yeah for specific areas, just certain things you can do, but obviously not all the time
431: Sp5 and we cover the probe and we wear an apron and we wear gloves but that's all
432:
433: **Mod what do you think prevents infection control practice being carried out?**
434:
435: Sp4 time
436: Sp3 hmm communication
437: Sp5 lack of communication
438: Sp2 no I don't think it is time I'd say its more cultures because you know you can say its time but then you know there can be ten people waiting or there can be no people waiting and I've seen people work the same you know from an infection control point of view. I think the biggest one is culture, its acceptable and it is you know and its perpetuated by the trust and by the directorate in their principles of making it acceptable. Its acceptable for the place to be unclean and its well you know we tell you you should be doing this but there's nothing to enforce it
439: Sp4 yeah but in practice
440: Sp2 so I think its culture because it
441: Sp3 but its so unacceptable as well to have a waiting list
442: Sp2 yeah you know the stresses of it being busy can add to it but I've also seen it as it slows down you know these measures don't necessarily change so because its already engrained you know you just do what you do. I think the biggest thing they can do is make MRSA smelly or visible
443: Sp4 yes make it look horrible
444: Sp2 cos everybody washes there hands after a manky foot
445: Sp3 yeah that's true
446: Sp1 yeah
447: Sp2 but you know you have you know
448: Sp4 something you can't see
449: Sp2 yeah you know that's what it needs, it has to have an assisted bug that makes it offensive
450: Sp3 oh I don't know everybody stays well away from x-rays don't they you know
451: Sp4 absolutely and you can't see them

452: Sp3 yeah they can't see them but they're not going anywhere near me
453: Sp2 another thing, I think they should be thinking of is the uniforms. Why don't we do what America does and have your whole, you know everybody has different colour theatre blues and everybody puts them on in the morning and everybody takes them off at night. Again it's a trust related thing its money, but they won't do something as radical as that you know.
454: Sp5 off on a tangent the other night in XXX[supermarket] I saw something strange I saw a lady who works here walking around in her theatre blues going around the shop
455: Sp3 no
456: Sp5 honestly and I just thought you need to draw the line don't you.
457: Sp1 the new practice in theatre just seems really strange
458: Sp4 yeah just walking in and out
459: Sp1 you from where you had to be
460: Sp3 what you don't have to get changed unless you actually go into theatre?
461: Sp1 you used to have to change whenever you went into any part, now so long as your not actually going into main theatre
462: Sp3 you can go into the anaesthetic room can't you
463: Sp4 you can certainly go into recovery
464: Sp1 you can go into recovery you can go into the main corridor
465: Sp4 I don't know about the anaesthetic room
466: Sp1 but how can you sort of like say you know like foot wear that was the thing you know you've walked in, its so much harder to police that someone hasn't walked dog dirt into it and then somebody comes out of the theatre in there clogs and goes straight back in
467: Sp4 yeah goes back in
468: Sp1 where as before we all went straight into change, but that's what they've enforced isn't it, you know what they've come up with
469: Sp4 yeah
470: Sp1 that just seems
471: Sp4 it seems a retrograde step doesn't it
472: Sp1 I mean its quite handy for us when we go to recovery but er
473:
474: **Mod we are coming to the end now what would you say could improve infection control practice?**
475:
476: Sp5 like we said before really isn't it it has to come from the top of the trust
477: Sp4 culture
478: Sp1 awareness
479: Sp5 probably our chief executive or somebody would have to be taken ill on the ward
480: Sp4 yes
481: Sp5 and have his clothes put into somebody elses locker
482: Sp4 yeah
483: Sp1yes
484: Sp5 drop something underneath the bed
485: Sp1 find a swab
486: Sp2 not having bed linen changed

487: Sp4 it would have to be an emergency procedure cos if he was elective then the place
488: Sp5 oh yeah the place would be prepared
489: Sp3 yeah the place would be spotless
490: Sp5 you just feel that sometimes its only when it happens, well you've been in it now and XXX been through it, sometimes that's when it actually comes to hits you isn't it as to what the practice is. Whats going on
491: Sp3 a friend of mines mother in law was ill and she was and someone as an outsider erm she was absolutely appauled when she went down there on the floor to pick something up yeah she said she couldn't believe that hospitals would have dirty floors and that's how it appears to outside people
492: Sp2 yeah
493: Sp3 horrible isn't it
494: Sp5 I don't think I've ever been up there, I don't look at the floors so people like myself can gloss over it really
495: Sp2 you don't see it cos you're here the whole time, its like you don't see the flaky paint.
496: Sp4 it's the smell though as well isn't it
497: Sp2 yeah it's the whole thing. And I think that perpetuates the culture it makes whatever you do seem irrelevant erm
498: Sp4 yeah cos you think if its that bad up there
499: Sp2 whats the point
500: Sp4 whats the point
501: Sp2 in the nicer issues, not in the big issues you know where you are driven by the protocol and you see the need for it but just on a perpetual drip sort of patient you think what difference will it make
502: Sp5 I think I'd have to work down on these places and have a look cos another thing I heard XXX say about her mum was that she has a colostomy bag and was having great difficulty, who was saying about having a similar experience where shortage of nurses or whatever I'll be back to you in a minute and never came eventually it burst and you just think that's an awful thing
503: Sp2 and then the mother got told off saying well why didn't you get someone
504: Sp5 and so its just that and somebody else was saying in the staff room exactly the same thing happened to one of their relatives so you hear these stories anecdotal aren't they and you think perhaps they need to look at what is it lack of staff
505: Sp3 I think it is
506: Sp1 well I would think it is
507: Sp3 not enough nurses not enough cleaners
508: Sp4 no
509: Sp5 did you find that sp1 are there not enough around
510: Sp1 no I think they are genuinely pushed because you just saying about that erm they wanted erm a urine sample and they'd given me a bed pan and they'd say to use it and they'd go and collect it so I'd use it, I'd come out of the toilet and then it was like I don't know half and hour later and I thought well I'll go in now and have a shower and my bed pan was still there and someone had used it on top because, the person that had used it god knows what they were thinking I don't know

511:
512: **Mod does anybody ever worry about taking infections home from the hospital?**
513:
514: Sp1 yeah when I think yeah
515: Sp4 there was a newspaper report not long ago about a young boy who'd been to visit his grandfather in hospital and contacted MRSA while he was visiting on the ward and I must say that's the first time I've ever thought about it but it did make me think about the children.
516: Sp2 yeah I do
517: Sp3 but you do worry I always worry about MRSA because people have got it and then they just walk out of hospital when they're discharged
518: Sp4 yeah
519: Sp5 its all around us
520: Sp4 and mingle with everybody else yeah
521: Sp2 I'll go home and take my uniform off before I do anything with the children
522: Sp4 before I touch the children
523: Sp2 its not I mean I never used to when it was just my husband and I but now we have the children now its the first thing I'll do before I bend down and kiss them I just go upstairs and take my uniform straight off
524: Sp5 I take my uniform off when I get home, but I just think, I know that they say now because of the space, but before I worked here, I don't think I've ever worked anywhere else where you could come in in your uniform and you weren't allowed to, if you went out at lunch time you had to change your uniform was strictly for where you worked.
525: Sp1 I think that is best practice isn't it
526: Sp4 yes I think it is too
527: Sp1 if you think about it I know its very convenient
528: Sp5 well it is cos I've got used to it now
529: Sp3 but best practice is to have a uniform for everyday
530: Sp4 everyday of the week yeah
531: Sp5 but you'd still go home with it though wouldn't you
532: Sp2 yeah
533: Sp5 if we, where we work now you would come in bringing in whatever you are bringing in from home
534: Sp2 but then again, it sits with your washing in your washing basket in you bathroom until you get all your whites together
535: Sp4 exactly
536: Sp5 oh yes
537: Sp1 where do you draw the line
538: Sp2 it's the whole cycle isn't it. But if it was you know like theatres used to be where there was a supply of your blues you know you came in in your own clothes you put there clothes on you wore them you took them off put them in another washing basket and left. That would be just so easy for everybody
539: Sp3 it should work like that, Americans, American hospitals often work like that

540: Sp2 yeah and it doesn't matter if you're going in twice a day or what ever cos its not you that's washing it, its just the system that's taking it all on board and you know then
541: Sp4 plus if you've been off to ward 14 to do a portable on an MRSA patient you can just change again before you go back to SCBU to do the baby
542: Sp2 exactly the implications are nothing really are they, its just a few minutes of your time. Its just changing your top really half the time isn't it
543: Sp1 its probably cost isn't it
544: Sp2 but they'll pick at the little bits of well we don't want our staff to go home but that costs nothing
545: Sp5Well I don't know the costs at the end how much are all these [uniforms] do you think you know
546: Sp1 it's the washing though isn't it I would have thought. We're doing it aren't we for them. Not only, can you imagine the laundry to have to go
547: Sp5 I've worked in places where they did laundry it forever gets lost you never get your own back and things, but erm I just thought it came to me before you did your own washing we were never god they were so strict and I'm just thinking who implemented this strictness you know it certainly wasn't our superintendent. So I'm trying to think where it came from cos XXX XXX was the most lax person going so I'm just trying to think there was this thing that you knew that you did not step outside that door in your uniform and I'm not talking about newly qualified I'm just thinking
548: Sp3 did you change your shoes
549: Sp5 yeah we had clogs
550: Sp3 oh right
551: Sp5 we had clogs for work. When you went for your interview you were asked what size you were and when you started work they were there
552: Sp3 oh that's good practice
553: Sp4 that is good practice
554: Sp5 yeah that was their policy but erm
555: Sp4 but that again comes down to culture if that's the way it works that's the way it works
556: Sp2 and you know that promotes people doing there little bit on top of it
557: Sp3 you do more then
558: Sp2 yeah
559: Sp5 I'm trying to think who would have stopped you if you were going to your car, I don't know who it would have been but there was this kind of big brother over you really
560: Sp4 you just knew you didn't do it
561: Sp1 it would be interesting to know what the rates are in hospitals with practices like that compared to us.
562: Sp2 they wouldn't necessarily want to publish stuff like that because
563: Sp4 they wouldn't want you to know would they
564: Sp1 well they publish everything else though don't they
565: Sp5 but it could become more of a thing that the staff may want it from the point of not wanting to take uniforms home
566: Sp1 do you know of any studies showing this
567:

568: **Mod I think they have carried out studies and not found the uniforms to be a real risk. A study at one hospital found the hospital floor to be more of a risk than the pavement outside so that may suggest that it isn't a real issue, having said that it may just have been that one hospital that would have those types of results?**
569:
570: Sp4 hospital floors more filthy, at least the pavements being rained on. But if the hospital floors were properly cleaned then that is an issue though isn't it you know you've got to look at it the right way round
571: Sp2 they've got to get the huge picture right and then work on the little bits, and at the moment you know they're happy to work on the little bits which really don't cost them very much and are lip service and not concentrating on the big bits and you know that's frustrating and that's disappointing
572: Sp5 I don't know how they set about it though who do you, you'd have to have a team wouldn't you, you couldn't just have one person just to start from the top
573: Sp4 well if you implemented somebody from every department in the hospital to start with
574: Sp5 yeah you'd have to do that and I don't know is it they say theatre is one of the worst places isn't it for MRSA involvement I don't mean in this hospital I mean generally so you just think well a high proportion visit theatre don't they patients when they are here just think well is there a main source or does it need a real good sorting out all the way through.
575:
576: **Mod well thank you very much unless anybody else has anything they'd like to add I think we will end it there?**

Appendix 17

Copy of consent form

February 25th 2004
Version 2

Hospital Number 1
Radiographer Identification Number for this study 2

Consent Form

Infection control within the Diagnostic Radiology Department

Carolyn Kelly
School of Radiography
University of Wales, Bangor
Archimedes Centre
Wrexham Technology Park
WREXHAM
LL13 7YP

1. I confirm that I have read and understand the information sheet Dated 25th February 2004 version 2 for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. ☐

3. I agree to take part in the above study. ☐

_____	_____	_____
Name of Radiographer	Date	Signature
_____	_____	_____
Name of Researcher	Date	Signature