DOCTOR OF PHILOSOPHY

Changing food choices through understanding nutrition and food labels: can increased knowledge and understanding in relation to nutritional information and food labelling bring about a change in eating habits?

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Changing food choices through understanding nutrition and food labels

Can increased knowledge and understanding in relation to nutritional information and food labelling bring about a change in eating habits?

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Summary of Thesis

Aims and objectives

This work uses an action research model to identify and test steps taken by study participants to make changes in food choices. The many and varied forms of information on food labels (labels) are explored. Literature is reviewed relating to action research, health promotion, behavioural change, food labelling and the risks of dietary related disease, including an overview of the cost to the NHS. Reflection on the literature reviewed led to the development of a plan to investigate people's use and understanding of nutrition and food labels using action research. An initial research question evolved:

> Can increased knowledge and understanding in relation to nutrition and food labelling bring about a change in eating habits?

With the development of a subsequent question:

> Can supermarket till receipts be used to provide information to measure change?

Methodology

A series of 3 studies using action research with mixed methodology, integrating qualitative and quantitative methods; examined people's eating habits, knowledge and understanding of nutrition, food labels and food shopping. Factors were examined which influence choices of food purchased thus the food eaten. A Food Label Guidance Tool (FoLaG) and nutrition information leaflet were developed in partnership with the participants to clarify and help people to understand nutrition and labelling information on food packets. These were tested as educational interventions to discover if people 's shopping behaviour could change. During the course of this research, new types food labels were introduced in Britain. The Food Standards Agency developed the "Traffic Lights" system. Concurrently, the Institute of Grocery Distribution (IGD 1998, 2006) together with Ministry of Agriculture, the Department of Health (DoH) and others developed the Guideline Daily Amounts (GDA) labelling.

Study Phases

The research is divided into four parts, as each stage developed, reflection on the process and findings informed the next phase. Firstly, the Calon Lân Survey (n=2562) identified the specific geographical areas of poor nutrition and risk factors for coronary heart disease (CHD) amongst the population of Anglesey, and identified some areas of poor

nutrition, e.g. very low intakes of fruit and vegetables. As a result of reflection on these findings a series of studies were designed to discover whether changes to improve food choices could be made. Study 1: 'Identifying the Use of Food Labels' (n=100) investigated the extent to which people read labels. This led to Study 2 'Identifying Knowledge of nutrition and Refining the FoLaG Tool' that examined the level of understanding of nutrition and the extent of label use by the participants (n=30) whilst concurrently the intervention tool 'FoLaG' was developed in participation with various groups. Study 3 'Evaluation and Measuring Changes' (n=103) addressed the findings from Studies 1 and 2 by providing educational material as an intervention and comparing the participants' purchases of various categories of foods, before and after the intervention with a control group. Study 3 also used supermarket till receipts as an indicator to measure the quantities of foods purchased in various categories. These were compared over a month measuring the changes in purchases, pre and post intervention by people undertaking their normal weekly food shopping in a "real life" situation. At each stage reflection on findings, participants views and the process informed the route taken, following an action research methodology.

Findings

Changes showing improved choices in the desired direction were found in 3 categories of foods; In the case of purchases of fruit and vegetable, an increase was required and was found. Fruit and vegetable purchases increased ($p<0.001$). For saturated fat purchases and white refined cereals, decreases in purchases were required and were found, purchases of saturated fats decreased ($p<0.001$), purchases of white refined cereals decreased ($p=0.037$). Other food categories showed trends of changes in the desired direction but were not significant. The control group showed no changes in 4 categories and changes in the wrong direction in 3 categories.

This research explored education and understanding as the activation to generate change and adds to knowledge by advocating the use of specific education in nutrition and understanding food labelling to elicit change used in a 'real-life' situation, together with the use of novel methods of measuring modifications to diet (itemised till receipts) using reflective practice working within an action research framework with the participants.

Correction Sheet

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This research has been a protracted journey. It seems a very long time ago that I started on this challenging, interesting and enlightening expedition and I would like to thank Professor Sally Sambrook for starting me on the road, for her patience and support along the tortuous rocky paths.

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Referencing and language used

The Harvard system of referencing is used.

The phrase "Nutrition information on food labels" will often be abbreviated to "food labels" or "labels".

The literature review search has been undertaken of books, hard copy journals, papers, reviews, government documents and other published literature In addition, internet sources were searched using: ATHENS, Medline, Embase, Cinhal, PubMed and the Cochrane Library. In addition, journal databases such as the British Medical Journal, American Journal of Clinical Nutrition, Journal of Human Nutrition and Dietetics. Websites, including that of the Food Standards Agency www.food.gov.uk, and search engines such as Google Scholar, have been used. Key words for the scope of the search have included Diet+Behavioural change, Diet+Health Promotion, Action Research, Health Promotion, Food Labels, Diet+Food Labels, Diet+Motivation and shopping+food labels of medical, Health Promotion and Education research

Only literature published in English has been included, although some papers are referred to, which were originally published in a foreign language and published in English as well as the original language, for example from Finland, France and Germany, these have been included where relevant.

Chapter 1

Setting the scene

1.1 Introduction

The aims, objectives and scope of the research were to investigate whether dietary change could be achieved by methods not previously explored in a real life situation. The focus, using an action research methodology, was behavioural change related to eating patterns using knowledge and understanding of food, nutrition and information on food labels as an educational intervention. This is a complex area and health promotion models are evaluated in the context of the theoretical methods of behavioural change and tests whether changes can be made to dietary intake employing educational interventions. Chapter 1 outlines the background; context, policy and scope of the research described in this thesis together with a summary of the chapters. This guides the reader through the path followed in this thesis and reflects on the factors, which prompted the lines of enquiry. Participants were involved in the development of two intervention materials, a Food Label and Guidance tool (FoLaG) and a nutrition and labelling information booklet. Reflection on and reaction to the findings at each stage of the studies led to a modification of the design and development of further stages. A review of food labelling is included.

The principal research question evolved from the key concepts as "Can dietary change be achieved amongst the general population on Anglesey through knowledge and understanding of nutrition and labelling?" leading to a subsequent question, "Can dietary change be measured by using itemised supermarket till receipts?" The emphasis of the action research cycle being learning and change (Carr and Kemmis, 1986; 2002)

1.2 Background, policy and context: a reflection

In the UK, USA and other developed countries, there has been a steady rise in the number of people with obesity with the consequence of increased associated risks of diabetes and coronary heart disease (CHD). The most common manifestation is coronary heart disease (CHD), also known as coronary artery disease and ischaemic heart disease (IHD). Cardiovascular disease (CVD) is disease of the heart and blood vessels. Further details are provided in Chapter 2. Other forms of CVD include stroke (the third biggest killer in the UK) and peripheral arterial disease (PAD). A healthy diet can reduce the risks of these diseases (British Heart Foundation, 2008).

There have been several short-term initiatives as part of the UK government's plan to reduce CHD, diabetes and associated health hazards. This research emerged out of a 6-year secondment as a cardiac disease specialist dietitian to a Cardiac Rehabilitation (CR) programme called Calon Lân (Clean Heart). The programme was financed by the Welsh Assembly Government's Inequalities in Health fund, commencing in 2002. The aim was to reduce heart disease, particularly in areas of social deprivation and to establish a cardiac rehabilitation service. Initially Calon Lân was a 3-year project that was extended to 6 years to April 2008. On Anglesey a team was formed to work to reduce the high incidence of Coronary Heart Disease (CHD), this team included a cardiac rehabilitation nurse, a smoking cessation specialist and a dietitian. The initial prompt, which led to this research, was need for the dietitan to develop methods to change the diet of the CHD patients and the general public for CHD prevention.

In relation to the population's eating habits, practical experience had led to the thought that food purchases may not always be made from a basis of informed choice and that a lack of knowledge and understanding of nutrition and labelling may contribute to an inappropriate diet. Following literature reviews to clarify what had already been found, a series of studies was planned. The first was the Calon Lân survey to identify dietary related health risks and the eating habits of the population of Anglesey, in order to identify which specific areas of people's diet needed improving. This was followed by three studies, which investigated the use of food labelling and nutrition knowledge as a means to dietary change.

As a dietitian, initial thoughts on the problems encountered by patients trying to understand nutrition and food labelling led to a decision to investigate previous work in this field. The original plan was that following on from the literature reviews, studies designed to measure knowledge and change could be developed. These studies were conducted using an action research methodology in order to learn collaboratively through the participant's empowerment and involvement, reflecting on what happened at each stage. Emancipatory action research emphasising learning and change was used (Carr and Kemmis, 1986; 2002). Before using the findings of each stage the reflection-on-action (Schön, 1983) draws on the experience to analyse the events, which occurred. These initial reflections resulted in the guiding principle of seeking to find methods of improving understanding nutrition and the use of food labels as an education tool for change in diet. Thus a brief history of the development of food labelling from its origins to current formats and the use of food labelling today is provided. Appendix 3 provides a synopsis of the nutritional terms found in nutrition information panels on food labels (hereafter referred to as 'food labels').

To reduce the risks of CHD and diabetes, changes in diet are required to achieve healthier eating. Reflections on ways to achieve this, such as that people need to understand nutrition and their requirements led to the early development of research questions. It had become apparent, as a practitioner that people are frequently confused by nutrition information on food labels. The introduction of the Food Standards Agency's "Traffic Light" and the alternative "Guideline Daily Amount" systems may help by clarifying labelling or further confuse the public because two different systems were introduced at the same time. A systematic review (Cowburn and Stockley, 2004) identified research gaps in knowledge of use of labels. Initial reconnaissance from the Calon Lân Survey showed that dietary intake of the population of Anglesey, was low in fruit and vegetables and high in saturated fats and sugars. Exploratory Studies 1 and 2 showed that although 63% of the study population read labels, only 25% claimed to understand them, also knowledge of nutrient requirements and their functions was low (Rigby, 2004). A summary of chapters follows.

1.3 Summary of Chapters

1.3.1 Chapter 1: Food labelling: an explanation

In this first chapter, an introduction to the background reasons for the research is given. The food industry's role is discussed and specific examples of good and bad practice are illustrated. The food labelling systems used in the UK is described, clarified and discussed. Some of the historical background that has led to the current food labelling information and formats, controlled by government legislation in the UK is provided. An overview is given of nutrition information and mis-information seen on current food labels. New types of food label information were introduced in the UK in 2006 (Traffic Lights and Guideline Daily Amounts) these are discussed.

1.3.2 Chapter 2: Principal Literature Review

Literature is reviewed relating to health in the UK, with particular reference to Coronary Heart Disease (CHD), causal risk factors and the need for change. CHD figures in Wales and remainder of UK, also eating patterns for Wales and the rest of the UK are compared. The diets of both adults and children are examined as the background to what has led to the current health situation. Health promotion is also reviewed; examining examples of health promotion interventions and how health promotion models for behavioural change can be used to influence or modify unhealthy eating behaviours overcoming barriers to change. The role of the dietitian is described in relation to healthy eating, dietary change and initiatives that could reduce NHS costs by improvements to diet. The alteration and development of food shopping from local shops to hypermarkets and changes in shopping habits are also illustrated. The combination of increasing obesity, heart disease and related conditions such as diabetes, all of which are associated with poor diet, led to this investigation of effective methods for dietary change. Reflection on the literature reviewed led to a decision to conduct the research through an action research methodology as it was anticipated that a reflective role of the researcher, reacting to the findings at each stage of the research and adapting the study design accordingly together with a collaborative, interactive approach with the participants would be appropriate. This is explored in more detail in Chapter 3, which examines action research literature, which led to the development of the action research methodology.

1.3.3 Chapter 3: Action Research Methodology

A literature review of action research, both historical and specific to healthcare provides key insights, which led to the study design using an action research methodology as a reflective tool, specifically in the context of changing dietary behaviour. The progression of the series of studies in this research will be shown to follow an action research methodology, reflection on each stage of the research together with collaboration with the participants in the development of materials used, led to further stages in the action research path. Action research is explored in order to understand the processes and methodology, which will be used to achieve behavioural change, linked with the health promotion models. The processes, focus groups and reflection on findings are described and how each of these led to the following stages, culminating in the evolution of the design of the studies. A reflective diary provided an overview of the research as a whole as it progressed.

1.3.4 Chapter 4: Calon Lân Survey: Reconnaissance and Planning Findings

The baseline Calon Lân survey provided comprehensive information on the lifestyle of the population of Anglesey with a twofold purpose, firstly, to provide a starting point to target health-promoting interventions to reduce and prevent Coronary Heart Disease (CHD). More specifically, for this research, the findings of the food section of the Calon Lân survey were needed as part of the initial reconnaissance or fact finding initial stage of Lewin's (q.v.) action research cycle. Reflection on how these findings affected and led to each study, combined with the participants' views were a stage in and continuation of the action research cycle.

1.3.5 Chapter 5: Study 1: Identifying use of food labels - Findings

Having identified the problem of poor eating in the Calon Lân survey, the logical progression was to identify whether people could improve their eating habits. In order to change eating habits successfully, people needed to understand nutritional requirements and what is contained in food. Thus the next stage was to identify whether the study population read food labels, a problem identified initially through clinical work with patients. The aim of this small exploratory survey study was to gather more objective data to confirm or contest anecdotal evidence from practitioner experience. If confirmed, then data-driven action could be employed to investigate potential solutions. The aim of Study 1 was to discover the extent of food label reading and perceived understanding (or lack of) in the study population on Anglesey. The findings led to the development of the following phase, Study 2 and the progression of the research question.

1.3.6 Chapter 6: Study 2: Identifying knowledge & refining the FoLaG tool

This chapter describes the findings for Study 2, which examined the study participants' knowledge and understanding (or lack of understanding) of nutrition information on nutrition and food labels in use prior to 2006. The reflective process of the development of intervention materials and the research sequence is described in Chapter 3 but the findings of Study 2 linked with those of Study 1 were considered together. Reflection on the findings formed the progression, leading to the further development and refinement of the Food Label and Guidance tool (FoLaG) and development of the nutrition and labelling literature. Additionally the action research methodology was particularly important in Study 2 where reaction to and reflection on work with the participants, including using focus groups, not only tried to identify their understanding of nutrition but also informed the direction for the design of the following Study 3.

1.3.7 Chapter 7: Study 3: Evaluation and measuring changes

This gives the findings from the principal study, Study 3. The aim of Study 3 was to investigate changes in food choices, specifically measuring items requiring changes in intake of nutrients indicated by the COMA reports of 1991, 1994 and 2002 (p.103) specifically linking with those identified in the Calon Lân survey. Since the beginning of this work in 2002 there have been significant developments in types of food labelling used in Britain. Chapter 7 reports the findings of Study 3, which tested the working hypothesis that people follow the behavioural change routes identified in health promotion models. The use of the new labelling options was incorporated. The example in Chapter 7 describes the participant's route to change employing nutrition education as an intervention. In addition Study 3 used supermarket till receipts as a tool to measure changes in nutritional content of purchases.

1.3.8 Chapter 8: Discussion and reflections for further studies

To encapsulate, this research found that people did read labels but did not understand them. Furthermore, the level of knowledge of functions of nutrition and nutrient requirements amongst the study participants was poor. The intervention study found that significant changes improving food shopping choices could be made in a real life situation. This chapter discusses the findings bringing together the results, together with a synthesis of the findings in the context of other research in this area. Recommendations are made for further research; there are opportunities for education and data collection on a large scale, possibly nationally if supermarkets were willing to work collaboratively with universities and government.

1.4 Food labelling review

1.4.1 History, early food legislation, from which today's legislation evolved

Historically, the earliest record of food legislation in the UK was an Act in 1266 that protected customers against unsound meat and short weight in bread. Guilds tried to ensure foods sold were as pure as possible by checking that items such as grass, gravel, sand or twigs were not added to foodstuffs. Despite these early good intentions, by the 19^{th} century, food adulteration was endemic and public pressure resulted in the 1875, Sale of Food and Drugs Act. This Act is the foundation of current UK law, which in 1928 introduced the first regulations relating to food composition and labelling. A further major review resulted in the 1990 Food Safety Act. Regulations and Orders made under the 1990 Act are termed Secondary Legislation. The Food Labelling Regulations 1996 (Food Standards Agency, 1996; HMSO, 1996) are under this Secondary Legislation (Manual of Dietetic Practice, 2007:198).

1.4.2 Current EU and UK Food Labelling Legislation

There are several key stakeholders involved in legislation and labelling use, including the EU, the UK Government, food industry and health professionals, such as dietitians. The role of the Government and the EU is to legislate to ensure clear, legitimate, legal and meaningful labelling. The Government's Food Standards Agency conducts research in labelling and disseminates labelling information to the public. Food manufacturers use food labels in a dual role, for nutrition information and as a marketing tool, this will be discussed in more detail to clarify how it may influence users. Health professionals need to provide appropriate information to their clients in order for them to make informed decisions. There are other interested stakeholders, such as the Institute of Grocery Distributors and the Food and Drink Federation, who represent the food manufacturers and supermarkets. These organisations, whilst conducting scientific research in the field, and developing the Guideline Daily Amount percentage system, do have a vested interest in producing a system, whilst valid, is approved by their members.

In the UK and EU food labelling formats have been defined by legislation and guidelines. In 2001 the EU 1990 Council Directive (EEC, 1990) was adopted by member states including the UK, in addition to the existing UK 1996 Food Labelling Regulations (Food Standards Agency, 1996; HMSO 1996). The Food Safety Act 1990 (Food Safety Act 1990) is the primary UK legislation on food safety and consumer protection in Great Britain and incorporates the regulations for the description and labelling of food. The aims of the Food Safety Act are to:

- Ensure that all food produced for sale is safe to eat, meets quality expectations and is not misleadingly presented.
- Provide legal powers and penalties.
- Enable the UK to fulfil responsibilities in the European Community.
- Keep pace with technological change.

The main offences under the Act relating to labelling are:

- Selling food that is not of the nature, substance or quality demanded

- Falsely or misleadingly describing or presenting food. This applies to written statements or pictorial representations that are untrue. Additional constraints are laid down in the Food Labelling Regulations.

The last point has particular relevance to this thesis. The Food Labelling Regulations require that all food supplied to either the consumer or a catering establishment be labelled with:

- The name of the food
- A list of ingredients in weight order*
- An indication of its durability, either a 'best before' or a 'use by' date.
- Any instructions for storage conditions or conditions for use
- The name and address of the manufacturer, packer or seller established within the European Community

* the minimum legal requirement, extended information is described below.

1.4.3 European standards

Membership of the European Union (EU) requires the UK to implement European Commission (EC) Regulations and Directives; this is now a major influence on UK food legislation. The Codex Alimentarius Commission, usually known as the "Codex" (Codex, 1989), is a mandate to develop international standards and norms for consumer health protection and fair practices of the food trade. It is the produced by two United Nations bodies working together – the Food and Agriculture Organization (FAO) and the World Health Organization (WHO). Codex standards are incorporated into European and thus UK legislation (Gibney, 2000, 2002, 2005).

*The minimum labelling requirements are 'a list of ingredients in weight order'. The 1996 Food Labelling Regulations specify that next additional information, or second level of information that can be provided is 'Group 1' also known as 'Big Four' format, (Table 1.1) which comprises:

Energy expressed as kJ and kcal per 100g/100 ml	Protein g/100 g or 100 ml
Carbohydrate g/100 g or 100 ml	Fat g/100 g or 100 ml

The second level is the "Group 1" as shown in table 1.1.

Nutritional data per 100g	
Energy	221kJ/52kcal
Protein	1.7g
Carbohydrate	8.7g
Fat	1.2g

Table 1.1 Example of Group 1 "Big Four" Minimum nutritional data for the food, required on food labels to be provided in tabular form in UK

(A description of nutritional components is provided in Appendix 3).

Alternatively, the next level, 'Group 2' can provide more detailed information, also known as 'The Big Eight,' described below:

Energy expressed as kJ and kcal per 100 g or100 ml

Protein g/100 g or 100 ml

Carbohydrate g/100 g or 100 ml *of which sugars* g/100 g or 100 ml

Fat g/100 g or 100 ml *of which saturates* g/100 g or 100 ml

Fibre g/100 g or 100 ml Sodium g/100 g or 100 ml

Nutrient	Amount per 100 g/100 ml
Energy expressed as kJ and kcal	180kJ/43Kcal
Protein g	0.6g
Carbohydrate g	5.2g
of which sugars g	3.7g
Fat g	2.2g
- of which saturates g	1.3g
Fibre g	1.2g
Salt g	0.7g
of which Sodium g	0.3g

Table 1.2 example of Group 2 "Big Eight" labelling from a soup.

In the example above, salt is included, the legal requirement is for sodium only.

Typical values for a slice of Granary Bread, showing the "per serving column:

	per 100g	per serving 16g
Energy	497kcal	80kcal
Protein	7.0g	1.1g
Carbohydrate	66.6g	10.7g
Of which Sugars	18.8g	3.0g
Fat	22.6g	3.6g
Of which saturates	9.8g	1.6g
Fibre	3.2g	0.5g
Sodium	0.6g	0.1g

Table 1.3 The Big Eight items as seen on a British Food Label plus per serving information

Manufacturers, supermarkets, the Food Standards Agency (FSA) and other organizations, such as the Consumer's Association (CA) and Food and Drink Federation (FDF) have made various attempts to unify, simplify and clarify food labelling for the public, an early lead was taken by the Co-operative Society, their position is explained below.

1.4.4 Co-operative Society's stance on food labelling

The Co-op's responsible stance on food labelling can be traced back to 1997. Its report, "Lie of the Label", was published in conjunction with Sustain, the alliance for food and better farming together with the Consumer's Association (CA) (Co-operative Society, 1997). The report highlighted how food retailers and manufacturers often misled the public into thinking the food they were buying was better than it actually was, largely through what the report called the 'seven deadly sins' (see below). In response the Co-op put forward a code of practice for honest labelling, which formed the basis of its own labels and urged the rest of the food industry to follow suit.

The Co-op Lie of the label listed the following "Seven Deadly Sins" as poor practice, which should be addressed to provide the consumer with a fairer more realistic factual account of what the foods actually contain. The list is given below:

1.4.5 The Co-operative's Lie of the Label Seven Deadly Sins

- **The Illusion,** labels that hide information, for instance, 'mince and onion' when the main ingredient is actually mechanically recovered poultry.
- **Weasel Words,** labels that use nice words that don't mean very much, such as 'natural', 'wholesome' or 'traditional'.
- **Rose-tinted Spectacles,** where pictures on the pack make the food look better than what is actually on offer inside.
- **The Bluff,** making the food sound special because it's free of something. For example, dried pasta labelled 'free from preservatives' when, by law, it's not allowed any preservatives.

- **The Hidden Truth,** crucial information is hidden away where it can't easily be seen. For instance, the minimum percentage meat content.
- **The Half Truth,** labels that tell you what isn't in the product. For example, '80% fat free' actually means 20% of the product is fat, it would be a high fat food, considerably above the 3% allowed for a'low fat' claim.
- **Small Print,** despite the law requiring print to be 8pt or larger, frequently ingredients are listed in print significantly smaller than this. Also suitable contrast is advised. Examples of small print and low contrast e.g. dark red print on lighter red background can be seen in Appendix 4.7 and 4.8.

Examples of the above can still be found over a decade later, it would appear that a code of practice is not sufficient and legislation is probably required to enforce clear, legible, easily understood labelling.

1.5 Front of pack labelling

In 2006, the FSA and the FDF produced separately two different options for voluntary front of pack labelling. The FDF worked with food manufacturers and supermarkets to develop their Guideline Daily amounts system.

1.5.1 Recommended Daily Amounts (RDAs) and GDA labelling

The Recommended Daily Amounts (RDAs) of vitamins and minerals against which amounts in foods are compared in the nutrition panel, are a set of data for adults produced especially for labelling purposes. Guideline Daily Amounts (GDA) used on the GDA form of labelling are based on these figures. Guideline Daily Amounts (GDAs) are guidelines for healthy adults and children about the approximate amount of Calories, fat, saturated fat, carbohydrate, total sugars, protein, fibre, salt and sodium required for a healthy diet. Although the values are similar to UK Reference Nutrient Intake (RNI) for adults, they are not identical. Dietary reference standards have been in use in the UK since 1950, originally confined to recommended daily allowances (RDA) (DHSS, 1969). In 1991 a major review replaced the RDA figures with a range of reference standards for different applications (DoH, 1991). These standards are now referred to as Dietary Reference Values (DRVs).

Item	GDA		5-10 years
	Women	Men	Children
Energy (calories)	2000	2500	1800
Fat (g)	70	95	70
Saturated fat (g)	20	30	20
Carbohydrates (g)	230	300	220
Total sugars (g)	90	120	85
Protein (g)	45	55	24
Dietary Fibre (AOAC) (g)	25	24	15
Sodium (g)	2.5	2.5	1.4
Salt (g)	6	6	4

Table 1.4 Guideline Daily Amounts (GDAs) used on food labels

The GDA labelling guide shows not only grams of each nutrient but also the GDA as a percentage in a portion of the food consumed. The Tesco version sometimes shows "Guideline Daily Amounts" in a panel below the percentage flash. The label below in Figure 1.1 is an example of one used by Tesco on the front of food packs and indicates that a portion of the food would provide 13% of the 2000 kcal Guideline Daily Amount (GDA) and 18% of the of GDA 6g of salt. The 90g Sugar on the panel is incorrect, as it should be no more than 70g men, 50g women (DoH COMA, 1991). Tesco has also only given one average figure, for both men and women. The figure for Calories is possibly too low for some men, being the average figure for women, as is the quantity for fat and saturates. This is a further example of how consumers are likely to be confused, or even misled, by a manufacturer using figures other than those set by the government. The figures, which can be compared with the MAFF guidelines in table 1.7. It has not been possible to obtain an explanation from Tesco as to why the figures differ from those of the government.

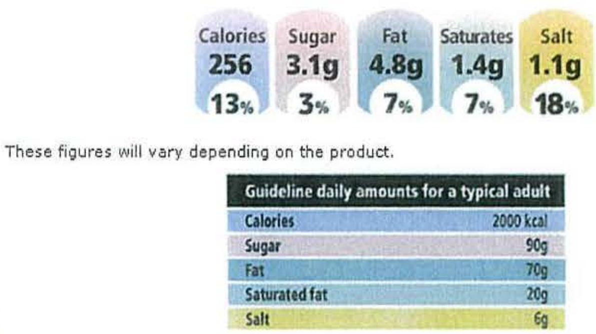

Figure 1.1 Guideline Daily Amount (GDA) "Signpost" system with GDAs

	Men	Women
Energy	2500 kcal	2000 kcal
Fat	95g	70g
Saturates	30g	20g
Sugar	70g	50g
Fibre	20g	16g
Sodium	2.5g	2g

Table 1.5 The Daily Guidelines for an average adult (MAFF 1998)

The Guideline amounts table (1.5) as shown above is incorporated into the FoLaG used in the studies in this thesis.

	High, more than	Low, less than
Carbohydrate		
Of which sugars	10g	2g
Fats	20g	3g
Of which saturates	5g	1g
Sodium	0.5g	0.1g
Salt	1.5g	1.3g
Fibre	3g	0.5g

Table 1.6 Guide to interpreting Food Labelling High, Medium, Low amounts of nutrients (MAFF Food Safety Directive, 1998)

	Fat per 100g	Fat in 15g portion
Full fat Mayonnaise	82g	12g
"Light" Mayonnaise	33g	5g
"Extra Light" Mayonnaise	3g	0.5g

Table 1.7 Fat content of three types of mayonnaise per 100g and per portion

Table 1.7 above gives an example of how people can compare the fat content either per 100g or by an equal sized portion in three different products.

In addition to Tesco some other major supermarket chains have also adopted the "percentage of GDA flash". A number of large food companies (members of the FDF) announced during 2006/7 that they were introducing front of pack information strip showing figures per serving as a percentage of the GDA for Calories, fat, saturates and salt.

The Food Standards Agency (FSA) introduced the "Traffic Lights" system (described below) shortly after the GDA system had started to be seen on labels. Some supermarkets and manufacturers opted for this alternative system. Others selling products in the UK are likely to join one of the schemes, which is currently voluntary. The GDA percentage system is similar to the USA (q.v.) and Canadian systems. Some Canadian labels are found both in English and French. A few Welsh foods provide bilingual labels.

1.5.2 Traffic Lights also called 'Signposting' labelling

The Food Standards Agency set up an Expert Group, which conducted extensive consumer research into a "Traffic Lights" system (FSA, 2001; 2002a; 2004a; 2006) as an addition to the existing legal requirements. In 2006 the FSA introduced the new "Traffic Lights" system of food labelling. Foods containing high levels of fat, sugar or salt are given a red warning on the label, medium levels are given an amber indication and green is used to signify low levels. One, two or all nutrients could be red, amber or green, e.g. all green if low fat, low saturated fat, low sugar and low salt (figure 1.3). The amounts of each are also shown in grams.

To provide information "per portion", the FSA has set portion size criteria at 30% of Guideline Daily Amounts (FSA, 2004b). The portion criterion for salt has initially been set at 2.4g per portion. This is in accordance with the FSA targets for salt reduction and is expected to encourage further salt reduction by industry. This figure is being reviewed. The criterion for 'Low' for each nutrient is based on the levels in the current European Union (EU) proposal on Nutrition and Health Claims (EU, 2006). From 2008 the per portion criteria will apply to all foods over 100g. The per portion criteria may be used if the serving size is 250g or greater (FSA 2007).

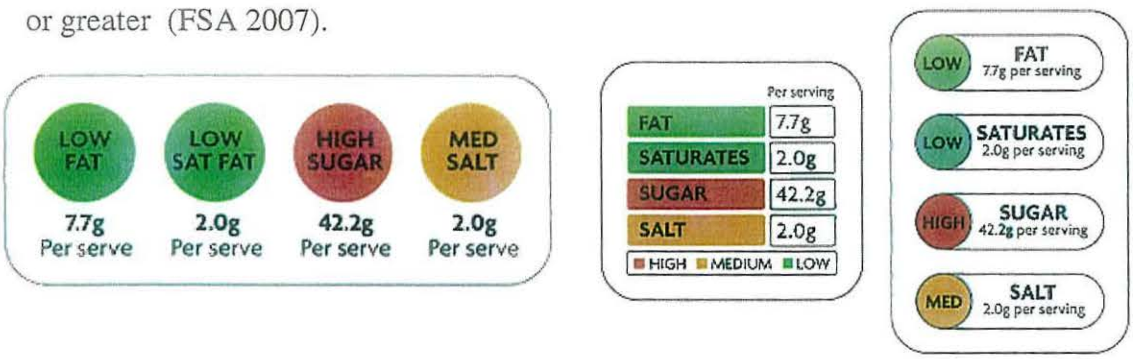

Figure 1.2 Three examples of "traffic lights" labels that meet the core elements of the Food Standards Agency's signposting Traffic Lights scheme

People with Red/Green colour blindness could find this scheme confusing, or difficult to interpret. This was discussed in a conversation with a member of the Food Standards Agency "Signpost" project on the 24th June 2006. The FSA had considered this and had decided to include the word "Low", "Med" or "High" in the circle or bar to reinforce the message to avoid confusion where colour blindness exists.

Sainsbury's "Wheel of Health"

Sainsbury introduced their own system based on the traffic lights format. They devised a "Wheel of Health" using the same classification as the FSA (Figure 1.3). As with the FSA examples (Figure 1.2 above) this not only gives the colour warnings but also shows how many grams of fat, saturated fat, added sugars, salt and calories each portion contains, however the Sainsbury wheel does not state "High, Medium or Low" on it so people with colour blindness are not provided for. The wheel is used on Sainsbury's own brand foods. In 2006 it appeared to be displayed principally but not exclusively on the "be good to yourself" products, which are marketed as healthier. An example was seen of labelling on two own brand tubs of hummus, the reduced fat hummus displayed the "Wheel of Good Health" but it was not on the standard product. The fat level of the reduced fat product was amber but would have been red for the standard item. This could be an example of using labels as a marketing tool.

Figure 1.3 Sainsbury's "Wheel of Health"

1.5.3 Criteria for High (Red), Medium (Amber) and Low (Green) labelling for Food Standards Agency's Traffic Lights system, per 100grams

Table 1.8 below illustrates the Food Standards Agency's criteria for 'high', 'medium' and 'low' colour coding for fat, saturated fats, total sugars and salt (www.food.gov.uk) for the Food Standards Agency's "Traffic Lights" labelling.

The amber/red (medium/high) boundaries are based on existing advice from COMA and SACN for fat, saturated fat, sugars and salt using 25% of recommended intake levels per 100g and 30% (40% for salt) per portion. In view of the fact neither COMA nor SACN has provided advice on intakes of total sugars an expert group was set up to recommend suitable criteria.

Criteria per 100g from the Food Standards Agency website May 2006

	Low (green)	Medium (amber)	High (red)
Fat	≤ 3 g/100g	≥3 - ≤20 g/100g	≥20 g/100g
Saturates	≤ 1.5 g/100g	≥ 1.5 - ≤5 g/100g	≥ 5 g/100g
Total Sugars	≤5 g/100g	≥ 5 - ≤15 g/100g	≥ 15 g/100g
Salt	≤0.3 g/100g	≥ 0.3 - ≤1.5g/100g	≥ 1.5 g/100g

Table 1.8 FSA criteria for Low, Medium and High for Traffic Light labelling

The conflict between the research undertaken by the FSA trying to produce a simple visual system (traffic lights), which includes greater detail for those who wish to know more, and the IGD/FDF GDA system, which may be manipulated as a marketing tool is profound.

Foods, which may carry a red traffic light warning, can be perceived as "unhealthy" by people, who may avoid it, whereas the same product carrying a GDA flash will have no warning colours, but states the % that a portion of that food contains of the daily allowance. The potential for adjusting portion sizes for both systems to achieve lower figures or amber or green colours exists. Portion guidelines have been seen which are considerably smaller than the average. For example for some breakfast cereals to achieve a medium (amber) colour as opposed to red, very small weights can be found on some packets, which would enable the portion to be within the 5 to 15grams of sugar. In the GDA system, small portions could reduce the number of Calories shown or the percentage of recommended daily allowance.

1.6 Different labelling formats from the USA, New Zealand and others

In addition to the labelling described, manufacturers frequently add, on a voluntary basis, symbols denoting 'Gluten Free', 'GI', 'suitable for vegetarians', Braille, 'instructions for recycling packaging materials and a whole range of 'Free from…' information as well as using marketing terms such as 'Lite' which have no legal meaning, which could add to possible confusion.

1.6.1 USA food labels

The USA label gives percentage information of the total daily requirement that an average portion of the food would provide (Table 1.9). This means that a portion of a food providing 12g of fat gives 18% of the daily allowance. The IGD, FDF members, Tesco and other manufacturers' Guideline Daily Amounts (GDA) partially follows this format, showing amounts per portion as a percentage of the daily requirements. Canadian labels use a very similar format to the USA but in some areas of Canada they are bilingual, English/French.

The label does give guidelines e.g. (point 4) next to the fibre section, "5% or less is low" but does not provide information as to whether low is good or higher is better for you as in the case of some nutrients, e.g. Vitamin C, or other water-soluble vitamins, to have a little more than the minimum recommended allowance would not be detrimental. However, in the case of others e.g. salt, or fat, it would be preferable to take less as the recommended allowance is a maximum guideline.

Print size - USA

The print size used on USA Labels (Table 1.10) is specifically covered by legal requirements of the FDA (Food and Drug Administration, 2008). There are EU and UK guidelines (not a legal requirement) that the print size should not be less than 8 point but examples considerably smaller than this are often found. The EU Codex also provides guidance on visibility such as where there is a dark background on a label, the print should not be dark but in a suitable highly visible contrast. However UK and European examples of poor print examples are common (Appendix 4).

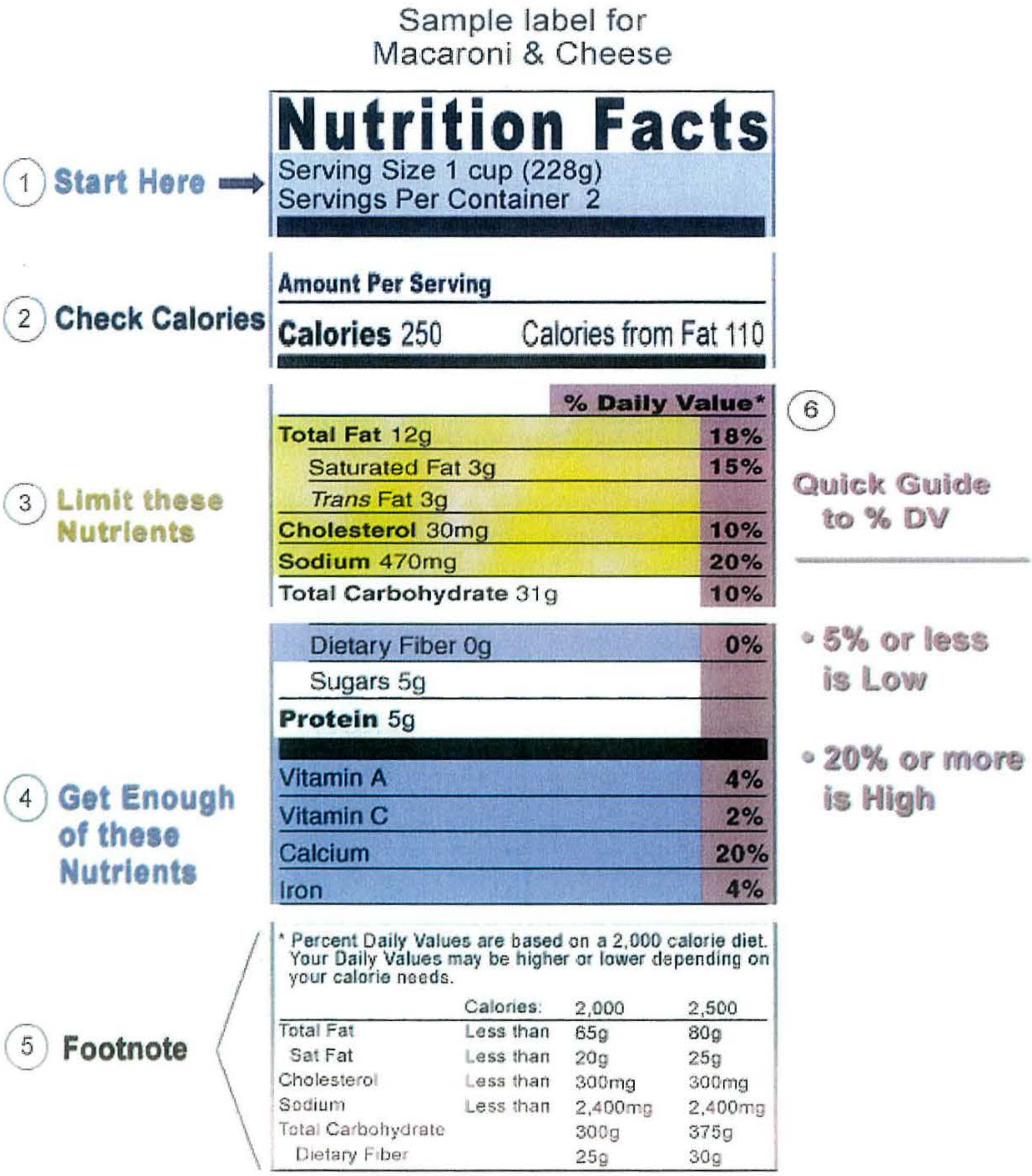

Table 1.9 An example of an American food label showing the % of daily requirement. From the US FDA website http://www.fda.gov/ 2006

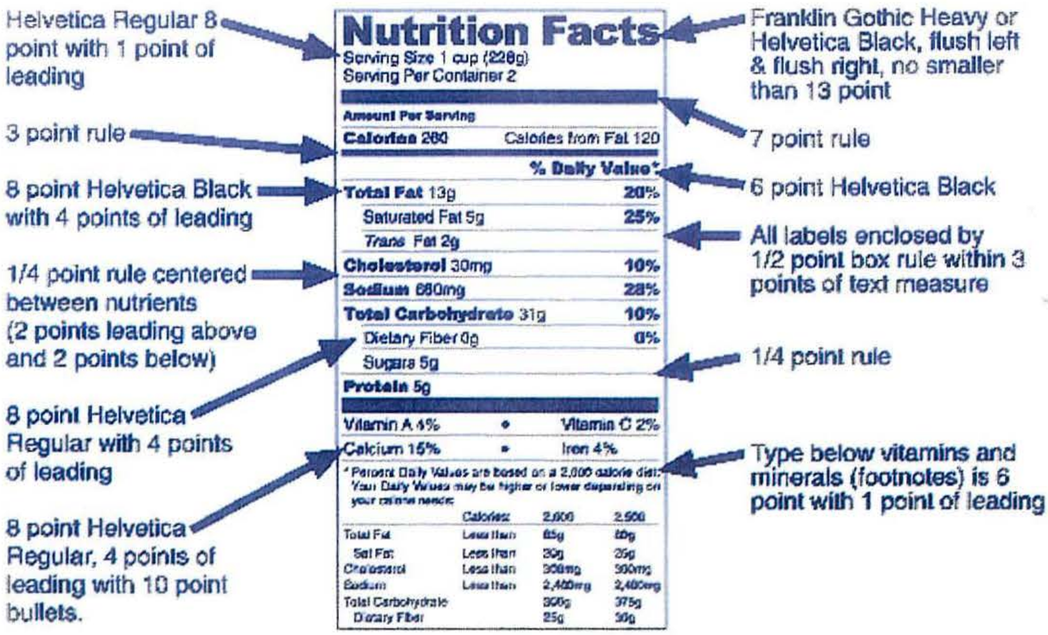

Table 1.10 USA Print size guidelines (FDA, 2008)

http://www.cfsan.fda.gov/~dms/2lg-7b.html 14.4.2008 (FDA, 2008)

1.6.2. The New Zealand "Pick the Tick"

In New Zealand a simple graphic device has been introduced on labels, the "Pick the tick" logo (Figure 1.4). The Pick the Tick programme of the National Heart Foundation of New Zealand provides a framework for the food industry to improve nutrition labelling and to develop a healthy food supply by achieving targets for lower salt fat and sugar in products, thuds qualifying for the "Pick the Tick" label –(Young and Swinburn, 2002). Table 1.11 below gives the criteria to qualify for the logo.

Figure 1.4 New Zealand's "Pick the Tick" logo

	Fat	Sodium	Sugar	Fibre
Bread	5% or less[a]	450 mg per 100 g or less	15 g/100g added sugar or less	3 g per 100 g or more
Breakfast cereal	5% or less[a]	400 mg per 100 g or less	15 g added sugar or less	3 g per 100 g or more
Margarine and reduced fat spreads	Saturated fat plus *trans*-unsaturated fatty acids no more than 28% of total fatty acids			
[a]Products with a fat level of between 5 and 10% will also be approved if the saturated fatty acids are ≤20% of total fatty acids.				

Table 1.11 *Pick the Tick* nutrition criteria for bread, breakfast cereal, and margarine and reduced fat spreads (Young and Swinburn, 2002).

Other countries', mainly in Australia and Sweden, work with food labelling includes analysis of foods for Glycaemic Index (GI – glossary) and the effect of rate of absorption of different carbohydrates (Brand-Miller 1995, 1997; Colaquiri and Brand-Miller, 1997; Arvidson and Lenner et al., 2001). Some manufacturers on some high fibre products use a 'GI' symbol in the UK.

Despite numerous individuals, groups, up to national level, there has been very little international cooperation to develop a uniform system of food labelling.

1.7 Landmarks in Nutrition Labelling

1984 COMA report recommends fat content labelling.

1984-5 MAFF research shows consumer preference for *high, medium and low* wording, the Co-op adopts this wording.

1990 EC Nutrition Labelling Directive comes into force, 'Big Four' and 'Full Eight'.

1992 Coronary Prevention Group (CPG) publish a comprehensive labelling study *"Just Read the label"* recommending a graphic information system.

1993 Co-op publish the *'Lie of the Label'* report in conjunction with the Consumers Association and a code of practice for honest labelling.

1997 Institute of Grocery Distribution (IGD) and Food and Drink Federation (FDF), following extensive research, publishes voluntary guidelines within the constraints of the law, to make nutrition labelling more consumer friendly, including Guideline Daily Amounts (GDAs).

1998 FSA Research confirms that nutrition labelling confuses customers, who also indicate a preference for *high, medium and low.*

2000 Quantitative Ingredient Declaration. Manufacturers are obliged to declare the % contribution of the principal ingredients since 14/2/2000.

GM (Genetically Modified) Manufacturers are required to state if the product contains genetically modified soya or maize since 19/3/1999, plus GM additives or flavourings since 14/4/2000.

BSE (Bovine Spongiform Encephalitis) for beef and beef products, manufacturers must state the countries where the animal was slaughtered and cut since 1/9/2000 and when and where born since 1/1/2002 with identification codes specifying origin.

2002 FSA researches modes for better labelling. The Consumer's Association publishes its own investigation into labelling; showing dishonest labelling is alive and well.

2006 FSA introduces *high, medium and low* Traffic Light Labelling and the FDF/IGD introduce GDA labelling.

1.8 Reflections

Anecdotal experience has shown that people are confused about what foods to choose and how to differentiate between the nutritional information on various products. The variety of systems in use that are described above are likely to confuse the consumer, there are still examples of good and bad practice in food labelling. This research will investigate comprehension of nutrition and use of food labels.

There are many stakeholders including the World Health Organisation, British Government, the EU, Food Standards Agency, FDF and IGD, Supermarkets, particularly, Co-operative Society, Tesco and Sainsbury and bodies such as the Coronary Prevention Group, who have been involved with food label guidelines and the design of varying, competing labelling systems, both legislative and non-legislative. It is not surprising that several different systems have been developed and are in use. Because of this, food labelling has reached a stage of possible conflict and misunderstanding between the various systems in use. It is a matter of some regret that the excellent and comprehensive research undertaken by the Coronary Prevention Group (CPG) in 1990 was not acted on by the government. It could have provided a lead in clear understandable labelling, developed as a result of extensive testing with a population and possibly produced one defining "user friendly" method, which could have been in use over the past 20 years (Coronary Prevention Group 1990). Despite the CPG developing "user friendly" systems of labelling, the research was conducted in a workshop/focus group situation and not in a real shopping environment. This thesis intends to address this by conducting studies with people in a "real life situation, shopping in supermarkets.

There is a need for change in eating habits to reduce risk factors for Coronary Heart Disease (CHD). A literature review of health, health promotion and change will identify areas for study, not previously investigated in this context, in order to take this research forward.

Chapter 2

Literature Review

2.1 Introduction

This chapter consists of a literature review of health, specifically areas where health improvements can be brought about by changes in diet. The current predominant health risks and causes of mortality have changed from the previous high death rates from infectious diseases, to chronic conditions, which include obesity, diabetes and Coronary Heart Disease (CHD) and originate from a common group of risk factors to health. The cost to the NHS of these chronic conditions is explored. Also reviewed are health promotion models and how they may be used to influence change in eating patterns. The dietary and shopping habits of the population are reviewed. The summary of the literature review draws together all the issues regarding knowledge of the relevant topics; health promotion, healthy eating, the current eating habits leading to CHD risk and the need for change, understanding nutrition and labelling, also food shopping choices. Reflection on all of these factors and experience built upon reflection on practice informed how to take the research forward.

Literature Review

2.2 Historical background, changes in causes of mortality in the UK

Over the last 150 years in many developed countries there has been a considerable increase in Health and Safety legislation and investment in infrastructures and services both to promote health and prevent diseases. In the UK the prosperity of the country in Queen Victoria's reign, from the industrial revolution, brought great investment in infrastructure that had beneficial effects on health. The change in causes of mortality from that period to present day is that of a change from infectious diseases to the current non-communicable diseases associated with overweight and obesity, such as coronary heart disease (CHD) and diabetes. The reduction in infectious diseases was brought about by improvements such as sewage treatment. In the 19th century, sewage was collected in cesspits that were emptied or drained into the Thames (Portcities, 2008). The river Thames was virtually a sewer but also supplied London's drinking water. In 1832 Cholera was pandemic, with 14,000 deaths in London and 54,000 deaths in the UK from Cholera. By the time the third epidemic of cholera occurred in 1852-1853, Dr John Snow had proved that Cholera was a water-borne disease (Russell, 1986). In 1856 the Metropolitan Board of works agreed to build a sewerage system for London, which was completed by 1865, those sewers still serve London today. In an early example of health promotion and prevention being better than cure, Joseph Chamberlain, mayor of Birmingham in 1875 claimed, "we may hope to see disease (and crime) removed, the cost of the goal, the hospital and the workhouse is infinitely greater than that of any sanitary improvement which the most extravagantly minded man can devise" (Hillborne et al., 2006). Slum clearance, sewage and drainage improvement and other measures were seen as paying long term dividends in creating healthy communities run on hygienic principles (Hillborne et al., 2006).

At this fundamental level, reduction of disease was achieved by improved sewage treatment, improved sanitation and hygiene and reducing the incidence of diseases such as Cholera (Russell, 1986). Infectious diseases that were the major causes of death at the turn of the 19th to 20th century, such as diphtheria, gastroenteritis, tuberculosis (TB) and typhoid have now practically disappeared (Parliament UK, 1999). In 1880, Tuberculosis killed 80,000 people with only 7% of the population were recorded as having died from circulatory diseases (Parliament UK, 1999). Whereas only 440 people died from TB in 1997 in the UK (Dauer et al., 1968; Parliament UK, 1999) and the deaths recorded for men in 2005 from circulatory diseases, had risen to 37% (BHF 2007). Thanks to public health measures such as improved handling of sewage, purer water and improved food hygiene standards, people are now less exposed to infectious diseases. In addition, vaccines have helped to control some diseases including smallpox and diphtheria. From 1911-1915, 63% of people died before the age of 60. Now only 12% die before they reach 60, in 1918, life expectancy for boys was 45 years and for girls 47. By 1998, this had risen to 75 for males and 82 for females (Parliament UK, 1999).

It is interesting that the philanthropic perception was that the enormous investment then would not only benefit people at the time but have very long term benefits.

Experience and research in new methods of treating these diseases has shown that there is the ability to prevent or delay the onset by lifestyle changes and treatments (Department of Health, 1999; Joffres et al., 2004).

Factors affecting health				
Fixed	**Social and economic**	**Environmental**	**Lifestyle**	**Access to services**
Genes	Poverty	Air quality	Diet	Education
Sex	Employment	Housing	Physical activity	NHS
Ageing	Social exclusion	Water quality	Smoking	Social Services
		Social environment	Alcohol	Transport
			Sexual behaviour	Leisure
			Drugs	

Table 2.1 Factors affecting health (Department of Health 1999)

2.3 UK mortality rates and England/Wales CHD and risk factor comparison

In contrast with the causes of mortality a century ago, the major causes of death in England and Wales are now chronic non-communicable degenerative diseases, in 2002 the highest incidence being CHD and CVD (37% of all deaths), followed by cancers (26%) (Day, 2000) and respiratory diseases (13%) (Statistics.gov.uk, 2004). In 2002, across the United Kingdom (UK) figures showed that CHD and Coronary Vascular Disease (CVD includes strokes) accounted for 37% of male deaths and 36% of female deaths in Britain. The deaths from CHD only, were men 21% and women 15%. (British Heart Foundation, [BHF] 2002). By 2005 the equivalent figures for male and females deaths remained static at 37% and 36% respectively (BHF, 2007). In 2001 on Anglesey, the figure for the male deaths from CHD and CVD was higher than the national average at 47% of all male deaths; but the female figure was lower at 17% (Statistics National Assembly for Wales [WAG], 2002).

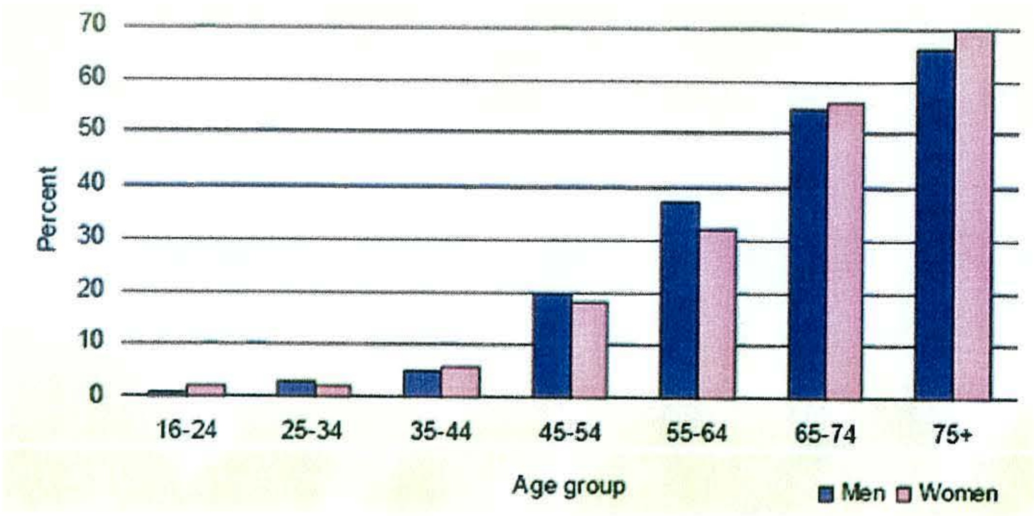

Figure 2.1 Percentage in UK reported being treated for any heart condition, including high blood pressure by age and sex (Office of National Statistics, 2006)

The WAG figures also provided information on socio economic differences, showing that the premature death rate from CHD for male manual workers was 58% higher than that of professionals such as doctors or lawyers. Although the premature death rate is falling, it is falling faster in non-manual workers, which means the difference between the socio economic groups in the death rates is increasing (NHS 1995). Over the same period, there has also been an upward trend in the incidence of obesity (Department of Health, 2004c). The Welsh Health Survey 2004-2005 reported that in Wales 55% of the population were overweight, with 18% of those being obese. In Wales 23% of the population were being treated for heart conditions, with deaths from circulatory disease amounting to nearly half of all deaths, both men and women (National Assembly for Wales, 2005). Poor diet high in saturated fats and low in fruit and vegetables, together with sedentary lifestyles also contribute to the increase in CHD (Jebb and Moore, 1999).

Figure 2.2, below shows the percentage of the population who are obese, it can be seen there has been a steady rise from circa 12% of the population in 1994 to circa 23% in 2003. UK Government statistics stated in 2004 that in relation to overweight and obesity:

"There is no significant change in the proportion of adults who were overweight, (from 1993 to 2004) though there was a marked increase in the proportion who were obese" (statistics.gov.uk 2004).

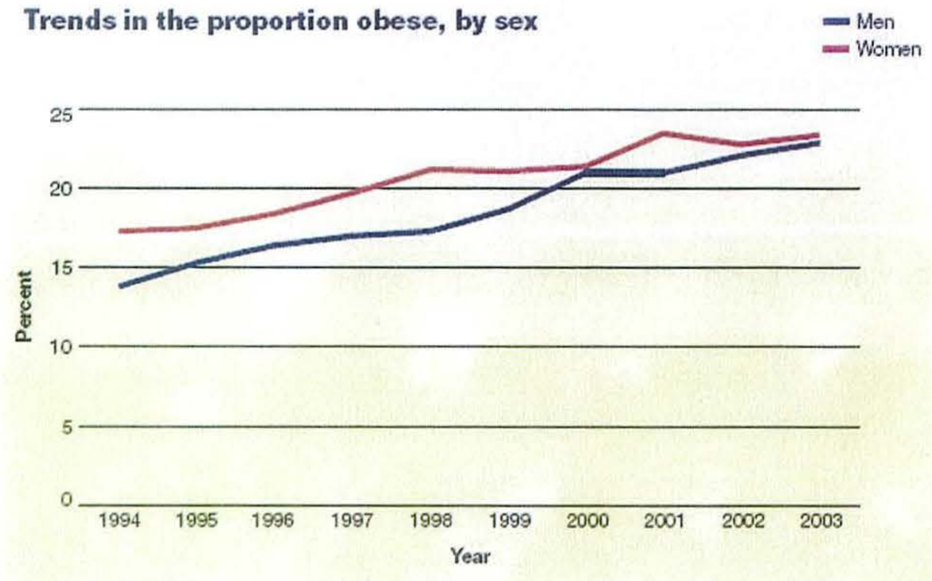

Figure 2.2 UK Obesity Trends 1994 to 2003 (Department of Health, 2004c)

The proportion that was categorized as obese (Body Mass Index [BMI] over 30 see glossary) increased from 13.2% of men in 1993 to 23.6% in 2004 and from 16.4% of women in 1993 to 23.8% in 2004. In the case of Children, between 1995 and 2001, mean BMI increased among boys (from 17.6 to 18.1) and girls (from 18.0 to 18.4). Among girls aged 0-15 years, mean BMI increased from 18.2 in 2001 to 19.0 in 2004, but there was no significant increase among boys aged 0-15 years in the same period (Sprowston 2003; Statistics.gov.uk, 2004).

Figures show that in the data from 2002, that 50% of the adult UK population is overweight and 21% of women and 18% of men are obese (Comptroller and Auditor General, 2002), these figures are rising for both adults and children (Statistics.gov.uk, 2006). Recent estimates indicate that unless considerable changes are made to dietary intake and exercise patterns for the population of Britain, 50% of the population will be obese by 2050. In England 1 in 5 adults is obese, the number has trebled over the past 20 years and nearly to thirds of men and over half of women are overweight or obese (National Audit Office, 2001)

Obesity is rising throughout the UK, despite the figures for Wales being slightly better than those in England, having a larger percentage in the healthy weight range, the percentage of overweight is greater at 55% and obese in both populations have steadily increased since 1990 (Office for national statistics, 2006).

2002-2005	England	Wales
Underweight	5%	3%
Healthy weight	33%	43%
Overweight	40%	36%
Obese	22%	18%

Table 2.2: comparison of weight ranges in England and Wales 2002- 2005

The figures for overweight and obesity on Anglesey 2004/6 showed that 62% of men were recorded as being overweight or obese and 46% of women (National Assembly for Wales, 2004/5). Whereas although the equivalent figures for England were slightly higher at 67% of men and 59% of women, it still showed that only 38% of men and 54% of women were not overweight.

2.4 Coronary Heart Disease

In 1992 Coronary Heart Disease (CHD) was one of five key areas identified in the Health of the Nation White Paper (Department of Health, [DoH] 1992). The main CHD targets in the 1992 White Paper were to reduce death rates from CHD by at least 40% in people below 65 and 30% in those between 65 and 74, respectively by the year 2000. Improvements in treatment and rehabilitation were expected to contribute to reducing the burden of CHD (Ashenden 1997); however, in the long term, it is likely that prevention will have the greatest potential for overall improvement in health (Health Evidence Bulletin Wales CHD, 2004). Health promotion to reduce the risks of CHD therefore has a big role to play in securing the Health of the Nation targets (DoH, 1992). However, in contrast to treatment interventions, little is known about the effectiveness or cost-effectiveness of health promotion for CHD as it is difficult to measure improvements in health through health promotion over short periods. One long-term programme, which has shown significant cost effective improvements over 30 years, is the North

Karelia programme in Finland (Puska et al., 1995). From 1957, the Finnish Heart Association (KTL) planned health promotion, dietary and activity measures for the prevention of CHD, which have shown significant reductions in CHD as well as an increase in health and life expectancy, together with savings in health care costs (Puska et al., 1995).

In the UK the notion that prevention would be cheaper than cure persuaded local authorities to extend services to improve health through education. Post World War II (WWII) public health measures brought about improvements in standards of living in the UK. Part of the prevention programme included children being taught hygiene in school and mothers being instructed in nutrition, hygiene and childcare by health visitors (Lewis, 1980).

2.4.1 CHD risk factors and the cost to the NHS

Commensurate with a rapidly escalating obesity problem in the UK are the associated diseases of Diabetes and Coronary Heart Disease (CHD) (Statistics.gov.uk, 2006; British Heart Foundation, 2008). The costs, both to the individual and the NHS are substantial Coronary Heart Disease (CHD) is the Britain's main cause of premature death (Statistics.gov.uk 2006). It costs the NHS over £3.5 billion a year (DoH, 2002a; BHF, 2007a). CHD and CVD combined total costs were £14.7 billion per year this was 57% of the total health care expenditure, a per capita cost of £250 per annum (BHF, 2007a). The cost of hospital care for people who have CVD and CHD accounted for about 79% of that figure, that of drugs to treat the conditions and of dispensing them for about 16% (heartstats.org BHF, 2008). The NHS Health Development Agency (HDA) stated in 2002 (HDA, 2002) that increasingly, UK government targets and health policy have reflected the growing emphasis on the contribution of diet to the health status and health outcomes (DoH, 2007b).

In 2002 the cost of overweight and obese individuals to the economy was between £6.6 - £7.4 billion, (BHF, 2002; FSA, 2002), with over 100,000 UK deaths from CHD in 2003 and over 65,000 deaths from strokes (Petersen et al., 2003).

2.4.2 Cost to the NHS of CVD related prescriptions

During 2001 nearly 145 million prescriptions were dispensed relating to the cardiovascular system (Cardio Vascular Disease CVD) (Department of Health Statistical Bulletin, 2002). Improvements in lifestyle and diet could produce a significant saving for the NHS. The annual cost in the UK in 2003 of lipid lowering drugs (statins) was £440 million (BHF 2002), a 25% increase since 2000. Statins reduce the synthesis of cholesterol in the liver. These drugs now cost the NHS more than any other class of drug. Of the overall increase (2000 to 2003) in the cost of drugs to the NHS, 22% was due to lipid lowering drugs. The cost of prescriptions for anti-hypertensive therapy increased to £421 million. This is a 14% increase over the 3 years. Anti hypertension drugs are the second most costly class of drug to the NHS. The CHD National Service Framework (NSF) recommends the use of both statins and anti-hypertensive drugs for secondary prevention of CHD, so it is likely there will continue to be an increase in their use. In 2001 around one quarter of all prescriptions issued in Wales were related to CVD. If methods could be found which could lead to dietary improvements and an overall reduction in the rising obesity levels, this could lead to a reduction in the requirements for some of these drugs with resulting in savings for the NHS (Marmot 1994; Hallikainen et al., 2000; Department of Health, 1999; Department of Health, 2004b).

2.4.3 Overweight and Diabetes

Up to 2008, there were 2.3 million people diagnosed with diabetes in the UK and ii is estimated that more than 500,000 with undiagnosed Type 2 (Diabetes UK, 2008). The NHS spends £9 billion per year (10%) of its budget on diabetes and related complications (DoH, 2008). A report by Diabetes UK (2004) stated that since 1996 the number of people diagnosed with diabetes had increased from 1.4 million to 1.8 million. The report estimated that by 2010 the number could increase to 3 million. The majority of the cases will be Type 2, attributable to an ageing population and rapidly rising numbers of overweight and obese people. Type 2 Diabetes is linked to inappropriate diet, sedentary lifestyle and the consequence of these, being overweight or obese (Diabetes UK, 2005). The cost to people's quality of life, the economy, society and the NHS are already high.

Poorly controlled diabetes can lead to serious complications such as heart disease, blindness, kidney failure, stroke, nerve and circulatory damage which can lead to amputation. If everybody's weight was in the ideal BMI range 19-25 kg/m^2 (glossary) it could drastically reduce the incidence of Type 2 diabetes.

2.4.4 Why current eating habits involve the NHS

The NHS is committed to health improvement and disease prevention. A wide range of health promotion programmes and services are offered within the NHS, the specific area that is relevant to this work is healthy eating. Primary Care Organizations (PCOs) (DoE T & R, 2000) and in Wales, Local Health Boards (LHBs) carry out some health improvement activities as a part of primary care. Activities specified in the National Service Framework are an important part of health improvement (Health Development Agency, CHD NSF, 2002). There are aspects, which fall outside, or are on the borderline of the NHS services (Abbot et al., 2001). These include activities that address the root causes of ill health, such as social inequalities, low income, poor housing and unemployment. Although the responsibility for these lie with government, both national and local, implementing change often falls to those at a local level. Addressing poor diet would come within the scope of the NHS; whose overview is to put health improvement at the centre, not the periphery of the PCO/LHB's work.

2.4.5 Can dietary changes provide a reduction in cost to NHS?

Blood cholesterol levels can be reduced and more importantly the ratio of High Density Lipoprotein (HDL) to Low Density Lipoprotein (LDL) [Glossary] improved by significant changes in diet and weight, consequently reducing the requirement for lipid lowering and anti-hypertensive drugs (Hooper et al., 2004; Potter et al., unpublished). A high level of sodium (mainly in the form of salt) in the diet contributes to raising blood pressure (BHF, 2002). A reduction in sodium intake, principally in the form of salt will bring about a reduction in hypertension (raised blood pressure) (BHF, 2002). Reducing salt by 5g a day can lower blood pressure by 5mmHg (Australian NH MRC, 1989). A fall of 10 mmHg in blood pressure is associated with a 12% decrease in Myocardial Infarction (MI) and a 19% reduction in stroke (Adler et al.,2001). Although statins and antihypertensive drugs are prescribed widely to reduce serum cholesterol and hypertension they are contraindicated in liver disease and Hypothyroidism (under active thyroid) (British National Formulary, [BNF] 2008). People who need the medications may be reluctant or unwilling to take them if they experience side effects. For statins, these may include cramps, muscle fatigue and tremors (BNF, 2008) and sometimes Rhabdomyolysis, (breakdown of muscle fibres), which may lead to acute kidney failure (BNF, 2008). Dietary changes could reduce the incidence of all these conditions, as risk of stroke and CVD can be influenced by diet, such as a reduction in sodium intake and an increase of fruit and vegetable intake (Joshipura et al., 1999). Eating the recommended intake of fruit and vegetables has cardio protective effects, (Ness and Powels, 1997).

Anti-hypertensives such as Angiotensin-converting enzyme (ACE) inhibitors may cause profound hypotension (low blood pressure) in people with heart failure, already receiving high doses of diuretics (to increase excretion of fluid) and may cause pulmonary oedema (fluid in the lung) and Agranulocytosis, a reduction in the white blood cells in the body (BNF, 2008). This may result in light-headedness and fainting in susceptible people. Other antihypertensive drugs may cause tachycardia (rapid heartbeat), nausea, weight loss, rashes, flushing and acidosis, some are not suitable for diabetics with some renal (kidney) impairment (BNF, 2008).

Mortality	>20% ↓ total morbidity >30% ↓ diabetes related deaths >40% ↓ obesity related cancer deaths
Diabetes	↓ 50% in fasting glucose ↓ 15% in HbA1c
Blood Pressure	↓ 10mmHg systolic ↓ 20 mmHg diastolic
Blood Lipids	↓ 10% total cholesterol ↓ 30% triglygerides ↓ 15% Low Density Lipoprotein (LDL) 8% high density lipoprotein (HDL)

Table 2.3 showing the benefits of a loss of 10kg body weight (Jung RT, 1997)

At a lower cost to the NHS, one method of reducing blood cholesterol is the use of stanol and sterol esters. A systematic review of research into the effect of foods with added plant sterol and stanol esters is reviewed in a Cochrane meta analysis (Potter et al., unpublished). Currently there are 2 principal manufacturers, which offer these products, firstly Benecol, which contains plant stanol esters in margarines and other products. This has the effect of preventing the absorption of cholesterol from the gut and re-absorption of circulating cholesterol. The second manufacturer is Flora, their Pro-Activ products have added plant sterol esters which act in a similar way to plant stanol esters but the sterol esters are absorbed to a small extent. Both reduce serum cholesterol, when combined with a healthy low fat diet. Other manufacturers are developing similar products.

Finnish studies have resulted in significant lowering of total cholesterol by changes in diet and using plant stanol added products (Hallikainen et al., 2000). Several studies have been done in both the Netherlands and Finland (Hendriks et al., 1999). Discussions with Professor Pekka Puska in Finland in 2002 indicated that reductions in their population's total cholesterol had been achieved by the use of these products in conjunction with a healthy diet. Where people had a very high blood cholesterol level, they were given low doses of lipid lowering statin medication plus stanol products (Miettinen et al., 1995). The Finns used 'functional foods' as the first line in preference to using statins. The claims for these products in the research findings, would seem to indicate that the resulting lowering of total cholesterol is similar in both stanol and sterol ester products Miettinen et al. 1995; Hendriks et al., 1999; Hallikainen et al., 2000; Potter et al., unpublished).

The Calon Lân cardiac rehabilitation programme, showed (Wain et al., 2006) that of the patients who completed the rehabilitation programme, which included a combination of exercise and diet, only 9% were readmitted to hospital with further cardiac events. Of those who chose not to follow the programme 32% were readmitted to hospital within a year. Exercise programme and dietary education sessions for all referred patients could lead to a reduction in re-admission costs of up to £450K per annum for patients from Anglesey and Gwynedd. Readmission could include further events such as myocardial infarction or the requirement for further surgical procedures (e.g. Coronary Artery Bypass Graft - CABG).

2.4.6 Cost to the NHS of the ageing population in the United Kingdom

Another cause of financial pressure for the UK National Health Service (NHS) is the ageing population, the falling birth rate and the lengthening life expectancy (Statistics.gov.uk 2006). There will be progressively larger numbers of elderly people who are disproportionate users of health services (DoH, 2001a-2005). Moreover, the effect of the ageing population is more acute because it also means that the burden of paying for these services falls increasingly on a relatively smaller working population (Abel-Smith and Maynard, 1979). In addition the public appears to have rising expectations about what the NHS should provide. A growing knowledge and interest in health is a result of improved health education, public health activities and wider use of information sources such as the internet. In 2007 80% of adults use the internet and 80% of these look for medical information (pewinternet.org., 2007). As the older population increases in number and the working population decreases, future budget for the NHS will be required to treat diseases related to unhealthy eating which could escalate beyond the capacity of the working public to pay for it if this problem is not tackled now (DoH 2002a, 2007a).

2.4.7 Changes needed to reduce risk of CHD, dietary targets

As a result of increasing incidence of CVD and CHD (Stats.gov.uk, 2006), Government targets set in 1992 (COMA report, 1994), sought to effect a reduction of both total fat to 35% of energy intake and saturated fat to 12 % of energy intake for the adult population in the UK by 2005 (Gregory et al., 1991). The UK 2003 percentage of total energy from fat was 39% whereas the European average was 32% (Petersen et al., 2003). The Finnish populations' percentage intake of fat was over 40% in the 1970's but they have reduced their energy percentage derived from fat, over 30 years to 35% and their target is 30% (KTL, 1998).

Research has consistently demonstrated a link between the percentage of energy derived from fat and the risk of Coronary Heart Disease (COMA, 1994). A healthier diet reduced in fat, saturated fat and salt and increased in starchy foods, fruit and vegetables is central to achieving targets set for cardiovascular disease, obesity and mean systolic blood pressure. Literature reviewed will examine health promotion, understanding the functions and recommended quantities of nutrients together with comprehension of food labelling and effective methods to dietary change, which is the main tenet that this research is designed to address.

UK Government surveys and policy

Dietary and nutritional surveys undertaken by Gregory (Gregory et al., 1990, 1995 and 2000) analysed intakes for different population age groups. The Committee on Medical Aspects of Health (COMA) working group made dietary recommendations. They investigated different areas of health and the effect of diet on disease between 1991 and 2002. Comparisons between Gregory's population actual intakes and the COMA desired intakes produced recommendations for changes in the proportions of nutrients that should be consumed. This was with the aim of reducing the incidence of CHD and other diseases such as cancer, which can also be affected by diet (HEA, 1999a; Steinmetz and Potter 1996). In 1994 the COMA committee made recommendations aimed at reducing CHD and cancers at 15 sites in the body (DoH, 1994, 1998). Briefing papers produced by the former Health Education Authority (COMA, 1990, 1995; DoH, 1994; Ruston, 1998; Butler, et al 1999) summarise the conclusions and recommendations of their reports as follows:

The DoH 1998 report recommended, on a population wide basis:

- Increasing the consumption of a wide variety of fruits and vegetables
- Increasing intakes of dietary fibre from bread and other cereals (particularly wholegrain varieties), potatoes, fruit and vegetables
- Reducing dietary intake of fat and particularly saturated fat.

The Wanless Report (Wanless, 2002) outlined an overall view of the NHS with long term planning, incorporating all cost forecasts and long term workforce planning. Emphasis was placed on long term planning for health promotion.

The importance of addressing diet as a risk factor for diet-related cancers, CHD, obesity, Type 2 diabetes and other chronic conditions is reflected in key policy documents including: The National Service Framework for Coronary Heart Disease; The NHS Cancer Plan; The NHS Plan and The National Service Framework for Diabetes (DoH, 2000a; DoH, 2000b; DoH, 2000c; DoH, 2001c). Each of these requires specific action to be taken at local level to promote healthy eating in order to achieve targets. For example, The National Service Framework for Coronary Heart Disease required all NHS bodies, working closely with local authorities, to have agreed and be contributing to, the delivery of local programmes of effective policies for promoting healthy eating by April 2001 (DoH, 2000a).

Access to affordable supplies of fruit and vegetables is a key issue within government policy, reflected in the NHS Implementation Plan and Programme for 2001-2002. This required Health Authorities to produce quantified plans to increase availability and consumption of vegetables and fruit, particularly among those on low incomes (Anderson and Cox, 1998 and 2000; Palombo and Lederman, 1999). This was to support the national Five-a-Day Programme, which was launched in 2001 (DoH, 2001b). People cannot make changes to healthier eating patterns if the healthier options are not available. A report by Policy Action Team 13 (PAT13) in 1999 confirmed that, in some areas, it may be difficult to access affordable, good quality fruit and vegetables. This was followed up in "The NHS Plan", which stated that the government would work with industry, to increase provision of fruit and vegetables and where necessary, establish local food cooperatives. These are legal entities run on a membership basis, to supply fresh, predominantly locally produced fruit and vegetables at a low fixed weekly cost, usually they are established in areas of deprivation with little access to fresh fruits and vegetables. Food cooperatives can increase the availability of fresh fruit and vegetables and allow people to try new foods at affordable prices.

As an educational tool to help people to understand the correct balance and proportions of the macronutrients, the Food Standards Agency (FSA) produced "The *Balance of Good Health*" (BoGH) which was revised in 2007 becoming the "*Eatwell Plate*" (FSA, 2008) (Appendix 10). It provides clear indication of the main food groups and the proportions in which they should be eaten each day (Health Education Authority, 1994a). A pan European study examining peoples' perception of healthy eating found that 70% of EU subjects believed their diet was healthy and a lack of nutritional knowledge was considered an important barrier to healthy eating (Kearney and McElhone, 1999). Kearney and McElhone suggested that using nutrition-based education with food-based guidelines could be developed as a method to improve knowledge, as people's understanding of an appropriate diet was not always ideal.

Within the UK, The Scottish Office produced a paper; "*Eating for Health*", in which the importance of the correct nutrition advice is emphasized, specifically suggesting that registered dietitians have a crucial role in the improvement of the nation's health. Qualified dietitians facilitate dietary behaviour change as part of an integrated approach to health promotion and disease prevention (Scottish Office, 1996).

> "When communities, families and the private sector have substantial involvement with dietetics professionals in the design, delivery and evaluation of nutrition programmes and services, as well as the development of healthcare policy, dietary behaviour change strategies are more effective. A healthy diet and wise food choices are critical components of promoting health and reducing the risk of chronic disease. Expanding health promotion programmes that target dietary change effectively could save a substantial amount of health care resources" (The Scottish Office, 1996 point 8.7).

2.5 Welsh eating patterns

Regarding eating patterns relating to Wales and Anglesey there are some differences in eating habits from the rest of the UK. The Welsh office of the Food Standards Agency survey (FSA, 2003) revealed that the Welsh:

- are likely to eat more fruit and vegetables compared to consumers in England, Scotland or Northern Ireland. People in Wales eat 33% of the recommended five or more portions of fruit and vegetables a day, in England 28% and both in Scotland and Northern Ireland, 23%. However despite the Welsh figures being better than other areas of the UK they still show significant under intake throughout Wales and methods of increasing intake need to be explored.

- regularly eat more dairy products (97%) and eggs (68%) than people living in other parts of the UK compared to the UK figures of dairy (92%) and eggs (59%).
- are unlikely to be vegetarian, just one in 25 households (4%), contained a member who was a vegetarian. This was found to be even less in the original Calon Lân Lifestyle survey (2002) (Chapter 4), which showed there was a vegetarian in only 2% of households in Anglesey, with only 1 vegan in 2,500.
- eat more convenience foods (66%) than anywhere else in the UK. (48% Northern Ireland, 55% England and 64% Scotland). Convenience foods are likely to have a higher salt and sodium content than homemade items.

Although the figures below (Table 2.4) do show an increase in intake of fruit and vegetables in Wales over 10 years, they still indicate that only 33% of the population are eating the recommended amounts. Although fruit and vegetable consumption has increased since 2001, rising from 22% to 26% of men eating 5 portions a day and from 25% to 30% for women, these figures still show that 74% of men and 70% of women are not reaching the 5 a day target (COMA 1998; Cox and Anderson 1998; Food Standards Agency, 2002b; 2003). This combined with the high intake of dairy foods and convenience foods are all contributory factors to the high incidence of CHD and cancer, fruit and vegetables having a protective and preventative role for both CHD and certain cancers (Lavechia and Tarani 1998). Takeaway outlets (fish and chip shops, curries and pizza houses etc.) are used by 47% of Welsh consumers and 35% regularly or occasionally visit fast food restaurants such as McDonalds or Kentucky Fried Chicken (KFC) (FSA, 2001b). Because takeaway foods are likely to be high in fat and salt (Food Standards Agency, McCance and Widdowson, 2002c) they are contributory factors to weight gain and associated cardiovascular and related diseases (Bray, 1985; 1998).

The low fruit and vegetable intakes, combined with the high intake of dairy foods and convenience foods are all contributory factors to the high incidence of CHD in Wales (Brunner et al., 1997; Bray, 1998; Gregory et al., 1991; Ashwell, 1998).

Health and Lifestyle in Wales 2001	1985	1990	1993	1996	Calon Lân 2002
Percentage of adults who:					
Smoke:					
Males	40.8%	34.5%	31.5%	33.5%	
Females	33.2%	28.8%	28.1%	29.4%	
Drink above recommended sensible limits:					
Males	..	29.0%	26.4%	27.4%	
Females	..	9.8%	8.5%	11.2%	
Are overweight or obese:					
Males	44.4%	46.7%	49.7%	53.2%	
Females	42.0%	44.8%	47.1%	51.2%	
Exercise regularly:					
Males	33.0%	32.8%	36.3%	34.9%	
Females	11.9%	12.9%	15.6%	16.0%	
Eating habits:					
Used solid cooking fat (a)	32.5%	13.8%	12.6%	9.4%	7.0%
Quantity of fruit and vegetables	22.0%	26.0%	30.0%	33.0%	36.0%
Ate red meats (b)	38.6%	25.2%	23.0%	20.9%	35.0%
Ate poultry (c)	16.5%	31.8%	38.2%	50.5%	88.0%
Drank skimmed/semi-skimmed milk(d)	16.4%	44.1%	58.8%	67.5%	89.0%

Table 2.4 lifestyle changes in Wales 1985-1996 stats.healthinfo@wales.gsi.gov.uk

Key for table 2.4 above

(a) Two or more times a week.

(b) Lamb, pork or beef 4 or more times a week.

(c) Four or more times a week.

(d) Type used normally

2.6 Health and Diet

In this section, an overall review of issues that influence diet and health is given, together with a review of the factors that may influence changes in eating behaviour. The rationale as to why we should attempt to improve eating patterns is also discussed.

2.6.1 The Dietitian's role in effecting dietary change

One of the principal roles of a dietitian is to advise patients on healthy eating and to motivate people to modify their diets for specific conditions. This requires particular skills based on cognitive behavioural therapies, to ascertain people's knowledge and comprehension of nutrition to bring about the required changes (Rollnick et al., 1992; and 1999; Roe et al., 1997; Rapoport, 1998: Steptoe, 1999). These skills can be compared to the reflective role used in action research. From clinical experience it has been seen that a high proportion of patients referred to dietitians are overweight or clinically obese (BMI over 30). Associated conditions, Type 2 Diabetes, raised blood pressure and raised cholesterol are all influenced by dietary intake and all are risk factors for CHD (British Heart Foundation [BHF], 2002). A combination of more than one factor increases the risk of CHD significantly (Health Education Authority, 1996; Ashwell, 1998). At the same time amongst the patients seen in the clinical setting, the majority have a desire to be healthier, slimmer and wish to lower their cholesterol, risk of diabetes and/or blood pressure. It is evident that either a lack of knowledge of nutrition, or understanding of nutrition labelling information (or both) may be factors that prevent people from following a healthy diet in appropriate quantities (Coronary Prevention Group, 1992; Shine at al., 1997; Byrd-Bredbener et al., 2002).

The dietitian has a role in providing people with knowledge of a well balanced healthy normal diet, calculated to provide sufficient energy for people's needs and appropriate balanced amounts of the macronutrients i.e. carbohydrate, protein and fat. In the UK these are currently being consumed in the wrong proportions, with a higher fat intake than recommended (Gregory et al., DoH, 1991; 1995; 2000; 2004). The micro-nutrients, i.e. minerals and vitamins are also often eaten in the wrong quantities (Health Education Authority, [HEA] 1994a). This may be too high an intake as is often the case with sodium, mainly in the form of salt, or insufficient is eaten, such as a low intake of Vitamin C if very few fruits or vegetables are eaten. Many people regularly eat higher intakes and the wrong proportions of fats, protein and Calories than the government's recommendations, which can lead to obesity (Gregory et al., 1990; 2000; DoH COMA, 1995; HEA; 1994a; 1994b; MAFF, 1998; Van de Wreiden, 1998). A considerable number of people are choosing poor quality highly processed carbohydrates with high sugar content, which combined with obesity, can lead to insulin resistance; as opposed to choosing complex, high fibre, minimally processed foods, which can reduce the damaging high peaks of raised blood glucose and improve blood lipid profiles (Bjork and Elmstahl, 2003; IDF, 2005). In addition it has been seen that people are commonly eating less than the government target of "Five a day" of fruit and vegetables (DoH COMA, 1994a). Common to many of the studies and reports above is that the input of dietitians can have a considerable effect (Price, 2000). If this research can find effective methods of dietary change, this could assist dietitians.

Professional knowledge and expertise

Identifying the barriers and developing an integrated programme of health promotion activities requires the input of people with a range of skills. The Health Development Agency (HDA) suggests that while most areas have access to a community dietitian, it is quite common for clinical duties to restrict the provision of their time in the community. In planning the resources needed to implement the strategy, they suggest considering ring fencing a block of dietitian's time to devote to community work. In addition to dietitians, who are trained and qualified to treat patients, public health nutritionists, who do not treat patients, can provide the expertise to develop and implement a public health nutrition strategy and to work on other nutrition issues at a population level. The Nutrition Society has in recent years introduced a registration system for Public Health Nutritionists (RPH Nutr). In addition, the Nutrition Society has also developed an associate registration scheme for newly qualified public health nutrition professionals who have not yet accumulated the three years' experience required for full registration as a Public Health Nutritionist.

For some time it has been apparent that the UK government could foresee an increased requirement for dietitians, dietetics degree places at universities were increased from 2001 – 2004. Consequently increased numbers of dietitians qualified in 2005 – 2008, which should help to address the increasing problem of obesity and associated diseases. However, in 2007 there were only 6,661 dietitians registered with the Health Professions Council, the organisation which

Dietitians and other health professionals must be registered with in order to practice. At the same time there were over 43,000 physiotherapists registered. The situation in 2008 has now reversed from that in 2001, there are often over 20 newly qualified dietitians applying for every post advertised. Based on this increase in newly qualified dietitians, permanent posts in the community for health promotion work need to be established. as they are in a unique position to help reduce obesity and CHD risk related diseases with the potential to save the NHS considerable sums.

2.7 The ability to choose to change eating habits

There are people who are overweight and obese in all socio economic groups who want to lose weight, although there are those who do not. Cancer Research UK (Institute of sociology, Epidemiology and Cancer Research Survey 2006) found that over 50% of the 4,000 people polled (general population, not diagnosed with cancer) were overweight or obese but just over 1000 of the 4000 (26%) said they did not want to lose weight.

The fact that people have the ability to choose to control dietary intake is essential to improve dietary choices; from clinical experience, how much people will change their intake is very individual. Some people do try to change and others either make very little effort at change or seem to perceive changing their diet as insurmountable. There are two main requirements to achieve dietary change. Firstly the will power, the decision to make changes and secondly, the dietitian needs to enable the client to understand nutrition and interpret labelling information in order to make appropriate choices (Dusseldorp et al., 1999). Literature reviewed further in this chapter examines health promotion showing routes to change.

There may be a variety of reasons, which may have led people to obesity, such as inactivity, hormonal imbalance (e.g. hypothyroidism); also obesity can be a side effect of some prescribed drugs. But for the majority the increase in the incidence of obesity is caused by diets composed of large portion sizes providing more energy (Calories) than is being expended, together with an intake of disproportionate amounts of the macro-nutrients, particularly fat (Poppitt and Prentice, 1996; Bray and Popkin, 1998).

2.8 The current diet and availability of food in the UK

In Britain in 2009, there is considerable freedom for people to eat whatever and whenever they want. Approximately 15% of the energy content of the diet is from food eaten away from the home and 85% of all food purchased is bought in supermarkets (Hughes, 1996) it is likely that now an even higher percentage of food is purchased from supermarkets (in 2009). There is easily accessible affordable food available from numerous convenient outlets (Henderson et al., 2002). There continues to be an increase in the number and location of food stores. Both supermarkets and food manufacturers have vast advertising budgets to promote food products, via television, magazines, newspapers, postal promotions, hoardings, radio and other media. In addition to supermarkets, numerous other food outlets are easily accessible. To illustrate the proliferation, these include local shops, markets, restaurants, cafes, pubs, country shows, mobile food vans, fish and chip shops, canteens, restaurants, shopping delivery services, including the internet and deliveries e.g. pizzas and fast food chains. Outlets traditionally associated with other products such as garages and newsagents now frequently offer sandwiches, snacks, confectionery, drinks and often ready meals. Many of the foods purchased are high in fat and sugar content, which is contributing to the increase in obesity (Bray & Popkin, 1998). Although some people may restrict their diet for a variety of reasons, such as wishing to control their weight or dietary restrictions for specific illnesses (e.g. diabetes or coeliac disease), there will also be people who eat a minimal diet for other reasons, such as depression, dementia or having a low income. There has been a culture of freedom of choice with virtually no restriction, to the extent that people of all ages could eat as much as they want, of whatever they want at any time, we are surrounded by food and advertisements for it. Many people referred to dietetic services have not restricted their intake at all, either in the choice of type of food or the quantity.

2.9 Diet of children and school meals

Although it is adults who are the principal food purchasers and study population in this thesis, it is worth reflecting that the current eating habits of children are directly linked with their parent's choices and obesity in childhood frequently leads to obese adults (Nguyen et al., 1996: Parsons et al., 1999). Familial dietary patterns provide the example and habit of over eating (Epstein, 1996). The dietary intake of current adults follows on from the habits developed in childhood (Parsons et al., 1999). Pupils can also influence the menus for school meals and at home. The diet of children both at home and in schools has changed significantly over the past 60 years. Contrast the current food choice and availability with the situation immediately post World War II (WWII) when the UK government issued children with milk, cod liver oil and orange juice to supplement the minimal rationed diet (Belton, 2005). Through the 1950s to the end of the 1970s school main meals were generally traditional meals comprising of meat, potatoes and a vegetable with a pudding, with little or no choice and after school, similar traditional meals were cooked at home from basic ingredients. Post WWII an increase in supplies of food; both in quantity and range grew annually.

The first major changes in school meals came with the Education Act 1980, when the obligation to provide school meals was removed from the Local Education Authorities (LEA), except for children entitled to free school meals. The 1980 Education Act also removed the requirement for meals to meet any nutritional standards. Schools were free to choose whether they provided meals or not for the majority of pupils and had freedom to control the price, the type and quality of any meals provided. Section 22 of the Act also removed the requirement to provide free school milk; LEAs could now decide whether to provide milk and whether to charge for it, thus many LEAs discontinued school milk. The freedom of choice from the Act resulted in the majority of secondary school meals being served on a cafeteria basis with profitable commercial confectionery, chocolates, crisps, fizzy drinks etc. available at the same point of sale as the school meal (HEA 1999b). This resulted in children being given free choice, thus able to select from a range of options. They could, if they wished, choose a lunchtime meal consisting of chips, chocolate, crisps and a sugary fizzy drink. There was also the possibility of having chips three times a day, at morning break-time, school lunch and in a meal at home in the evening. School meals services became profit driven. Consequently gradually less popular but healthier foods such as fruit and vegetables were reduced from the menu, while more popular items, such as deep fried foods increased. High intakes of fat are associated with increased body fat (Bray and Popkin, 1998). At the same time, 'Domestic Science' was replaced by 'Food Technology' and lessons incorporating nutrition and practical cooking were replaced by those with the emphasis changing to technological aspects of food production. There has been a generation of children, now young adults bringing up their own families, many of whom have not been educated to plan, cook and eat a balanced meal. A highly processed, high fat diet, with frequent "grazing" patterns, not eating regular meals at a table, combined with large portion sizes is highly likely to lead to overweight, resulting in the health problems associated with overweight and obesity (Bray and Popkin, 1998). It is highly probable that this total freedom of choice, without restriction of quantity or quality and without education in nutrition in schools, has led to widespread unhealthy diets in children and their parents. To improve the diet of the next generation, children need to be educated in basic nutrition, which needs to be shown by example cross curricula and by providing nutritionally balanced, healthy food in schools.

2.9.1 Food in Schools and change

The Welsh Assembly Government (WAG) in 2006 issued a consultation document *Appetite for Life* (WAG, 2006), which investigated all aspects of children's food and exercise in schools. The responses to the consultation were submitted October 2006. Recommended proposals in the document included the return of nutritional standards for school meals. The final *Appetite for Life* document with recommendations for change was launched November 2007 (WAG, 2007) with a 5-year plan currently being implemented to include nutrient based standards (Caroline Walker Trust 2005).

The CHD National Service framework (NSF) reviews a range of Health Promotion and nutrition interventions based in schools, local communities and the workplace. It gives a snapshot of the evidence of their effectiveness in improving diet plus the skills and resources needed (Ellison et al., 1989). Interventions in schools can significantly improve children's and parent's diets (Bowker et al., 1999; Perez-Rodrigo and Aranceta, 2001). New legislation in England from 2001 and 2005 (DfES, 2005) added further support to the CHD NSF, by requiring school lunches to meet minimum nutritional standards and changing the budget holder from the Local Education Authority to the Governing Body. Nutrient based standards for school meals have been promoted by the Caroline Walker Trust (Crawley, 2005). These have been adopted in Scotland in 2004 and in England in 2005. The Welsh Assembly Government (WAG) document *Appetite for Life* (AfL) (WAG, 2007) introduced in November 2007 incorporates nutrient based standards (Rivers et al., 2000, 2001; Caroline Walker Trust 2005).

A meta-analysis of 12 intervention studies to promote healthy eating in relation to CHD in schools concluded that they could have a significant effect in terms of improving diet. Fruit tuck shops were shown to increase intake of fruit in school pupils (McArthur, 1998; Moore et al., 2000). A systematic review of health promotion in schools (Lister-Sharp et al., 1999) found improvements in diet were achieved with a health promoting school and whole school approach, which ensures that healthy nutritional messages provided in lessons are supported and reinforced by providing healthy meals and other school food such as fruit tuck shops. The review found that interventions were effective in increasing dietary knowledge, improving dietary intake and increasing exercise but were less successful in some other health areas such as prevention of substance misuse or promoting safe sex (Ellison et al., 1990; Lister-Sharp et al., 1999). Action research methods can be implemented to improve food choices. Practical cooking skills in schools were shown to improve nutrition amongst pupils (Moynihan et al., 2001).

2.9.2 Jamies' School Dinners

The state of the eating preferences of the children in England was highlighted in 2005 in the Channel 4 television programmes 'Jamie's School Dinners' (Oliver 2004). Jamie Oliver, the chef and cookery writer looked at a number of schools, both in London and the North East of England. He found the majority of the children he encountered would not eat fresh vegetables, fruit, salad, boiled potatoes or meats such as chicken, preferring highly processed deep fried meats, fish and potatoes. Many of these products have a high fat, sugar, salt and additive content.

Healthy changes introduced to school meals by Oliver were not entirely welcomed by all children or parents; some wanted the freedom to choose less healthy foods if they wished. Some mothers were seen supplying fish and chip orders to children through the school fence in a protest against healthy menus. The key to changing diet is education and understanding (Johnson and Johnson, 1995). Oliver's experience confirmed routes seen in health promotion models, that improvements to menus, whether at school or at home have to go hand in hand with education, bringing about change by both parents and children wanting and supporting the changes, because both know and understand what is the best course of action and the reasons for the modifications.

2.9.3 Pre-school settings

Early childhood experiences may strongly influence dietary preference and good eating habits. While they may not have an immediate effect on morbidity and mortality rates, strategies to promote healthy eating among children are likely to benefit them in the longer term (Landon and Giles, 2002). They could also help to address the concerns raised by the National Diet and Nutrition Survey (Gregory et al., 1995), of children aged one to four years. Gregory's survey recorded intakes of sugars in excess of recommended levels, predominantly from soft drinks and confectionery. Acheson (1998) and Gregory (1995) concluded that pre-school healthy eating by example and providing healthy drinks and snacks together with education in day care may be particularly effective in improving the achievement and health of the most disadvantaged children and would also provide a good example for the parents.

2.10 Changes from unhealthy eating in the workplace

2.10 Changes from unhealthy eating in the workplace

Various strategies have proved effective in improving eating habits (HEA 1998b; Holdsworth et al., 1999) when employers and employees are committed to change to healthier foods. A study designed to measure improvements in blood cholesterol levels by changing diet showed positive effects of healthy eating interventions in the workplace, with decreases in blood cholesterol seen between 2.5%-10% (Roe et al., 1997). A Health Education Authority (HEA) review of the effectiveness of health promotion interventions in the workplace (Peersman et al., 1998; Sahay et al., 2000) identified studies on healthy eating. They showed positive effects on reduction of fat and increase in fruit and vegetable intake, as well as self-efficacy in the intention to change the diet. Effective interventions were examined in studies undertaken in cafeterias using symbols to promote healthy choices (Heartbeat Warm, et al., 1997; Tedstone et al, 1998). Workplace interventions that were identified as examples of good practice: were the Treatwell 5-A-Day study, part of the USA 5 A Day for Better Health Program, (Sorensen et al., 1996, 1998, 1999; Market Research Scotland Ltd 2000) and the Working Well Trial (Sorensen et al., 1996, 1998, 1999; Patterson et al., 1997), interventions found to be successful in these studies are listed below:

2.10.1 Characteristics of an effective workplace intervention included:

1. visible and enthusiastic support and involvement from management
2. involvement by employees at all levels in the planning and implementation phases, so that there is a sense of ownership
3. screening and/or individual counselling
4. healthy changes to the composition of best-selling foods provided in canteens and vending machines
5. promotion at the point of purchase of healthy products but altered to suit the choices and needs of the employees
6. combining population-based policy initiatives with intensive individual and group-based educational interventions
7. building in sustainability, so that the intervention becomes embedded within normal practices
8. employees that enjoy the support of the family in making dietary changes

Of particular relevance to this work are points 2 and 6. Point 2 states that involvement of the participants with the planning and implementation brings about commitment and ownership, which is very much part of the action research ethos. Point 6 stated educational interventions were used to achieve change.

2.10.2 Local Healthy Eating Projects

Local people can be an important addition to the skill base for teaching cooking and increasing nutritional knowledge (Cash, 1999; Onkin et al., 2000). Effectiveness of community-based interventions are often improved by using local people to complement the work of health professionals (McGlone et al., 1999). McGlone (1999) suggested that if local food projects are to work, then they must genuinely involve local people. Services provided by local people could be considered more appropriate and more accessible to the health needs of the community. One example of an initiative bringing health promotion into the community is the Focus on Food Campaign, which has a number of "Cooking Buses" which visit Communities First (glossary) areas and teach a wide range of cooking skills in the locations where they are needed most. Such services foster self-reliance, community participation and can help overcome barriers. They also allow access to hard to reach groups. In practice it is difficult to enrol the target 'hard to reach' population onto projects such as cooking lessons. One barrier has been found to be an inaccurate perception of what is being offered (Lobstein, 1997). In addition people who have had poor experiences at school may be frightened or very unwilling to embark on anything with any 'academic' or teaching connections. The target group may need an incentive or free attraction to encourage them to join. Targeting existing groups (for example mother and baby clubs) could be a route to access this sector. Again, empowerment of the community, by involvement is part of the action research philosophy.

2.10.3 Operation Christmas Turkey

Where there is very limited understanding of nutrition and cooking skills, addressing these needs can increase knowledge and understanding to encourage improved diet (Lan et al., 1999; Dobson, 2000). A practical example run on Anglesey was "Operation Christmas Turkey" where very disadvantaged single young mothers were offered cooking, hygiene and nutrition sessions leading up to learning how to cook a full Christmas dinner. The course was designed around an Open College Network (OCN - Glossary) nutrition, hygiene and cooking Unit. The course included a visit to a supermarket to read food labels where the participants found labelling information difficult to understand, so work was done with the group to develop information to address this. Their comments helped the initial development of the nutrition and labelling information tool (FoLaG), this collaboration was one of the stages of the action research journey (Chapter 3). The evaluation forms of those that completed all the sessions stated they had learned a considerable amount of useful information and that they would continue to buy and cook fresh vegetables and fruit and also continue to use their new knowledge and skills by shopping for and cooking healthier foods for their families. Similar findings, i.e. that improved cooking skills led to healthier food choices were found by Caraher and Lang (1995, 1999). There was a peer element in the teaching of Operation Christmas Turkey, where the participants offered suggestions and advice to each other on their experiences. This was spread to a wider audience, with regular repeated cooking sessions taking place in 2006 in 5 locations with 3 age groups and has continued to expand across Anglesey to a wide range of age groups, with separate classes being held for men and women. Exploratory work with this peer education approach (Hodgson et al., 1995; Price and Sephton, 1995; Ostasiewicz, 1997; Bur et al., 1999; Kennedy et al., 1999; Bullock, 2000) showed that it was possible to achieve both significant increases in nutrition knowledge and also had the potential for beneficial changes in the dietary practices of low-income families (Rolland Cachera and Bellisle, 1986). An added benefit is that people have the opportunity to develop their own skills. The 'hands on' food preparation/cooking sessions approach can be resource intensive, particularly in professional staff time and there is little formal evidence of effectiveness in terms of dietary change. However, this approach has the potential to result in health, social and economic benefits and therefore warrants further study. For the purposes of this research, improving dietary intake is limited to the area of nutrition education. In Finland it has been seen that collectively, community projects can be very effective in improving diet (Laduskar et al., 1999).

2.11 Health Promotion

2.11.1 Background

This research is aimed at helping people to make changes to their eating habits, which is one of the principal roles of a dietitian. Various health promotion models can be used to analyse how people may react to the intended ideal pathway of health related behaviour and behavioural change.

Health promotion has been defined as;

> "any planned combination of educational, political, regulatory and organizational supports for action and conditions of living conducive to the health of individuals, groups or communities"(Green and Kreuter, 1999: p.70).

Health promotion can influence lifestyles through health education, by fiscal policies and legislative measures (Kennedy, 2000; COP., 1991). Providing knowledge information and skills to individuals, groups or communities about the health consequences of certain lifestyle actions, can provide the direction to change their behaviour (Stroebe, 2000). Fiscal and legislative policies can influence lifestyle, for example, in the case of cigarettes; by increasing taxes on tobacco products and introducing laws preventing smoking in enclosed places. Such policies could be applied to food, a theoretical example could be increasing the cost of high saturated fat products, whilst subsidising and lowering the cost of reduced fat, mono/polyunsaturated products. Interventions to bring about change to healthy eating have to compete with a high number of contrary messages (HEA, 1998). Consumers are constantly targeted by advertising, easy availability and aggressive promotion of convenience products. The bewildering choice of foods available includes healthier low fat, low sugar and low salt products but a high proportion of a number of manufactured foods will have high fat, high sugar, high preservative and/or colouring content. How does the consumer distinguish between them? Why is it that some people are concerned about these issues and others are not (Abbott, 1997)?

When working towards improvement in health behaviours e.g. smoking cessation or healthier diet, the actions of individuals determine their risk of reduced or improved health. Morally, people should be to be told of the risks and dangers of their chosen actions and the onus is on them to act responsibly and to take steps to reduce the risks. Health promotion models provide theories of the path of people's behaviour in reaction to health information (Bandura, 2004).

An improvement in knowledge and attitudes does not necessarily mean that people will change and behave differently (Katz et al., 2000; Intille, 2005). It does mean that people are better informed and will have the knowledge that may predispose them towards a change of behaviour, although other factors might inhibit change. A health promotion project may teach children the value of eating more fruit and vegetables. The indicator of success might be the increase in the children's understanding and knowledge rather than a change in their eating pattern. This knowledge may ultimately lead to eating more fruit and vegetables in the long term, even if it is not quantifiable immediately.

2.11.2 Improvements to diet

There have been some significant improvements in peoples' eating patterns in Wales since 1985 (Table 2.4, Chapter 2). Other healthier options messages are being heeded, such as the change to semi/skimmed milk and an alteration in farming methods and breeding to produce leaner meats, led by consumer demand. These changes point to healthier eating messages being heard, understood and acted upon. Despite these changes, the figures for CHD are still high and further alterations in peoples' food choices still need to be made. In Chapter 1 it was seen that obesity has increased in both sexes at almost the same rate. From clinical practice it would appear that many people are choosing some healthier foods but do not fully understand the details of balanced nutrition. As foods with high quantities of fats, salt and sugars are still being consumed in too high proportions. This research aims to identify this lack of understanding and to design studies to test whether changes towards an improved diet can be achieved.

Another substance showing high consumption is alcohol, the total number of alcohol units drunk increasing in women at a greater rate than men, also there is evidence of an escalation of "binge drinking" in younger people of both sexes

(Doll et al., 1994; Pincock, 2003; Miller et al., 2005; DoH, 2005). On the positive side, health promotion has been effective in reducing the number of people smoking and increasing the number of women exercising (Table 2.4, Chapter 2) (National Assembly of Wales 2002).

2.11.3 Models of health promotion

Which health promotion models are applicable to dietary behavioural change

There are several overlapping approaches working towards improving health, all of which contain elements of health promotion, these include health education, prevention, public health and legislation.

Many people have investigated the paths of health promotion and behavioural change and several models have been put forward illustrating theories of the likely course of people's behaviour. Collins (1984) described nineteen separate models of health education, each with a theory of educational psychology and a different concept of health. However, critical analysis of Collin's concepts would appear to show that some aspects were separate components of more defined models. For example several are grouped together under titles including 'medical' and 'Socio political and would appear to overlap in some areas.

The terms below follow models of Beattie (1984), Aggleton and Homas (1987).

- 'Medical' health education can be described as giving educational information
- 'Pastoral' would be to help facilitate personal development
- 'Community' would be a broader approach, encouraging community changes
- 'Radical' would be designed to bring about social transformation

Vuori (1980) described a distinct "medical" model, while Tones distinguished "medical" approaches from more traditionally educational ones (Tones, 1977). Medical models could be categorised as direct orders, where a medical practitioner tells a patient what they should do, whereas modern educational methods are based more on motivation and helping people to understand how to achieve optimal health rather than just giving them instructions. French and

Adams (1986) described three basic theoretical models, medical-informational, educational and developmental-community action models. This framework can also be found in other theories. Beattie (1984) also Aggleton and Homans (1987), distinguish 'community' from more 'political' social models. Ryder and Campbell's four-model division of health education separates an educational approach from a pastoral one (Ryder and Campbell, 1986). These varying perspectives of health promotion provide a wide range of theoretical models, which can be mapped against people's behaviour. Following the paths of the models, the studies for this thesis were designed to lead the participants through an education process, after an initial needs assessment. Incorporating an action research model in tandem, meant that a flexible approach was adopted - reacting to the reactions of the participants and the findings at each stage. Some health promotion models are more suited to dietary change than others, which is discussed below.

The Medical Model

To promote health there is a presumption of a requirement for information recommending certain actions in order to improve a health situation. Health education frequently gives instructive positive messages giving explanations about the benefits of specific habits and their effectiveness. This method is frequently used in promoting good nutritional habits but it is open to question as to whether it is effective. In earlier public health practice, there appeared to be an underlying presumption that recommending a health change to people would bring about the desired changes in health behaviours (Beattie, 1984; Collins, 1993). Although instruction is arguably one form of education, the method of straight orders may be less effective than if combined with methods to achieve greater understanding. It was presumed that if people were shown the harmful effects of their actions they would stop. This is referred to as the "medical" model as the medical profession frequently uses this approach. However, people do not always do what they are told. An example of this is that the dangers of smoking are widely known. Education and health promotion programmes are frequently run in schools and elsewhere but people continue to smoke and to start smoking, including those in the nursing and medical profession who are well aware of the risks and dangers attached to smoking (Gatherer et al., 1979).

Early health education models such as the medical model (Figure 2.3), which is also known as the Knowledge Attitude Behaviour model (KAB) (Beattie 1984; Collins 1984), advocate that once information is given, people will react by taking the recommended action. Ryder and Campbell (1988) describe the medical model as manipulative and propagandist, which perhaps overstates the case.

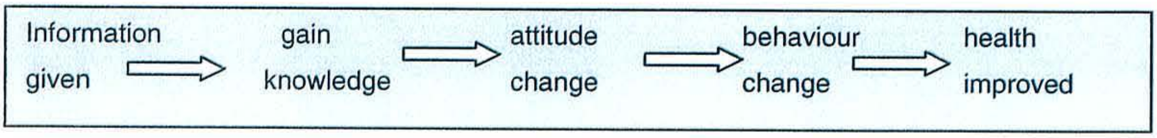

Figure 2.3 The medical model – "Knowledge Attitude Behaviour" model: (Collins 1993)

Negative messages are often used for the 'anti' messaging relating to unhealthy practices, such as taking drugs or smoking. Shock tactics, using graphic images of diseased organs or describing the possible dangers of unprotected sex with different partners and warning about the risks of contracting AIDS or other sexually transmitted diseases are examples of negative health promotion.

The Food Standards Agency (FSA) used the 'anti' message in connection with diet in a UK health promotional campaign on television from 2005, to 2009. The campaign was aimed at influencing people to reduce their salt intake, in the FSA "Sid the Slug" campaign (Appendices 2.1, 2.2, 2.3), the anti message being simply 'Do not eat too much salt, it's bad for you', by inference, salt is bad for slugs and it is bad for you. The first phase of the campaign was strange and the meaning possibly too far from message portrayed. The first phase in 2005 used "Sid the Slug" to raise awareness (Appendix 2.1). The message may have been so distant from the real reason for getting people to reduce salt intake that it may have been ineffectual in raising awareness and getting people to reduce their salt intake. In March 2005 the campaign was discussed with a member of the team working on Food Nutrition labels at the Food Standards Agency (FSA), to determine which model of Health Promotion the FSA considered. The FSA could not state a specific model followed but described the process as Phase 1 the "Sid the Slug" initial advertising campaign was to raise awareness of the issues surrounding high salt and the consequences of eating high salt foods. This was followed by Phase 2 six months later in 2006. Phase 2 drew the viewer's attention to identifying the high salt foods by checking the sodium content on food labels. This second message in the series "Talking Food" made cartoon characters of packets and tins on a supermarket shelf, talking about what the customers were looking at and boasting about each other's salt/sodium content (Appendix 2.2). Anecdotally, in discussions with patients, before the campaign, virtually no-one knew what the maximum recommended salt/sodium intake should be, after the campaign, several patients were able to state the maximum figure of 6g salt. However, working with patients has shown that many people do not know how to calculate or estimate this from the food label information, as it is sodium, not salt that is the legal requirement on the label. The final stage of the FSA salt campaign in 2007-2009 was advertising with the strapline "SALT is your food full of it? (Appendix 2.3) The aim of this part was to raise further awareness of the high levels of salt in many manufactured foods. This was evidently successful in that people were more aware of the total maximum figure of 6g (Chapter 6). Elements of Tones theory of reasoned action can be traced in the campaign, described in more detail below.

From the discussions with patients, it would appear that the health promotion campaign could be regarded as achieving some success but the effect of television advertising used for health promotion is difficult to quantify. A more direct approach was used for the series of studies in this thesis, following health promotion models, employing an action research framework with a strong health education element.

The Lalonde Report (1974; 1980) for the Canadian Government argued that;

> "the health care system is only one of the ways of maintaining and improving health. Of equal or greater importance in increasing the number of illness free days have been the raising of the general standard of living, (and) for the environmental and behavioural threats to health, the organised

care system can do little more than serve as a catchment net for the victims" (Lalonde, 1974: p.5; Health and Welfare Canada, 1980).

The report identified four areas where health could be promoted and suggested greatest attention had been given to healthcare and medical interventions but lifestyle and environment provided the greatest opportunities for future health promotion.

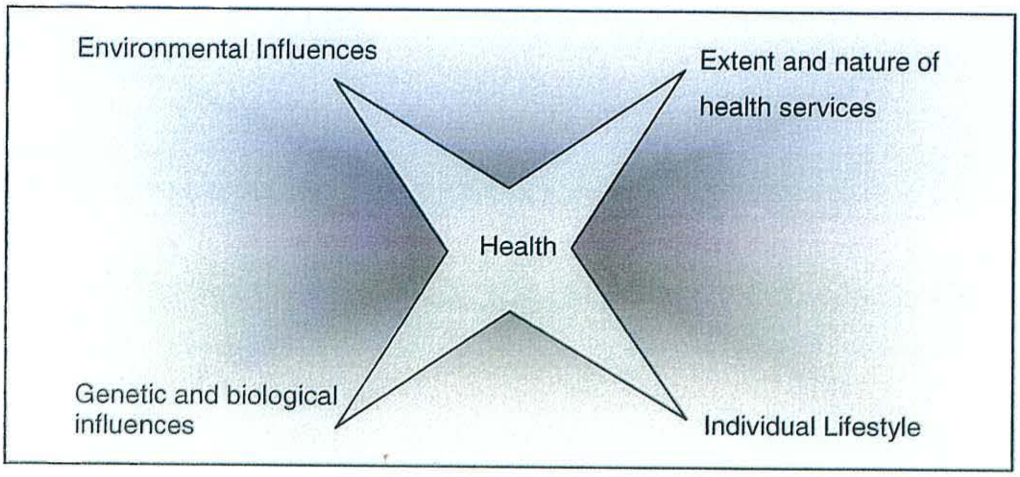

Figure 2.4 The Health Field Concept, Lalonde 1974

The Health Field Concept is simple, limited to 4 areas affecting health, no mention is made of will power, self belief, knowledge or motivation, although some of these could be attributed to some of the factors proposed in figure 2.4.

Naidoo (1986) notes that pressure from the media may influence people, advertising, role models etc. and peer social influences (DES, 1977). Peer pressure examples could also used where peer group health counselling messages can be influential, such as in teenage magazines, for example providing safe sex information. Naidoo's model does not follow a logical path, just a duplication of role model influence. However, this behaviour model is possibly at the heart of most advertising campaigns, whether promoting a "healthy" product or not, where role models are used to sell health products, food, drink, clothes, cars and previously in the UK, smoking (Aizen and Fishbein, 1980).

In 1980 Ajzen and Fishbein formulated the Theory of Reasoned Action (TRA), after trying to estimate the discrepancy between attitude and behaviour. The TRA was related to voluntary behaviour. They concluded that behaviour appeared not to be 100% voluntary (or did they mean *in*voluntary?) but under control, which resulted in the addition of perceived behavioural control. With this addition the theory was called the Theory of Planned Behaviour (Figure 2.5), which predicts deliberate, planned behaviour.

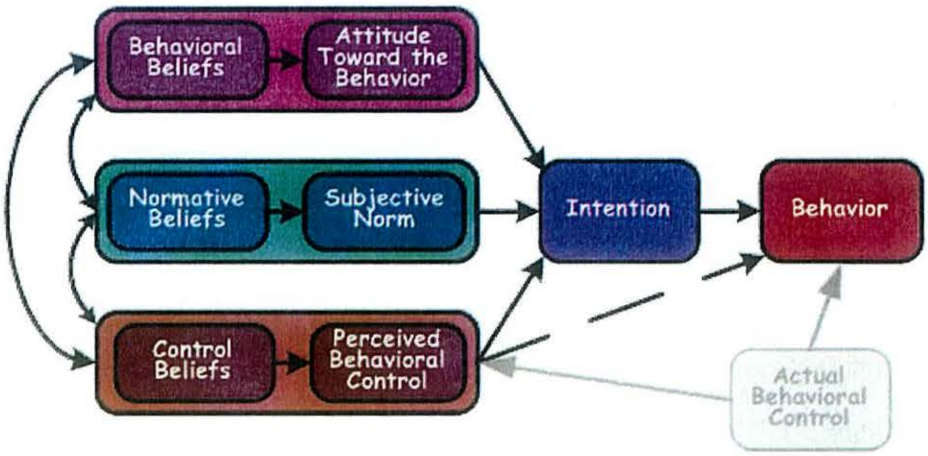

Figure 2.5 Theory of Planned Behaviour, 1980 (after Icek Ajzen)

The first heading in the model of the Theory of Reasoned Action (Ajzen and Fishbein, 1980, 1991) 'Behavioural beliefs' relates to behaviour, they propose that conditioning, peers or circumstances determine people's behaviour. They place more emphasis on other people who are close, such as family; friends or someone respected or admired, a role model. They put forward that the behaviour of someone who is admired would promote imitators or conformity. As with Naidoo (1986), this model is likely to be used in campaigns where it is believed that using celebrities may influence promote health messages; it is also concerned with how and why people decide to behave the way they do. This can lead to a change in attitude, following the example of others, leading to the intention to change and ultimately a change in behaviour. However, some people will make their own minds up and not be swayed by the suggestions of others, particularly if they do not agree with the message or do not admire the 'messenger'.

The centre of the diagram 'Normative Beliefs', the customary behaviour, leads to the subjective views of the individual. The third heading, 'Control Beliefs' indicate the individual has the power to direct a change, that they have control over their behaviour. All these phases may have some overlap and all can ultimately lead to the decision to change, followed by action when changes are made.

Ajzen and Fishbein (1980) question whether people believe health risks apply to themselves personally. They perhaps accept and understand the risks but do not act on it. Education should therefore help people to understand and resist peer and media pressures. The individual possessing behavioural capacity having been given information and training should be able to accomplish behavioural change. However everybody is different and the desire to change will be stronger and more positive in some individuals than others.

In contrast to the above, an educational model similar to the medical model, is more impartial and less concerned with immediate change than giving information, which could ultimately lead to improved or desired behaviour. The medical model has generally been abandoned in schools as the authoritarian aspects do not correlate with current teaching aims of developing independent decision-making. In addition, it has been proved not to work (Gatherer et al., 1979). Gatherer et al. showed that increased knowledge does not necessarily change behaviour. Tones (1983) also showed that although anxiety can be produced by increased knowledge of risks, this awareness may not affect behaviour. Pickens (1985) questioned the value of giving information in isolation to effect behaviour change. In a study examining the effects of information on cannabis use, De Haas and Schurman (1975) concluded the effects of factual information were unpredictable and that providing realistic facts on cannabis actually increased uptake. In a similar vein, Ajzen and Fishbein (1980) found that a group of alcoholics, given factual information on the problems and dangers of drinking, of those who were asked to attend a course of treatment, half those who had the intention of taking up the treatment dropped out.

As an example illustration of Becker's Health Belief model (Figure 2.6 below) could provide an explanation of why parents may or may decide not to allow their children to have the triple vaccination against measles, mumps and rubella. Most people feel the benefits far outweigh the slight risks of the vaccination. However, adverse publicity linking the triple vaccine to Autism (which has proved to be unfounded) has made many parents refuse to let their children have this vaccine. It would appear that people's actions suggest that behaviours depend on how a person perceives the situation. It highlights the function of beliefs in decision-making. Individuals weigh up the consequences of a particular action, taking into account possible gains and losses that might result, together with assessment of risk. In the case of dietary improvements, often people may not consider the cumulative risk of high fat, high Calorie foods at the moment of eating one item.

One of the problems with Becker's Health Belief model (Figure 2.6) is that it assumes a high degree of understanding and rationale. There is a presumption that people weigh the evidence, evaluate the pros and cons and modify their behaviour accordingly. In an ideal world where people were fully conversant with facts, this might be the case but in reality there are likely to be gaps in knowledge and understanding, also motivation and desire to change might be low. One critical point in the model is how much any individual feels an action may affect them. For example, despite people having seen much health promotion for anti smoking campaigns, people still smoke. If they have no experience of anyone close having contracted cancer or other illness due to smoking they may feel it is not likely to happen to them. If however someone close develops cancer, it may act as a catalyst to think about the relationship between cancer and smoking and a decision to stop may be made. There does not seem to be an inevitable progression between knowledge, attitude behaviour and change, though the three are not unrelated.

Tones describes the relationship as follows, once people become aware of a message (such as that it is good to eat fruit and vegetables each day) there are a number of stages that may or may not be passed through before they adopt new patterns of behaviour. Firstly they need to understand the message, secondly they need to believe it and see it as relevant to them and thirdly they need to assess the costs and benefits of acting on it. If and when these three steps are negotiated a positive attitude will emerge (Tones, 1995). Following Tones' model it is intended to develop a series of studies following aspects of a health promotion model route in an action research framework as this model would appear to be applicable to dietary change. The first stage was planned to be an assessment, to establish existing behaviour, followed by raising awareness. The development of the education materials started with the reflection on the requests of the 'Operation Christmas Turkey' group, for explanation to increase label understanding. Further stages intended to be an experiment to observe whether behavioural change is achieved as a result of the participants believing the information and making the decision to change. For attitudes to be converted into practice there are other influences. For example access to healthier products and disposable income has a bearing on peoples' choices. Tones summarises his Theory of Reasoned Action (Figure 2.6) as follows:

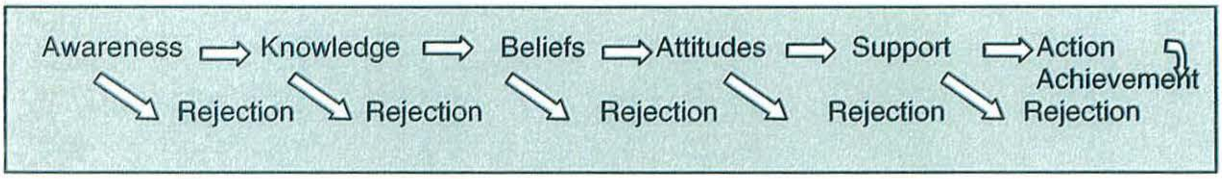

Figure 2.6 Theory of Reasoned Action (Adapted from: Tones, 1995)

The progression indicated above in Figure 2.6 does not show the assessment stage described in the Health Belief model (Figure 2.8) but does illustrate that at each stage the path may be rejected.

An example of a health promotion programme following the Health Belief model that has been successful is that a high proportion of people have changed from full cream milk to semi skimmed milk as result of health promotion interventions. People have become aware of advice to reduce fat and that semi skimmed milk has been promoted as healthier. Armed with this knowledge, they decide to believe it, their attitude to full cream milk changes to a negative attitude in that it is the less preferred option, their attitude to semi skimmed milk becomes more positive. The support is that the product becomes widely available and at the same price or cheaper than full cream milk. The action is then the change to buying semi skimmed milk, which is a very easy change to make however, as the product tastes very little different to full cream milk and likely to be used in the same quantities, at a similar or identical cost.

Tones' Health Action model, (Figure 2.7) below is an extension of his Theory of Reasoned Action and describes in more detail the many factors which influence the change process, including allowance for relapse, self esteem, self concept and motivation, all shown as influencing the behaviour intention which leads to decision and health action, or change. It demonstrates that the progressive route to change is highly complex. There are many influences other than the Theory of Reasoned Action, which is perhaps over simplified, where there is a presumption of 'reason'. The concepts of motivation and self-esteem are included but 'Will Power' or 'Determination' is not stated in the models but could be included under the heading 'Attitudes'.

Tones' Health Action model (Figure 2.7) includes self-perception, self-belief, motivation, support and reappraisal. An example of this model in practice would be an individual or group of patients given dietary advice attending a Coronary Heart Disease Rehabilitation session. The 'motivation' is likely to be the fact that they have suffered some form of heart problem and want to prevent reoccurrences, the 'self concept'. They have additionally the 'behaviour intention' to try to improve their condition and are likely to take the 'decision'. However as is also indicated in the model they need the "facilitating factors, knowledge, skills, supporting environment" and "belief" that the information is credible, belief in both the source and the provider in order to reach the 'health action' stage. The final stage would be where the changed behaviour becomes 'routine'. However, it is quite probable that they may 'relapse' and need further support either from the facilitator of the sessions (dietitian) and possibly other group members. Their 'self esteem' may be either lowered or raised by their progress along the route to 'Health Action'. If the patient is achieving their goal and their motivation is leading to the desired behavioural change their self-esteem will be raised. If however, they relapse and are failing to achieve their aims, their self-esteem may be lowered. Despite the additional concepts included in this model, there is still a requirement for deliberate purpose or willpower, which is not exactly the same as motivation. As an illustration, an individual may have the motivation and want to lose weight for a specific occasion, but in spite of this, may lack the willpower to actually eat less or change to more appropriate foods.

The Health Belief model (Becker, 1974) Figure 2.8, expands on the basic principles outlined in the previous models. It identifies further factors, which are likely to influence decisions, such as personality, social class and peer and media pressure, it suggests these affect the likelihood of taking the required action. It also details the perceived susceptibility of disease or risk, the perceived benefits being weighed against perceived barriers to action. This is a far more comprehensive model but could be said to follow the same path outlined more simply by Tones' Reasoned Action model, the Health Belief model providing explanations and reasons as to why each stage may or may not be taken.

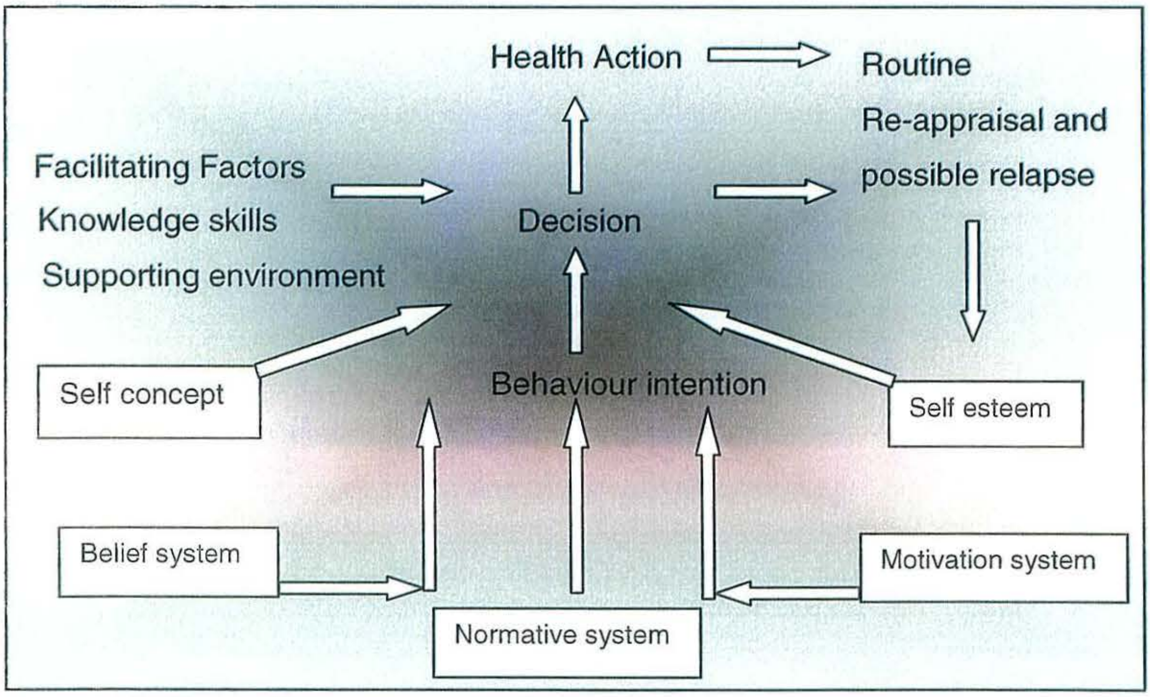

Figure 2.7 The Health Action Model (Tones 1995)

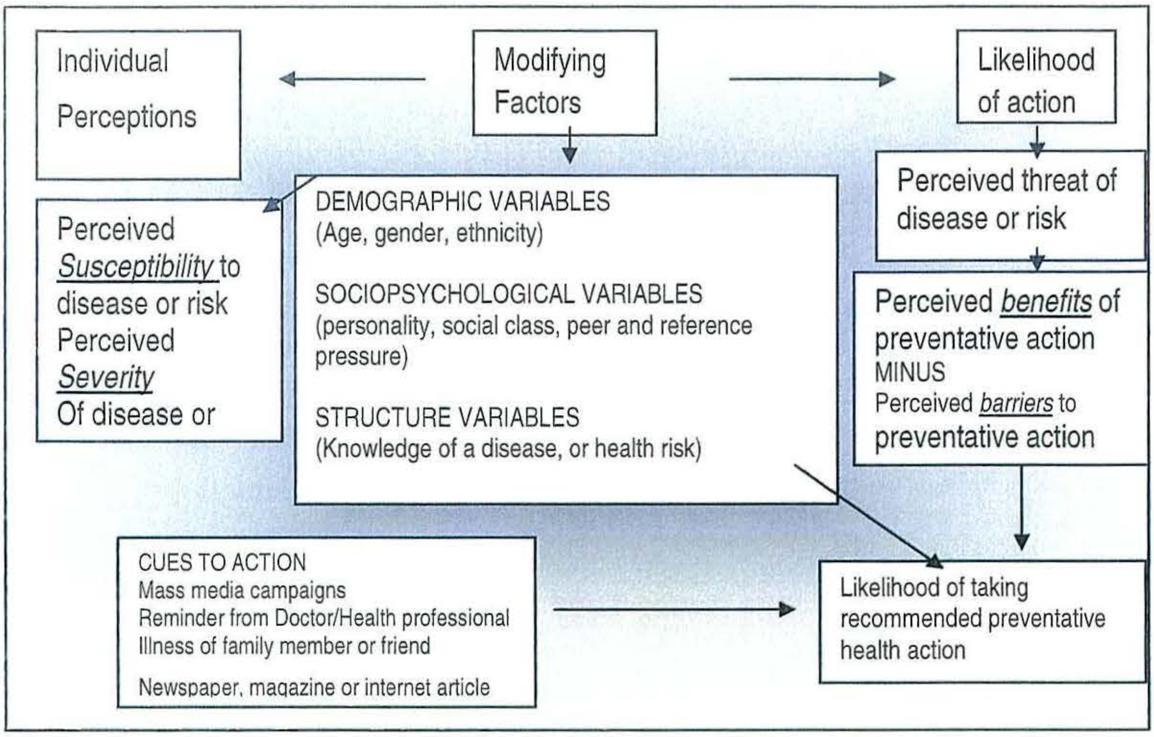

Figure 2.8 Health Belief Model, (Becker 1974)

The environment affects the behaviour of an individual through external factors such as family, friends and peers. These may affect the individual either in a positive or negative manner. Some people may develop misconceptions about health from peers, advertising or a lack of understanding and knowledge of facts. An example is the confused messages provided by so called 'health foods' which might claim to be low in fat but could be higher in sugar than the standard product. Some people may not have the knowledge or understanding of how to interpret the information on labels and accept the manufacturers' claims, advertising information or friends' opinions and recommendations. Others with increased knowledge and understanding could compare nutrition labels may make their own informed decisions to change their choice of product

Some of the earlier models described above could be described as having a paternalistic assumption; or in the case of the medical model, a presumption that because the information has been given, people will react in the intended way. There is a supposition that informed reasoned action follows increased understanding and knowledge. In addition the medical model has been shown not only to be an ineffective health promotion model, it could produce anxiety and concerns.

From clinical experience working with patients, Tones' theory of Reasoned Action and as a further extension, Becker's Health Belief model, would seem valid and appropriate models to base the outlined intended path for this research. Personal attitudes, experiences and individual reactions to information and perception of relevance to themselves are likely to provide an extremely varied timeframe for the achievement of "Action". Tones theory supports the view that people may or may not decide to change once they understand the reasons for the suggested change, i.e. "Reasoned Action". This does not explain fully why some people do and others do not continue on to the recommended change. Some of the reasons they may not are outlined in Becker's model.

Referring to the Food Standards Agency's (FSA) SALT campaign (Appendix 2.1, 2.2 and 2.3), as an example of a health promotion campaign on British television. The aim was to reduce salt intake by raising awareness, with a second stage that gave information about how much salt people should aim for, and gave guidance on reading the information on labels. As the information was from a credible source, the FSA, it was hoped that people would gain the knowledge provided and believe it. After the campaign some people will have understood the advice and may have decided to take action i.e. to reduce their salt intake but there will also be people who decided not to change. In the case of smoking there has been a great deal of information and despite messages on cigarette packets in very large print e.g. 'SMOKING KILLS' despite frequent advertising campaigns; people continue to smoke and although the addictive properties of tobacco make it difficult to stop, a proportion of people, even highly educated and those who are well aware of the risks, decide to continue. As Tones stated, people may feel it is not relevant to them, or perhaps the risks are seen as far away in a long timeframe and the individual could do something about stopping at a later date.

As discussed, both the Health Action Model and the Theory of Reasoned Action presume a certain level of thought and decision in the process. From clinical experience, some referred patients are minimally aware of health promotion and the relationship of healthier eating to better health. They may be insufficiently interested in improving their diet or do not believe their actions can make a difference. Or a perception that "just this once" won't matter, but cumulatively, there are probably a great number of "just this once" occasions. Some people, when given advice do follow it; others may feel it is not relevant to them. The Theory of Reasoned Action would appear to support this behaviour; it shows the option of rejection at each stage of progression.

There are some behaviours where the decisions are not always made via a rational route. Some sexual and addictive behaviours are likely to be undertaken in pursuit of pleasure and short term gratification and sometimes on the 'spur of the moment' rather than with rational planning or forethought. The vague and longer-term 'good health' benefits may not seem important in the heat of the moment. The Health Action Model (Tones, 1995 Figure 2.7) takes account of strong motivational forces such as hunger, pain, pleasure and sex in understanding the reasons for peoples' behaviour.

2.11.4 Planning Health Promotion

Elwes and Simnett (2003) suggest that all health promotion plans should provide answers to three basic questions:

1. What are my objectives?
2. What do I need to do to achieve these objectives?
3. How can I establish whether I have met my objectives?

Using the three questions above, it would be appropriate to examine the stages of the two Tones' models, particularly the second point, "What do I need to achieve my objectives?" to plan the various stages people will ideally achieve.

Ewles and Simnett's (2003) flowchart for planning and evaluating Heath Promotion suggests that at each stage the evaluation should reflect on the previous stage. This has many similarities with an action research methodology.

- Identify needs and Priorities:
- Set aims and objectives
- Decide the best way of achieving the aims
- Identify resources
- Plan evaluation methods
- Set an action plan
- Action – implement plan and evaluate

The parallel stages in action research are examined in Chapter 3.

Dignan and Carr (1992) clarify planning as follows:

Plan - How to get from starting point to end point and what you want to achieve.

Policy - guidelines for practice set out broad goals and the framework for action.

Programme – overall outline for action. A package of services or information in planned sequence is intended to produce a specific result.

- Strategy – the methods used in achieving the goals
- Priority- the first claim for consideration
- Aim – broad goal
- Objective – specific goal to be achieved

In the health promotion models above of both Tones and Fishbein, it is suggested that people go through a series of stages of adoption of new ideas. Consumers do not undertake behaviour changes in single steps (Rogers, 1962 and 1983). Others have developed stage models to look at how people voluntarily change problematic behaviour such as smoking or overeating. Prochaska and DiClemente's (1983) research established that (a) stages exist; (b) they can be identified by simple measurements and (c) interventions tailored to particular stages will be more effective than interventions that do not make this distinction. This has implications in the planning of any health promotion education programme. Reaction to and reflection on the stages achieved mirrors action research methods.

Prochaska and DiClemente (1983; 1984) held that there are six different and dynamic stages of healthy behaviours, referred to as the 'Stages of Change' model. This model has been used with successful results in understanding the smoker's lifestyle and also used to study eating habits. There are six stages in this model these are:

1. Pre-contemplation
2. Contemplation
3. Preparation
4. Action
5. Maintenance
6. Termination

These can be interpreted in the case of dieting as an example as follows:
At the pre-contemplation stage there may not be any conscious decision to change eating habits but there may be a sub conscious awareness that the person wants to lose weight. This could lead to the contemplation stage, where the person contemplates changing their diet but has not actually decided to. The next stage, preparation would be where efforts are made to plan what steps they will actually take. This stage could include telling people the intention to change and buying healthier foods, such as more fruit and vegetables. A date could be set for starting. The action stage could include reducing total quantity, to reduce Calorie intake, or stopping eating certain foods, such as those high in saturated fats or increasing healthier foods, such as fruit. The termination stage could be one of two options; firstly where the individual has successfully completed the five stages. Alternatively where the individual has relapsed and reverted to the undesired behaviour, as in eating some less healthy foods after successfully passing through the five stages above, at the sixth stage, the target aim of changing the diet has been achieved or the change stage is terminated. The maintenance stage is the continuation of the action stage. Termination is reached when the person feels they really have changed their diet, the healthier choices are now 'normal' and unhealthy choices occasional.

The Prochaska and DiClemente model is described as stages of change, which reach a conclusion or 'Termination'. The sixth stage, 'Termination' applies when an individual has stopped, there is a terminal event, they have stopped. In the case of eating, it could be argued that stopping eating chips on a daily basis is a termination but it is unlikely that the person will never eat chips again. A progressive model where a continued evaluation, belief and decision, as in the Tones Theory of Reasoned Action model is more analogous to the behavioural change required to modify eating patterns. However, changing to stopping eating unhealthily, to eating healthily could be seen as a termination of the unhealthy habit. Greene et al., (1999) applied Prochaska and DiClemente's theory to dietary applications.

DeVries et al., (1988) identified three stages for assessing nutritional behavioural change. Their Precaution Adoption Model makes a distinction between 3 levels:

1. awareness of risk behaviour (for example, people know that eating too much fat is unhealthy)
2. awareness of other people's performing risk behaviour (for example, they know that people in general eat too much fat) and
3. awareness of their own risk behaviour (they know that they themselves eat too much fat).

DeVries suggested that only after reaching this third level would people be motivated to change. Therefore nutritional awareness might influence behavioural change, Study 1; Knowledge and Identifying the use of Food Labels, attempts to establish the level of use and understanding food labels in North Wales.

An individual may possess knowledge without necessarily reflecting that knowledge in their behaviour. Nowhere is this more clearly demonstrated than in how people take care, or do not take care of their health. The requirement may be to increase some aspect of behaviour that is positive or desirable, or to decrease some aspect that is negative or undesirable. The common factor for success is the cognitive or realised knowledge that change is possible, in addition, understanding that an effective method or vehicle for change is available. Review of the literature concerning health promotion, when applied to healthy eating and behavioural change clearly points to the 'knowing' and 'understanding' as being vital for change to occur and that if changes are made with these factors incorporated, any changes in eating habits are likely to be lasting. This is a key point which will be used in the design of the studies in this thesis to test change in food choices.

2.11.5 Locus of Control

The theory of Rotter's (1954) concept of Locus of Control refers to people's general beliefs about whether or not behaviours get reinforced in life. Rotter classifies people's personality along a continuum from very internal to very external. Rotter states that people with a strong internal locus of control believe that the responsibility for whether or not the behaviour in question is reinforced ultimately lies with themselves. The people Rotter classifies as internals believe that success or failure is due to their own efforts. In contrast, the group Rotter classifies as externals believe that actions in life are controlled by luck, chance, or outside influences, which have a greater influence than the individual. They see little impact of their own efforts on the amount of reinforcement or support they receive. Rotter does state that locus of control is generalised and although it can be used to predict people's behaviour, there may be situations where externals exhibit internal behaviour, because their experience has shown that they have control in certain situations but not in others, the personality is shaped by interactions between the individual and their environment. Some of these theories are mirrored in Becker's Health Belief model. The majority of people may not analyse their own behaviour or any changes made in this way but nevertheless, when changes are made, observation can map them to stages in health promotion models.

It is the control of one's choices in relation to this series of studies, the control and capability to make cognitive decisions about purchasing choices and thus food intake that this research is investigating; people's food purchasing decisions and changing their choices to healthier options. The action research methodology employed in the studies in this thesis investigates and reflects on the interaction of the participants with the requisites for knowledge and understanding of nutrient requirements and food labelling information allied with the self efficacy to be able to take appropriate purchasing decisions and actions, The pathway of internal control given below follows a person shopping and wanting to improve an aspect of their diet (calorie reduction, reduced saturated fat, reduced salt, increased fruit vegetables and fibre etc.):

Pathway

1. knowing total nutritional requirement for a day
2. having knowledge and understanding of the food label information
3. thus being able to make informed decisions
4. to identify by understanding the labels, which is the appropriate product for their requirements
5. internal behaviour - to make permanent changes in addition to having the knowledge and understanding described above, a person needs the self-efficacy to make the decision to actually buy appropriate products and ultimately only eat appropriate amounts.

Common characteristics, which make change more likely are described in various health promotion models. The stages of change in Tones (1995) Theory of Reasoned Action model (Figure 2.6) follow a similar path to Prochaska and DiClemente's (1983) stages of change model, however Prochaska and DiClemente's model posits pre-contemplation, contemplation, and preparation as the initial stages of change, with a total of 6 stages completing their model. It states that these initial stages must be experienced before any action and are part of a decision making process. In Tones' Theory of Reasoned Action (1995) the initial stages, leading to Action are Awareness, Knowledge, Beliefs, Attitudes, Support followed by Action, the decision to change is made at the Beliefs and Attitudes stages. Following on from the stages of change in the health promotion models, it is clear that motivation is fundamental to the commencement of change; the focus is on discovering what brings people to instigate this chain reaction. Discussions with participants will aim to discover what might be the initiating factors.

2.11.6 Use of different media for Health promotion

The Ministry of Health Malaysia produced a report (Baba Y, undated) on communication strategies used in developing countries to deliver various health promotion messages. Television, Internet and radio were used with great effect due to their cost effectiveness, popularity, wide reach, repeatability and immediacy. Various formats were used, commercials, jingles and spot announcements. Their approach focused on 'infotainment', which combined health information with entertainment, making the programmes more attractive, interesting, palatable and retentive. It is important for any health information to be provided in an appealing format that is easily understood.

This method has been used in the USA. The John Hopkins Health Institution in America developed two health news series based on the content and storylines of high rating popular medical dramas, namely "ER" and "Chicago Hope". The 90-second health news segments, "Following ER", were broadcast immediately after each of the respective episodes and reached an estimated 80 million Americans weekly. The content related to how to prevent an injury or disease or to explain a health issue portrayed in the episode (Langlieb et al., 1999). This type of health related information could be a very effective method of health promotion as the viewers have the added positive role model influence of popular characters.

2.11.7 The North Karelia Project

The very successful programme, the North Karelia Project (KTL) for Health Improvement in Finland (Puska, et al., 1995), which has been running for over thirty years, has produced numerous health promotion interventions. In Finland, the KTL team used media, particularly radio, as they considered it very cost effective. When the author visited the project in Finland, various examples of health promotion were seen. A local radio station gave regular health promotion slots inserted between programmes. They ran six-week storylines on giving up smoking and other health issues. They have also achieved very positive rapport with their supermarket chains and food manufacturers, resulting in significant data being shared, showing regional food choice differences. The supermarkets have made this information available for planning health promotion. In addition, working directly with commercial bakeries, their products gradually and significantly reduced the salt content of their products over a number of years and the fibre content increased over the same period. In the UK the challenge is seen as getting commercially sensitive information released from the supermarkets routinely (Närhinen et al., 1999). Some of this information can be purchased from the Institute of Grocery Distributor's (IGD) website at a cost of £3,300 per item (http://www.igd.com 2009).

In Australia a 15-week supermarket based nutrition education programme was conducted as part of a larger community wide project. Supermarkets were found to be effective locations for point of sale health promotion (Scott, 2001). The programme was supported by a mass media campaign. The object was to promote the selection of low fat foods, especially low fat dairy products, fresh fruit, vegetables, bread and cereal products. Awareness was increased and high levels of self reported behaviour changes were noted.

Well-designed public relations activities can attract news coverage, which can be an important component of health promotion campaigns. In a study (Reger et al., 2000) examining the effectiveness of media interventions aimed at changing use of full fat milk to low fat milk, paid advertising did effect changes, however these may not always be sustained after a promotion has stopped. Reger concluded that mass media, in the absence of any other intervention was sufficient to encourage a significant proportion of people to change a targeted dietary habit.

Partnership working

A wide range of professionals from both the health sector and local government contribute to the development of strategies to promote healthy eating and deliver those plans through local partnerships. These might include: health promotion specialists; public health specialists; representatives from primary care trusts; community development workers; local authority housing; regeneration and sustainable development officers; employment advisers; representatives from the voluntary sector and from business and commerce. An example of this joint cooperative working is embodied in the working practices of the Calon Lân project, where several local partnerships worked together jointly to improve the lifestyles of the local population on Anglesey. An example of partnership working on Anglesey was the Food and Nutrition Strategy for Anglesey Schools and Leisure centres which was launched in March 2006. It embodies many of the ideas in the Welsh Assembly Government Strategy "Appetite for Life" (WAG, 2007) of which a core tenet is the return to understanding nutrition and teaching healthy cooking skills for children throughout school life, from primary through to year 11. The consultation for Appetite for Life was launched in October 2006 7 months after the Anglesey School Nutrition Strategy was in place. Partners involved in developing the strategy included the Local Health Board, health professionals, local government and voluntary sector organizations.

2.12 Food in Schools and change

The CHD NSF reviews a range of Health Promotion and nutrition interventions based in schools, local communities and the workplace, giving a snapshot of the evidence of their effectiveness in improving diet, possible contributors to such interventions, plus the skills and resources needed. Although the participants in the studies for this thesis are adults, arguably, children do have an influence on which foods parents purchase and improving children's diets is fundamental to improving their long-term health.

A meta-analysis of 12 intervention studies to promote healthy eating in relation to CHD in schools concluded that they could have a significant effect in terms of improving diet (McArthur, 1998). A systematic review of health promotion in schools, (Lister-Sharp et al., 1999), found improvement in diet was achieved with a health promoting school/whole school empowerment approach. Other positive impacts were found such as increased mental and social wellbeing, staff development and improved social atmosphere in the school. Some approaches were effective in increasing dietary knowledge, but were less successful in changing factors such as attitude towards diet.

When Jamie Oliver changed school menus (Oliver, 2004), he employed many aspects of health promotion methods. One example was when Oliver demonstrated to the children the content of chicken nuggets and Turkey Twizzlers, having only 30% meat, the remaining 70% being made up of fat, skin, preservatives, colouring, fillers etc. The children were convinced by the practical demonstration and refused to eat them afterwards. This simple example illustrates perfectly Tones Theory of Reasoned Action: Awareness of the content of Turkey Twizzlers, becoming knowledge, followed by a belief that it was unhealthy which brought about an attitude and behavioural change. The desire to change was supported by removing the nuggets from the school menu and the action was that the children no longer wanted to eat Twizzlers and by providing healthier meals, which the children chose to eat.

School meal improvements and community initiatives designed to follow health promotion models, in particular Tones Planned Behaviour and Reasoned Action models, whereby increased knowledge and understanding results in improved changes. These theories reflect the paths to change behaviour used in this thesis. Successful health promotion (primary prevention) programmes include empowering communities, families and individuals to develop and maintain maximum health. Examples include; nutrition and healthy cooking classes, canteen choice improvements, 5 a day campaigns, introduction of programmes such as the Food Dudes in primary schools (Lowe et al., 2001; 2002).

Healthy product placement in canteens and supermarkets, where healthy products are displayed the most prominently is practised in Finland and is very effective at encouraging people to buy the healthier foods. Secondary prevention (risk appraisal and risk reduction) includes risk appraisal and screening to detect pre-clinical disease with early intervention. Examples include: nutrition counselling programmes for individuals or groups at risk of developing CHD, Cholesterol screening and Diabetes education.

2.13 Dietary Intake

How could people calculate how many Calories they eat per day?

Taking Calories as an example, to calculate how many a person eats in a day is a time consuming and fairly complex calculation of the weight of each item eaten multiplied by the calorific value of the food. This information is available on food labels but not all food is wrapped giving detailed figures. Anecdotally from experience with patients and other members of the public, Calories are generally the only aspect of nutrition that people try to calculate, albeit in broad terms using individual amounts on product labels as a guide. In practice, the result is likely to be a very inaccurate figure. To calculate with accuracy this would require all food and drink consumed to be weighed and an analysis undertaken using food analysis figures from McCance and Widdowson (FSA 2002b). The preponderance of information on food labels is derived from McCance and Widdowson. Food manufacturers generally do not chemically analyse each product, as the majority do not have these facilities, thus there is an allowed range of variation between the label information and the actual analysis of any food.

2.13.1 How do people know how much of any nutrient they should be eating?

How would a person begin to calculate their daily requirements and intake from food labels? As described above, to be accurate all food and drink would have to be weighed and analysed using food tables. This is not practical for the general public. A fundamental requirement for an individual attempting to do this would be to know the target figure for the daily requirements for each nutrient. Armed with this information they would then have to try to calculate how much of each nutrient a portion of a food contained, record every item consumed and add the total together at the end of the day. This would be impractical and very time consuming for the majority. Also not all foods consumed would be in packets with nutrition information. One of the aims of this research is to discover what the participants know and understand about the quantities of nutrients required and their functions in order to plan educational interventions.

2.13.2 Research in Food Labelling

Cowburn and Stockley (2004) undertook a systematic review of food labelling understanding and use. They found little research, which undertook a specific education programme, to evaluate the impact of increased knowledge and understanding of food label information on food purchasing choices, particularly in a real life situation. This provided justification and supported the initial idea of designing a series of studies, with the aim of assessing peoples' use and understanding of food labels, to help them make more informed purchasing and eating decisions.

Previous studies reviewed earlier (FSA 2002b, Childs, 1998; Shine et al., 1997 and Bryd-Bredbenner et al., 2000) adopted a survey strategy to determine consumers' knowledge of, and attitudes to, the content of food labels. The action research approach is consistent with various health promotion theories and models reviewed such as Tones' (1995) Health Behaviour Model, the Stages of Change model (Prochaska and DiClemente, 1984) and the Theory of Reasoned Action (Ajzen and Fishbein, 1980).

2.14 Till receipts

The use of itemized supermarket till receipts to check nutrition intake from items purchased has been used in a few studies. Most studies incorporating till receipts examined marketing characteristics (DeWalt et al., 1990; Rowley, 2005) and were not investigating nutritional aspects. However one study did examine the use of till receipts to assess nutritional intake (Ransley et al., 2001). Their study aimed to validate the use of till receipts as an index of fat and energy intake in a population that bought most of its food from supermarkets. The study examined the till receipts from 214 shoppers in one supermarket (Tesco in Leeds). Ransleys' study was specifically aimed at validating calculation of specific nutritional intake (fat) from till receipts. A 4 day weighed food diary was kept by the participants and compared with the data on till receipts collected over 28 days. Ransley et al. compared the accuracy of the data obtained from till receipts with data obtained from food intake charts, specifically the proportion of energy obtained from fat.

Ransley et al. undertook a Bland-Altman analysis to assess the agreement between estimates of household intake of fat, energy and percentage energy from fat, from using the till receipt method and the 4 day weighed intake. For fat and energy, the difference between supermarket food and the 4 day weighed intake was plotted against the average of the 2 estimates (Table 2.5). The values of 2 standard deviations (2SD) above and below the mean were then used to assess the limits of agreement between the methods in accordance with the method outlined by Bland and Altman (1989). Their figures showed that in terms of population averages the agreement between the 2 methods of estimating household fat intake is close. Ransley's study found that the weighed intake method overestimated the intake of fat by 0.99% (95% CI: 0.94-1.05) compared with the till receipt method. Ransley stated that their findings demonstrated the potential for using till receipts to estimate intakes of energy from fat in a population who purchases most of its food from supermarkets.

The association between the amount of fat and energy purchased from supermarkets and the amount of fat consumed was strong. Ransley's study showed that there is a close relationship between the amount of fat calculated from food items on till receipts and the amount of fat consumed and consequently that till receipts are an accurate indicator of dietary intake.

	Itemised till receipts mean (SD)	**Weighed intake mean (SD)**
% energy from fat	35.9 (7)	34.0 (6)
Daily purchase or intake of fat (g)	184 (94)	190 (102)
Daily purchase or intake of energy (MJ)	19.2 (8.7) = 4588 kcals	20.7 (10.2) = 4947 kcals

Table 2.5 Comparison of fat intake between till receipts and weighed food diaries (Ransley et al. 2001)

	Purchased	**Consumed**
Energy	1MJ	0.90 MJ (95% CI:0.8-1.0)
Fat	1g	0.76g (95% CI: 0.65-0.87)

Table 2.6 Comparison of fat purchased and consumed (Ransley et al. 2001).

A further study (Ransley et al., 2003) compared the fat intake of overweight households (OH) and lean households (LH) (defined by BMI) again using till receipts and found that the energy and fat content of food recorded as consumed by the OH was not significantly higher that of the LH. Ransley suggests this may reflect the difference in mis-reporting between the two groups. Using till receipts to record food intake should overcome mis-reporting. It is interesting to note that in the LH, the food diaries record slightly higher Calorie intake than that recorded in till receipts, whilst the reverse was the case in OH. It is known that obese subjects under report nutrition intake (Prentice and Jebb, 1999).

The association between the amount of fat and energy purchased from supermarkets, shown on till receipts and the amount of fat and energy consumed by households recorded in food diaries was found to be strong. The figures for both total energy and fat showed a strong linear association between the content of supermarket food purchased (indicated on till receipts) and that recorded in food diaries of almost 1:1 relationship, indicating that the till receipts do provide accurate nutrient intake data.

In research undertaken in 2006 (Levin-Martin et al., 2006), trained data collectors approached adults in grocery stores and asked if they would volunteer their grocery receipts and answer questions. The grocery data were divided into 3 categories: "fats, oils, and sweets," "processed foods" and "low-fat/low-calorie substitutions" as a percentage of the total food purchase price. The questions assessed the shopper's general eating habits (e.g. fast-food consumption). Levin-Martin's research concluded that this simple dietary assessment method using till receipts, might be a useful indicator of dietary practices as evidenced by its association with perceived weight status.

Another study (Greenwood et al., 2006) included some of the same authors as Ransley (Ransley et al., 2001) and used itemized household grocery till receipts to calibrate dietary assessments as self reported dietary records could be inaccurate. Greenwoods' study concluded that as till receipts are not self-recorded and the data obtained from them are not subject to person-specific bias, they did provide accurate information about what is purchased for a family. However to obtain a complete picture of all foods consumed, the authors stated that till receipt data needed to be supported by self-completed diaries for foods eaten away from home. Their study was specifically examining detailed nutritional analysis of the total intake, whereas for the purposes of this research, indications of *change* in purchases are looked for. Both Ransley and Greenwoods' conclusions that till receipts do provide sufficiently accurate information on food intake support the requirements of this research.

In the report of the working group on monitoring Scottish dietary targets, the Food Standards Agency Scotland, (FSAS, 2006) refers to the Ransley 2001 research, stating that a feasibility study had highlighted the potential of utilising large quantities of readily available data generated from supermarket checkouts in dietary surveys. Further research (McCreadie et al., 2005) used till receipts to check the quantities of fruit purchased by a group of people with Schizophrenia. The most noteworthy mention of the use of till receipts to assess nutritional intake is stated in a report undertaken for the Department of Health (Hughes, 2003) which cited Ransleys' research, suggesting that till receipts have the potential for representing food purchasing and eating behaviour of large population groups. Hughes (2003) concluded that:

- there is potential for using till receipts to estimate the mean intakes of energy (kcal) and fat (g) and the percentage energy from fat, in a population group who purchase most of their food from supermarkets
- there is potential to increase consumer awareness of the fat content of foods purchased.

Analysis of till receipts gives a comprehensive picture of a family's supermarket purchases. The receipts will include non-relevant items (e.g. cleaning materials) which would be excluded but provide an indication of the types of foods the whole family consumes rather than a specific analysis for an individual member. Although purchases would probably be influenced by the buying habits of the member of the family doing the shopping, the items shown on the receipts still remain a true reflection of what a family consumes.

2.15 How we shop for food

Scientific literature on shopping frequencies is very limited, the supermarkets will have conducted extensive research on all aspects of shopping habits but this information is regarded as 'commercially sensitive' and not freely available. The frequency of people's shopping for the items involved will vary. Perishable goods such as fruit and vegetables are likely to be purchased more frequently than goods with a long shelf life such as frozen, tinned and dried foods e.g. rice and pasta. There are a wide range of perishable foods, relevant to this research, which are generally purchased on a regular basis, e.g. fruit and vegetables, spreads, cereals, bread etc. (Brunsø and Grunert, 1998).

Many factors affect the decision to shop at a specific supermarket e.g. location, service levels, pricing policies, product choice, store environment, store image and crowding. There is a trend of regular use of specific supermarkets (Dunn and Wrigley, 1984; Mason, 1991). People are likely to shop regularly at a store where they are familiar with the products and the layout of the store and are also encouraged to shop at a particular supermarket chain by the use of 'Loyalty cards'. These encourage regular use of one particular "brand" of supermarket. The 'Loyalty cards' enable the supermarkets to collect data on individual shoppers' purchasing habits. The information is invaluable for stock control, watching market trends and supermarket planning (Mauri, 2003). Customers may also be consistent in their shopping habits for other reasons, the store may be conveniently located, have good easy parking, they like the products, quality and /or policies of a particular chain.

2.16 Changes required in the UK diet

The table below (2.6) shows the UK intake of the main nutrient groups and the changes required to achieve a healthier diet (DoH, 2005; Gregory 1990). The Committee on Medical Aspects of Health (COMA) was a committee under the Department of Health and has been superseded by the Scientific Advisory Committee on Nutrition (SACN). SACN is now a department of the Food Standards Agency. In 1991 the COMA panel stated the dietary targets for the UK population based on work undertaken for the Department of Health by Gregory et.al. (1990-2000). Gregory undertook a series of National Diet and Nutrition Surveys. In 1990 the survey was of British adults, in 1995, the survey was of the diet of children aged 1½ to 4½ years. Further reports surveyed the diets of those aged 4 years to 18 (2000) and older people (2000). From the original 1990 survey, the COMA panels' recommendations were drawn up (table 2.7). Based on the targets shown in table 2.7, changes looked for in Study 3 are listed in the method section below.

(DH 1991/2005)	**Recommended intake**	**1990 intake** (Gregory et al 1990)	**Change required**
Total Fat	<35% energy	40% energy	Decrease by 12%
Saturated fat	11% energy	17% energy	Decrease by 35%
Monounsaturated fat	13% energy	12% energy	Small increase
Polyunsaturates	6.5%	6% energy	No further increase
Trans fatty acids	2% energy	2% energy	No increase required
Total Carbohydrates	50% energy	44% energy	Increase by 13%
Starches	33% energy	27% energy	Increase by 22%
Sugars	11% energy	17% energy	Decrease by 35%
Protein	<15% energy	14% energy	No increase
Fibre	18g/day	12g/day	Increase by 50%
Salt	<6g/day	9g/day	Decrease by 33%
Sodium	<2.4g/day	3.6g/day	Decrease by 33%

Table 2.7 Dietary Targets for the UK Population (COMA DoH 1991; 2005)

2.17 Reflections on literature reviewed

This research aims to test the working hypothesis that greater understanding of nutrition and food labels can lead to a change in behaviour, specifically; healthier food purchases that can lead to improved eating habits. It has been seen that the trends in the UK are increasing obesity and CHD and that poor diet is a contributory factor. A healthier diet can help to lower weight, cholesterol and blood pressure and reduce the risk of CHD and diabetes. It is known that the 5 main risk factors for heart disease are: obesity, raised blood pressure, lack of exercise, raised cholesterol and smoking (BHF, 2002). It has been shown that reduction of weight by 10% reduces the risk of heart disease by 20% (BHF, 2002). It is also known that motivation for weight loss programmes and methods meet with varying degrees of success (Wing and Phelan, 2005).

It has been seen from statistics on the health of the population and the literature reviewed that certain health risk situations exist, such as overweight and obesity and associated diseases, which require change. There is a steady increase year on year of obesity and diabetes. The levels of CHD and CVD are high and these conditions have great cost, both personally and to the NHS, over 57% of the NHS budget on CHD costing circa £7.9 billion a year. Overall CVD is estimated to cost the country £26 billion a year and diabetes over £9 billion a year (CHD statistics, 2007). Dietary habits which have contributed to the high incidence CHD, CVD, Diabetes and obesity are known and understood by health professionals but the general public need to understand how to change to healthier lifestyles by health promotion and education. Some aspects of CHD and CVD are worse in Wales than the rest of the UK. Fruit and vegetable consumption is on average only circa 30% of the target of at least '5 a day'. NHS plans for dietary targets include increase in fruit and vegetable consumption, reduce saturated and total fat, saturated fat, sugar and salt consumption by health promotion programmes. The dietary habits of the population of Anglesey needed to be established to compare to Wales and Britain as the study participants were from Anglesey, if the population had an ideal healthy diet there would be no reason for the studies.

It is evident that essential improvements to nutritional knowledge through education in schools are being introduced through various initiatives; however, it is probable that only part of this will filter through to parents. In order to improve eating patterns at home, for parents and other adults it is likely that they need the basic knowledge and understanding of nutrition and food labelling to begin to make appropriate changes.

Many of the school meal and community initiatives to improve diet follow the health promotion models, in particular Tones Planned Behaviour and Reasoned Action models, whereby increased knowledge and understanding intends to result in improved changes to healthier options.

Conclusions from the literature on health promotion reviewed are that empowerment is a fundamental principle, providing people with the knowledge and understanding to be able to make informed choices. The required behaviour changes should come from greater understanding bringing about the desire to change. It is this aspect of empowerment and the ability to choose to change that this research is employing.

Health promotion models follow a path where knowledge gained directs the individual to changes in attitude, leading to behavioural change. In practice the medical model, may be too paternalistic; people do not always follow the desired route when they are 'told' to despite increased knowledge of facts, possibly without an understanding. This may have worked with a few people but is unlikely to achieve meaningful sustained change if the individual does not really understand the theory behind the desired changes (Nutbeam, et al., 1990)

Also, health promotion needs to be specifically targeted to work effectively with the intended group. Methods need to be devised in collaboration with the participants together with reflective practice to assist the individual to be aware of their power to change and make choices. Furthermore, to achieve the changes needed an overall, long term plan needs to be implemented and continued, as in Finland, rather than short term funded posts and projects which however effective and successful they may be, are often stopped because of short term funding and planning. The Wanless (2004) report identified the need for long term planning.

The original question which led to this research was "How can I influence or change people's diet so that they eat more healthily?" The research question has been refined from the original to reflect the health promotion models, to "Which path (health promotion models) can I use and will it work?" Reflection after an examination of action research and findings from discussions with the participants might modify the routes followed. An action research approach embodies this flexible approach and is described in Chapter 3. A set defined path for the research could not be strictly set out at the start and stringently adhered to as reflection on and reaction to findings, whether from surveys, conversations or focus groups, would serve to influence the direction taken. An underlying understanding of health promotion models and their paths would inform the possible course.

To summarise, the causes of mortality have changed from infectious diseases a century ago to chronic non-communicable diseases, which are increasing steadily, such as obesity, CHD, CVD and diabetes. The cost to the NHS is becoming unsustainable. Reversing the situation has been achieved in Finland, where the mortality rates from CHD have reduced consistently over the past 30 years through long term planning, including dietary changes achieved with political incentives together with education in healthy diet throughout life, starting in schools, following health promotion models to achieve change. People have the ability to choose to change and will do so if they are fully conversant with the reasons. Health promotion models conceptualise the pathways people take en route to change. A consistent theme is that people have to have knowledge and understanding and make a decision to achieve change.

From the above review, thoughts on how to take the research forward brought about a plan to identify the current eating habits of the local population of Anglesey. Followed by exploratory studies to discover how much people understand about nutrition and their requirements. Ultimately, the intention was to devise a method to increase knowledge and understanding, as the route to achieving change. The next chapter will examine action research methodologies as a means of working with study populations to achieve improvements to diet.

2.18 Conceptual Framework

A conceptual framework, (Figure 2.9) bringing together all the relevant areas of interest from the literature review to this stage and the questions raised (2.19, Figure 2.10) from these subject areas follows. Thoughts and reflection on how to carry this research forward had at that stage, developed into an outline plan, illustrated in figures 2.9 and 2.10. and described on page 108.

What are key concepts in this research, how are they related?

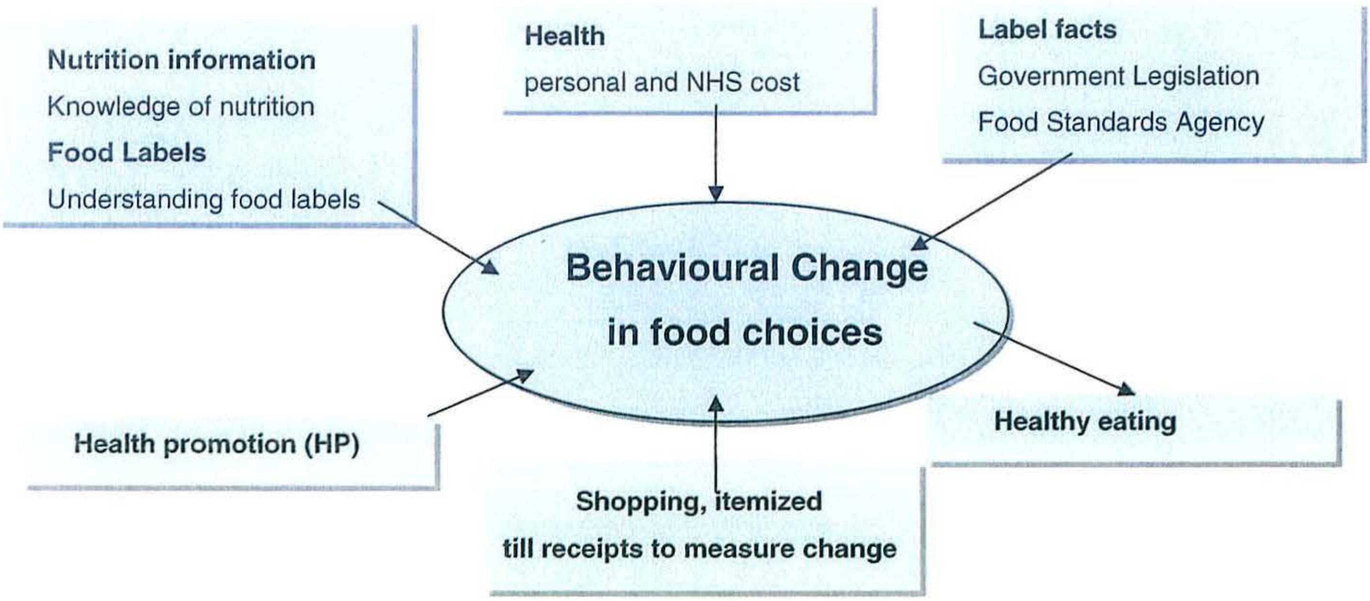

Figure 2.9 Conceptual Framework

Questions raised by the conceptual framework are listed below.

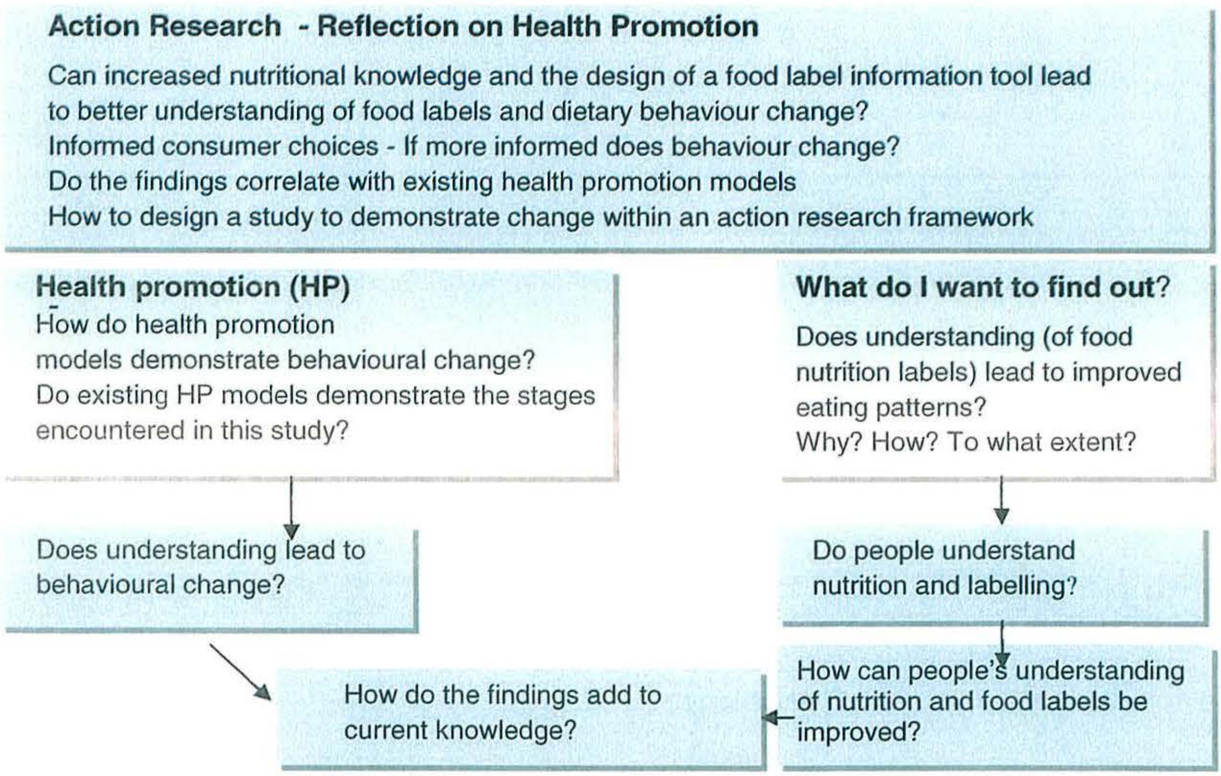

Figure 2.8 Questions arising from the Conceptual Framework

An explanation of the figures above (Figure 2.7 Conceptual Framework and 2.8 Questions arising) follows.

The literature reviewed above showed that certain health problems (obesity, diabetes, CHD and CVD) are escalating in the UK, resulting in rising NHS costs. Some causative factors for these conditions can be improved by changes in diet to reverse the trend, which is the central theme in the conceptual framework i.e. changes in behaviour relating to food choices need to be achieved. Factors that can influence choices are knowledge of nutrition, understanding food labels, thus this will be explored. Food labelling in the UK is governed by UK and EU legislation of food labelling. This legislation and the work of agencies involved in the UK, i.e. the Government department the FSA are examined in order to develop intervention information for the participants. Health promotion models have been shown to provide effective action pathways to achieve behavioural change in many health related areas. Health promotion is examined with a view to designing methods of change, which can be evaluated and measured. Till receipts are used, to measure change.

The first part of the literature review, together with the key concepts illustrated above show the principal areas, which were explored in this thesis. Studies were planned to identify gaps in understanding related to both nutrition and food labels which sought to change the situation. Health promotion models and steps in various models were compared to stages in behavioural change in eating. The next stage was to examine action research and how it would influence the design of the studies.

Chapter 3

The Action Research Approach

3.1 Introduction

The literature review outlined the health problems associated with inappropriate diet such as diabetes and CHD, the costs to the individual and the NHS, also how health promotion models can be used to change a health affecting behaviour, such as to improve eating habits. This chapter describes action research, specifically the approach used in the research reported in this thesis in the context of changing dietary behaviour. Action research as a methodology is examined in order to understand and reflect on the processes which could be used to achieve behavioural change, linked with the health promotion models, which led to appropriate methods supporting the design of the studies. The progression of the series of studies in this research will be shown to follow an action research model and how reflections on the actions of the participants and findings informed the design of stages one to four.

3.2 Literature Review of Action Research

The review of research and specifically action research is as follows:

3.2.1 Theories, research paradigms

3.2.2 The history of action research

3.2.3 Action research applied to health

3.2.4 Action research in Nutrition and Dietetics

3.2.1 Theories, research paradigms

The research process

The following definitions and descriptions are included in order to set action research in context in relation to other research paradigms and are taken from Denzin and Lincoln (1994:p.15);

1. Qualitative research has separate and distinguished histories in education, social work, communications, psychology, history, organizational studies, medical science, anthropology and sociology.
2. *Positivism* asserts that objective accounts of the world can be given. *Postpositivism* holds that only partially objective accounts of the world can be produced because all methods are flawed.
3. *Structuralism* asserts that any system is made up of a set of oppositional categories embedded in language.
4. *Semiotics* is the science of signs or sign systems- a *structuralist* project. According to *poststructuralism*, language is an unstable system of referents, thus it is impossible ever to capture completely the meaning of an action, text or intention.
5. *Postmodernism* is contemporary, developing since WWII that privileges no single authority, method or paradigm.
6. *Hermeneutics* is an approach to the analysis of texts that stresses how prior understandings and prejudices shape the interpretive process.
7. *Phenomenology* is a complex system of ideas associated with the works of Hussserl, Heidegger, Sartre, Merleau-Ponty and Alfred Schutz.
8. *Cultural Studies* is a complex interdisciplinary field that merges critical theory, feminism and postculturalism
9. "*Bricoleur* in French popular speech, is known as someone who works with their hands and uses devious means compared to those of a craftsman. The *bricoleur* is practical and gets the job done" (Weinstein and Weinstein (1991:p.161), (Denzin and Lincoln, 1994:15).

These points are discussed further in this chapter.

Hart and Bond (1995) describe positivism as follows;

> "A positivist approach is a 19th century doctrine, which holds that social science can be scientific in a similar way to physics or any other of the natural sciences, and can produce general laws about human behaviour with predictive power on a par with laws which govern the movement of the planets or heat through iron (*physics*). Positivism assumes that phenomena exist independently of the observer and can be comprehended through the senses and as such can be measured and quantified".
>
> (Hart and Bond, 1995:p. 35)

Denzin and Lincoln (1994:p.13) provide criteria of theories;

Paradigm/theory	Criteria	Form of theory	Type of narration
Positivist/postpositivist	Internal, external validity	Logical-deductive, scientific, grounded	Scientific report
Constructivist	Trustworthiness, credibility, transferability, confirmability	Substantive-formal	Interpretative case studies, ethnographic fiction
Feminist	Afrocentric, lived experience, dialogue, caring, accountability, race, class, gender, reflexivity, praxis, emotion, concrete grounding	Critical, standpoint	Essays, stories, experimental writing
Ethnic	Afrocentric, lived experience, dialogue, caring accountability, race, class, gender	Standpoint, critical, historical	Essays, fables, dramas
Marxist	Emancipatory theory, falsifiability, dialogical, race, class, gender	Critical, historical, economic	Historical, economic, sociocultural analysis
Cultural studies	Cultural practices, praxis, social texts, subjectivities	Social criticism	Cultural theory as criticism
Queer theory	Reflexivity, deconstruction	Social criticism, historical analysis	Theory as a criticism, autobiography

Table 3.1 Interpretive paradigms (Denzin and Lincoln, 2005: 24)

Whilst the positivist approach could perhaps be described as being "fitted" to human behaviours, it would appear that a dual approach, of positivism, where observable phenomena, anthropology, behaviours and facts can be verified, together with action research providing a forum with an alternative doctrine between independent physical measurement of science and the collaborative, empowering observation, immersion and participation. This form of research with a principally qualitative approach would seem to be particularly appropriate when observing and changing human behaviour. In relation to this research, there could be said to be a variety of paradigms involved. The Positivist theory comprises the practical factual experimental design including elements such as the Calon Lân survey and the Questionnaires for Studies 1, 2 and 3. Critical Realism could be said to involve stages such as the food label guidance and at the other end of the spectrum, Interpretativism involves discussions, talking to people, focus groups, interactive participation and interpretation of these, all of which are incorporated in these studies.

The table below (Table 3.2) lists the phases of research, the researcher, theoretical paradigms, research strategies, methods of collection and analysis and interpretation and presentation.

Although this research does not incorporate all the processes listed in Table 3.2 below, there are several which are an essential part of and used in this research.

Phase 1	**Researcher as a Multicultural Subject** History and research traditions, conceptions of self and others Ethics and politics of research
Phase 2	**Theoretical Paradigms and Perspectives** Positivism, postpositivism, interpretivism, constructivism, hermaneutics, feminism(s), criticial theory, Marxist models, cultural studies models, Queer theory
Phase 3	**Research Strategies,** Study design, case study, ethnography, participant observation, performance phenomenology, ethnomethodology, grounded theory, biographical, life history, *testimonio,* historical method, action and applied research, clinical research
Phase 4	**Methods of Collection and Analysis** Interviewing, observing, artefacts, documents, and records, visual methods, autoethnography, data management records, computer assisted analysis, textual analysis, focus groups, applied ethnography
Phase 5	**The Art, Practices and Politics of Interpretation and Presentation** Criteria for judging adequacy, practices and politics of interpretation, writing as interpretation, policy analysis, evaluation traditions, applied research

Table 3.2 The Research Process (Denzin and Lincoln, 2005: p.23)

From Phase 1, history, research traditions, conceptions of the researcher and others and the ethics and politics of research are fundamental. From Phase 2, perspectives from the theories, which apply are elements from positivism, postpositivism, interpretivism, constructivism. From Phase 3, research strategies, study design, ethnography, participant observation, performance and action research are all integrated. From Phase 4, Interviewing, observing, artefacts, documents, records, data management, computer assisted analysis, focus groups have all been incorporated. From Phase 5, interpretation, analysis and evaluation, touching on a viewpoint of political standing related to the NHS, diet, and health promotion.

Many academics have worked with and contemplated in depth, numerous aspects of human behaviour and have not always agreed. There are many differing interpretations and descriptions of the various theories. In using action research it is essential that an awareness that the researcher's own views, training, class, gender and general culture will have influenced the course of the research in some areas, but with the conscious thought at the forefront, to avoid influencing the participants if possible.

Denzin and Lincoln (2005:p.10) describe the word *qualitative* as implying an emphasis on processes and meanings that are not rigorously examined or measured (if measured at all), in terms of quantity or amount, intensity or frequency. They state that qualitative researchers stress the socially constructed nature of reality and that there is an intimate relationship between the researcher and what is studied, and the situational constraints shape the enquiry. They also describe qualitative researchers as seeking answers to questions that stress how social experience is created and given meaning. In contrast, they state that quantitative studies emphasize the measurement and analysis of causal relationships between variables, not processes and that the inquiry is purported to be within a value free framework (Denzin and Lincoln, 1994:p.11).

Qualitative research is frequently employed in healthcare action research methodologies, however a combination of quantitative and qualitative methods can be effective in tandem, Denzin and Lincoln (2005:p.11) suggest that postpositivism relies on multiple methods to capture as much of reality as possible and that qualitative procedures can lend themselves to structured (sometimes statistical) analysis and that statistical analysis may be employed for qualitative methods.

Denzin and Lincoln (2005: p.10) describe qualitative research as a field of enquiry in its own right but that it is many things to many people. They describe its essence as being twofold; a commitment to some version of the naturalistic, interpretative approach to its subject matter and an ongoing critique of the politics and methods of positivism. They describe it as having developed from a complex historical field (Denzin and Lincoln, 2005:p.13). Also they state that three interconnected generic activities define the qualitative research process; which have different labels including, theory, analysis, ontology, epistemology and methodology (Denzin and Lincoln, 2005:p.21). They describe the personal biography of the researcher, their class, gender, race, culture and ethnicity as having an effect on the perspective of the researcher, that they will approach the world with a set of ideas, the framework (theory, ontology) and specifies questions (epistemology) that they will examine in a certain way (methodology, analysis). Denzin and Lincoln (2005:p.21) advocate that the researcher speaks from within a distinct interpretive community that configures in its own way the multicultural, gendered components of the research act.

Becker (1993) posits that qualitative research differs from quantitative research in five different ways. These points of difference revolve around different ways of addressing the same set of issues. They return always to the politics of research and who has the power to legislate correct solutions to these problems (Denzin and Lincoln (1994:p.4).

3.2.2 History of Action Research

Action research is characterised by active participation of both the researcher and the participants in the study. It is a process that can be used as a method of change. Kurt Lewin is generally credited as the person who coined the term 'Action Research'. Lewin's origins were in Germany, leaving for the USA in 1933 to escape Nazi persecution. His early politics were strongly left wing and he saw action research as a method of gaining knowledge of a social system, but at the same time, trying to change methods for the better. This was specifically in his work in the context of improving the production line system in factories, to improve the quality of life for the workers. He involved the workers in the process and used the term 'Action Research' in 1944 (Van Elteren 1992: pp.36-37), however, although the term can be found in earlier works such as the work of Buckingham in 1926 and that of Collier in the USA between 1933-45 (Hart and Bond 1995: 13) it is Lewin who is credited with the development of the process which has evolved into what it is perceived as today. He described the research needed for social practice as best characterized as research for social management or social engineering, as a type of action-research, a comparative research on the conditions and effects of various forms of social action, and research leading to social action. He was of the opinion that research that produces nothing but books is not enough (Lewin, 1948).

Lewin's approach involves a spiral of steps, each of which is composed of a circle of planning, reconnaissance, action and fact-finding. Followed by evaluating the result of the action, with at each stage the likelihood of re-evaluation, assessing what has happened and redesigning the process (Lewin, 1946).

The idea of action research emerged from the assumption that a theory could be directly expressed in action. Kurt Lewin's pioneering action research work in the USA, was in the 1930s and 1940s. He associated the idea of undertaking experiments in the field rather than the laboratory. He required that an action research experiment must not only express theory but it must do so in such a way that the results of the experiment can be fed back directly to the theory (Lewin et al., 1939). In the UK the Tavistock Institute of Human Relations was undertaking work, which has since been described as action research (Holter & Swartz-Barcott 1993). Both Lewin and the Tavistock Institute applied action research methodologies to address problems in industry. They studied people in the workplace, examining the rigid, production line methods in place at the time, with bureaucratic management (Eng, 1978). Lewin and Lippit (1938) working with the Tavistock Institute noted that up to and immediately after World War 2 (WW11 1939-45) workplaces were characterised by centralised control and lack of worker autonomy. The possibilities of improving efficiency by worker independence and participation in decision making evolved from Lewin's action research work.

Later, action research was used in schools, developing with school-based reforms (Stenhouse, 1975).

3.2.3 Early Action Research in Practice, an example of the processes

Lewin planned an experiment in the Harwood factory in Virginia in 1939 (Burnes, 2007). It was designed to research the effect of worker participation on the productivity of work groups. The work was to study the relationship between autocracy and democracy in the workplace. Unfortunately he died before the work was undertaken, but the experiments were completed and said to follow the aims of Mayo (1960) i.e. that effective leaders could use effective communication skills to increase worker participation and emancipation in industry, raising morale, job satisfaction and output at the same time improving relations within the workgroup. Hart and Bond (1995:p.18) describe what transpired as follows;

Resistance to change in the workforce and grievances and resentment towards management had developed, caused by frequent transfers between jobs without consultation, which had built up resentment, frustration and conflict. The 'real life action experiment' (Coch and French, 1948:p.512) described the 3 levels of worker participation:

1. No participation in changes
2. Participation through appointed representatives
3. Participation by the whole group in all aspects of changes and discussions with management.

The results demonstrated that, following job transfers;

1 Group 1 still underwent a drop in morale and productivity and a rise in turnover and aggression.

2 This was not the case in either of the participating groups

3 The fully participating group worked well with supervisors and quickly regained the pre-change level of output, which continued to climb strongly. (Hart and Bond, 1995:p.19).

The experiment showed there was a relationship between the degree of democratic participation and the level of job satisfaction, output and morale. It confirmed Lewin's theory that democratic participation was far more effective than autocratic coercion (Hart and Bond, 1995:p.19). It also shows an example of the fundamental ethos of all action research; that the views of the participants are essential and equal to those of the researcher or practitioner.

In relation to contemporary health settings, it would seem to be appropriate that the same democratic values should be applied to designing and working with groups in any health experimental setting as the same underlying principles apply, that if people have the opportunity to 'cast their vote' with free open choice and no coercion, the truth will be found and they are more likely to cooperate when they contribute to the process. Equally, reflection on the views of the people can be used to form plans for change democratically.

> "It is important to understand clearly that social research concerns itself with two rather different types of questions, namely the study of general laws of group life and the diagnosis of a specific situation".
>
> (Lewin 1948:p.204)

Bogdan and Biklen (1992) view action research as a frame of mind, 'a perspective that people take toward objects and activities'. In some of Lewin's earlier work on action research (Lewin and Grabbe, 1945) he identified a tension between providing a rational basis for change through research and the recognition that individuals are constrained in their ability to change by their cultural and social perceptions. Having 'correct knowledge' does not itself lead to change; this is of particular relevance to this research. Attention also needs to be paid to the 'matrix of cultural and psychic forces through which the subject is constituted' (Winter, 1987). In Chapter 2, the scrutiny of health promotion showed that in several models, having 'correct knowledge' on its own did not necessarily bring about change, there need to be other factors such as motivation and belief (Kariel, 1956).

Action research did suffer a decline in popularity during the 1960s because of its association with radical political activism (Stringer, 1999). However, it has subsequently gained a significant foothold both within the realm of community-based, and participatory action research; (Carr and Kemmis, 1986). There is an expectation that action research should be collaborative and entail group work. The studies in this thesis were carried out in the community, both in groups and individually. The participants undertook the surveys individually, though some were recruited in a group situation and the intervention materials were developed by focus groups. However, why action research must be collaborative or collective is open to question and debate by some (Webb, 1996; Kelly et al., 2004). There is no reason why the action research principle cannot apply to small groups or even the study of an individual, the democratic principle of discussion, viewpoint and reflection, change could equally be employed with 1 person, thus being an alternative yet powerful process.

Carr and Kemmis (1986:p.164) criticise aspects of Lewin's work in three areas, that group decisions would now be a matter of principle rather than technique. Current views would object to the participants being 'led', using democratic principles rather than achieving it. Carr and Kemmis also state that contemporary researchers would object to Lewin's language, ('developing deeper insights into the laws that govern social life through mathematical and conceptual analysis, laboratory and field experiments') aims and methods, describing it as positivistic and incompatible with aims of social science. An alternative view is that Lewin's description does fit current action research methods and that if Lewin was conducting his experiments 70 years later, he might be using the same methods but adapted to 21^{st} century mores.

An important point concerns the commitments and orientations of those involved in action research. One of the legacies Kurt Lewin left is the 'Action Research spiral' and with it there is the danger that action research becomes little more than a procedure. It is a mistake, according to McTaggart (1996) to think that following the action research spiral constitutes 'doing Action Research', McTaggart's opinion is that action research is not a 'method' or a 'procedure' for research but a series of commitments to observe and examine problems through practice, a series of principles for conducting social enquiry. (McTaggart, 1996).

It was McTaggart's argument that Lewin has been misunderstood or, perhaps misused. When set in historical context, while Lewin does talk about action research as a method, it would appear that he is stressing a contrast between this form of interpretative practice and more traditional empirical-analytic research. Mc Taggart felt that the notion of a spiral may be a useful teaching device but it should be avoided as using it as *the* template for practice (McTaggart, 1996).

Lewin made defining contributions to a number of fields. He had a major impact on our appreciation of groups and how to work with them. Lewin not only conducted pioneering experimental action research; he demonstrated that complex social phenomenon could be explored using controlled experiments; he helped to move social psychology into a more rounded understanding of behaviour, a function of people and the way they perceive the environment. The consistent theme in all Kurt Lewin's work, according to Kolb (1984) was his concern for the integration of theory and practice. This was symbolized in his best-known quotation:

> 'There is nothing so practical as a good theory' (Lewin, 1951:p.169).

Bjorn Gustavsen has written many papers on aspects of action research, principally examining workplace organisation. He felt previous research saw the creation of theory and the development of practice as different activities. Many of Gustavsen's concepts link theory to practice. For this to be possible the experiment must be an expression of the theory, in such a way that there is a relationship between the concepts of the theory and the variables of the experiment. Gustavsen (2001) stated that if such a direct relationship is lacking it is no longer an experiment in the same sense. Action research is not easily defined (Lilford, 2003). A variety of approaches, definitions and uses have emerged since it was created by Kurt Lewin and have given rise to much debate within social and behavioural sciences.

In 1997, the first annual action research conference was held in. London, despite Lewin's concepts having been originally published in the 1930's, it took over 60 years for action research to be considered to have sufficient scientific credibility and merit to justify a conference dedicated to works in this field. At the same time in 1997, the *Collaborative Action Research Network* was established.

Key elements of the types of action research named above are described by Kemmis and McTaggart (Denzin and Lincoln, 2005:p.560) in Table 3.3 below;

	Attributes
Participatory research	Shared ownership of research projects Community based Orientation towards community action Social, economic and political development Responsive to needs and opinions of ordinary people
Critical Action Research	Commitment to bring together broad social analysis, self reflective collective self study of practice The way language is used Organization and power in a local situation Action to improve things A strong commitment to participation A broad view of role relationship between education and social change, taking account of gender, ethnicity, and social class as initial point of reference
Classroom Action Research	Qualitative interpretive enquiry and data collection by teachers and academics, with a view to improving their own practices.
Action Learning	To bring people together to learn from each other's experiences, with an emphasis on studying one's own situation, clarifying what is trying to be achieved, working to remove obstacles, aspirations – organizational efficacy and efficiency
Action Science	The study of practice in organizations as a source of new understanding and improved practice Two aspects of professional knowledge 1. Formal knowledge though training 2. Professional knowledge of interpretation and enactment The development of the "Reflective Practitioner"
Soft systems approaches	Human systems in engineering where the researcher (or consultant) has a role of discussion partner or trainer in a real problem situation. S/he works with the participants generating models of the situation, uses these to question and develop revisions.
Industrial Action Research	Consultant driven, collaborative between social scientists and members of different levels of the organization, recognizes the need for democratic organized, and social change. Humanistic and individualistic rather than critical. Emphasis on improving effectiveness and employee relations. Learning through bringing about change

Table 3.3 The family of Action Research (Denzin and Lincoln, 2005: 560)

It can be identified from Table 3.3 above that despite varying titles having been given to the differing approaches of action research, there is a common theme of, observe, identify the problem, consult and incorporate the participants' (their actions, views, ideas), reflect, discuss and move forward towards improvement and change democratically.

Kemmis (Kemmis et al., 1982:p.14) describes action research as;

"an expression of an essentially democratic spirit in social research".

Kemmis and McTaggart (2000) identified key approaches to action research, the settings in which they are used and examined criticisms, which have been advanced. They identified an eclectic mix including; participatory research, classroom action research, action learning, action science, soft systems approaches and industrial action research (Kemmis and McTaggart, 2000; Denzin and Lincoln, 2005:p.559). This research is an eclectic mix of qualitative participatory research combined with quantitative measurement.

It could be argued that the ethos of democracy is fundamental to the action research ideals. The views of the participants are equally as important as the practitioner or researcher.

Elliot (1991) proposed that in action research the original idea should be allowed to shift, or be flexible and that the reconnaissance stage should involve analysis and fact-finding. Further, Elliot proposes that this should constantly recur in the spiral of activities rather than only at the beginning. Finally, Elliot states that the implementation of an action step is not easy and one should not proceed to the next step without evaluating the effects of an action until one has monitored the extent to which it has been implemented (Elliot, 1991:p.70)

Although there are differing view as to the precise nature, definition and use of action research, there is a general consensus that it is in principle qualitative, although some elements of quantitative measurement can be employed and it has a strong enquiry element, with the aim of evaluating what is happening with a view to changing to improve practice. Hart and Bond (1995:p.40) distinguish 4 types of action research;

Experimental approach (Lewin and followers)

Organizational approach (Tavistock Institute)

Empowering approach (community development

Professionalizing approach (education and nursing)

Whitelaw et al (2003) (Gerrish and Lacey 2006; 276) describe three types of action research as follows;

1. technical scientific and positivist action research
2. mutual-collaborative and interpretivist action research
3. critical and emancipator action research

Technical scientific and positivist action research. In this model, the action researcher sees themselves as experts and primarily draws on traditional scientific methods to investigate a problem in practice. The main aim of this type of research is to 'test' a particular type of intervention. While the participants in the study may provide 'on the ground' feedback, they are not seen as sufficiently expert to get involved in the process of research. This model is often associated with management consultancy and is used frequently by health service managers. The tendency for a top-down approach endangers ownership of both the problem and the solution by staff, however, nurses have used this type of research (Gerrish and Lacey 2006:p.276).

Mutual-collaborative and interpretivist action research

This model is more firmly based on the underlying principles of action research. It involves bringing together policy makers, researchers, service users, healthcare providers (practitioners and their managers) to identify potential problems, try out solutions and monitor the process and outcomes of change. It relies on open channels of communication, and a consensus amongst participants of what is needed for change, a willingness to change and joint engagement in the process. (Gerrish and Lacey, 2006:p.278)

For this research although there are positivist elements there are also interpretative approaches.

Critical and emancipatory action research

Research is sometimes seen as apolitical. The choices made about what research approach to take and which data collection methods to use are bound and influenced by those in power (funding bodies and academic élites). This model is explicit in its political and critical expression and as such, not always favoured by funding bodies. It challenges the forces that profit from maintaining particular viewpoints and values the notions of participation, empowerment and emancipation. The Royal College of Nursing Institute Practice Development Unit advocates the use of these approaches, stressing the importance of facilitation, clinical supervision, action learning, critical companionship, practice development, transformational leadership processes, creative arts and using developing evidence (Gerrish and Lacey, 2006:p.278)

Gerrish and Lacey (2006) differentiate between action research and practice development as action research having changes in process, which are rigorously monitored and the findings published, shared with a wider audience. Whereas practice development, whilst having many of the same processes and the same ethical assurances as action research it is primarily for local improvement and not generally shared with the wider audience (Gerrish and Lacey, 2006). This research follows aspects of the multi-method, collaborative and emancipator action research approach by empowering the participants and involving them in the research process, it is also self-funded, thus without outside pressure.

> "This confusion has carried over into health literature without any systematic identification of or debate about the core characteristics of action research or the multitude of approaches or uses that have come to be associated with this method" (Holter, Schwartz-Barcott, 1993:p.300).

Others have described action research as a form of self-reflective enquiry.

> "Action research is simply a form of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of these practices and the situations in which the practices are carried out"
>
> (Carr and Kemmis, 1986:p.162)

The description above by Carr and Kemmis would seem to mirror aspects of health promotion pathways where although it could be possible that participants may undertake some stages with 'automatic' or almost subconscious reflection, i.e. they may decide to follow the desired route with minimal intervention. It is more likely to have a greater effect if, via a more conscious reflective thought, an action research method is employed, whereby participants are involved and are part of the decision making process as described in the work of Lewin and Mayo.

Kemmis and McTaggart (1990:p.122) state that communication between all participants is of equal importance:

> "Since action research looks at a problem from the point of view of those involved, it can only be validated in unconstrained dialogue with them. Since action research involves unconstrained dialogue between 'researcher' (whether outsider/teacher or researcher) and participants, the participants, there must have free information flow between them.
>
> (Kemmis and McTaggart, 1990:p.122)

In many areas of research, decisions about research methods should be informed by the nature of the research question; the research question should indicate what approach and methods should be used. Action research is a useful approach for identifying education and training needs, also identifying and overcoming barriers to change. The research can be adapted and perhaps go down a different route to that initially envisaged, reactive steps can be taken to the findings at each stage. The measurement of the patient's experience with a condition or behaviour, as in the case of requiring food choices or eating behavioural changes, is an important and quantifiable outcome and specifically in the case of this research, could follow the model of action research (Cruikshank, 1996; Morrison and Lilford, 2001). An example of the initial identification of a problem stage could be a needs assessment, the initial part of this research addresses this and is repeated at several stages. Despite McTaggart's criticism of using the spiral as a template, it is provides a useful diagram to illustrate the research pathway (Figure 3.1), with the important premise at the forefront of the thoughts on design and method, that reflection and adaptation should be continuous and the template should not be a rigid inflexible pre-determined pathway.

Bowling describes action research as a process being undertaken by participants in social situations to improve their practices and their understanding of them and with the aim of changing them by achieving certain goals (Bowling 2004). Bowling also describes action research as a technique for attempting to achieve improvements by auditing processes and critically analysing events and a critical, self-reflective, bottom-up and collaborative approach to enquiry that enables people to take action to resolve identified problems (Bowling 2004).

Proponents of action research claim that it is not just for researchers, but helps to empower research participants to make changes in practice (Karim, 2001). Karim examines some of the evidence for and against a research methodology that might be unfamiliar and concludes that action research often lends itself to small-scale studies but can be time-consuming. The value of such a methodology is that it provides a powerful means of improving and enhancing practice.

Awareness in the Action Research process, Reflection and Reflexivity

The Oxford Dictionary (Oxford 1993: 1286) definition of reflection is

> "the act or an instance of reflecting, meditation, reconsideration, an idea arising in the mind, a consequence, evidence"

The Oxford Dictionary Thesaurus (Oxford 1993: 1286) offers the following;

> "image, thought, thinking, meditation, consideration, cogitation, rumination, deliberation, pondering, cerebration, reconsideration, second thoughts, result, consequence, sign, evidence, testimony, substantiation, corroboration and proof"

Reflexivity is the noun for the process of reflection. Both the dictionary definition and the Thesaurus alternatives encapsulate the enquiring, thoughtful process of reflection involved in the process of action research. Mezirow, (1990) describes critical reflection as follows:

> "Becoming critically reflective of assumptions underlying content, process, or premise is common in both instrumental and communicative learning. Reflectivity involves reasoning and/or intuition. Both are significantly

influenced by conditioned emotional responses. Many beliefs are generalized from repetitive interactions outside of consciousness. Critical reflection in the context of psychotherapy focuses on assumptions regarding feelings pertaining to interpersonal relationships; in adult education its focus is on an infinitely wider range of concepts and their accompanying cognitive, affective, and cognative dimensions. " (Mezirow, 1990:pp.21,22).

Action research embodies "reflection" which Schön (1983) argues is fundamental to understanding how health professionals work. Usher (1997) claims Schön uses an alternative theory of practice where the knowledge inherent in practice is understood as "artful doing" (Usher et al., 1997:p.143). Schön's central concepts were reflection-in-action and reflection-on-action. The difference between the two, he describes as follows; reflection-in-action is 'thinking on your feet', i.e. examining the experiences as they happen, trying to understand theoretical frameworks being used to explain what is happening, involving continuous, active awareness of change in the situation. Schön describes the process as the practitioner carrying out small experiments which generate a new understanding of a situation to effect positive change (Schön, 1983:p.68). The researcher tests 'theories' which in turn lead to new actions, this may result in rejection of previous ideas and methods.

Schön's term reflection-on-action, refers to 'post event'. Reflection on what has taken place, an exploration of what has happened and why. The reflection may be in various forms; discussion, writing a journal, setting aside time to think about and consider what actually happened. Schön describes a 'repertoire' of images, ideas and examples, which enables practitioners to explain an event.

Reflection has been described by many but generally, it is agreed that it is an active conscious process. Dewey (1933) described it as the active persistent and careful consideration of any knowledge in the light of the grounds that support it and further conclusions to which it leads. Dewey developed his concept of reflective practice from experience. A slightly different perspective is taken by Boud *et al* (Boud et al., 1985), they define reflection as a generic term for any intellectual activities practitioners (who also viewed as the learners), use to explore experiences leading to new understanding.

Kemmis (1985) describes reflection as a positive active process of reviewing, analysing, and evaluation of experiences, together with drawing on previous experience, theoretical concepts and learning to provide an action plan for future practice. Reflection has been described as active rather than passive thinking (Reid, 1993). Reflection gives the practitioner the opportunity to learn through experience, the outcome of reflection is learning as identified by Mezirow (1990).

3.2.4 Action research in Health

There were few examples of action research published in medical care until the late 1980's to early 1990's, however more recently, the process has been widely used in the UK to promote change in primary health care. (Meyer, 1993; Murray et al., 1994; Hampshire et al., 1999; Hampshire, 2000). Hampshire (2000) states that there is debate over the term action research, in that its definition varies in different countries and different settings (Corey, 1949; Gold, 1999; Badger, 2000; Hampshire et al., 1999; Hampshire, 2000). Meyer, using action research in nursing defines it as a 4 step framework, planning, acting, observing and reflecting, as a modern development of Lewin's methods (Meyer, 1993:p.1066). Action research was being developed and used in Britain in the 1970s (Rapaport, 1970). Following this, in Australia recognition of the practical character of the British work led to critical and emancipator action research (Carr and Kemmis, 1986; Brock-Utne, 1980). It has been very widely used in nursing and care situations but less widely used in medical research (Greenwood, 1994).

Action research has been described as a variant of a 'quasi-experiment' (Gill and Johnson (1991:p.57) and in care settings, Sapsford and Abbott (1992:pp.101-3) refer to it as a simple type of 'change experiment' for the purposes of measurement. There are numerous authors who concur in the view that it is a method which sits very well in educational and healthcare settings and is appropriate both for very small scale individual projects as well as being able to be used in large scale national ones (q.v. Devadas 2002; Chisholm and Elden, 1993; Winn, 1990). Holter and Schwartz-Barcott (1993:p.299) suggest that action research was 'designed specifically for bridging the gap between theory, research and practice' (Holter and Schwartz-Barcott, 1993:p.299). A large body of research using an action research methodology has been undertaken in the nursing profession, where change and improvement in practice and methods are the focus, however the action research methodology could be applied across the whole range of health professions, including medical. The origins of action research were in industry, observing manufacturing processes with a view to change but this process applies equally to observing human actions in any field.

Schneiderman (Schneiderman 2001; Lilford, 2003) examined methods of applying behavioural and social sciences using action research methods to major public health concerns and education for change (Elliot, 1991). In community-based approaches, examples were examined where behavioural and social sciences have been integrated into public health. Contributing to understanding the role of risk behaviours and risk-group characteristics for health promotion and disease control and prevention, the authors (Schean, 1995; Schneiderman et al., 2001) provide successful examples of integrating behavioural and social sciences in public health in the US. One method used in action research in health is "Rapid Appraisal" (Ong et al. 1991) which can be used for a quick assessment of views and perceptions of problems and needs as a qualitative technique for community assessment (Bowling 2004). Murray and Graham (1995) assessed the health needs of the needs of residents on a council estate in Edinburgh using rapid participatory appraisal techniques, with a team collecting local data. They conducted interviews, held focus groups with representative sections of the population (ages, social groups, differing health problems) data from the general practice, such as number of consultations, incidence of acute illness, referrals, prescribing details to appraise health needs of the population (Murray and Graham, 1995).

At the opposite end of the scale, extensive community-oriented action research programmes have been undertaken over a much greater time period. In India, country wide national programs were developed following community-oriented action research over four decades, conducted under the leadership of Dr.

Rajammal P. Devadas (2002). The award-winning programme involved educating, activating, empowering and energizing the community, which was the focus of the action-oriented research in India (Devadas, 2002). A complete national programme measuring large-scale efforts was developed.

The areas covered included:

1. infant and preschool child nutrition
2. nutritious school meal programs for children
3. integration of nutrition, health, and sanitation in the primary school curriculum
4. use of local foods to eradicate malnutrition
5. introduction of novel and under exploited foods
6. food-based approaches to overcome micronutrient malnutrition
7. educating women in food hygiene
8. general nutrition education.

Of particular relevance to this series of studies is point 8 using action research for nutrition education to bring about improvement. Action research interaction with the population was used to develop relevant food and educational materials, their introduction to the community and impact evaluation. Many of the topics indicate above formed the basis for regional and nationwide nutrition intervention strategies. The experiences gained and training efforts developed have gone beyond the country-level exposure to training and equipping nutrition workers in other countries. This is an example of action research being used in the largest scale, nationwide, over a vast country and beyond. Despite the scale of the project, the action research process was fundamental to the interactive basis on which the success of the changes was based (Devadas, 2002). The overall strategy would implement many small changes at a local level incorporating ideas and feedback from the local participants, which were likely to have made the greatest impact and evolved through an action research process.

3.2.5 Action Research in Nutrition and Dietetics

The COMA report "The Nutrition of Elderly People" (1993) recommended that elderly people should be targeted for health education programmes in order to maintain nutritional status in this group (Linderman, 2003). Research by Robinson et al. (2000) indicates that interventions, which aim to influence nutritional behaviours are more likely to succeed if they involve target populations at all stages of the process, again including the empowerment of the target group. Their paper outlines a preliminary action research project which attempted to identify some key issues influencing eating behaviour in a group of elderly people based in Merseyside. An innovative methodology, combining empowerment and reminiscence, was used to produce a nutritional advice leaflet, to be used as a resource within the local community. This example demonstrates an action research methodology where the aim and outcome was to change eating behaviour the development of the material was democratic and fully involved peers of those it was designed to target. Similar methods are used in this thesis but with a wider age group.

As described above, action research has been used to improve diet in extremely large experiments, such as Devadas' (2002) use of the process in India but it can also be used with individuals on a one to one basis, such as that of Stensland (2003). Nicholas et al., (1997) which suggest healthcare settings are appropriate for action research. Greene et al. (1999) undertook a study of dietary applications of the stages of change model (Prochaska and DiClemente 1983), with an action research element. The series of studies in this thesis, progress according to the findings and involvement of the participants and is particularly appropriate for participatory action research, where reflections on patient or participant involvement and findings decide the next stages' direction.

Differences between traditional/mainstream research and participatory action research, are shown below, the following was taken from Giacello et al. (2003:p.311) where action research was used in a participatory education programme to raise awareness in various stakeholder groups to reduce the incidence of diabetes.

TRADITIONAL/MAINSTREAM RESEARCH	PARTICIPATORY ACTION RESEARCH
Rigid	Flexible
Has limited or no utility in understanding or solving important community problems	Aimed at understanding and solving important community problems.
Seeks limited community representation when funding has been obtained.	Seeks community participation at the initiation of the project.
Uses mainly quantitative methods.	Uses both qualitative and quantitative methods.
Tends to include women and members of ethnic minority groups as study participants.	Maximizes efforts to include groups affected by the problems.
Stresses cultural deficits and a "victim" ideology.	Stresses community assets and individual and community empowerment.
Research is "on" minorities or other "populations."	Research is "with" and "by" minority group members/community participants.
Principal investigators are in control.	Shared governance/ownership; participants have leadership roles.
Project ends when data are collected and analyzed.	Real action starts when data are analyzed.
"Partnership" is limited.	Shares resources, provides jobs, technical assistance, and training.
Researcher is the "expert."	Researcher is a resource person who facilitates and educates

(Giacello et al. 2003:p.311)

Using Action Research

Because of the flexibility of action research methods and possible changes in direction it is paramount that the researcher remains focussed on the original aim and does not deviate into other areas (Hagey, 1997). To sum up, action research is flexible, particularly suited to health promotion research and works well with studies ranging from an individual to a whole nation. It may be viewed by some as no different to other forms of "people watching" but this underestimates the interactive value of the study participants and when the research is planned soundly with robust methodology, it is a valid, scientific process which can achieve many positive benefits. Action research was designed specifically to bridge the gap between theory, research and practice and incorporates both humanistic and scientific methods (David and Sutton, 2004). As such, action research is a highly appropriate method for health promotion projects. In relation to this research, it was felt that an action research methodology would provide the framework for a flexible approach, incorporating mixed methods.

In this series of studies, an ongoing reflexive journal was kept, in the form of memos, emails, notes from sessions with supervisors and discussions with participants, materials used in focus groups, such as flip chart listings and discussions with the participants, which were noted. In addition, the respondents' answers and comments in the questionnaires provided a quantity of material both for analysis and reflection. At each stage, thought, or reflection on these comments, answers, discussions educated reflexivity, resulting in informed decisions on the progression and further stages. The process of reflection in itself was found to be a valuable resource in the action research cycle. It was envisaged that the design as originally planned in draft form would move from the original direction, according to the findings and participant's democratically expressed views through a flexible two-way interaction. It was intended that this process of change in design would occur not only with the participants but also the findings from the literature reviewed, discussions with supervisors and self critical analysis

3.3 The Practitioner

The practitioner is in a multiple role of observer, provider of knowledge, and analyst followed by user of the new knowledge discovered. Thus they are involved and implicated as not only the researcher but also a subject within the process. The practitioner should self-evaluate their practice, participate in problem solving and share their findings. Practitioners should search for ways to improve practice but also critique positive or negative findings to decide which changes should be implemented. . – ('is this the way forward – am I doing the right/most appropriate thing?' – 'What would be the range of options?' – "*Check* – 'am I influencing the direction?'). It was imperative to constantly retain these thoughts in tandem with keeping all the other aspects at the forefront together, in order to achieve a true reflection of all the participants overall which included, study cohorts, general population, supervisors, literature authors and self.

3.3.1 Ethical issues in action research for the practitioner.

Zeni, (1998) examined a differing viewpoint of ethical issues for the action research practitioner. She describes the issues, which may affect the traditional 'distance' of an observing researcher as opposed to the immersion of a practitioner who is implicated by their very involvement in the process.

> "Traditional 'human subjects' reviews may not address the ethical issues that arise when practitioners study their own contexts. Guidelines for the outsider doing a classic experiment (random selection, control groups, removing the personal influence of the researcher) are either irrelevant or problematic for the teacher investigating her own classroom. In the same way, guidelines for the outsider doing qualitative research (anonymous informants, disguised settings) may subvert the value placed by 'insider' research on open communication with colleagues, students, and participants.
> (Zeni, 1998:pp.9–19)

In other words the researcher undertaking action research is taking the dual role of researcher/practitioner and in some aspects, participant. They must be aware and cautious of the conflicts of immersion in the study to be able to distance themselves and to 'stand outside' and look in from a detached viewpoint. The practitioner could take differing stances, either being in an outsider role or insider. This role might change as the project progresses (Hart and Bond 1985:p.10). It is therefore of paramount importance for the practitioner to be conscious of and able to differentiate between their involvement as observer and facilitator, rather than leading the participants. The participants should be leading themselves, in tandem with direction provided by the practitioner, given as a result of observation and reflection on actions of the participants. There is a very fine line between a) controlling a group and providing direction and b) observing and using the findings of each stage to directing by putting forward ideas which have evolved through participant interaction, progression should be via a democratic vote rather than a dictatorship through autocratic coercion.

The practitioner or researcher had to retain a distance to provide freedom for the participants to provide unbiased information and data. Whilst facilitating the research and meeting some of the participants, the researcher must be aware that the participants should have as much freedom as possible. There could have been a conflict where the views of the practitioner impinged on those of the participants, an awareness to avoid this situation was paramount. It was possible that some of the participants may have been influenced in their comments or food choices (in Study 3) because the researcher was a dietitian, which was a point raised in the qualitative study on low recruitment. However despite this, it is unlikely that people would alter the family's shopping habits over the period of a month.

3.4 Practical depiction of action research

There have been several attempts to present the action research spiral in diagrammatic form, including the one below (figure 3.1). All follow a similar methodical approach of identifying the initial problem, action planning, implementation and evaluation, with reflection being fundamental at each stage. It could be argued that trying to present a fluid, critically reflective process in this form is an artificial structure, as opposed to the reality of the process, where the progression is unlikely to have a tidy sequential form. It is highly probable that the process would be more likely to have several strands running concurrently and overlapping. Therefore, although the illustration below partially represents the research spiral followed in this research, a full explanation will be found further in the methodology section in this chapter, of each stage represented.

To follow Lewin's path; the first step is to examine the initial problem. Frequently more fact-finding about the situation is required. If this first period of planning is successful, two items emerge: namely, 'an initial overall plan' of how to reach the objective and secondly, a decision regarding the first step of action. Frequently this planning has also modified the original idea (Lewin, 1948).

A representation of Lewin's action research cycle follows (Figure 3.1) illustrating the progression of the research for this thesis, i.e. the aim was to investigate methods to achieve behavioural change in eating patterns and measurement, expressed within the action research cycle for the series of studies conducted.

Original idea: A need to devise and test methods of improving eating habits

Planning:, Reflection, designing a study to test

Acting: Reconnaissance, Initial fact-finding, critical reflection, redesign

Observing: Empowering participants, reflection, redesign

Reflecting: What do they really think? Is the feedback accurate?

Of the 8 or 9 steps represented below in Figure 3.1, the action cycle would or could replicate steps 4 to 8 several times, reverting to stages 2 and 3 depending on critical reflection of the findings.

At each of the stages above a cycle of revising, re-planning, observation the practitioner should be prepared for the process to develop into a further stage or go in a different or totally new direction, depending on the actions of the participants. Using Lewin's model shown below (figure 3.1), it could be argued that the original structure (blue boxes) could lead to fixed ideas. "Reconnaissance" collecting data, from questionnaires or discussion was followed by reflection and adaptive change, as the research progressed.

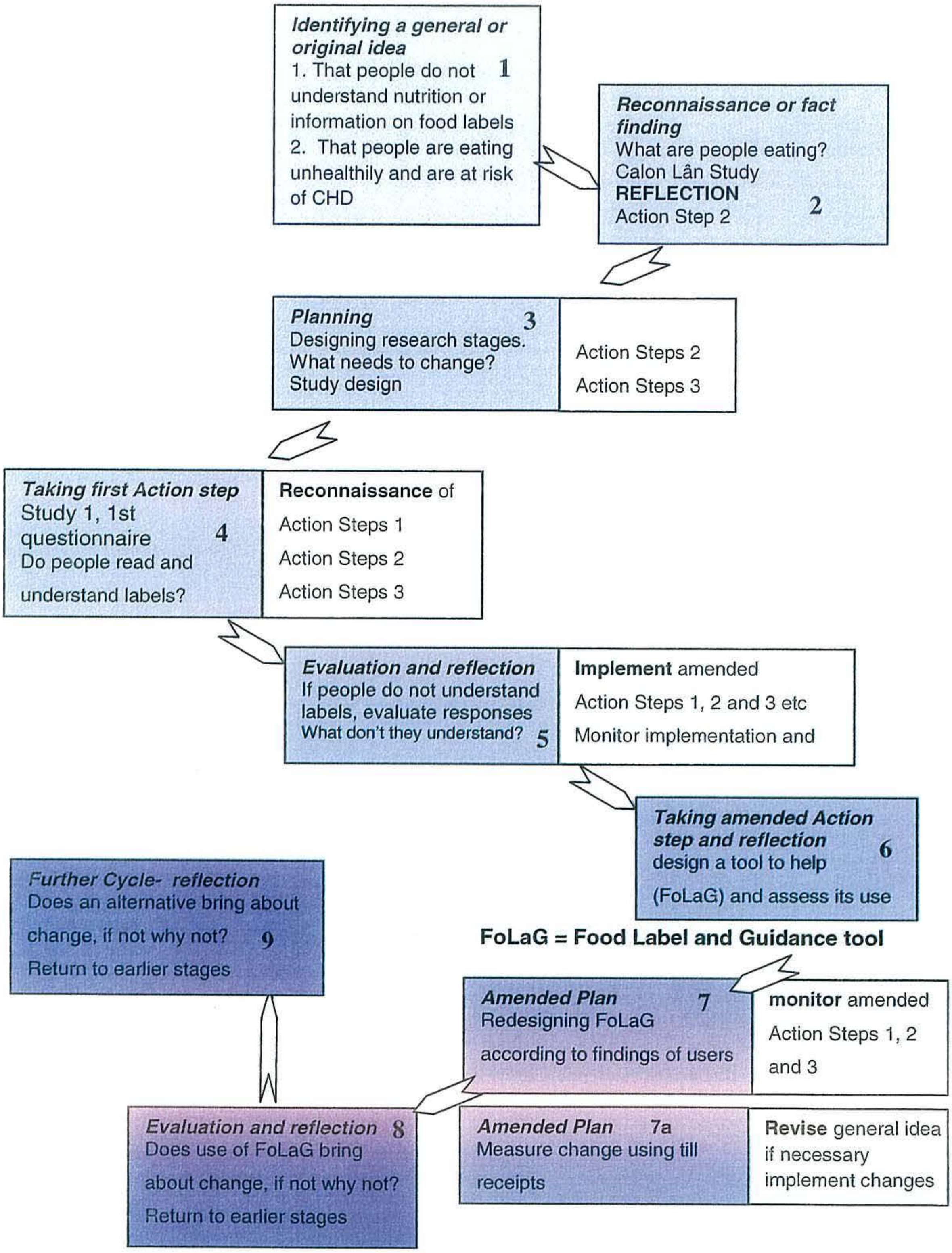

Figure 3.1 Lewins' Action Research cycle as used in research in this thesis:
(Lewin; Elliot, 1991)

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A further description of action research which follows the Lewin model (Figure 3.1) is presented by Ortrun Zuber-Skerrit (1992), she describes her model as ***CRASP***:

> *Critical* (and self critical) collaborative enquiry by
> ***R****eflective* practitioners being
> ***A****ccountable* and making the results of their enquiry public
> ***S****elf evaluating* their practice and engaged in
> ***P****articipative* problem solving and continuing professional development
>
> (Zuber Skerritt, 1992:p.15; emphasis in original)

Zuber-Skerrit (1982) also describes action research as connecting theory and practice together.

3.5 Research Design

The rationale for choosing an action research method for this research is that it has been shown to be particularly appropriate for use in public health, where the practitioner has dual roles of observation and reflection on the activities of the participants as the research progresses and unfolds. For this research, the researcher is a dietitian, which is a role that involves considerable reflection on patient's behaviour, with the dietitian then adapting advice according to the likeliest most effective option for the patient. In a similar way to the treatment of patient in therapeutic dietetics, the views of the participants contribute to the research experiment. The flexibility of the experimental approach had led to consideration that this method can incorporate the capacity for change where required. An action research approach has been adopted as the process of this research follows the spiral of problem identification, data collection, reflection, analysis, data-driven action path, continuing on to problem redefinition with involvement and empowerment of the participants leading to change.

To summarise the key features and stages of action research:

1. A problem is identified
2. Planning is done to facilitate change
3. Change is implemented, this is observed

4. The observations, processes and occurrences are reflected upon
5. Consultation with the participants may be required
6. Re-planning takes place to adapt to the findings observed
7. Change is re-implemented and observed again
8. Reflection on what happens again, and repeated if required again and so on, with the practitioner retaining a flexible open mind, ready to adapt.

Consideration of the review of literature on action research formulated a path from the initial idea that people struggle to understand nutrition and food labels, which led to the first stage of reconnaissance or fact-finding. What is the situation amongst the likely study population; Does their diet need improvements? Does the study population read and understand food labels? How much do they know about quantities and functions of nutrients?. Can changes be made in food purchases, thus ultimately food eaten, by educational interventions? Can any changes be measured by using supermarket till receipts? These questions emerged from reflections following the literature review.

There are also a variety of viewpoints as to how action research should be used and how effective it can be. Not all proponents agree, a flexible approach, using reflexivity and awareness of all the pitfalls should ensure that the resulting findings are as free from bias as possible. It has been used successfully in healthcare settings and is particularly suited to mixed methodologies, which are employed in this research.

3.5.1 Step 1 – Identifying the initial problem

The initial action research step is to identify a problem. Experience with patients struggling to understand nutrition and labelling had formed the initial idea of trying to help them with some form of nutrition and labelling information. The initial stage of the series of studies was designed to find out whether people read labels and whether they felt they understood them. As mentioned in Chapter 2, taking both patients and the young mothers from 'Operation Christmas Turkey' (OCT) on supermarket tours to read food labels, had identified the initial problem, i.e. that people found it difficult to understand nutrition information on food labels. This coincided with a realisation that both patients and the OCT group generally had a low understanding of the functions and quantity required of nutrients and those on the supermarket tours, all groups had asked for help.

In Chapter 1 food labelling legislation and labelling options in current use were described. To comply with this legislation, the food industries' role regarding food labels should be to provide information to enable individuals to make informed decisions about the food they purchase. In addition, despite the basic legal requirements and two new labelling systems, which appeared during the course of this research, there is considerable inconsistency in the manufacturers' provision of other nutritional information on food labels; these inconsistencies are likely to further confuse the purchaser.

A lack of nutritional knowledge and of the constituents of a healthy diet is likely to render the consumer confused at the very least, about how to interpret the labels' information to achieve the correct nutritional intake. Following the route of the health promotion models, if nutrition information on labels is to be understood and used to make healthier choices, the consumer has to understand the function of each nutrient and how much should be aimed for in a normal healthy diet. This requires labelling information on food packets that is easy to interpret together with a basic knowledge of normal nutritional requirements and an understanding of the information provided on labels.

The action research methodology is disclosed thus: the joint initial problems of lack of nutritional knowledge in patients together with a lack of understanding food labels were identified anecdotally. This was followed by literature review to discover work done in this field, although studies had been done in England, some were a considerable time ago (Coronary Prevention Group 1990) or were examining either nutritional or labelling knowledge, no studies were found which had been conducted on nutrition and labelling knowledge and change and none in this field at all in Wales. It was decided to conduct a series of studies with an action research methodology, to confirm and formally identify the extent of the problem with participants working together to discover what could lead to achieving change. This would be followed by further studies, dependent on the actions of the participants.

3.5.2 Taking second step – reconnaissance or fact-finding

The action research methodology followed a path of reconnaissance, reflection, planning, amendment and action, which developed into 4 separate interconnected stages, each of which involved their own reconnaissance stage and adaptation as the studies progressed. The culmination after several adaptive changes as the studies progressed is listed below:

a. The first stage was identifying the original idea, which resulted initially from reflection on work with the public and clinical practice, also supported by findings from the literature review.

b. Calon Lân Survey: Reconnaissance and planning; was undertaken to formally identify eating habits and CHD risk factors of the local population. Once these were known, studies could be designed to measure whether change could be achieved in relation to specific nutritional needs. For example if high levels of fruit and vegetable intake were found, it would be less likely to find changes.

c. Study 1: Identifying the use of food labels; was intended to identify extent of label reading and perceived understanding.

d. Study 2: Refining the FoLaG tool and knowledge; was intended to identify extent of knowledge of nutritional functions and requirements and to develop an information tool as a participatory action to address areas where there were found to be problems understanding nutrition and labelling.

e. Study 3: Evaluation and measuring changes; was undertaken to examine whether change can be achieved by education and to measure change, using supermarket itemised till receipts

A diagram of the progression of the stages in the research follows (Figure 3.2), it shows the timeframe and path followed on the action research pathway from the initial identification of a problem, through the initial reconnaissance and fact finding (Calon Lân survey) to Study 1 (formal identification of initial problem), to Study 2, (formal identification of nutrition knowledge and development of FoLaG), to Study 3 (intervention, evaluation and measuring), with reflection on each stage indicating the design of the next stage.

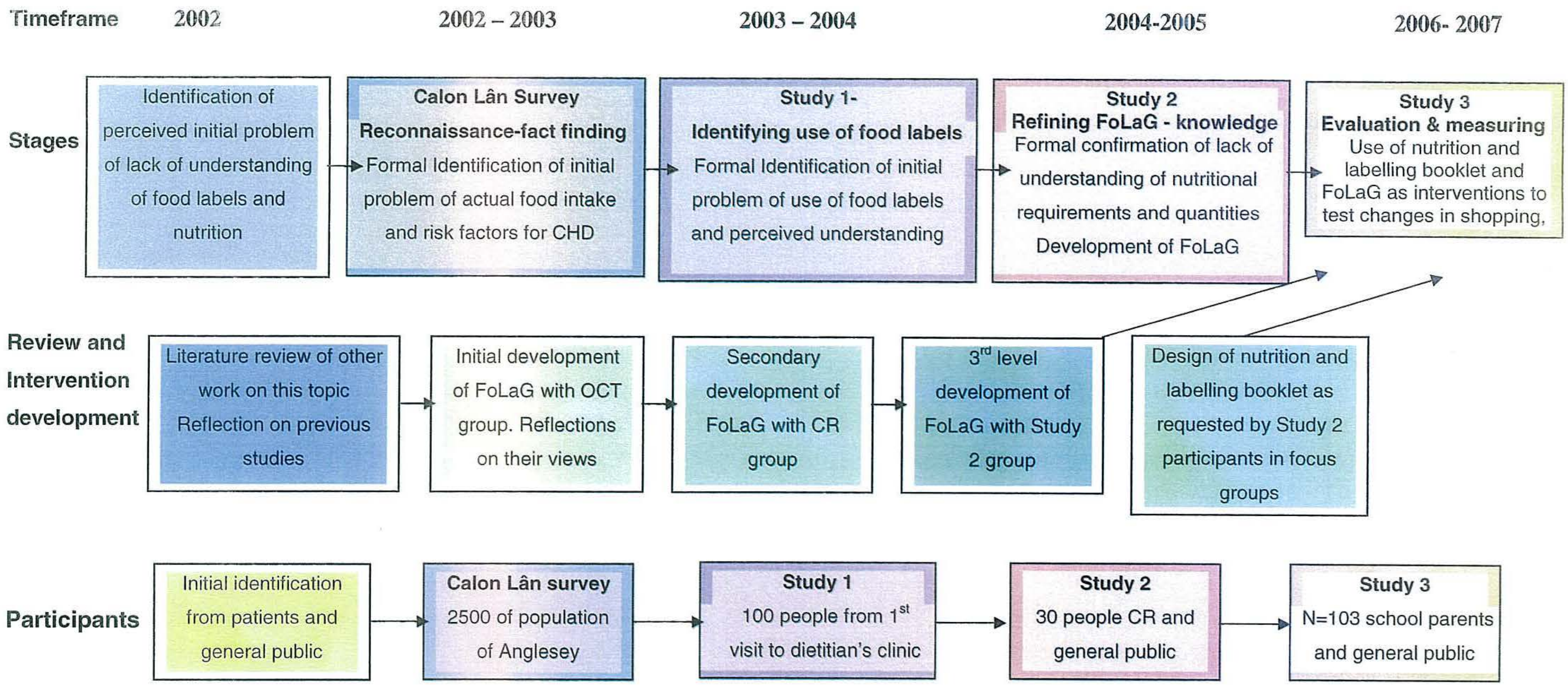

Figure 3. 2 Stages, design development and timeframe for studies

3.6 Calon Lân Programme

The Calon Lân Programme provided a cardiac rehabilitation service for people who had undergone heart surgery or had a Myocardial Infarction (MI). The work of the dietitian on the programme not only involved the rehabilitation provision but also prevention of CHD with the development of a programme of health promotion and education with respect to diet in the wider population. The health promotion element was parallel with this research in behavioural change in eating patterns.

3.6.1 Calon Lân Survey purpose: Reconnaissance and Planning

The Calon Lân Survey was undertaken with a twofold purpose. The first was to undertake a comprehensive survey of the population of Anglesey of a number of risk factors for CHD. These included smoking and exercise, which were outside the remit of this work. However, the purpose for this research was also to confirm and identify the extent of the problem of unhealthy eating and drinking in the study population, using the food and drink section of the survey, as a baseline as part of the reconnaissance of the action research cycle. It was an extension of the initial problem of anecdotal identification of label reading difficulties and understanding nutrition in the participants, in that without an understanding of the dietary habits of the study population, it would be unclear as to where to target an experiment for change. The dietary intake of the local population had to be established in order to target specific dietary problem areas, or, in the unlikely event of the population of Anglesey having an ideal diet, no intervention for change would be required. Ethics committee approval was granted in June 2002.

3.6.2 Aims and objectives of the Calon Lân Survey

One of the purposes of the Calon Lân Lifestyle survey was to identify the geographical localities on Anglesey where there was the highest prevalence of risk factors for CHD, thus being able to target health promotion in areas showing the highest incidence. It was anticipated that these areas would be likely to be the most socially deprived (Statistics National Assembly for Wales 2001d; BHF, 2002). The survey provided extensive data on the dietary habits of the local population, with the action research step of further identifying the initial problem of poor diet and providing baseline reconnaissance information for this research. Questions in the survey were designed to identify risk factors for CHD. These risk factors include; being overweight, which is likely to be caused by an inappropriate diet comprising of too many Calories, too much fat, particularly saturated fats, too much salt and insufficient fruit, vegetables and fibre (National Assembly for Wales, 2002; Welsh Assembly Government, 2004). Increased weight predisposes the body to raised blood pressure, raised cholesterol, increased incidence of diabetes and heart disease (Calle et al., 1999), Body Mass Index (BMI) over 25 (BMI over 25 is categorised as overweight, over 30 obese).

The data relating to the population of Anglesey in the survey was compared to the data for the Welsh Nutrition Reports undertaken by the Food Standards Agency (Food Standards Agency, 2003; National Assembly for Wales, 2002) and the UK regional data (Office for National Statistics 2004/5). The information from the Calon Lân survey was important to the design of the series of studies in this research to discover the eating patterns of the local population, in order to plan and design appropriate intervention studies. The Calon Lân Lifestyle Questionnaire provided information on the attitudes and values of the local population on Anglesey towards their own health and that of their families. The Calon Lân questionnaire identified the local eating habits, socio economic patterns and locations to target health promotion interventions for the areas with the greatest need. Following the findings from the Calon Lân survey, Studies 1, 2 and 3 were planned and designed specifically with the needs of the local population in mind. All documentation for the Calon Lân survey is in Appendix 5. The results are given in Chapter 4.

3.6.3 Method - Questionnaire

Initially, it was planned to undertake a simple short indicative questionnaire to assess the dietary intake of the population of Anglesey. It was realised that an opportunity existed to undertake a much larger, in-depth survey, which would produce a wide range of data that could be analysed for several different purposes, including this research.

The Calon Lân Survey was started in 2002; the food and diet section of the Calon Lân survey was used as reconnaissance for planning Studies 1, 2 and 3. The 2002 Calon Lân survey was sent to 5000 people, 10% of the adult population of Anglesey, a random cross section of those of 18 years and over. A draft questionnaire was produced using two principal existing validated lifestyle questionnaires as models. The first of which was the Countrywide Integrated Non-communicable Diseases Intervention (CINDI) questionnaire. The CINDI international programme was created by the World Health Organization (WHO 2000, 2006a, 2006b) in the early 1980s and has been used regularly in some 20 European countries over more than 20 years (WHO 2000). The WHO is keen to encourage a large number of European countries to participate. The CINDI questionnaire comprises of a number of consistent compulsory questions, which are used for comparative analysis between nations. All the obligatory questions were included in the Calon Lân questionnaire. The second questionnaire used was the Somerset NHS Trust Lifestyle questionnaire (S.NHS.T) (Somerset Lifestyle Survey, 1997). The (S.NHS.T) questionnaire was issued in 1987, 1992, 1997, 2002 and 2007. It is available on their website for use and permission was requested and given to incorporate sections into the Calon Lân questionnaire. The researcher was the lead on a steering group of 3 people, to develop and issue the questionnaire and the ethics committee applicant.

It was decided the questionnaire should incorporate all of the CINDI compulsory questions in order to be able to participate in the European survey and a proportion of the Somerset questions, as there was considerable overlap between the two surveys. Some of the questions were removed as it was decided the data gained from these could be obtained in other areas of the questionnaire, or that the data was unnecessary for the CHD specific purposes, or not relevant to this research. For example the Somerset Survey included a section on accidents and the CINDI survey included optional questions on illegal drugs. It was felt neither had a specific relevance to this research or CHD so were not included.

The steering group decided to have most of the questions answered by tick box format, with some questions requiring written responses, which would provide more specific answers. An example of this could be "Where do you work?" or "What brand of butter or spreading fat/margarine do you use?" Analysis of the data was undertaken using descriptives in the SPSS programme (Statistical Package for Social Sciences, version 12). The intention with the tick box format was to scan the responses using a software package such as "Formic" but the cost of the programme was deemed too expensive, which resulted in an administrative member of staff manually inputting all the responses which took a year, at a cost considerably in excess of the cost of Formic. For any future large-scale surveys, this factor should be included in any budget proposals.

The North Wales Research and Development Support Services (NWRDSS) were contacted in 2002 for advice on protocols for surveys on the general public. The Somerset NHS Trust Lifestyle survey was examined and the methodologies and data required were discussed with the NWRDSS department at Bangor University. Oppenheim (1987), Fink (1995) and HMSO McColl et al. (2001) were also considered for the formulation of the questions.

Having drafted an initial questionnaire, it was piloted locally. It was sent to 50 people, which was 1% of the final number intended to be sent out. The responses were considered and a few minor changes in layout were made to make it visually easier to read and less distracting. Most people in the pilot group commented that although it was quite long, it was manageable. 2 found it very difficult, 1 gave up, 5 commented on specific questions, not fully understanding what was asked but 42 commented that it was not a problem and it took them approximately 20 minutes to complete it. The comments from the 5 were acted upon, to aid clarification of the relevant questions. When translated into Welsh, by the Bangor University translation department, further pilot samples were sent out to evaluate if the translated version was accurate for local Welsh speakers. It was found that some of the "technically correct" Welsh words, were not those in common usage locally so alterations were made to suit the local use of the language following comments by the pilot participants.

After several redrafts including the pilot trial, the questionnaire was submitted to the ethics committee at the North West Wales NHS Trust (NWWT) by the author. It was originally intended to send the survey to people on GP patient lists as the Anglesey GPs were totally supportive but the ethics committee felt this was inappropriate as it may contravene the Data Protection Act. Instead the electoral roll was used to obtain the names of the adult population of Anglesey as this information was in the public domain. Every 10th name was selected for the survey. Ethics committee approval was granted in June 2002.

A bilingual letter was sent (Appendix 5.1, 5.2) with the survey to all 5,000 people explaining the purpose, the fact that it was non-commercial, an NHS project and emphasizing the anonymity and confidentiality of the survey. The letter explained that the questionnaire would not be identified with the respondent's name i.e. it would be anonymous but had sequential numbers for tracking purposes only. No identification would be linked to the information received, which was covered by the Data Protection Act. The unique number was used for 2 purposes, firstly to track those who did not return it by the 2-week deadline, a reminder letter was sent out. Secondly, the number was also used to distribute prizes. These were 15 prizes of £50, donated by the British Heart Foundation as an incentive. Confidentiality was strictly observed for the data provided by the participants; there were no names in the database of survey responses.

It was posted the third week in November 2002 to 5000 adults, selected from the electoral roll. In 2002 the total population of Anglesey was 66,829 (National Statistics Online, 2001b), the questionnaire was sent to every 10th person on the electoral roll, resulting in 10% of adults and 7.5% of the total population of Anglesey receiving it. By 12th December 2002, 1862 replies were received from the first posting, which was a 37% reply. A postcard reminder was sent January 2003, which resulted in 90 further replies, as a 50% response was the target, further questionnaires were sent out. The final response was 2,562.

The Calon Lân questionnaire was sent out the week commencing 18th November 2002 with a 2-week return date, despite the proximity to Christmas, 50% return was achieved. Anecdotally, lifestyle, dietary habits are more likely to be untypical over the actual Christmas holiday week and immediately afterwards in the New Year period, pre-Christmas is likely to be fairly normal. The analysis of the data received was undertaken using the Statistical Package for Social Sciences (SPSS) version 12. (Full report, appendix 5.7). The results are given in Chapter 4. The food and diet section of the Calon Lân survey was repeated in 2007, in Study 3 some of the original respondents replicated the Food and Diet section (summary of results Appendix 5.5 and 5.6).

The Calon Lân survey provided information on the eating habits of the population of Anglesey. The aim was to confirm formally the anecdotal impression that the eating habits of sections of the population needed to improve to reduce the risk of CHD, with a view to designing appropriate studies to find effective methods of addressing the situation.

Following the action research path, having identified the initial problem anecdotally and formally confirmed from the findings of the Calon Lân Survey, that there were eating habits which contributed to the risk factors for CHD amongst the population of Anglesey, Study 1 was designed. This next stage in the action research sequence was to identify whether people read food labels and to what extent they felt they understood them, with a view to addressing this in further studies. It was also planned to investigate whether different groups showed differing levels of understanding, i.e. whether sex or age was a factor in label use and understanding. Findings are shown in Chapter 4, 4.2, p. 174 and Appendix 5.3 p. A22.

3.7 Study 1: Identifying use of food labels

3.7.1 Background,

It was seen from the Calon Lân survey (Chapter 4, 4.2 – results) that several aspects of the local population's diet were poor (e.g. low fruit and vegetable consumption). The literature review confirmed the anecdotal impression from work as the dietitian on the Calon Lân cardiac disease prevention and rehabilitation programme that people were unsure of nutrition and labelling and how to interpret it. The next stage in the action research path was to investigate various methods of influencing people's food choices and behavioural change in eating habits. Food label information is one device used to help people to make appropriate food choices. Clinical experience working with patients had suggested that many people did not understand the fundamentals of nutrition or nutrition information on food labels and many patients had stated labels confused them. This made it difficult for them to make informed choices about healthier food purchases and consumption. This next stage in the action research cycle led to the research questions; if people do not understand nutrition, do they read food labels and if so do they feel they understand them? This study was intended to discover whether the study population read labels, did they feel they understood them, did they want to know any more about them and were there any factors which influenced the reading of labels.

One of the roles of the dietitian is to advise individuals about their specific nutritional requirements and how to achieve them (DoH, 2002b). The current range of labelling options may hinder the consumers' ability to read and interpret food labels and compare different foods when trying to make informed purchasing decisions or to make comparisons between different manufacturers and products. The unhealthy eating habits identified in the Calon Lân survey together with the lack of knowledge and understanding of nutrition and food labelling seen in the patients on the cardiac rehabilitation programme and general public in health eating and cooking sessions, led to the need to identify initial levels of label reading in Study 1. This study was to determine the extent of the use of labels in the local population and the participant's perceived level of understanding.

3.7.2 Study 1: Aims and Objectives

Following the action research model, the study was intended to discover

- To what extent did people actually read labels?
- Did they think they understood them?
- Did they want to know more about food labels?
- If they did want to know more, what?

- Did they have any comments about labels?
- Did some population sub-groups read labels more than others? i.e. men/women, younger/older.

Purchasers may well be attracted to certain products by the appearance of food labels, well known brands or perceptions of 'socially responsible' food manufacturers. However, beyond this commercial dimension, to what extent are purchasers influenced by food labels, do individuals understand the nutritional information provided in these labels? Reflection on the researcher's experience taking people/patients to supermarkets and giving tutorials on understanding nutrition labels had suggested that when people read and understand the information on the label, it does affect their shopping choices. It is important to improve the knowledge of those who are responsible for purchasing food products in order to enable them to make informed and hopefully healthier choices. However, it is also important to provide clear information for specific 'groups' of consumers who might be more inclined to read food labels, for example, people with diabetes and those recovering from heart problems or those with specific dietary disorders such as Coeliac Disease. Of those who wish to lose weight, there tend to be more women than men. Both Weight watchers and Slimming World indicated that 95% of their customers are women, (WeightWatchers, 2004).

Having established from the Calon Lân Survey that the incidence of some of the risk factors for CHD was higher on Anglesey than the national average and that some of the dietary habits needed to improve, Study 1 was intended to establish to what extent people read food labels and their perceived understanding of nutritional information on them. Although the study population were all attending dietitian's clinics, this initial study was to determine the extent of label reading and understanding and whether the study population wanted to know and understand more about nutrition labels. It could be that this group might have a greater interest in nutritional content than the general population, however, they were all attending the clinic for their first appointment so should have no more knowledge of nutrition than any member of the general public.

In the literature reviewed in Chapter 2, health promotion models indicated that before people can change (what they are eating), they need to have knowledge and understanding (i.e. know what is contained in each type of food and understand what their requirements are). The Calon Lân Survey showed the population on Anglesey had higher intakes of Calories, fat, saturated fat and salt than rest of Wales/UK. From the Calon Lân survey it was found that peoples' dietary intake needed improving to reduce risk factors for heart disease, hypertension and diabetes. Following the findings of the Calon Lân survey, for this research, studies needed to be designed to find interventions to improve people's dietary intake, consequently the action research pathway was developing into a series of studies planned as follows:

- Study 1, an initial survey to identify label use in the study population
- Study 2, a second survey to identify participants' understanding of nutrition and labelling as a basis for a further study; and to develop information in collaboration with the study population and others.
- Study 3 a further quasi experimental survey, to identify whether nutrition and labelling information interventions could improve people's food purchasing choices

However, following the action research concept at each stage the research pathway and detail of actions would be adapted and amended according to the findings and views of the participants in order to develop and inform practice.

3.7.3 Study 1: Design and Method

Study 1 was designed as an exploratory investigation to discover whether people read food labels and whether they felt they understood them. The findings would lead to the development of further studies leading along the path towards discovering effective methods of dietary change.

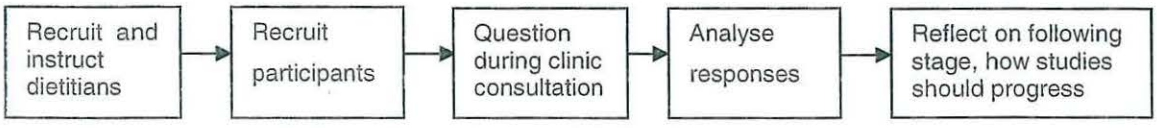

Figure 3.3 Study 1 design

The Study 1 questionnaire was issued in September 2003, following approval by the North West Wales NHS Trust Research Ethics Committee, obtained in August 2003.

A questionnaire survey was undertaken by four dietitians asking three questions to 100 out patients (participants) relating to their understanding of food labels. The data collection form (Appendix 6.1 A93) was completed by the dietitians contemporaneously. Although the participants were dietetic outpatients, they were otherwise representative of the general public in that approximately 50% were male (46% male, 54% female) and there was a wide age range from 16 to 85. A breakdown is given in the results in Chapter 5. Four dietitian colleagues working in outpatient clinics in North Wales were each requested to ask 25 clinic patients attending their first consultation a series of short questions regarding their understanding of food labels and a further question asking for comments on their individual requirements (data collection form Appendix 6.1 A93).

As the patients had all been referred to see a dietitian, they might have had some dietary knowledge as they had a specific condition for which required dietary advice. However, the fact that they had been referred to a dietitian possibly indicated that they needed advice, also the dietitians were asked to conduct the survey with patients attending their first appointment, so they would have no more information at this stage than any other members of the general public. They were representative of the general public in that the study was concerned with identifying the extent of the problem (i.e. people not understanding food labels) rather than with individual behaviour at this stage. Clinical experience has shown that of those referred virtually all have a very limited knowledge of nutrition and labelling. The sample was indiscriminate, a non-probability sample (Fink, 1995,p.23) in the context that no participants were specifically chosen other than it being their first appointment and adopting the "Taxi Rank" principle (they were the next in line on the dietitians' clinic list). Their names and reason for referral were not included as this would breach patient confidentiality and was not relevant for the purpose of this study.

Data collection

Gender	Age	1. Do you read food labels?	2. Do you understand food labels?	3. Would you like to know more about food labels?	4. If so what?	Comments

Table 3.4 Short initial questionnaire, showing the questions asked.

Oppenheim (1966; 1986) stated than a closed question requiring an answer such as "yes" or "no" can be attitudinal as well as factual and that a closed question loses the opportunity for spontaneity and expressiveness, however, in this questionnaire, a factual answer is looked for, i.e. does the person read labels or not. Providing a range of answers to choose from, which could manipulate or bias the response, could influence an attitudinal answer.

The research undertaken by the Coronary Prevention Group in 1990 asked a very similar question;

> "Do you look at the nutrition information on food packaging?"
>
> (Coronary Prevention Group, 1990).

One of the limitations of closed questions (where the answer is yes or no, or one of a group of predetermined answers) is that choices may 'lead' the respondent. In this case the respondents may have subconsciously felt that they "*should be reading labels*" so might have answered more positively than was actually the case. However questionnaires frequently use closed questions with a "yes/no" response. Closed "yes/no" questions are recommended by several authors on questionnaire design as an efficient method of providing factual answers which are quick to analyse and many recommend avoiding open ended questions which require open, possibly lengthy answers (Frazer and Lawley, 2000: pp.16, 27, 29, 38; Gillham, 2000:pp.4, 7, 71; Schuman et al., 1983; Oppenheim, 1966; 1986).
Consistency of data collection between the 4 different dietitians collecting data was assured by providing a short, standardised questionnaire with 3 closed questions on a form with spaces for 25 patients (Appendix 6.1). They focused on three closed questions with little opportunity to influence the participants'

comments or be distracted and digress into unrelated areas. There is the danger that people may give the response they perceive the questioner might want or expect. In this case, because this had been anticipated, the dietitians were asked to tell the patients that it did not matter whether they did or did not read labels, or whether they felt they understood them but that the researcher just wanted to find the facts. A further fourth open question was asked "Would you like to know more about labels, "If so what?" (would you like to know more about [labels]). There was a final box for comments. Clients were asked if they would agree to take part and answer the questions, they were assured of confidentiality and that their decision to participate or not would have no influence on their treatment. Each new patient was asked in turn as the dietitians went through their clinic list, all potential participants agreed to answer the questions. All 100 participants answered all the first three questions. For the last comments option, some who made comments made more than one and others made no observation. Data collection stopped once 100 participants were achieved.

Analysis of the data collected was undertaken using SPSS version 12, logistic regression and Chi Squared tests were run, the results and findings are to be found in Chapter 5 (Siegel and Castellan, 1988).

3.8 Study 2 Refining the Food Label and Guidance Tool (FoLaG) and identifying knowledge of nutrition

3.8.1 Method

The North West Wales NHS Trust Ethics Committee had granted ethics committee approval for this series of studies. The first phases the Calon Lân survey identified the eating habits of the population, which were a risk factor for CHD. Study 1, the second stage of the action research progression identified that although a high proportion of the participants read labels, they stated that they did have a problem understanding them. Reflections on the areas identified as being problematical for people led to the need to design a more specific study to identify what people did or did not know about the function of nutrients and the daily quantities required. Study 2 was designed and undertaken to discover the extent of the study population's lack of knowledge of nutritional functions and requirements and further to develop materials to address the problem.

At this stage, the action research spiral had followed the direction of anecdotal identification of the initial problem of poor diet and lack of understanding of food labels and nutrition. This was followed by the first reconnaissance or fact finding from the formal identification of the dietary intake by the Calon Lân survey, i.e. the eating habits of the local population having high risk factors for CHD and continued with further studies to find an effective method for change. The second stage was Study 1 to identify the extent of label reading, reflection on the findings, which led to Study 2. The principal rationale for Study 2 was further reconnaissance to identify the extent of the participant's knowledge and understanding of daily requirements and functions of nutrients, combined with the development of intervention material in collaboration with the participants. This involved the further design of the information tool, the Food Label and Guidance (FoLaG) the development of which had started in collaboration with previous groups.

3.8.2 Study 2 Part 1 FoLaG development by various groups

The initial idea for the development of a food labelling aid, which could be used in supermarkets was originally raised as a result of supermarket visits with patients, healthy eating groups and the Operation Christmas Turkey (OCT) group. The initial design of the FoLaG was started with the OCT group and followed by reflection on comments obtained from a questionnaire and collaboration of the participants of Study 2, as illustrated on page 140, the development of the FoLaG was undertaken by various groups as follows:

3.8.3 FoLaG development 1. - OCT Group

After the supermarket tour with the OCT group, it was decided to devise some information, which would help them interpret information on food labels. An initial meeting was held with the OCT group, to decide what they felt was needed to help them understand nutrition and labels. There were 6 participants, the meeting was 'workshop' style held in a room in a community centre. It was explained to the 6 that the aim was to develop a 'tool' that would help them but it would be also given to a wider audience. Some examples of food labels from food packets were provided and the 6 were asked to write a list of which items they found difficult. A précis of their responses are given below as some were repeated:

What does kj mean?	Why does it say kcal?	Why per 100g?
What are saturates?	How much of......... should we have?	
What is a lot of ....?	How much should I weigh?	
How many alcohol units are in...?	Why don't beer and wine have nutrition labels?	

Also discussed was what format they would like. Healthy eating and labelling information booklets (BHF leaflets) were shown as examples for discussion. The group generally dismissed these as being too big and having too much 'writing'. A consensus opinion was that a small easily portable information sheet with minimum information in table format, would be the best option, which could be easily folded, able to be put in a purse and referred to in a supermarket as an aide memoire.

Following on from their questions (listed above) the group decided that they would like the following to be included:

1. A short explanation of the abbreviations found on labels.
2. Dietary target amounts of the main nutrients for men and women
3. 'something' about fats
4. How many units in different types of beer, wine etc.
5. A blank table to work out what they were buying.

As a result the initial design draft was the "Food for thought – What's in it for me? (Appendix 7.6.1) This was given to the group at the next meeting and cooking session, they were asked to use it when shopping and report back on its content and usefulness.

The group only met once again after the cooking session, which was for a final very busy practical cooking session. There was very little time to obtain any formal feedback, four members of the group said they had used it and it had been 'helpful' and that they liked it. As there was no opportunity to take it further with the OCT group, it was decided to move the design and refinement of the 'tool' to another group, the cardiac rehabilitation (CR) group, as they had also discussed wanting some form of food labelling aid.

3.8.4 FoLaG development 1. – Cardiac Rehabilitation (CR) Group

The CR group was undertaking a 20 week rehabilitation programme, which included nutrition education. During the sessions, some patients had asked for information on blood lipid levels (Cholesterol) this information was added to the draft already worked on with the OCT group. The CR group (n=14) was asked if they would like to be involved by staying on after the CR session to help to develop a food and labelling aid, 8 said they would be interested. A focus group session was held with 7 who stayed after the CR session. Prior to the group being given a copy of the amended 'tool' as designed in collaboration with the OCT group, plus cholesterol information it had been decided to call it the "Food Label and Guidance tool" (FoLaG). The group were asked the same questions as the OCT group about what they would like in the tool and given the same sample packets with nutrition labelling panels, copies of healthy eating and BHF labelling leaflets as the OCT group. The group were given time (30 minutes) to look at the packets and booklets and discussed them amongst the group. The CR group found similar aspects of labelling difficult to understand, again their answers are provided below. A table of the responses is in Chapter 6 Study 2 results (p.213).

What does kj mean?	What does kcal mean?	Why per 100g?
What are saturates? – of which?	How much of... should we have?	
What is a lot of ...?	How much should I weigh?	
How much is a portion of fruit?	What's the difference in calories fat/carbs?	
Can blood levels be explained?	How can you work out alcohol units?	

The draft FoLaG initially developed with the OCT group with the added blood level section, then with the CR group. They were asked to discuss between themselves what they thought about it, what they would like adding, or removing and any other comments. An open question and answer session followed using a flip chart to record their ideas and comments.

3.8.5 FoLaG development 1. – General Public (GP) Group

The same process was undertaken with a third group of members of the general public (GP), who were voluntary recruits for six sessions of 'healthy eating' talks. The FoLaG focus group session with the GP group was held at the beginning, before they received the healthy eating talks. Putting all groups' comments together produced a redesign of the FoLaG (Appendix 7.6.2). In accordance with the requests of the participants, the FoLaG was redesigned in colour, with the blood levels section removed. (a separate version with the blood levels included was designed for the CR group: Appendix 7.6.3). Additional information on fats was included and fruit portion size examples were given as it had been decided to include these by the groups. The OCT group's original idea had been to use a separate sheet for each shopping session but this was unworkable both in practical terms and in the credit card sized format as the design had changed to a folded and glued card, folded to credit card size, as suggested this to put it in a purse or wallet. Follow up sessions were held with both groups (CR and GP). Both groups were very positive about the revised designs and neither group suggested further amendments. People had commented that although it contained a lot of information, they could pick what they wanted from it and ignore what was not relevant to them.

3.9 Method Study 2 - questionnaires

Continuing cycle of steps above, returning to steps second stage if necessary

In parallel with the process of designing the FoLaG in collaboration with the groups of participants, a second phase of Study 2 was the questionnaire designed to find out the extent of the participants knowledge and understanding of the functions and ideal daily quantities of nutrients required, with the intention of developing a further nutritional information leaflet, specifically to address those problem areas. Specific reference to questionnaire design was obtained from Oppenheim (1966, 1986), Fink (1995), Frazer and Lawley (2000), Gillham (2000) and McColl et al. (2001).

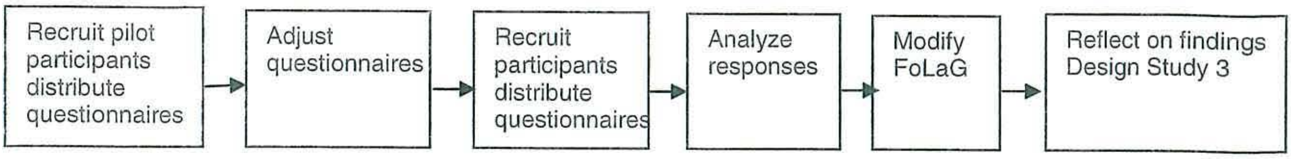

Figure 3.4 Study 2 design

A small pilot study was undertaken to identify whether any problems with the forms or questions was an obstacle to the participants. Six people who were part of the cardiac rehabilitation (CR) programme were shown the forms at one of their CR sessions and agreed to complete them. This was done around a table in the presence of the researcher. These 6 people did not comment at the time that they found the forms daunting or confrontational, which were comments from some of the actual Study 2 participants. As a result of comments made by the pilot study participants, minor modifications relating to layout of the forms were made but none relating to content. Two questionnaires (Appendices 7.5 and 7.5) and accompanying explanatory letter and consent form (Appendices 7.2 and 7.2) were issued to 80 people who were recruited by personal contact, some were patients who were attending the cardiac rehabilitation programme. It was not felt that this would preclude them as Study 2 was designed to discover what people knew or did not know and understand about nutritional requirements and functions. The fact that some participants were patients was irrelevant. The "pack" provided included an explanatory letter (Appendix 7.1), the two questionnaires, a consent form (Appendix 7.2), the "Food Label Guidance Tool" (FoLaG) (Appendix 7.6) together with a stamped addressed envelope, which was provided for the return of the completed questionnaires. The participants were given the questionnaires by hand with a verbal explanation, 80 questionnaires were issued and 30 were returned completed. The 30 participants comprised the following; 7 were members of the public who were voluntarily attending healthy eating sessions. These 7 were asked to complete the first part of the questionnaire (establishing their nutritional knowledge) before any healthy eating information was given. Seven were attending the cardiac rehabilitation programme, 18 other participants were members of the public who were recruited face to face amongst these, 1 was a health visitor, 2 were nurses and 4 were students. The participants comprised 8 men and 22 women. In both Studies 2 and 3, recruitment has been an obstacle, despite people stating they were interested in learning more about nutrition and labelling, disappointingly small numbers have been recruited. Possible reasons for this are discussed further in this chapter and in Chapter 7. The professionals were included as their area of health specialism was not specifically nutrition related e.g. Smoking Cessation

Age range	Gender
21 to 80	M= 8 F = 22

Table 3.5 Study 2 population characteristics

The female dominance of the volunteers both in Study 2 and 3 may reflect the predominance of women as the principal food shoppers (Oakley, 1976; Falk and Campbell, 1997). The age range of Study 2 participants was from 21 to 80, with the mean age being 49.

Part one of Study 2 was a questionnaire (Appendix 7.4) with the same tabular format used on the nutrition information panels on food packets. The study participants were asked to complete this with their estimation of how much of each of the main nutrients they required each day and to write what they thought was the function of each nutrient.

For the second part participants were provided with the "Food Label Guidance Tool" (FoLaG) "What's in it for you?" (Appendix 7.6), which provided eight sections of information:

1. Abbreviations found on labels
2. Typical values found on labels
3. Guidelines for amounts of macronutrients in grams per 100g of a food that constitute "a lot" and what is "a little" (Ministry of Agriculture, Fisheries and Food [MAFF] 1998)
4. Dietary target amounts for men and women
5. An explanation of the effect of different types of fats
6. 5 a day fruit and vegetable portion guidelines
7. Alcohol units and Calories in "pub measures"

8. Normal blood level ranges, included to raise awareness of cholesterol levels, as an incentive to improve dietary intake

The participants were instructed to read the tool at home and refer to it when shopping for a period of approximately a month, or at least three main weekly shopping trips and compare labels on food products using the tool for guidance. The participants were then asked to complete the Feedback Form (Appendix 7.5) at the end of this period.

The findings (Chapter 6) showed a low level of understanding of the function of nutrients and quantities required. The primary reason for Study 2 was to assess the level of knowledge of nutrition and labelling with a view to developing appropriate information. In addition, the focus group sessions discussing the content of the FoLaG had suggested that a fuller explanation could be provided in the form of a leaflet. At further sessions with both the CR and GP groups they were asked what content they would like included, some sample nutrition information leaflets were shown to the groups. Both groups commented that they were too long and "wordy", both wanted very short descriptions and asked for brief explanations. Shortly after Study 2, at the time of the focus groups, the new formats for food labelling were being introduced, i.e. GDA and the FSA Traffic Lights. The focus groups requested short explanations on the following:

The new types of labelling (GDA and Traffic Lights)

Calories	Carbohydrate
Fats	Sodium and Salt
Protein	Fibre
Vitamins	Alcohol units
Additives	Use by, best before, low fat

Once the leaflet was designed and produced according to the requests of the focus group participants it was shown to them and discussed. Very positive comments were given and minor layout alterations were suggested and made. The amended leaflet (Appendix 8.10) was produced bilingually in English and Welsh, then used as an intervention along with the FoLaG in Study 3.

Both in the design of the FoLaG and the Nutrition Information leaflet, it was imperative that the researcher should "take a back seat" being particularly conscious of avoiding influencing the development of the materials and that these were the result of democratic decisions by the participants of the groups involved and followed their requirements rather than any preconceived requirements on the part of the researcher. The factual information requested was of course provided as requested.

3.10 Study 3 – Evaluation and measuring changes, method

Study 2 (Results Chapter 6) found that in the study participants, there was a low level of knowledge and understanding of both the functions of nutrients and quantities required. The literature review had not found any nutrition education intervention studies in a real life situation (no studies in this field had been found conducted in Wales), together with the findings from Study 2, brought about a decision to design a further study (Study 3) comparing food purchases of control and intervention groups, with educational material as an intervention. As the various groups had requested and contributed to the FoLaG and Nutrition Information leaflet, it was decided to conduct a further study, using these as intervention materials. The final study's aim was to measure whether increased understanding of nutrition and food labelling could bring about behavioural change (Tones, 1984), particularly in a real life situation. Study 3 used the educational materials developed with various groups to address the lack of understanding found. It measured whether changes could be made to food purchases by increasing knowledge and understanding evaluating combining education and modification of behaviour change. Study 3 also considered the recently introduced types of food label information and used itemised till receipts to measure change in purchases.

Study 3 compared the differences in food purchases over a period, examining whether as a result of the education/information interventions provided, the participants changed their regular items purchased for healthier choices. For a total analysis of food intake, it would have been necessary for the participants to complete detailed food diaries but for this study, indications of trends of changes in choices of foods were required and from Ransley's work using till receipts, it has been shown that supermarket itemised receipts could provide sufficiently accurate evidence of nutrient intake that comparing several weeks shopping would show any changes achieved (Ransley et al., 2001).

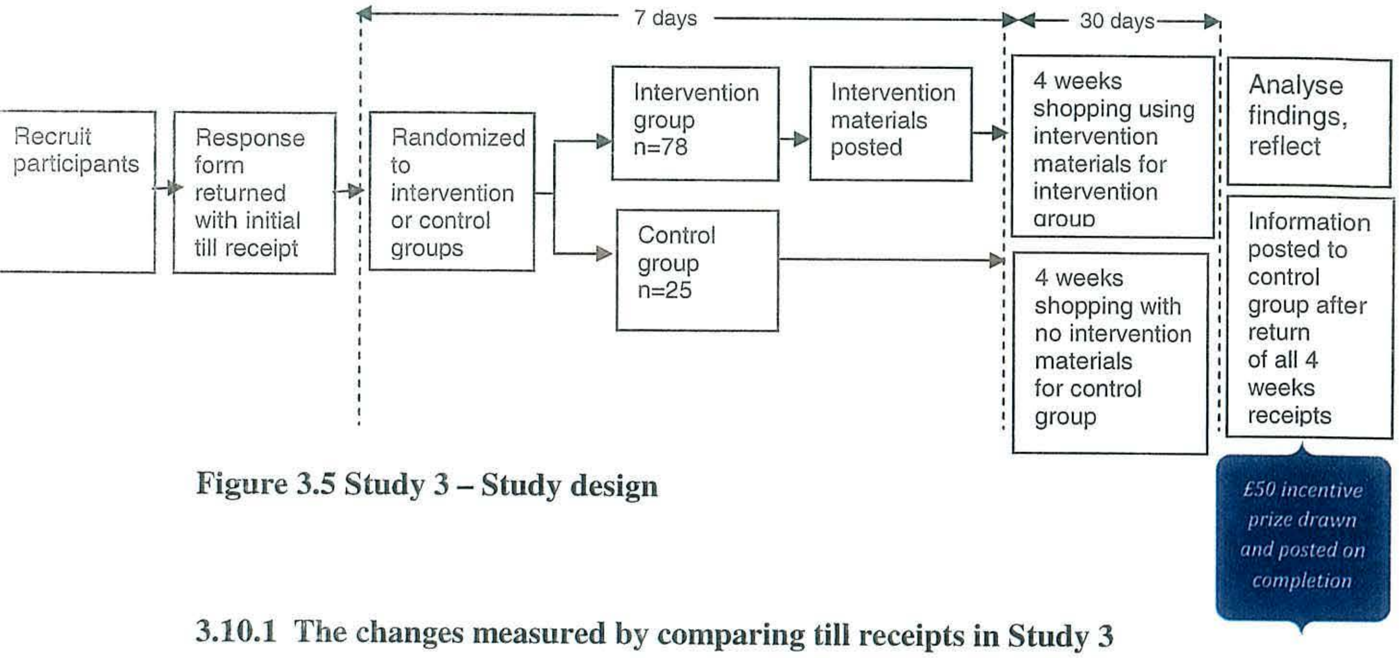

Figure 3.5 Study 3 – Study design

3.10.1 The changes measured by comparing till receipts in Study 3

Following the COMA report (1991) which showed dietary changes required nationally and the local dietary patterns from the Calon Lân survey, markers to indicate the desired modifications were as follows:

1. Increased amounts of fruits and vegetables purchased

2. Purchases of saturated fats decreased and changed to monounsaturated spreads/oils shown by a reduction in purchases of lard or butter and a slight increase in purchases of vegetable oil or monounsaturated spreads

3. Changes from polyunsaturated spreads to monounsaturated spreads and oils requires either no change or minimal decrease

4. A reduction in highly salted foods, indicated by a reduction in the purchases of ready meals and processed foods

5. A reduction in white cereal products, indicated by a change to an increase in coarse/wholegrain cereals purchased

6. A reduction in high fat and processed foods shown by a reduction in total fat content of foods chosen – more reduced fat products

3.10.2 Method Study 3 Part 2 Recruitment

Sample selection

Recruitment was carried out in 5 groups, described below. Table 3.8 below summarises the responses.

1. Schools

Two thousand recruitment forms were given to pupils in schools to take home to their parents to ask them to take part. Although school children do not have control over food purchases, the role of the school children was as a conduit to reach large numbers of people i.e. their parents. All documentation for Study 3 can be found in Appendix 8 and is listed below). The primary schools were all on Anglesey; secondary schools were at Amlwch, Menai Bridge, Llangefni and Holyhead on Anglesey and one secondary school in Bangor. All schools were issued with a bilingual poster (Appendix 8.1) and a post box for the completed forms to be returned to. For the primary schools the process was explained to year group teachers. At 3 of the secondary schools, the forms (Appendix 8.2 and 8.3) were given to year 7 and at two, Llangefni and Menai Bridge, the forms were given to year 11 pupils, the study was explained to the pupils who were given the forms personally to take home to parents. For the primary schools visited the research process was explained to teachers and in 2 cases groups of children who were given the forms.

Of the 2000 recruitment forms issued to schools, only 57 forms were returned completed with 1st till receipt. Of those, only 36 provided 3 further till receipts and completed the 2 questionnaires (concluded = completed all the forms and provided 4 week's till receipts). Two who did provide 4 till receipts but were incomplete were excluded. This was a completion rate of 1.8%, reasons for this low rate of response are examined further.

2. Supermarket face to face

Three days were spent in 3 different supermarkets, Tesco in Holyhead, Lidl in Llangefni and Co-op in Menai Bridge, trying to recruit people to undertake the survey. Only 7 people agreed to complete the recruitment form and of those, only one completed the whole to conclusion. Although this shows a return completion rate of 14.3%, this does not take into account a large number of shoppers who were approached but declined.

3. General public face to face

In addition to efforts to recruit people in supermarkets, members of the public were recruited face to face. Of this group, 75 completed the recruitment form of which 34 completed all the stages of the survey (concluded). This group showed the highest rate of completion at 48.7%, which may have been due to the increased personal contact as at this stage the very low return rates from the schools and supermarkets was apparent, which was explained this to the people recruited in this 'face to face' group. In addition, each participant was given a more detailed explanation of what was required and the process of anonymity.

4. University

Six people were recruited at Bangor University (Administrative staff) and 2 completed to conclusion, this represented a return of 33.3% which is the second highest group. Despite the small numbers recruited, university staff were aware of the difficulties in recruiting people for surveys and were very supportive.

5. Calon Lân previous responders

The Calon Lân Lifestyle Survey (Chapter 5) was sent to 5000 of the adult population of Anglesey in 2002. In the 2002 survey, after 2 reminders, 2562 were returned. As circa 50% had returned the survey in 2002 it was decided to reissue the food and drink section along with the Study 3 food labelling survey to the original responders. The original survey included both women and men over 17 but with no upper age limit.

The original Calon Lân responders were screened, all those over 65 were removed, as Study 1 had shown that as people age they read labels less and less. There was further screening (using the Exeter database of GP patients) to remove those who no longer lived on Anglesey and also to ensure that no surveys were sent to anyone who had died since the original 2002 posting. This screening was undertaken using the Exeter database and was undertaken by an Exeter authorized member of staff from the North Wales Health Board's Business Services Centre Mold. This resulted in a list of 822 of the original 2562 responders. The 822 Calon Lân participants were sent a pack by post, which included a letter in English and Welsh with an explanation of what was required for Study 3, (Appendices 8.11 and 8.12). The pack included bilingual recruitment forms (Appendices 8.2 and 8.3) requesting participation, together with a short bilingual (food section only, Appendices 8.15 and 8.16) repeat of the original Calon Lân survey undertaken in 2002. Short information sheets providing some of the results of the original survey were included in English and Welsh (Appendices 8.13 and 8.14). Only 27 of the 822 returned the first recruitment form and volunteered to participate but all 27 completed. This represents a 3.3% return from the 822 but 100% of those who returned the initial recruitment form completed. This was the only group that showed a high completion rate.

A comparison of various characteristics of the control and intervention groups was analysed to ensure the 2 groups were not significantly different. The analysis was undertaken using Crosstabulation and Chi squared tests using SPSS version 16, results are given in Chapter 7.

The intervention material supplied was firstly the Food Label Guidance Tool (FoLaG) (Appendix 8.8, A114), the labelling aid developed with various groups and in Study 2 and amended as a result of the Study 2 participants' comments and findings. This credit card sized food labelling and nutrition guide was designed to be taken to supermarkets and used in situ as an aide memoire. It provided information on nutrition guideline requirements for men and women.

The participants were also given the Nutrition information leaflet (Appendices 8.9 A115 and 8.10 A119), designed in response to the request of the participants of Study 2 and others. This gave brief information on energy expenditure, explanations about the functions and amounts required of the macronutrients i.e. carbohydrates, proteins and fats and information on micronutrients i.e. vitamins and minerals. A list explaining "E" numbers and their functions was also included as this had been requested. The participants had specifically asked for the information in the leaflet to be as short and to the point as possible as previous existing examples were "too wordy".

3.10.3 Documentation used and Intervention material, Appendices for Study 3

8.1	Poster for Study 3 A107	8.10	Food and label intervention booklet (W)
8.2	Recruitment questionnaire - English	8.11	Letter to Calon Lân respondents (E) A123
8.3	Recruitment questionnaire - Welsh	8.12	Letter to Calon Lân respondents (W)
8.4	Questionnaire 1 in English (E) A110	8.13	Summary of CL survey 2002 results (E)
8.5	Questionnaire 1 in Welsh (W) A111	8.14	Summary of CL survey 2002 results (W)
8.6	Questionnaire 2 (E) A112	8.15	Food & Diet Calon Lân questionnaire (E)
8.7	Questionnaire 2 (W) A113	8.16	Food & Diet Calon Lân questionnaire (W)
8.8	Revised FoLaG A114	8.17	Data collection form for Study 3 A131
8.9	Food and label intervention booklet (E)		

Those who returned the first recruitment form with the first till receipt were then randomised into 2 groups as follows:

3.11 Randomisation for Study 3 – Evaluation and measuring changes

Randomisation was achieved by alternating sending the second questionnaire and intervention literature, the labelling aids (intervention group) and control (no information), 3 participants were given intervention information, followed by 1 control in turn. The control group participants were one quarter of the participants and were provided with the information after they had provided the 4 till receipts. Repeated measures ANOVA type III sum of squares, which is the default in SPSS, allows for the problem of analyzing disproportionate groups (Tabachnick and Fidell, 1996). An analysis of group characteristics is given in the results section for Study 3 in Chapter 7.

Procedure

Bilingual single sheet A4 recruitment forms explaining the purpose of the survey and asking for contact details were issued as described above. The response rate is shown below. They were to be returned using a FREEPOST envelope provided, together with the initial shopping till receipt. A prize draw for £50 was offered as an incentive, particularly to attract some of the hard to reach sectors.

Summary of response rate:

Location	Number given out	1st form only returned	% 1st form only return	Completed	completion % return
Schools – forms picked up or given out in school	2000	21	1.1%	36	1.8%
Supermarket face to face	7	7	100%	1	14.3%
General public face to face	76	3	4%	37	48.7%
Calon Lân by post	822	27	3.3%	27	100%
University	6	4	66.6%	2	33.3%
Total	2911	62	2.1%	103	3.5%

Table 3.7 Responses to Study 3 Recruitment and Completion

1. Group A, Intervention group. The recruitment form was sent asking for 1 weekly shopping till receipt to be returned. When the applicants had been randomised into intervention or control group, the intervention group were sent Questionnaire 1 (Appendices 8.4 and 8.5) together with labelling and nutrition information (FoLaG and Nutrition information booklet). The participants were asked to read the information and to refer to the FoLaG whilst shopping. The participants then provided weekly till receipts over 4 weeks. The post intervention questionnaires (Appendices 8.6 and 8.7) were sent to intervention group, B on completion of questionnaire 1 and return of the 4 weeks' till receipts to assess their use of the interventions and differing labelling options.

2. Group B, Control – The recruitment forms had been issued as described above, the participants provided their 1st weekly shopping till receipt when they returned the recruitment form. Questionnaire 1 (Appendices 8.4 and 8.5) was sent with no intervention information. They were then asked to send 4 weeks' till receipts and were told that the nutrition information would be sent on completion. The control group participants were sent the nutrition and labelling information after they had provided the 4 weeks' till receipts.

Study 3 compared the differences in the purchases of the control group A with those of the intervention group B over a period of a month. It examined whether as a result of the educational and information interventions provided, the participants changed the items they purchased regularly for healthier choices. To measure changes over the period itemized till receipts were used as an indicator.

3.12 Till receipts collection

Till receipts were collected from all the participants as follows:
1st weeks till receipt/s was returned with the recruitment form in Freepost envelope provided, 2nd, 3rd and 4th week's receipts were returned in Freepost envelope provided at the end of the collection period i.e. after 4 weeks.

The anticipated quantities of purchases for the different categories of foods by each participant were likely to be dissimilar because of normal shopping patterns, i.e. some foods are purchased in larger amounts on a regular basis, such as highly perishable foods (e.g. fruit and vegetables). Whereas foods with a longer shelf life such as canned and frozen goods, or store cupboard items such as rice and pasta are likely to be purchased on an occasional basis. There would also be a difference in the specific types of foods in people's shopping, i.e. families will customarily purchase the same favourite types, i.e. the same brands, types of bread, spreads, cereals etc., whilst other families will buy their favourites, which may be different brands and choices of foods. In addition, it is known that overweight families purchase foods higher in fat (38% total energy from fat) than lean families (34.9%) (Ransley et al., 2003). Any changes in purchases of different categories of foods found would be an indication of trends of modification of purchases.

The till receipts' items were coded into nutrient categories described below. McCance and Widdowson's Composition of Foods (FSA, 2002) was used to calculate the nutrient values. The parameters followed the Food Standards Agency's (FSA) figures per 100g (or percentages) as used in their labelling guidance (FSA 2006a). The food categories, as described above were those shown to require changes (Table 8.3, COMA 1991)

3.12.1 Food categories for analysis:

Fruit and vegetables –	all fruit and vegetable items were included including fresh, tinned, frozen and dried
Saturated fats -	all items containing ≥5% of saturated fats
PUFAs	all items containing ≥5% of polyunsaturated fats
MUFAs	all items containing ≥5% of monounsaturated fats
Ready meals	included items such as pizzas, quiches, sausages and compound recipe dishes such a lasagne or shepherds' pies. The sodium content being ≥300mg per 100g. This figure was calculated taking an average of the sodium mg/100g of basic ingredients i.e. fruits, vegetables, meat, fish, flour, rice, pasta, fats – natural oils, not manufactured fats e.g. margarines.
Whole grains	These included all wholegrain cereal products, such as wholegrain and wholemeal bread, cereals, rice and pasta.
White cereals	All refined processed cereal items such as white bread, breakfast cereals with fibre removed such as cornflakes and rice crispies, white rice and pasta were included.
Full fat items	The level of fat was variable, depending on the product, for example whole milk only has a fat content of 4%, semi skimmed 1.7% with skimmed milk 0.2%. A *change* from whole milk to semi skimmed was included as the indicator measured on till receipts.. Similarly a change from full fat yoghurt 3% to a low fat yoghurt at 1% fat was included. In the case of spreads a full fat spread would be 80% fat, a reduced fat spread could

	range from 25% to 60%, so spreads ≥60% fat content were rated full fat spreads.
Reduced fat items	Using the same parameters as above, spreads with ≤60% fat content were rated reduced fat spreads and changes from higher percentage products were recorded as *change*.

Further explanation of the changes required is described below; the desired changes of purchases in the intervention group for each food category were as follows:

For fruit and vegetables, the desired change was an increase in purchases

For saturated fats a decrease in purchases. In a hypothetical situation, none at all would be bought.

Polyunsaturated fats (PUFAs) and Monounsaturated fats (MUFAs) both have benefits over saturated fats and MUFAs have some benefits over PUFAs but neither was expected to increase in any great quantity. All fats are high in Calories and only very small changes would be required, so it was not anticipated that great changes would be seen. In addition, the message for these might be slightly confused as it is a complicated issue. The desired change is either that:

a) People who previously bought saturated fats e.g. butter would change to PUFAs or MUFAs but in small quantities. As a percentage of the total shopping, it is likely that any changes seen would be minimal.
b) If people customarily bought MUFAs (rapeseed oil, olive oil or products made from them, or PUFAs (corn oil, sunflower seed oil and products made from them such as Flora) pre intervention, no change was required or likely to be found.

For the Ready Meals category, as with saturated fats decreases in purchases were looked for, in a ideal situation, none at all would be bought.

Wholegrains; if people customarily bought wholegrain products there would not be likely to be great increases or change, whereas if people usually purchased white cereal products an increase of wholegrain products bought would be the desired change.

For white cereals, a reduction in purchases of these products was the desired change, in a hypothetical "ideal" situation none at all would be bought.

Full fat items; a change reducing the number of full fat items purchased, to buying more reduced fat items was the desired change. In a hypothetical "ideal" situation, no full fat products would be bought.

For reduced fat items, where people customarily purchased reduced fat products it was unlikely that any changes would be seen, however if previously they exchanged full fat for reduced products, an increase would be the desired change.

For each participant all food items till receipts were coded, counting the number of items in each category, a data collection sheet (Appendix 8.17) was completed for each individual with all 4 weeks' itemized, categorized shopping. This data was calculated as a percentage of the total shopping. The categories of products on the till receipts were counted then calculated as a percentage of the total shopping, thus if week one's till receipt showed 100 items, of which 30 were fruit and vegetables, the shopping showed 30% fruit and vegetables. If in week 2 the receipt showed 100 items of which 35 were fruit and vegetables, this equated to 35% of the shopping being fruit and vegetables. The differences in percentages of purchases from week 1, week 2 etc. would show any *changes* in purchases. This data was then entered into SPSS and the analysed using SPSS version 16 General Linear Model ANOVA Repeated Measures (Field, 2005) tests were undertaken and described in the results, which are given in Chapter 7.

In this research, it was not possible to undertake a detailed analysis of nutrient breakdown of all items purchased. If a till receipt stated "apples" this was counted as 1 fruit/vegetable. In the case of loose apples, a weight was shown on some stores receipts (e.g. 650g) but on some receipts, only "apples", others "Fruit". In addition, although in some cases weights were shown for loose fruit, if the customer bought pre-packed apples, a weight was not given. It was also noted that if one shopper bought pre-packed apples one week, they tended to buy the same type of pre-packed apples in another week. It was decided to calculate by count and calculate this as a percentage of shopping as for the purposes of this study, what was required was an indication of change in purchases.

3.13 Recruitment - Low recruitment

The aim of Study 3 was to investigate changes in food choices, specifically measuring items requiring change indicated by the COMA reports of 1991 and 1994. Participants were recruited by the methods described. As shown in Table 3.4, the response rate and number of participants recruited for Study 3 was extremely low. The purpose of this qualitative investigation was to explore, clarify and interpret why the Study 3 recruitment and completion rates were so poor and to provide recommendations to increase response rates in future studies in this field (Bate and Robert, 2002; Bateman, 2002). The results are given in Chapter 7.

3.13.1 Method, low recruitment data collection and analysis

The participants for this qualitative analysis were enlisted from those who had initially responded to the recruitment request form for Study 3 (Appendices 8.2 and 8.3) but did not continue on to completion. The first 13 non-completers (in alphabetical order) were interviewed by recorded telephone conversations; their consent was obtained to record (Ethics committee approval had included the interviewing of participants). They were from a cross section of the recruitment sources. As forms were returned in the original data collection for Study 3, they were filed in alphabetical order, rather than the date received. Therefore the dates of response of the first 13 were varied. The telephone interview method was chosen for 2 main reasons. Most importantly, it would be possible to interact with the participants by adapting the ensuing questions according to their answers, rather than by providing an inflexible postal list of questions to be answered.

Secondly, having experienced such low rates of response, it would be clear when the required number was achieved.

Details of the original recruitment process are shown above to describe in detail which areas of recruitment were the most successful. To recruit the original participants for Study 3, the recruitment forms were given to school pupils and parents, sent by post or given face to face.

3.13.2 Method for response evaluation

Pre Collection Material

The question list was formed with the aim of discovering which specific area of the recruitment, data collection and returning information had proved to be the most negative to continuing to completion.

The questions:

1. Why did you take part in the first place? /What motivated you? /What prompted you to take part?
2. Why didn't you carry on?
3. What do you think might have put people off?
4. Was providing till receipts a concern to you?
5. In what way?
6. Did providing receipts seem intrusive?
7. Did the original recruitment form explain what was involved clearly enough?
8. Were there any questions which put you off? 9. Which?
10. Was there anything else which put you off?
11. Was the £50 prize an incentive?
12. Were the booklet and FoLaG card useful?
13. What do you think would increase responses in the future?

Following the overall total of 3.5% response from all sources, telephone interviews were conducted with 13 of the respondents who returned the recruitment form and 1st till receipt only. In addition to the recordings, the responses were hand written. Difficulties had been foreseen with recruiting for the interviews as such low responses had been found in Studies 2 and 3 but all those asked were happy to be interviewed. The responses are shown and a thematic content analysis (Smith, 1992) was undertaken, the results are given in Chapter 7, Study 3 findings.

3.14 Reflections

Despite low recruitment numbers, 103 people enlisted and the 2 groups, intervention and control, whilst disproportionate, retained common characteristics, which are described in Chapter 7. The results of the qualitative survey of the low recruitment are given in Chapter 7, Study 3 findings.

From the literature reviewed, it was concluded that the action research methodology would be the ideal method to enable the research to follow a constructivist, proactive path, reflecting on and reacting to the participants' views, suggestions and actions, together with an increasing awareness of trying to avoid influencing the outcomes on the part of the researcher. Caution was exercised not to use the template of Lewin's action research spiral inflexibly but with McTaggart's viewpoint in mind; that it should not be the *only* model and that flexibility changing from the original plan as the research develops. Observation of the progression and reflection on it will be discussed in Chapter 8.

The routes described in the health promotion models would be followed in this research, i.e. as typified by Tones' Theory of reasoned Action, studies would be designed which raise awareness, provide knowledge, the participant believes in the message provided, their attitude changes, there is support for the change to occur and any changes made will be measured using supermarket till receipts.

The range of food categories might be ambitious for a study conducted with relatively small numbers of participants and over a short period of time. However, if changes were to be found, this would indicate that a larger study, over a longer period would be important.

Chapter 4

Findings - Calon Lân Survey; Reconnaissance and Planning

4.1 Introduction

Baseline Calon Lân (Clean Heart) survey - Findings

This chapter describes the initial reconnaissance, fact-finding exercise, step 2 in Lewin's action research cycle (p.134) and provides the findings related to risk factors for CHD and the diet of the population of Anglesey from the initial baseline Calon Lân Lifestyle survey, which led to the planning of further stages. Also included in the survey were questions on other CHD risk factors, such as smoking and exercise but these are excluded, as they are not relevant for the purposes of this thesis. As a continuation of the action research process, the findings of state of health of the population of Anglesey, in relation to risk factors for CHD the dietary habits from the findings of the food section of the Calon Lân survey, led to the planning and design of the further studies undertaken. The dietitian, the lead on the Calon Lân project team, the author of this thesis, carried out the Calon Lân lifestyle survey

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4.2 Results - Calon Lân Questionnaire

The results of the risk factors for CHD and the food and diet section are shown below. The full report, which includes data on smoking and the other risk factors is in Appendix 5.6. As the incidence and reduction of risk factors for CHD are the focus of this work, the results from the Calon Lân survey on Anglesey are those specifically relating to risk factors for CHD, which can be affected by diet, i.e. food intake, overweight, raised blood cholesterol, raised blood pressure and diabetes.

Weight

The BMI % figures for England for 2004 are shown in red italics. The Calon Lân survey (2003) showed, from descriptives tests, that mean BMI was 26.6 with 42% *44%* of men and 32% *35%* of women overweight (BMI 26-30) and 1 in 4 men 25% *23%* and 1 in 5 women 20% *(24%)* being classified as obese (BMI>30) with

1.1% being in the morbidly obese category (BMI over 40). These figures show a slightly lower proportion in Wales in the overweight category but showed a higher percentage of men who were obese, than in England.

	Calon Lân Survey number (%)
Underweight	49 (2.0%)
Ideal	1169 (48.2%)
Overweight	867 (35.8%)
Obese	312 (12.9%)
Morbid	26 (1.1%)
overweight/obese	1205 (49.7%)
Total	2423 (100.0%)

Table 4.1 BMI of Calon Lân survey respondents

The total figure for overweight or obesity in Wales was 49.7% whereas the figure for England was 55% over the same period. Although the Calon Lân figure is slightly lower than the figure for Wales and England, it is still a concern that nearly 50% of the people on Anglesey are overweight or obese.

Results of incidence of MI are shown below.

		Heart attack, diagnosis/treatment in last 12 months		% of total men and women	MI % UK last 12 months
		yes	No		
Gender	Male	26	793	1.5%	0.79%
	Female	6	999	0.3%	0.44%
Total		32	1792	1.8%	1.23%

Table 4.2 Gender, Myocardial Infarction in last 12 months

On Anglesey, in the previous 12 months prior to the survey, 32 people, i.e. 26 men and 6 women had heart attacks (Myocardial Infarction – MI), which was 1.8% of the survey respondents. A Chi-squared test (Siegel and Castellan,1988) showed significantly ($p<0.001$) higher proportion of men compared to women having MI. The 2003 UK incidence of those having experienced MI in the past 12 months is 0.4% of all men and 0.2% of all women (DoH 2003). The Anglesey

Calon Lân figures for diagnosed with MI is higher than the UK figure for men 1.5%, *0.79%* but lower in women 0.3% *0.44%*.

		Angina diagnosis/treatment in last 12 months		% of total men and women	UK % of total men and women
		yes	No		
Gender	Male	70	776	4.0%	2.5%
	Female	51	984	2.9%	2.0%
Total		121	1760	6.9%	4.5%

Table 4.3 Gender, Angina, diagnosis/treatment in last 12 months

In the previous 12 months, prior to the survey, 70 men, 6.06% *2.5%* and 51 women 4.42% *2.0%* experienced Angina. Chi-squared tests showed significantly (p=0.007) more men than women stated they had been diagnosed or were being treated for Angina. Again the Anglesey figures showed a higher percentage than the UK national figures for Angina (DoH, 2004c).

		Diabetes, diagnosis/treatment in last 12 months		Wales % 2003	England % 2003
		Yes (%)	No	%	%
Gender	Male	75 (4.2%)	778	(6.0%)	(4.3%)
	Female	35 (2.0%)	991	(5.0%)	(3.4%)
Total		110 (6.2%)	1769	(11.0%)	(7.7%)

Table 4.4 Gender, Diabetes, diagnosis/treatment in last 12 months

In the previous 12 months, prior to the survey, 110 people, 75 men and 35 women had been diagnosed or were receiving treatment for diabetes, which was 6.2% of the total survey respondents. Chi-squared tests showed there were significantly more men than women (p=0.05) diagnosed with diabetes. This was similar to the UK national statistics, in the case of men, Anglesey 4.2% with *4.3%* for England. The incidence of diabetes in women was lower in Anglesey at 2%, with England being *3.4%*. The figure for Wales was 6% incidence of diabetes in men and 5% in women, thus the figures for Anglesey were more analogous with those of England than other localities in Wales.

		High cholesterol, medication in last 7 days		% of total men and women
		yes	No	
Gender	Male	157	757	9.2%
	Female	129	956	7.5%
Total	16.7%	286	1713	16.7%

Table 4.5 Gender, High cholesterol, medication in last 7 days

Table 4.5 shows that in the previous 7 days, prior to the survey, 286 people, 157 men and 129 women i.e. 16.7% of the respondents had taken medication for raised cholesterol. Chi-squared tests showed the greater incidence of men having raised cholesterol was significant (p=0.034). Comparative figures for Wales were not available. 16% of those surveyed used butter as their main fat for spreading and cooking, 7% used lard in cooking on Anglesey, again equivalent figures for Wales or UK were not available.

		High blood pressure, diagnosis/treatment in last 12 months		% of total men and women Calon Lân	England 2005 % treated	Wales
		yes	No			
Gender	Male	249	698	(15.8%)	(20.3%)	(18.0%)
	Female	333	874	(21.2%)	(8.4%)	(20.0%)
Total		582	1572	(37.0%)	(28.7%)	(38.0%)

Table 4.6 Gender, High blood pressure, diagnosis/treatment in last 12 months

In the previous 12 months, prior to the survey, 37% of the survey respondents had been diagnosed or were receiving treatment for hypertension (raised blood pressure). Unlike the previous conditions, MI, Angina, Diabetes and raised cholesterol, where in all previous cases, men showed a higher incidence, in the case of raised blood pressure, women had a higher rate but the difference between men and women was not significant (p=0.502). However, both on Anglesey and in Wales as a whole, the incidence in women was higher than in England.

Table 4.7 below, shows that, one third (33.8%) of the study population, ate only 1 portion of fruit or vegetables per day. The government's target of 5 portions a day was only eaten by 4.3% of the survey respondents. The British Heart Foundation figures (heartstats.org 2008) show that only 14% of the UK population was eating

5 portions per day. The average total number of pieces of fruit and vegetables eaten per day by the population of England in 2003 was 1.5. A comparative figure would not be calculated from the Calon Lân survey as it recorded specific types of fruit and vegetables individually. However, they were very low figures, which is a concern.

Number of portions of fruit and vegetables per day	Number of people	% of People	Number of portions per day
0	124	5.5%	0
1	745	33.8%	1
2	638	29.0%	2
3	377	17.1%	3
4	167	7.6%	4
5	95	4.3%	5
6	32	1.45%	6
7	17	0.8%	7
8	1	0.04%	8
10	3	0.14%	10
12	2	0.08%	12
14	1	0.05%	14
15	1	0.05%	15
	Total 2203		

Table 4.7 Number of portions of fruit and vegetables eaten per day

		Salt in cooking			
		yes	No	Total	%
Gender	male	721	361	1113	44%
	female	941	458	1409	56%
Total		1662	819	2522	

Table 4.8 Gender, Salt in cooking

There was a significant ($p<0.001$) difference between men and women adding salt in cooking, it is possible that women do more of the cooking. Comparative figures were not available for the rest of the UK.

A significantly ($p<0.001$) higher proportion of women added salt to meals after tasting the food, nearly 25%, whereas although the proportion of men who added salt without tasting was slightly higher than women at 7.4%. It was not possible to calculate actual salt intakes from the Calon Lân survey but the national statistics for Wales had a lower daily salt intake at 7.9g per day than other parts of the UK, with England and Scotland being 7.7g and 6.8g day respectively (Office for National Statistics, 2006).

		Salt added to meals			
		No	when food not salty enough n(% of total)	almost always without tasting	Total
Gender	male	412	512(20.4%)	185(7.4%)	1110
	female	646	622(24.7%)	135(5.4%)	1404
Total		1058	1134	320	2514

Table 4.9 Salt added to meals by Gender

Vegetarian

	Calon Lân	UK
Men	20 (0.8%)	(2.0%)
Women	56 (2.2%)	(4.0%)

Table 4.10 Incidence of vegetarians on Anglesey and UK

Anglesey has a very low incidence of vegetarians compared to the rest of the UK, particularly low in the case of men. There was only 1 vegan out of 2,562 participants.

Consumption per person/day	Wales	England	Scotland	N. Ireland
Energy kcals/day	2326kcals	2320kcals	2179kcals	2258kcals
Total fat grams	96g	94g	87g	91g
Total fat % of energy	38.3%	37.6%	37.3%	37.4%
Saturated fat g	37.6g	36.7g	34.4g	36.2g
Saturated fat % of energy	15%	14.7%	14.7%	14.8%
Total sugars g	138g	138g	130g	132g
NMES % food energy	15.9%	15.5%	15.8%	15.2%
Fibre grams	14.1g	14.5g	13.3g	14.1g
Salt g/day	7.9g	7.7g	6.8g	7.6g

Table 4.11 Consumption of energy, fat, sugar, fibre and salt, by country of the UK (Office for National Statistics, 2006).

The intake figures for Wales, above in Table 4.11 show that the people of Wales consume more Calories, more fat, which forms a higher percentage of energy, more saturated fat, more sugar and more salt than any other part of the UK and less fibre than England or Northern Ireland.

The total fat intake per day (as a percentage of food energy) in Wales was the highest in the UK at 38.3%, with England and Scotland's intake being 37.6% and 37.3% respectively (heartstats.org 2002-2005 -2008). The UK target is 35% (COMA, 1994).

To improve both the figures relating to CHD risk factors found in the Calon Lân survey and BHF heartstats.org, dietary changes to reduce CHD risk factors would ideally be in line with those recommended by the DoH report (1994) and FSA Wales (2003). The comparison figures for Anglesey were of fundamental importance in planning and designing the approach for change undertaken in the studies in this thesis.

Nutrient	**Recommended intake** (DoH 1991; FSA Wales 2005)	**Current intake** (Gregory et al. 1990)	**Change required**
Total Fat	<35% energy	40% energy	Decrease by 12%
Saturated fat	11% energy	17% energy	Decrease by 35%
Monounsaturated fat	13% energy	12% energy	No change
Polyunsaturated fat	6.5% energy	6% energy	No change
Total Carbohydrate	50% energy	44% energy	Increase by 13%
Starches	33% energy	27% energy	Increase by 22%
Sugars	11% energy	17% energy	Decrease by 35%
Protein	<15% energy	14% energy	No increase
Fibre	18g/day	12g/day	Increase by 50%
Salt	6g/day (2.4g Na)	9g/day (3.6g Na)	Decrease by 33%

Table 4.12 Intake and changes required of principal dietary components

Calon Lân survey, have been diagnosed with:	**Number**	**Percentage**	**England percentage 2003 figures**
Raised blood pressure	583	27.1%	4.5%
Raised cholesterol	355	21.5%	>=5mmol/l 70.5%
Diabetes	110	5.9%	4.0%
Myocardial infarction	32	1.8%	3.8%
Angina	121	6.4%	2.1%
Overweight/obesity	1545	61.6%	67%

Table 4.13 Calon Lân survey CHD risk factors

4.3 Discussion

As a result of the findings in the Calon Lân survey, (CLs) it was seen that the figures for Anglesey for several risk factors for CHD were higher than either the Welsh or UK figures, particularly hypertension, diabetes and Angina.

- On Anglesey, 50% of those surveyed were overweight or obese.
- A higher rate of Myocardial Infarction (MI) was found, CLs 1.8%, UK 1.2%.
- A higher rate of those suffering Angina was found, CLs 6.9%, UK 4.5%.
- A higher rate of Diabetes was found, CLs 6.9%, UK 4.5%.
- A higher rate of treated blood pressure found in women, CLs 21.2%, UK 8.4%.
- 23% were using saturated fats in cooking and for spreading.
- 34% of those surveyed only ate 1 piece of fruit or vegetables per day.
- 63% of those surveyed only ate 1 or 2 pieces of fruit or vegetables per day.

The results above have shown that several of the risk factors for CHD that are influenced by diet were worse on Anglesey than in the UK as a whole. In order to research methods for change, a series of studies were designed following the findings to consider how nutritional intake could be improved on Anglesey. The survey had shown very low intakes of fruit and vegetables, 5.5% eating none, 33.8% having only 1, 29% having 2 and 17% having 3 portions per day, in total over 85% of the population eat between none and 3 portions daily. Also 16% (comparative figure not available for UK) of people used saturated fats for cooking and spreading. The Calon Lân survey found increased rates of MI, Diabetes, Angina and hypertension on Anglesey (compared to the rest of the UK).

4.4 Reflections

Reflecting on the above findings from the initial stage in the action research spiral, reconnaissance, there was an evident need to find some means of improving the dietary habits of the population in order to improve their health by reducing risk factors. Having identified the dietary habits, the main areas that needed improvement were; to reduce the intake of specific nutrients, i.e. saturated fats, sugars and salt. There was also a very important requirement to increase the fruit and vegetable consumption, as this was particularly low. In order to reduce the specific nutrients, the study population would need to understand how to identify them in the various foods they chose, to achieve this, an understanding of nutrition labels on food packets would be required. To progress the action research cycle it was decided to conduct a survey to find out whether a study population read labels and whether they felt they understood them, with the intention of developing further studies with the principal aim of testing methods which would measure change, for example to encourage greater intakes of fruit and vegetables and other dietary improvements.

The research questions arising from the literature review derive from the principle points that over the whole of the UK, overweight and obesity are rising, CHD is increasing and the incidence of CHD is high on Anglesey. The Calon Lân study showed that the population on Anglesey were not eating an ideal healthy diet i.e. too much saturated fat and not enough fruit and vegetables.

A series of studies, following the action research path of the original idea, that there is a dietary problem leading to obesity and CHD, reconnaissance, the findings from the Calon Lân survey and the literature review led to reflection, thinking about how could studies be designed which could measure and show change in eating habits? The next study was designed to be a further stage in reconnaissance. This initial study was not designed to test people's actual comprehension of nutrition and labelling.

Study 1: Identifying the use of food labels

1. Do people read nutrition information on food labels?
2. Do people feel they understand food labels?
3. Do they want to understand them more?

Chapter 5

Study 1: Identifying the use of food labels

To what extent do people read and understand food labels? An initial investigation on Anglesey

5.1 Introduction

The findings from the Calon Lân survey showed the increased risks of CHD in the population of Anglesey and some of the poor dietary habits, which were risk factors, contributing to the high incidence of CHD. The research question was developing from the original broad based "How can dietary change be achieved and measured?" which had arisen from the first stage in the action research spiral, that of the identification of the initial problem. The reconnaissance stage of the action research cycle, or fact-finding was via the Calon Lân survey. The next stage was to identify whether people had the knowledge to make changes, thus leading to a more specific question, "Do people understand nutrition and can they interpret information on food labels?" Study 1 was the next stage in the action research process was to progress towards a method, which could be tried to discover whether change in eating habits could be achieved and measured.

The Food Standards Agency (FSA) research (2001) on people's understanding and reading of food labels, found that consumers looked at labels in a wide and often ill-informed and vague context. The FSA research found that people may know that they should pay attention to food content but do not understand how to read food labels, or what they should be looking for. Following the action research cycle, the first identification of the problem, generally from the literature review and specifically from the Calon Lân survey, found higher levels of some of the risk factors for CHD, such as the use of saturated fats in cooking and spreading and low levels of fruit and vegetable consumption on Anglesey.

The working hypothesis was developing into:

Dietary changes are more likely to be successful if people understand nutrition and the reasons for changes required. In relation to understanding nutrition, people need to comprehend and be able to interpret nutrition information on food labels.

The next stage in the action research cycle was further reconnaissance or fact finding. The aim of Study 1 was to discover the extent of food label reading and perception of understanding in the study population who were recruited from patients attending dietitians' clinics.

5.2 Results Study 1

The analysis of the data collected was undertaken using SPSS version 12, logistic regression (Sharma, 1996: 317-341) and Chi squared tests (Siegel and Castellan,1988) were performed. A summary of the analysis of the responses is presented below. As the sample size was 100, the numbers represented both the absolute number (frequency of mention) and percentage of the total.

Participants

The sample was balanced in terms of gender: 46 participants were men, 54 were women. The mean age was 52.7, with a wide age range from age 16 to 85 years old.

		Gender numbers in age groups				**Total number and %**
		16-29	30-49	50-69	70-89	
Sex	**male**	5	13	19	9	46%
	female	4	13	29	8	54%
Total		9	26	48	17	100%

Table 5.1 Gender and numbers of participants in age groups

Chi square test showed the difference between the groups was not significant (p=0.933), i.e. the groups were balanced in terms of age and gender.

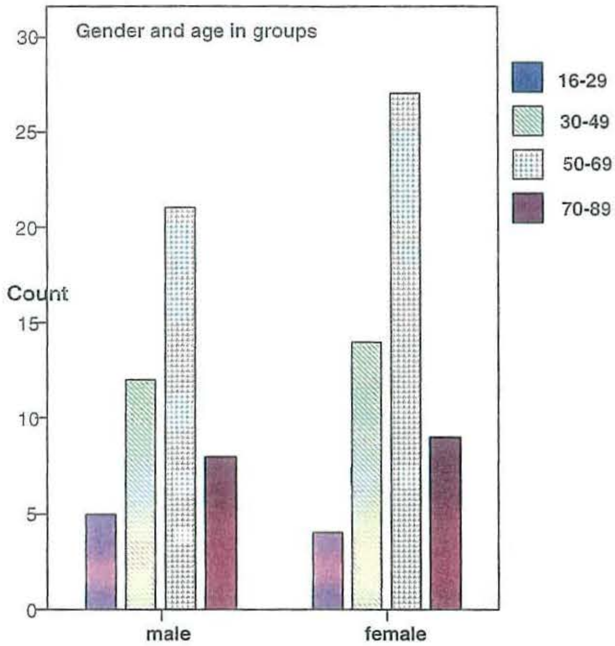

Figure 5.1 Gender and age in groups of Study 1 participants

Figure 5.1 shows that in the males and females surveyed, the 50-69 age group is the predominant age group referred to the dietetic service, with more women in each age group except the youngest group.

Question 1 – Reading labels

		Do you read food labels?		Total number and %
		Yes	No	
Sex	male	22 = 47%	25 = 53%	47%
	female	41 = 77%	12 = 23%	53%
Total		63	37	100%

Table 5.2 Those Who Read Labels by Gender

Table 5.2 shows that almost equally, the men stated they did (47%) and did not (53%) read labels whereas approximately 77% of the women said they did read labels. It can be seen in table 5.2 above that men and women did not read labels to the same extent, women read labels more than men. Chi-squared tests showed the difference in reading labels between men and women was significant (p=0.006).

		Do you read labels?		Total
		Yes	no	
age in groups	16-29	8 (89%)	1 (11%)	9
	30-49	17 (65%)	9 (35%)	26
	50-69	31 (65%)	17 (35%)	48
	70-89	8 (47%)	9 (53%)	17
Total		64	36	100
Mean age		50.80	59.22	

Table 5.3 Study 1 Participants Who Read Labels in Age Groups

It can be seen in table 5.3 that the youngest age group had the highest proportion of those who read labels i.e. 89%. In the middle two age groups, the percentages of those who read labels (65%) was the same in both age groups. In the oldest group (70-89 years) only 47% read labels. The older a participant is the less likely they are to state that they read labels, logistic regression test results are shown below in table 5.4.

In the first three age groups, up to age 69, a much greater proportion of people read labels than did not read them. It was only in the oldest age group, from 70 to 89 that a higher proportion of people who did not read labels rather than those who did read them. Results from logistic regression tests showed the effect of age on whether people read labels or not (table 5.4 below).

Read Labels		Sig.	Exp(B)
	Sex 1 (1=male)	.006	3.518
	Age	.006	1.047
	Constant	.000	.024

Table 5.4 Effect of Age and Sex on Whether People Read Labels or Not

In order to find out whether age or gender differences had an effect on label reading, a logistic regression analysis was undertaken. It showed (Table 5.4) that although both age and sex have a significant effect on whether people read labels or not, it showed that the effect gender has, that men and women do not read labels to the same extent. It also shows that the odds of men (sex 1) reading labels were 3.5 times less likely than women. For each year people age (both sexes) they were 1.047 times less likely to read labels for each year of life. This confirmed that age and gender both have an impact separately. Further logistic regression tests were carried out which confirmed that the effect of age is the same in both genders. Concluding that while age had a significant effect (p=0.006) on whether people read labels, the effect of age was the same in both genders.

Question 2 – Understanding labels

		Do you read labels?		Total
		Yes	No	
Do you understand labels?	yes	22	1	23
	no	42	35	77
Total		64	36	100

Table 5.5 Do those that read labels understand them?

Table 5.5 shows that the majority of those who read labels, claimed they did not understand them. It is perhaps surprising that despite the fact that the majority of people did not understand labels, a high proportion of them did actually make the effort to read them. This finding led to the next stage of the action research cycle, planning the development of further stages in this series of studies.

		Do you understand labels?		Total n and %
		Yes	No	
Sex	Male	8 = 17%	39 = 83%	47%
	Female	17 = 32%	36 = 68%	53%
Total		25	75	100%

Table 5.6 Males and females who stated they understood labels

Table 5.6 shows that although proportionately more women (32%) claimed to understand labels than men, (17%) overall only 25% of the people in the survey stated they understood labels. Further logistic regression analysis demonstrated whether there was a relationship between sex, age and understanding, similar to that of reading labels, in the case of age, for each year people age, they were less likely to understand labels by a factor of 1.05.

	Do you understand labels?	Number	Mean age
Age	No	77	56.16
	Yes	23	46.04

Table 5.7 Age and Understanding of Labels

		Do you understand labels?		Total
		Yes	No	
age in 10 year age groups	16-29	6 = 67%	3 = 33%	9
	30-49	5 = 19%	21 = 81%	26
	50-69	11 = 23%	37 = 77%	48
	70-89	1 = 6%	16 = 94%	17
Total		23	77	100

Table 5.8 Do you understand labels? In age groups

Question 3 - Do people want to know more about labels?

		Do you want to know more about food labels?		Total
		Yes	no	
Sex	male	34 = 74%	12 = 26%	46
	female	40 = 74%	14 = 26%	54
Total		74	26	100

Table 5.9 Gender of those who want to know more about food labels

The total of people who wanted to know/understand more about food labels was 74%, it was equal in both sexes, whether male of female had no effect on whether people want to know more. This was confirmed by further logistic regression analysis.

		Do you want to know more about labels?		Total
		yes	No	
age in 10 year age groups	16-29	7 = 78%	2 = 22%	9
	30-49	14 = 54%	12 = 46%	26
	50-69	23 = 48%	25 = 52%	48
	70-89	7 = 41%	10 = 59%	17
Total		51	49	100

Table 5.10 Do you want to know more about labels in age groups

Table 5.10 shows that a high proportion of the youngest age group (78%) wanted to know more whereas the other age groups were almost equal, however, logistic regression analysis did show there was a gradual fall in the desire to know more by a factor of 1.05 each year. As with the questions relating to reading labels and understanding labels, logistic regression analysis showed that the factor that had a bearing on whether people wanted to know more was age.

Question 4 - Comments

The data collection forms (Appendix 7.5 p.A98) completed by the participants provided the free comment responses which are discussed and analysed by thematic content analysis below (Smith, 1992). Not all participants made comments but of those who did, some made more than one comment. Of the comments relating to the second question, "Do you understand food labels?" 66 said no, 8 said they partly understood some aspects of labels and one person stated they understood calories. 2 participants said they understood labels only "a bit." 1 participant stated that not all tables are the same, 25 said yes, they did understand labels. However, their knowledge was usually inaccurate, the dietitians noted this from the patients' comments about what they claimed to know, or the patients stated that their knowledge was principally limited to one item e.g. Calories. The question related to the participant's perception of their understanding as there was no test of actual knowledge included in Study 1.

In answer to the fourth question "Would you like to know more?" 52 said they would like to know more, 46 said they would not and 2 said maybe. Of those who said they would like to know more, the items they wanted explaining most frequently were fats, followed by carbohydrate/sugar. Other items included salt, vitamins and specific requirements such as potassium. The younger participants asked about minerals, vitamins and additives.

To provide a further opportunity to enhance the research agenda and influence the collaborative nature of the action research process, all participants were also asked if they wanted to make any further comment, and 63 did. Figure 5.2, and table 5.11 below show the range of comments. The comments about labelling were many and varied, and the phraseology shown is that of the participants. People predominantly interpreted the comments section as a question section. The majority and the most specific comments/questions were from people who had a specific requirement, for example those with Coeliac disease or Diabetes, wanted more information about what would be appropriate for their condition.

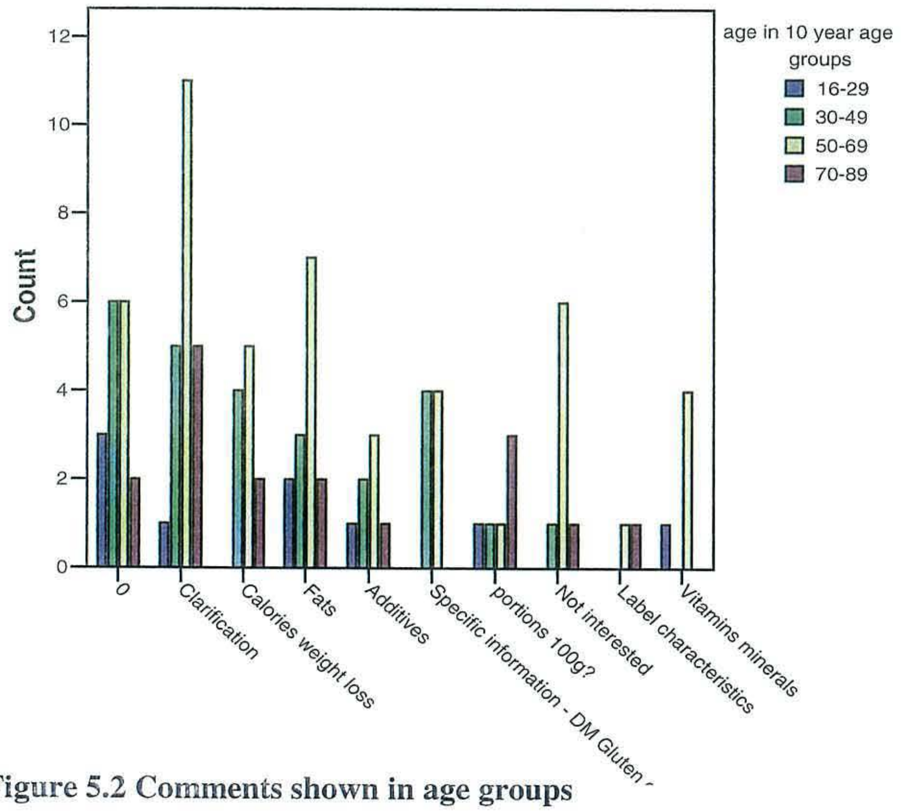

Figure 5.2 Comments shown in age groups

The dietitians recorded the comments on the form. These were spontaneous remarks, which were not prompted by the questioner. This information was used to amend the design of the nutritional information tool, together with the information gained from discussions with the Cardiac Rehabilitation (CR) and General Public (GP) groups. A qualitative, thematic content analysis was undertaken (Smith, 1992). The free-response comments are shown in themes in Table 5.11.

Category/theme	Frequency	Examples
Weight loss information	12	How many Calories should I have?
Clarification of labels	10	Complicated confusing
Fats	9	How much is right? Which type is best?
E numbers and additives	9	What are they? Natural/chemical?
Specific information	5	Diabetic (3) – sugars and carbohydrates Coeliac (2) – gluten free
Don't shop	5	Wife or neighbour shops/cooks
Label characteristics	2	Print too small
Weight	2	What is 100g? 100g is not a portion
Other		Vitamins, minerals, salt, potassium etc.

Table 5.11 Responses to "Comments" section

Seventeen people made no comments but some people made more than one. The two most frequently mentioned items were requests for weight loss information and clarification of food labels, as people found them confusing. The next most frequent were requests for a variety of information relating to fats, "E" numbers and additives. The information gained would be used in further stages of the action research cycle; various strands were developing. Although the FoLaG was not used in Study 1, it was beginning to be developed with other groups. The questions in table 5.11, led to an evaluation and questioning of the plan, thinking about developing an information booklet, which would provide more detailed information than the FoLaG.

The comments column was intended for the participants to state what they thought about current food labels, for example, how easy they were to understand, but most commented on the aspect of nutrition they personally wanted to know more about. On reflection, if this were to be repeated, this question would be included to gain the information that was given but in addition a second more specific question with precise phrasing to avoid ambiguity would be "Please comment on the way nutrition information is provided on food labels. Would you like more details on the way the information is presented?" Careful thought should be given to both questions to ensure the answers respond accurately to the information required as ambiguity resulted in answers to a different question than intended.

In one form or another, participants stated they wanted simplification and an explanation of what items on food labels mean. They stated they were confused, found labels complicated and even misleading. As the dietitians were hand-recording their comments in a limited time frame, there was no expansion of the word "complicated" but it could be inferred that the participants found food labels too complicated to understand clearly.

Following the action research cycle, the next action step was to further develop the information material with the participants in Study 2, by incorporating the comments from the thematic content analysis stated below.

Weight loss information

Several participants wanted weight loss guidance on labels.

Fats

Participants wanted to know a range of information about fat. Their comments indicated that there was a lack of knowledge relating to fats at many levels. As part of the action research framework, these requirements were addressed in Study 3.

E numbers and Additives

Participants wanted more information about additives and "E" numbers. They wanted to know what they were, how harmful, that they did not understand them and wanted an explanation. Again this information was provided and used in Study 3.

Calories

Participants stated that Calories were the only or principal item that they understood. They also stated they did not understand "kJ", did not know what it stood for (kilo Joules). As before, explanation was provided for use in Studies 2 and 3.

Specific Information

People with specific conditions required detailed dietary information such as for diabetes or Coeliac disease and wanted information on what would be appropriate for their condition. Participants who had diabetes wanted the most specific information and sought clarification to help them understand about carbohydrates, sugars and what they should look for in food labels.

"Don't shop/Don't cook/someone else looks after it/not interested"

Eight participants stated that their wife or neighbour shops and cooks or they had no interest in food labels.

Label characteristics

Some said the print was too small. From anecdotal evidence, when visiting supermarkets with patients to teach nutrition label reading, the fact that on several occasions, people have brought along magnifying glasses to read labels, supports this comment. The FSA is developing standards to address this (FSA 2007).

Weight and portions

Many made comments relating to food or portion weights. Commenting that they did not understand 100g and that 100g is not a portion.

Vitamins and Minerals including Sodium/Salt

People wanted information about quantities of vitamins and minerals and specifically mentioned calcium, sodium and potassium. It was also mentioned that they didn't understand salt and there was confusion regarding the difference between sodium and salt. As salt/sodium can impact on blood pressure and CHD/CVD, this was included in the information used in Studies 2 and 3.

5.3 Discussion

Study 1 was principally designed to investigate if people read food labels, whether they felt they understood them and whether they wanted more information to help them understand labels better. The quantitative analysis undertaken on the three principal questions examined how factors, such as age and gender influenced label reading and understanding and found; women were more likely to read labels, age was a factor in that as people aged they read labels less. The fourth area, "comments" was an area for investigation in the further stages of this research and was included in Study 1 as part of the "reconnaissance" stage of the action research cycle, as an indicator for topics at the next stage. Although some of this information was available by 2007 it was not at the time of this research (FSA, 2007) and there were gaps in literature reviewed. Given the regional differences in eating habits seen in Chapters 1 and 4, the Calon Lân Study; no literature has been found examining the label reading habits of the population of Wales and specifically Anglesey.

A study conducted in Glasgow (Ellaway and MacIntyre, 2000) compared several different aspects of food shopping. One of the aspects their respondents were asked to rate was "the importance of clear food labelling". They found that 73% of the participants stated, "clear food labelling" as being very/fairly important in all income groups. Ellaway and MacIntyre's study does not expand on any details of people's perception of what "clear" labelling is, but it does support the findings from Study 1. It could be concluded that as 63% of the study population and 77% of the women in the study felt labels were important enough to read them. It could be inferred from the statement that people in Study 1 found labels 'complicated' that they wanted clarification and explanation. This was the case with the Operation Christmas Turkey (OCT) group and reflection on discussions with that group that had indicated they found labels "complicated and wanted clarification, led to the design of the FoLaG.

Health promotion models (Chapter 2), particularly Tones's 'Reasoned Action' model identified stages in nutritional behavioural change. For example, the initial stages could be interpreted as; awareness of risk behaviour (eating too much leads to obesity/heart disease/diabetes), awareness of other people's risk behaviour (people are becoming fatter) and awareness of one's own risk behaviour (I eat too much and "can't" lose weight). Considering the participants' responses in Study 1; the relationship with Tones's model demonstrated some awareness of the first two levels, but sought further information to help address their own risk behaviour. Regarding the first question, 64% said they read food labels. The second question found that only 25% stated they understood labels. The third question found that 51% wanted to know more, with the highest percentage of these, 78% wanted to know more in the 16-29 year group. Relating these findings to Tones's 1995 model, the first stage could be said to equate to the first question, people read labels as they are aware of the need to eat healthily. The second stage could be said to equate to the second point, knowledge i.e. they may be aware that people generally don't understand labels (perhaps their own family or friends). The third phase would be that people are aware of their own limitations of knowledge.

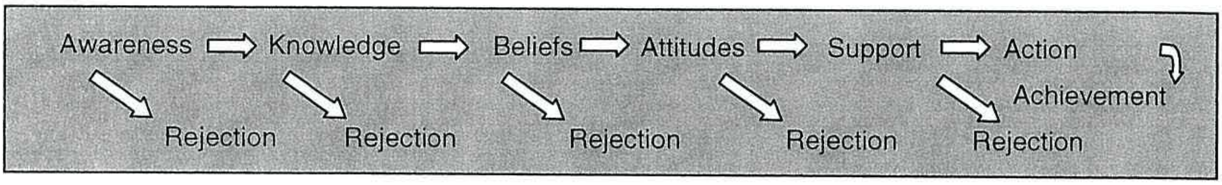

Figure 2.6 Theory of Reasoned Action (Adapted from: Tones, 1995)

Of the 64 who did read labels, some (n=6) only wanted very limited information, such as Calories only. Some additional people (n=11) wanted weight loss information. From anecdotal experience during consultations, this would appear to be the most commonly understood part of nutritional information. Also, those who were trying to lose weight generally had a good understanding of how many calories they should have in a day and that "I know that cutting calories looses weight." This also supports findings from the Eves et al., (1994) study that found dieters were significantly more likely to read food labels and gave more priority to Calories.

Why would there be a difference in the higher proportion of women (77%) reading labels than men (47%)? Women do the majority of the food shopping (Falk and Campbell, 1997), which may be a factor.

Some (n=5) wanted information on "how much was right for them". Patients seen frequently ask "How much should I eat?" They want specific information about food quantities providing appropriate amounts of Calories, vitamins and all the nutrient requirements.

It was found that age influences use of and intention to read food labels, also the type of information that is a priority, in that as people age their interest reduces. In the comments section, for example, younger people wanted more information on additives, minerals and vitamins, whereas older people wanted information on fats and as stated above, specific information relative to any condition they may have had such as diabetes. It could be that chronic conditions such as diabetes may provide an incentive to read labels amongst older people to improve their condition. Although younger people, may not be motivated to read labels to try to improve any chronic medical conditions, Study 1 found that there are factors, which do interest them regarding their health, such as avoiding additives.

Turning to the labels themselves, four people commented that the manufacturers are not consistent. As described in Chapter 1, although manufacturers are required to table the nutritional content per 100 grams, they also often offer nutritional content per typical portion of the product. When listed in columnar form these may be in either order. The list stating the nutrient content per 100g may be listed first on some products, followed by nutrient content per average portion size, whereas other products list the portion column first. Some products only give the 'per 100g' information. This makes it difficult for individuals to judge how much a portion would be. Even the same manufacturer will vary the column order, with one product label giving 100g information first with another product giving portion information first, this lack of consistency is likely to confuse people who are in any case unsure of their facts. If there was a legal requirement to state legally defined portion sizes, it could help people to compare products. At the time of writing, manufacturers can choose different sizes of portions, which makes it very difficult to compare different products.

Some manufacturers give the portion values as typically eaten, for example some breakfast cereal manufacturers give the values for a portion of cereal with milk, but not all. The 100g column would give values for 100g of the product alone and the typical portion column would give values for Xg as eaten with milk. However, this is potentially confusing and probably inaccurate as the values for the type of milk may not be that chosen by the consumer (full cream, semi/skimmed or Soya etc).

Some people (n=3) stated they did not understand either the amount 100g or portion sizes given in grams such as " What is 100g?" "100g is not a portion". The data is given in the 100g format so two similar products can be compared to look for exact fat content etc. In addition, any proportion of 100g is equivalent to a percentage; 33g of fat per 100g is 33% fat. People do not usually realize this simple "conversion" until it is pointed out to them. As a result of discussions with various groups, it was included in the information leaflet.

One participant stated, "Labels are too confusing and time consuming." Several others commented that labels confused them.

There was a range of comments regarding the various terms used on food labels: - For example, "What does 'lo' mean?" "What is unhealthy?" was asked as a general question, not relating to anything specific, such as fats. Also, in terms of portion sizes, some asked, "How much is right?" "Which type is right?" "What is good/safe?" "What is the right level?"

Some people (n=13) wanted information about how much provide safe levels of various minerals, vitamins and nutrients such as fats, carbohydrates.

Fats generally were found to be confusing; there were a number of questions relating to fats, such as "What is "Low Fat", and "How much is low?" Various comments included, "Which type is beneficial?" and many sought explanations regarding Monounsaturated fatty acids, (MUFA) and Polyunsaturated fatty acids, (PUFA) and their functions. "What type of fat is best?" "How much is too much?" "How many grams of fat are healthy?" "What are saturates?" "Does 95% fat-free mean it is good?" "Low fat is not always good, could we have an explanation please?" It was positive that there were so many questions on fats, as this is an area of nutrition, which can impact on CHD. The information requested was incorporated as an action step in the material used in the studies that follow.

The participants wanted more information about additives, such as what the "E" numbers, mean, an explanation of what they all do, which ones are harmful, and also which are natural, or chemical. This reflects the notion of 'prejudice' mentioned earlier, where people might avoid "E" numbers altogether because they are perceived as harmful, when some are actually duplicated natural and beneficial. This suggests inaccurate nutritional knowledge and the inability to detect these differences on food labels. Following the action research process, this information will be provided as it was requested.

Some participants, (n=5, all male, aged 49, 59, 69 and two aged 63) did not do their own cooking and were not interested in knowing or understanding anything about nutrition or food labels. Three stated their wives "did it" and one stated their neighbour "does it". This perhaps reflects the predominantly female role in food purchasing (DeVault, 1991)

Two people, both in their eighties, felt that reading labels was "too late for them", (their words). Two people wanted labels to have larger print, one was female age 54 and the other was male aged 49.

5.4 Reflections on findings from Study 1

The limitations in this research are firstly, the sample size is rather small at 100, but it is argued that the sample is representative of the general population in this local community in North Wales in some aspects, half were men and whilst limited in that the largest number was in the age group 50-69, the range was 16 to 89 years old. Perhaps not fully representative of the general population (a nonprobability sample, Fink, 1995,p.23) in that all the participants had been referred to the dietetic service which may influence them to read labels more. However for the purposes of this study it was seen as a positive strength and an advantage as it was possible that this group may have an increased interest in nutrition and labelling. This study was intended to identify the problem of understanding labels and it is likely their knowledge and understanding would be the same, at the initial consultation, regardless of whether they had been referred to a dietitian or not.

The survey was intended to determine if there was a local problem in terms of the ability to read and understand food labels and nutritional knowledge. The problem was confirmed by the study and the action research cycle progressed. Further research was planned to explore this problem in more depth. Some participants appeared not to want to expose any ignorance about labels and answered more positively about their understanding than was actually borne out by discussion. For example, four people who refused to answer the third question claimed they had no interest in food labels because they did not buy any food with labels on. They also stated that they knew what they should be eating and ate a healthy diet. When questioned to explore people's understanding of how much they should be eating, the highest level knowledge was limited to how many Calories were appropriate per day and this was often inaccurate. Others appeared more 'honest' and frequently said they did not understand them at all and wanted to know more. This suggests that some participants may have felt threatened or embarrassed to answer, despite the assurance of confidentiality and that participation would have no influence over their treatment. Despite this apparent reluctance, this is an area that must be explored if meaningful interventions are to be developed to achieve change.

From the findings above, it was seen as a positive factor, that in the study population, many people read labels and despite the fact that they felt they did not understand them, they wanted to understand them more. In addition, people wanted to lose weight, understand food content, nutrition and eat more healthily.

Findings from this small questionnaire survey of 100 out-patients in North Wales indicated that a high proportion of the public read but felt they did not understand food nutrition information labels. People stated they felt they understand some aspects; but this understanding may be limited and could be inaccurate. The presentation of information on the labels is inconsistent and confusing to people.

It is perhaps surprising that despite the fact that the majority of people felt they did not understand labels, a high proportion of them did actually read them. This finding justified continuation of this series of studies to develop further stages to test methods to help people understand labels and change their eating habits, with amended plans and evaluation of the findings continuing the action research cycle.

Finally, to summarise; the findings of Study 1 were that 63% of the participants read labels (77% of women and 47% of men), only 36% claimed to understand them (32% of women and 17% of men. 74% (both sexes) wanted to know more about understanding labels. In addition comments from the participants indicated people were confused by the content of the labels themselves, such as "what is 100g?" and nutrition, such as questions about specific nutrients, fat, sodium etc. and how much is right. Evaluation of these initial conclusions led to planning Study 2, which was designed to address points not examined in Study 1, i.e. to find out exactly how much people know about their nutritional requirements and what they understood about food labels in current use, also to discover which aspects they would like to understand better. The next phase will investigate how much people actually know and understand about nutrition. The research questions for Study 2 were a further development from reflections on the findings of the Calon Lân survey and Study 1;

How much do people think they should eat of the various nutrients per day?
Do they understand the functions of the nutrients?

Following the health promotion models, considered in Chapter 2, having identified that individuals found it difficult to understand and interpret food labels, the FoLaG was developed to assist people to a better understanding of food labels and to explain various aspects of the content of food labels.

Study 2 aims to discover the following:

1. Do people understand what they should eat?
2. i.e. Do people understand the functions of nutrients?
3. Do people know the quantities of the various nutrients they should eat?

Chapter 6

Study 2: Identifying the extent of participants understanding of nutrition and refining the FoLaG Tool

6.1 Introduction

This chapter gives the results of the next stage in the action research cycle, Study 2, action steps 6 and 7 in Lewin's cycle (p. 134). The aim of this study is to assess people's level of understanding of nutrition and labels with the further aim of developing and examining interpretational aids and methods. The study participants were recruited from 2 sources, the general public and some from the cardiac rehabilitation programme. Continuing the action research cycle, the findings in Study 1 indicated that people did not understand food labels, what did they not understand? Study 2 will take a further action step, to discover;

1. Do people understand what they should eat?
2. i.e. Do people understand the functions of nutrients?
3. Do people know the quantities of the various nutrients they should eat?

6.2 Results, findings for Study 2

The data collected from 30 participants were analysed using SPSS but as all the participants did not answer all questions, this resulted in quantitative analysis being limited. The 30 participants in Study 2 comprised 22 women (73.3%) and 8 men (26.6%). The mean age for males was 54.5 with SD of 20, ranging from 21 to 80 years. The mean age for women was 45.3 with SD of 16.4, ranging from 22 to 82 years. Table 7.1 below shows the age distribution in approximately 15-year age groups, in order to show if there was any age group over or under represented. The distribution in the sample is evenly spread except for a small reduction in the 35 – 49 year old group. A Chi squared test showed no significant difference between the groups (p=0.440) in that there was no age over or under represneted. The qualitative analysis of the data was undertaken by thematic content analysis (Smith, 1992). .

		Number	Male	Female	Percent
1	21 – 34	8	2	6	(26.7%)
2	35 – 49	6	1	5	(20.0%)
3	50 – 64	8	2	6	(26.7%)
4	65 – 80	8	3	5	(26.7%)
	Total	**30**	**8**	**22**	**(100.0%)**
			(26.6%)	**(73.3%)**	**(100.0%)**

Table 6.1 Ages in 15-year age groups

The first section of Study 2 was designed to discover the study participant's existing (or lack of) knowledge of amounts of specific nutrients they should be eating (Appendix 7.4). Corroborating the findings in Study 1, it was found that of the sample in Study 2 a high proportion amongst females, 69% did read food labels whilst only 37.5% of the men read them.

		Do you read labels		**Total**
		yes	**no**	
Sex	**male**	3 (37.5%)	5 (62.5%)	8 (100%)
	female	20 (69%)	2 (10%)	22 (100%)
Total		23 (76.6%)	7 (23.3%)	30 (100%)

Table 6.2 Number and gender of Study 2 participants who read labels

A Chi squared test showed a statistically significant difference (p=0.002) between men and women in that women read labels more often in the Study 2 group.

In Study 2, 50% of the participants claimed to understand labels, 57% of the women and 37% of the men surveyed (table 6.3).

		Do you understand labels? N = (%)		**Total**
		Yes (% of men or women)	No (% of men or women)	
Sex	male	3 (37%)	5 (63%)	n = 8 (26.6%)
	female	12 (57%)	9 (41%)	n= 22 (73.3%)
Total		15 (50%)	4 (46%)	30

Table 6.3 Study 2 Gender distributions of those stating they understood labels

Although Table 6.3 shows a higher proportion of women in the study state they understand labels (57%), while only 37% of men claim to understand labels but a Chi squared test showed the difference between men and women was not statistically significant (p=0.409).

Having completed the nutrient table in Questionnaire 1, shown below, people were then asked the following questions (Appendix 7.4) about the standard labels on foods, current at the time of Study 2 (pre GDA and Traffic Lights)

1. What would help you to understand food-labelling information better?
2. Would you like another column showing as a percentage how much of the daily recommended amount a portion of food would give you?
3. If so have you any comments about percentages?
4. What do you think about the way labels are presented?
5. Are they easy to read or understand?
6. Do you plan your food?
7. Do you eat what you like?

Having completed the table and questions above, the participants were then asked to read the "FoLaG tool" at home and refer to the "FoLaG" whilst shopping for three or four main shopping trips. They were then asked to complete the Feedback form (Appendix 7.5), which asked for comments on each section of the FoLaG, as part of the participatory action research design.

The responses and percentage of correct answers are found below in table 6.4. In order to assess whether people had given appropriate figures, those accepted as correct were those, which were +/- 15% of the correct recommended figure for each item, the criteria being the recommended amounts from the COMA report (1994).

The calculations used in assessing the "correct" parameters used for each nutrient in Study 2, are given in Appendix 7.7.

Nutrient	Quantity (%of total)	Male n (% of men)	Female n (% of women)
Calories	15 (50.0%)	3 (37.5%)	12 (54.5%)
Carbohydrates	5 (16.6%)	0	5 (22.7%)
Fats	6 (20.0%)	2 (25.0%)	4 (18.2%)
Saturated fats	10 (33.3%)	2 (25.0%)	4 (36.4%)
Protein	4 (13.3%)	0	6 (27.3%)
Salt	12 (40.0%)	1 (12.5%)	11 (50.0%)
Sodium	1 (3.3%)	0	1 (4.5%)
Fibre	15 (50.0%)	1 (25.0%)	13 (59.1%)

Table 6.4 correct answers for nutrient quantity by gender

Nutrient	Function (%of total)	Male n (% of men)	Female n (% of women)
Calories	18 (60.0%)	3 (37.5%)	15 (68.2%)
Carbohydrates	15 (50.0%)	0	15 (68.2%)
Fats	5 (16.6%)	1 (12.5%)	4 (18.2%)
Saturated fats	5 (16.6%)	0	4 (18.2%)
Protein	18 (60.0%)	4 (50.0%)	14 (63.6%)
Salt	4 (13.3%)	0	4 (18.2%)
Sodium	1 (3.3%)	0	1 (4.5%)
Fibre	15 (50.0%)	2 (25.0%)	13 (59.1%)

Table 6.5 Correct answers for nutrient function by gender

Participants left the space blank where there are no figures

Key: ***Green 50%** or higher correct,

***Black 20% to 49%** correct,

***Red less than 20%** correct

It can be seen that there are differences between mens' and womens' answers across the table. In the case of some items, e.g. Calories, 50% of the total participants gave the correct quantity with 60% giving the correct function. In the case of women, 54% stated the correct quantity and 68.2% understood the function. The men's figures, whilst having an equal understanding of quantity and function of Calories at 37.5% for both points, this is lower than women, who were 50% correct for the quantity and 60% correct for the total. For some items, for example, protein, the correct quantity was only stated by 13.3% of participants, whereas the function was correctly given by 60% of participants. There are other discrepancies in knowledge of quantity and function, which can be seen above (Tables 6.4 and 6.5). Although this is perhaps not surprising, that the level of knowledge is variable, it was perhaps not anticipated that the level would have been so low in some areas. Other nutritional knowledge will be examined further in Study 3.

For the question "On which items would you like more information?" the responses given by the participants are listed below verbatim. The comments were given in free text and grouped into categories. Most respondents who asked for information provided a single word, without further explanation.

For clarity, expansion on participants' comments (where given) follows;

- Fats and saturated fats , unsure about these items values and uses
- Fats and the amounts of different foods meant to be eaten each day
- Different types of fats
- Fats, LDL, HDL
- Saturated fat, protein, calories, fibre
- Food tables should show daily amounts as well as portion amounts

Verbatim responses to question "On which item/s would you like further information?"	No	Sex
"I need more on each item"	4 5	Women Men
Calories	1	Woman
Saturated fat x 2 and fat, unsure about these items, values and uses LDL HDL	6	Women
Salt and Sodium	4 1	Women Man
Fibre	3	Women
Protein	3	Women
Fats	4	Women
Carbohydrates	1	Woman
Amounts of foods to be eaten daily	2	Women
Reasons (not explained on form)	1	Man
Vegetarian	1	Woman
Diabetes	3	Women
None!	1 1	Woman Man

Table 6.6 Verbatim responses to question "On which item/s would you like further information?"

		Would you like percentage amounts on labels?		Total no responding
		Yes	no	
Sex	male	4 (13%)	1 (3.3%)	5 (16.7%)
	female	17 (57%)	2 (6.6%)	19 (63.3%)
Total		21 (70%)	3 (10%)	24 (80%)
ages groups				
1 21-34		8 (26.6%)	0	8 (26.6%)
2 35-49		4 (13.3%)	0	4 (13.3%)
3 50-64		5 (16.7%)	2 (6.7%)	7 (23.3%)
4 65-80		4 (13.3%)	1 (3.3%)	5 (16.6%)
Total		21 (70%)	3 (10%)	24 (80%)

Table 6.7 Gender and Age of those who would like % amounts on labels

6.3 Thematic content analysis – Study 2 – nutrition knowledge

A thematic content analysis (Smith, 1992) of each item in nutrition information panels on labels is discussed separately as follows:

1. Calories
2. Carbohydrate
3. Fat
4. Saturated fat
5. Protein
6. Salt
7. Fibre
8. "Do you want further information?"

Please refer to tables 6.4 and 6.5 for details for each nutrient.

Calories

Following the format of the nutrition information panel on commercial food labels, the first question was "How many kCalories do you need daily?" It was not anticipated that the general public would need an explanation of Calories as it has been found that many people do have an understanding of them (Coronary Prevention Group 1990). This was partially supported by the data in Study 2, showing that 55% of the women in the sample knew approximately how many Calories they should have. The percentage giving a correct explanation of the function of Calories was 60% but men were less knowledgeable, with only one man giving an appropriate figure for the number of Calories required. Amongst the inaccurate figures for Calories one man stated 500 kcals for the daily total requirement, which is considerably below the average requirement of 2500 kcals per day for men.

The appropriate amount required and function of Calories and fibre, were the only items which were moderately well understood table 6.4 shows that 50% of all those surveyed gave a correct or appropriate answer for both items. This is perhaps lower than would have been expected, particularly for men only 37.5% of whom gave correct answers for both function and quantity. In the case of carbohydrate (CHO), although 50% of the participants (all women) gave correct answers for the function of CHO, the figures given for quantity was only correct in 16.6% of participants, again, all women.

In answer to the question: "What is the function of Calories?" the answers, demonstrated that in this small sample, the women had a greater understanding than men of the function of Calories.

Carbohydrate (CHO)

The COMA report (COMA, 1991; DoH 2005) stated that carbohydrate should provide 50% of daily Calories. In answer to the question "why do you need carbohydrates?" the responses provided, demonstrated again that although as stated above 68.2% of women in this sample did have an understanding of the function of the nutrient, no men at all of those surveyed demonstrated an understanding of the appropriate quantity or function of carbohydrates.

Fat

The COMA report (COMA, 1991; DoH 2005) stated that total fat should provide less than 35% of energy, using the same parameters as above. For women this equates to 65g to 88g daily, for men 82g to 111g total fat. Within the limit indicated 18.2% of women and 25% of men gave correct responses of amounts of fat required. Although this shows a low number demonstrating knowledge of amount required, the ratio of men who were correct to women is greater. Few men or women gave sufficiently accurate responses of the role of fat, demonstrating a poor understanding of the nutrients' functions.

Saturated Fat

As stated in Chapter 2 there is no actual requirement for saturated fat at all as the essential fatty acids, which we cannot synthesise (linoleic acid *n6* omega-6 and alpha-linoleic acid *n3* omega-3) are not saturated fats and can be obtained from vegetable sources and eggs. The COMA 1994 and DoH 2005 guideline for the daily limit of saturated fat is that it should comprise of less than 11% of energy. As we do not actually *need* any saturated fat at all, therefore all figures lower than the ±15% parameters are included as correct. This is a slightly 'trick' question as stated we do not actually *need* saturated fat at all.

Eight women (36.4% of women) and two men (25% of men) gave appropriate responses of a total 38% of the participants.

Protein

The same parameter of ± 15% of COMA (COMA, 1991; DoH 2005) protein recommended amount equates to: COMA stated dietary target <15% of energy. Based on nitrogen balance studies, the UK dietary reference values (DRVs; DoH, 1991) assume that healthy adults consume a mixed diet require 0.75g protein per kilogram of their ideal *(not actual)* body weight in kilograms (Manual of Nutrition, 2001).

Six women gave an accurate figure of the amount of protein required with no men in the sample giving an appropriate answer, whereas a much higher proportion of people understood the function of protein 63.6% of women and 50% of the men gave an accurate explanation of the role of protein. It is perhaps surprising that women still had a higher understanding than men as anecdotal experience would suggest that this is one nutrient which men were more aware of, or perhaps more interested in.

Salt and Sodium

Salt is sodium chloride, the COMA (COMA, 1991) maximum daily dietary targets for salt or equivalent as sodium is 6g salt, 2.4g sodium, this is a maximum recommend amount. The actual physiological requirement is small, in the region of 69-460mg/day, 6g of salt is 6000mg, all answers given lower than the recommended upper limit have been accepted, as they are correct. Men and Women: 6g x +15% = 6.9g. therefore +15% = 6.9g.

Of the appropriate responses for salt, 50% of women and 13% of men were correct and 23% of all participants gave the specific amount 5g or 6g for salt with only one woman giving an appropriate amount for sodium. A concurrent health promotion advertisement run by the FSA stating the daily maximum recommended amount of salt possibly contributed to greater knowledge regarding the maximum recommended amount of this nutrient.

For the function of salt, 18.2% of women gave a sufficiently accurate response.

Fibre

The average UK diet contains approximately 12g of fibre or Non Starch Polysaccharides (NSP) per day (Bingham et al., 1990; MAFF, 1998). We should be eating at least 18g of NSP/fibre per day (COMA, 1991). Although the COMA target for NSP/ fibre is 18g per day of the recommended daily intake has been estimated as 24g by the Association of Official Analytical Chemists (AOAC) method of analysis i.e. that now used for most food labelling (Joint Food Standards and Safety Group [JFSSG], 1999). 18g to 24g has been used as the dietary target but as this is a minimum ± 15% of 24g has been used for the calculation as a guide.

Nearly 60% of the women and 25% of men gave an appropriate response relating to the function of fibre in the digestive system, again demonstrating that women in the sample have a greater understanding of the function.

In answer to the question, "Do you want further information?" people's responses related to their particular interests and dietary needs. These responses were used to design the information that would be provided for Study 3 as intervention material. This is described in Chapter 7 Study 3.

6.4 Food Labelling Guidance Tool (FoLaG) development from Study 2

Table 6.9 below shows participant comments during the development of the FoLaG tool in the focus groups. The comments from the Study 2 participants are shown for each response as this was an open question "What was the best thing about the FoLaG?" most people were only providing one answer as there was only one line of space, it was possible that participants would have made more comments if there had been more space available, some did manage to provide more than one answer. An alternative would have been to provide a range of options to "tick all that apply".

In answer to the question "What did you find useful about the tool?" 36 comments were made about the usefulness of the tool, some people making more than one observation and others none. As part of the action research ethos, it was intended that the tool would be redesigned in response to people's requirements, interpretations and criticisms.

The highest proportion of the respondents' comments on what they liked best about the tool was principally about its size, with 58.6% stating they liked the handy size, although this high percentage reflects the appeal of the FoLaG and not the content, it could be seen as a positive point that the participants liked it and would presumably want to use it on a regular basis. Of those who did make comments on the content, 50% made positive comments on targets, amounts, clarification and ease of understanding it. In addition to the questionnaire responses from the Study 2 participants, focus group sessions were held with Cardiac Rehabilitation and General Public groups, table 6.9, which follows, gives the comments from these groups.

	Question	Cardiac Rehab group	N	General Public group	N
1	Is the tool easy to understand	Mostly Some parts	6 5	Most Some Complicated	3 3 5
2	If no what is complicated	Typical intake	5	BMI, typical intake	5
3	Is there anything not needed	Typical intake	6	Typical intake BMI Blood levels	5 4 5
4	Anything you would like included	Guide for how much I should eat to lose weight	6	Guide for losing weight	5
5	Do you understand nutrition information on food labels	Partly	6	A bit	5
6	Do you understand the abbreviations section	Yes	5	Yes	4
7	What is unclear in the abbreviation section	What are joules What are Monounsaturated	6 5	What are joules Please explain fats	5 4
8	Do you understand the daily guidelines	Yes but it seems complicated	5	Yes but it seems complicated	4
9	What would make it better	Leave out the % calculations	4	Put amounts to eat of each item to eat for normal and to lose weight	5
10	Do you understand the 5 a day portions	Yes	6	Yes	5
11	What would make it better	Just list them, we can count to 5!	6	Just list them	6
12	Do you understand the alcohol section	Yes	6	Yes	5
13	What would make it better	Add recommended amounts	6	Add recommended amounts	5
14	Do you understand the blood level section	Not completely, need fuller explanation of LDL, HDL etc.	6	Not really Don't want this in	5
15	What would make it better	Explanation of LDL HDL , which foods we should eat to change it	6	This is useful, would like more detail in this section	5
16	Do you understand the fats	A bit	3	Not really	5
17	What would make it better	More explanation	6	More explanation, a leaflet to go with it	5
18	How has it helped you choose foods	Has helped me understand the labels and how much I should be eating	4	Helped to understand labels but I want more explanation	4
19	What is the best thing	Small, handy, comprehensive	6	Convenient, can look at it when shopping, lots of info	5
20	What is the worst thing	Writing too small (1) needs colour	3	Needs colour, needs simplification, needs a more detail	5
21	Would you like % of RDA for portions	On labels yes	4	On labels yes	5
22	Would you use it again	Yes	5	Yes, but changed in line with the comments	5
23	Would you recommend it to a friend	Yes	4	A new one yes	4
24	Any other comments				

Table 6.8 FoLaG development comments from CR and general public (GP) focus groups

In addition to the focus group comments above, additional comments from the questionnaire were as follows;

	Number	%
Amounts	2	6.7%
Targets	2	6.7%
Clarified	4	13.4%
handy size	17	56.6%
Easy to understand	7	23.3%
attractive colourful	1	3.4%
well thought out	1	3.4%
Laminate please	5	16.6%

Table 6.9 FoLaG responses

Despite a lot of information being provided in the FoLaG, its appearance was mentioned with 6.8% commenting that it was attractive, colourful, well thought out, easy to use. 16.6% thought it should be laminated as they had used it so much it had disintegrated. Some (7%) did not want the blood levels but one person wanted more information on blood, giving the example of cholesterol. Some commented that pale colours were not very visible and that the print was rather small. Some (10%) commented there was too much information. One person aged 79 commented that older people don't think in metric and suggested information should be available in imperial measures. A man of 70 said the older generation weren't bothered, it was too "high tech", he also pointed out that some of the terms were not explained sufficiently, such as KCals, another said maths was difficult.

In response to the question, "Would you like a panel on labels stating "A portion of this food is ...% of the daily recommended amount"? (Study 2 was undertaken before the introduction of the GDA labels which provide this information). The responses in Table 7.7 shows that 70% of those surveyed would like to see percentage amounts on labels. The highest proportion of those who wanted percentage amounts shown on labels was in the youngest group.

6.5 Discussion

One of the aims of Study 2 was to identify what people did **not** know, in order to work towards addressing this. Study 2 has found that the participants did have some understanding of how many Calories they should have per day. Notwithstanding this being one of the highest correct percentages, it was still only 50% of the participants, thus, half did **not** know how many they should aim for.. To follow the health promotion models (e.g. Tones Fig 7.2) this would translate as follows;

- Stage 1 awareness of "the problem" e.g. wanting to lose weight.
- Stage 2 a decision to take action e.g. limit calorie intake.
- Stage 3 knowledge of an appropriate target amount of Calories
  knowledge and understanding of how to interpret food label information
- Stage 4 belief that reducing Calories will result in losing weight.
- Stage 5 a positive determined and motivated attitude to eat appropriate amounts
- Stage 6 support could be in several forms, e.g. group support organizations such as WeightWatchers, or individual support from a dietitian, family members or friends.

The correct quantities for carbohydrates, fats and protein were less well known and nutritional knowledge was limited, both the amounts required and the functions of the nutrients. There was also a limited understanding of the function demonstrated with carbohydrate and fibre at 50% (of total participants) and the functions of protein and Calories more widely understood at 60% correct. Many did not understand the function of salt, but the figures given for the quantity were more accurate. This may have been as a result of the FSA television health promotion campaign that was running concurrently, which advised people to have no more than 6g a day. In relation to health promotion models, the advertising would relate to the knowledge stage. The fact that sodium is listed on labels rather than salt is a cause of confusion to many people (Study 3).

Women in the sample had a greater understanding than the men of both the amounts and the functions of the various nutrients. It was found that although some people knew the amounts required and understood functions of Calories, carbohydrate and protein, none of these were stated or understood with great accuracy. Again in relation to health promotion models, the knowledge stage has to be achieved before further progression can occur. It was interesting that one of the participants (female) who had a high proportion of correct answers, had been educated in Ireland. When this was discussed with her, she commented that she had been taught all the correct target amounts and functions of foods at school in Ireland. She was also in the appropriate weight range for her height i.e. BMI 20-25kg/M^2. In Chapter 2, the North Karelia programme in Finland was shown to have addressed the problem of lack of nutritional knowledge, their programme included nutrition education in the curriculum for all school age groups. The *Appetite for Life* document (WAG 2007) includes nutrition education to be included in the Welsh school curriculum.

In the comments section people indicated that they found the tool helpful. One woman from the cardiac rehabilitation group who also had diabetes stated that it had been "a lifesaver" when shopping and that it had "made everything make sense", (Journal entry, July 2004). Five people asked for it to be laminated as they had used it so much their copy had fallen apart.

Despite the pilot group not finding the forms difficult, some participants stated the nutrition section in the questionnaire was "daunting", "confrontational", and "shows my ignorance" (Journal entries, 2004). When the nutritional estimates part was discussed, the participants generally found this to be an unpopular aspect of the questionnaire; this may have been an obstacle to some people completing it. The aim was both to identify what nutritional knowledge people did and did not have and to conduct the study in a real life environment (Cowburn and Stockley, 2005). The participants were asked to use the tool in supermarkets whilst shopping rather than in a "test situation" such as an artificial workshop location. Over 100 people were contacted (cardiac rehabilitation patients and general public), if all of these had undertaken the study as a workshop as opposed to a postal questionnaire, greater numbers could have been achieved but the study would have been based on a simulated situation.

6.6 Reflection

Despite the sample being somewhat small, many aspects of the qualitative analysis were undertaken using thematic content analysis, which only requires a small study population (Smith, 1992). The participants included a wide cross section of age, experience and socio economic groups and were consistent in an overall lack of knowledge of the quantities and functions of nutrients, although there were some variations. No one gave 100% correct answers. It could be argued that providing a range such as using a multiple choice of answers would be less confrontational but it would provide the correct answer amongst incorrect answers. This would result in the possibility of people guessing, if they did not know. If there were 5 choices there would be a 1 in 5 chance of guessing the correct answer, whereas if a blank space is provided, people would have provide a factual answer, which could include no answer.

The lack of knowledge and understanding of nutrition needs to be addressed for people to be capable of modifying their diets correctly. It is a matter of regret that for many years the British school curriculum had moved away from basic nutrition to Food Technology, which concentrated more on production design than basic nutrition, but indications from government and in the media point towards this trend being reversed. Included in the North Karelia Project in Finland (Chapter 2), were widespread education programmes educating the whole population but particularly schoolchildren to understand the importance of a healthy diet and provide theoretical information and practical experience of how to achieve this, with cooking lessons for all ages and both sexes throughout school life (Puska, WHO, 1995). As a result, as one of a combination of many initiatives CHD in Finland has steadily reduced over more than 30 years and is continuing to fall.

It had been found from Study 1 that a high percentage of participants read labels but stated they did not understand them and wanted to understand more. The results showed that despite a high proportion of people reading labels both in Studies 1 and 2 many of them did not understand the information. Nor did they know with any degree of accuracy, the target amounts, or functions of nutrients they should be eating. From the researcher's clinical experience many people had said they want to eat more healthily and want to understand nutritional information. Reflection on the results of the findings of Study 2, and discussions with participants as an evaluation stage of the action research process, a further study using food-labelling aids, Study 3, was designed to further develop this information in a format incorporating the suggestions of the participants and test its use as an intervention for change.

In addition to the comments from the Study 2 participants, a focus group comprising of 8 of the cardiac rehabilitation patients discussed and revised the FoLaG after the study, in order to develop it further for use in Study 3. (Journal August 2004). The 8 were all given the original version of the FoLaG and a second revised version, which had been amended according to the comments received in Study 2. They were asked for their opinions and comments with a view to further revision.

Reflection on these findings led to the design of a further study (Study 3) comparing control and intervention groups' food purchases, with educational material as the intervention. The final study's aim was to measure whether increased understanding can bring about behavioural change (Tones, 1984). Study 3 provided educational materials to address the lack of understanding found. It also measures whether changes can be made to food purchases by increasing knowledge and understanding evaluating combining education and modification of behaviour change. Study 3 will also consider the views of the participants of the recently introduced types of food label information, using itemised till receipts to measure change. Despite the FoLaG providing a great deal of information and possibly appearing somewhat "busy", there were many positive comments about it and discussions with the various groups involved with the development of it found that people "dipped into" the parts they felt relevant to them and its main purpose was to act as an aide memoire to be referred to when out shopping, longer and more detailed reference to it could be made at home. There were few negative comments, those made were specifically practical, e.g. pale print and were addressed. The fact that there was quite a large amount of information did not seem to confuse people as a high proportion made very positive remarks.

From the findings above, it can be concluded that amongst the people surveyed, a high proportion did not have sufficient, accurate, or in some cases any knowledge of appropriate amounts or the functions of the nutrients that are needed daily. Interventions such as an educational "tool" could help interested parties. Reflecting on peoples' comments and the fact that it provides a lot of information in a small space, in practical terms, can it really be useful in a real life situation? Would an additional simple explanation leaflet assist further? How could this be tested in an experimental real life situation? This will be explored further in Study 3.

Chapter 7

Study 3: Evaluation and measuring changes - findings

7.1 Introduction

The action research pathway continued, reflecting on the findings of the Calon Lân survey and Studies 1 and 2, what had been discovered was that the population of Anglesey had low intakes of fruit and vegetables and high intakes of fats and saturated fats, the participants were willing to read labels but did not understand them, nor did they understand the functions or amounts of nutrients they should be consuming. Participants had been involved in the development of a nutrition aid, the FoLaG and had asked for further information in the form of a short concise nutrition and labelling information leaflet. The next stage-evaluation, stage 8 in Lewin's cycle (p.134) was to evaluate whether using the FoLaG and leaflet as an intervention could change people's eating habits, which would be measured by supermarket till receipts showing their food purchases.

In addition, since the beginning of this work in 2002 there have been significant developments in types of food labelling used in Britain. Two new principal methods of displaying information emerged in 2006, (Chapter 4) explanations of these were incorporated into the leaflet as requested by the participants.

This chapter gives the results from Study 3, which examined the use of the new labelling options and tested the working hypothesis that people follow the behavioural change routes identified in health promotion models. In the example described in this chapter the participants' route to change of diet employed nutrition education as an intervention. The aim was to increase understanding and belief of nutrition and food labelling to facilitate changing their purchases for healthier items by means of education and information intervention material. This study examined which type of the new food labelling along with label and nutrition information, helped people to better understand information provided on labels. Study 3 used supermarket till receipts as a tool to assess changes in nutritional content of purchases.

7.2 Results, findings for Study 3

The study population sample numbered 103 and has been divided into 4 x 15 year age groups to compare numbers in each age range, to ensure the group was not unbalanced by, for example, a preponderance of older people. Of the total population, the youngest age group had equal numbers of males and females. The 31 to 45 age group was 85% female and the 46 to 60 group was 94% female. The over 61 group was 78% female. This reflects the fact that more women do the food shopping in older groups (Brunsø. and Grunert,1998).

It was originally intended to achieve randomisation by alternating the intervention and control as each participant responded thus achieving 50% by selecting alternate people. 1st person to be given the intervention, followed by 2nd person no intervention as control and so on. However, during data collection it became evident that as the response rate was extremely low, having 50% of the participants in the control group might not provide sufficient data to demonstrate change. Therefore the researcher decided that 1 in 4 of the participants would be in the control group leaving 76% in the intervention group. As stated above, using type III sum of squares, which is the default in SPSS, allows for the problem of disproportionate groups (Field:p.399, 2005).

	Frequency	percentage
up to 30	23	22.3
31 to 45	26	25.2
46 to 60	31	30.1
over 61	23	22.3
Total	**103**	**100.0**
male	23	22.3
female	80	77.7
Total	**103**	**100.0**

Table 7.1 Study 3 Ages in Groups and Gender

		Intervention	Control	Total	% Percentage
Ages in groups	up to 30	16	6	22	21
	31 – 45	20	7	27	26
	46 - 60	25	6	31	30
	61 - 75	15	3	18	17
	76 - 90	2	3	5	5
Total		78	25		
		76%	**24%**	**103**	

Table 7.2 Intervention and Control in Age Groups

Characteristic	Intervention =n	**Intervention =%**	Control = n	**Control = %**
Sex				
Male	16	21%	7	28%
Female	62	79%	18	72%
Age				
up to 30	16	6%	22	21%
31 – 45	20	7%	27	26%
46 - 60	25	6%	31	30%
61 upwards	17	6%	23	22%
Total Number 103	78	76%	25	24%
Ethnicity	80	100% white	23	100% white
Weight				
Underweight	4	5%	2	8%
About right	32	41%	14	56%
Slightly overweight	32	41%	6	24%
Very overweight	10	13%	3	12%
total	78	100%	25	100%
Education				
early school leaver	6	8%	4	16%
gcse o level	25	32%	5	20%
a levels	8	10%	3	12%
degree	39	50%	13	52%
	78	100%	25	100%
Occupation				
professional	28	36%	10	40%
manager or technical	9	12%	1	4%
skilled non manual	11	14%	1	4%
skilled manual	8	10%	2	8%
part skilled	8	10%	3	12%
not working	14	18%	8	32%
	78	100%	25	100%
Read labels?				
never	5	7%	6	24%
always	22	28%	6	24%
sometimes	51	65%	13	52%
	78	100%	25	100%

7.3 Comparison of Group characteristics between Intervention and Control groups

		Gender		
		Male	Female	Total
Intervention	Count	16	62	78
	Expected Count	17.4	60.6	78.0
Control	Count	7	18	25
	Expected Count	5.6	19.4	25.0
Total	Count	23	80	103
	Expected Count	23.0	80.0	103.0

7.4 Comparison of gender balance in Intervention and Control groups

Pearsons Chi-Square Tests = 0.434, Likelihood ratio = 0.442 showing no significant difference in the gender balance between groups

		Education level				
		Early school leaver	GCSE/O level	A levels	degree	Total
Intervention	Count	6	25	8	39	78
	Expected Count	7.6	22.7	8.3	39.4	78.0
Control	Count	4	5	3	13	25
	Expected Count	2.4	7.3	2.7	12.6	25.0
Total	Count	10	30	11	52	103
	Expected Count	10.0	30.0	11.0	52.0	103.0

7.5 Comparison of Education level in Intervention and Control groups

Pearson Chi-Square Tests = 0.501. Likelihood Ratio = 0.513 showing no significant difference in education levels achieved between intervention and control groups.

		Age in groups				
		1	2	3	4	Total
Intervention	Count	16	20	25	17	78
	Expected Count	16.7	20.4	23.5	17.4	78.0
Control	Count	6	7	6	6	25
	Expected Count	5.3	6.6	7.5	5.6	25.0
Total	Count	22	27	31	23	103
	Expected Count	22.0	27.0	31.0	23.0	103.0

7.6 Comparison of Age in Intervention and Control groups

Pearson Chi-Square = 0.597, Likelihood Ratio 0.614 showing no significant difference in the age groups between intervention and control groups. (Siegel and Castellan 1988).

		Occupation						
		professional	manager or technical	skilled non manual	skilled manual	part skilled	not working	Total
Intervention	Count	28	9	11	8	8	14	78
	Expected Count	28.8	7.6	9.1	7.6	8.3	16.7	78.0
Control	Count	10	1	1	2	3	8	25
	Expected Count	9.2	2.4	2.9	2.4	2.7	5.3	25.0
Total	Count	38	10	12	10	11	22	103
	Expected Count	38.0	10.0	12.0	10.0	11.0	22.0	103.0

7.7 Comparison of occupation in Intervention and Control groups

Pearson Chi-Square = 0.446, Likelihood Ratio = 0.388
showing no significant difference of occupation categories between intervention and control groups.

All the participants were white. Anglesey has a very low ethnic minority population.

The original Calon Lân survey included specific questions on weight and height in order to calculate BMI. This was included in the short food section only Calon Lân questionnaire used for study 3. The majority of Study 3 participants were asked to state whether they considered their weight to be underweight, about right, slightly overweight or very overweight. The percentage response is shown below (Table 7.3).

The data was planned to be analyzed using SPSS, General Linear Model ANOVA Repeated Measures (GLM ANOVA RM) tests (Field, 2005) on the food categories, comparing the changes in shopping in the intervention group and control group.

	Frequency	Percent
underweight	6	5.8
about right	46	44.7
slightly overweight	38	36.9
very overweight	13	12.6
Total	103	100.0

Table 7.8 Self Reported Perception of Weight of Study 3 Participants

Nearly 45% considered themselves to be "about right", only 5.8% felt they were underweight, 36.9% felt they were slightly overweight and 12.6% felt "very overweight", shown in Table 7.8 above.

Weight perception	**Body Mass Index (BMI)**																		
BMI	19.0	20.4	21.	22.	24.	24.	25.	26.	27.	27.	28.	30.	30.	31.	31.	32.	34.	36.	37.	Total
about right	1	1	1	2	1	1	0	0	***1***	0	0	0	0	0	0	0	0	0	0	8
slightly overweight	0	0	0	0	0	0	1	2	3	1	1	***1***	***1***	***2***	0	***1***	***1***	0	0	14
very overweight	0	0	0	0	0	0	0	***1***	0	0	0	0	0	0	1	0	0	1	1	4
Total	1	1	1	2	1	1	1	3	4	1	1	1	1	2	1	1	1	1	1	26

Table 7.9 Perception of Weight Compared to Body Mass Index

Table 7.9 above shows the self reported weights in the Calon Lân group. The ideal Body Mass Index (BMI Glossary) range is between 19 and 25, BMI 26 to 29 is overweight and over 30 is obese. People who estimated inaccurately are shown in red italics and underlined. The questions on weight and height were only on the Calon Lân questionnaire as it was included on the original full Calon Lân questionnaire. The questions were not included for other respondents as Study 3 was not an NHS survey, which the original Calon Lân survey had been and it was felt the general public might feel the questions were too intrusive.

It can be seen that 8 people stated they were "about right" this should be those with a BMI from 19 to 25. However one of these had a BMI of 27 and stated they felt they were about right but it is overweight. In the "slightly overweight category, 7 people judged their weight correctly, having BMIs in the 26 to 29 range but 6 people underestimated their weight, having BMIs of 30 to 34, which is in the obese category and should be categorised as "very overweight". Three people did categorise themselves correctly as "very overweight" or obese but 1 person stated they were "very overweight" incorrectly when they were only just into the overweight category, with a BMI of 26.

This small sample would appear to demonstrate that the perceptions of weight amongst the "about right" and "slightly overweight were more accurate than those in the "very overweight" category, a higher proportion of this group underestimated their weight.

BMI is an estimated figure and if the individual had a high muscle to fat ratio, they could be categorised as overweight by BMI measurements yet not having excess body fat.

"Zero" data

In respect of the data from the original quantity of food purchased figures, if people did not buy any of a food category, this would mean than no data had been collected, however, in this study the fact that some of the data was "0", did not mean "no data". For example, if a person bought 2 packs butter on week 1, 1 on week 2 and none on week 3 but changed to MUFA on week 4, the data would be as follows (showing % of total shopping say 100 items):

Week 1	Week 2	Week 3	Week 4
2 butter = 2%	1 butter = 1%	0 butter = 0%	0 butter = 0%
0 MUFA = 0%	0 MUFA = 0%	0 MUFA =0%	1 MUFA =1%

Table 7.10 Why no purchase is not "no data"

In the example above, the change from 2 packs of butter to none represents a desired change, also substituting MUFA for butter represents a desired change. In the example above, there are 5 cases where purchases show 0, which is a fact or data. Despite the quantities in some types of foods being very small, significant changes have been found in some categories in the intervention group, both in the general linear model and nonparametric tests. Both types of tests were run, general linear model test on the standard data and logistic regression on the binomial transformed data. It was found that the logistic regression tests on the transformed data removed too much data to provide valid analysis in most cases.

In the case of MUFAs and PUFAs the fats were purchased either in very small quantities, or not at all, thus it would be expected that it would be difficult or unlikely to show statistically significant changes. In addition, as stated above, the information about the benefits of MUFAs and PUFAs is complex; there are a number of factors, which may not be understood from a short explanation.

A space has arisen here, as the following table (7.11) is easier to read if not split on two pages.

Table 7.11 which follows, shows the percentages of the total shopping of each food category over the 4 weeks, for both the intervention and control groups.

		Intervention (n=78) Mean (SD)	Control (n=24) Mean (SD)
Fruit & veg %	Week 1	30.41 (16.14)	38.75 (13.64)
	Week 2	35.43 (14.76)	31.84 (12.37)
	Week 3	36.47 (15.71)	40.39 (17.78)
	Week 4	40.00 (15.12)	36.70 (16.19)
Saturated fat%	Week 1	3.91 (5.43)	3.40 (6.26)
	Week 2	2.62 (4.34)	4.98 (5.20)
	Week 3	2.59 (4.32)	2.02 (2.76)
	Week 4	1.57 (2.55)	2.17 (3.86)
Monounsaturated fats %	Week 1	0.27 (1.02)	0.0 (0.0)
	Week 2	0.21 (0.71)	1.10 (2.74)
	Week 3	0.61 (1.88)	0.46 (1.17)
	Week 4	0.62 (1.57)	0.19 (0.52)
Polyunsaturated fats%	Week 1	1.29 (5.89)	0.48 (1.03)
	Week 2	0.81 (1.89)	0.50 (1.52)
	Week 3	0.74 (2.24)	0.28 (1.04)
	Week 4	0.70 (1.60)	0.61 (2.47)
Ready meals	Week 1	3.19 (5.56)	2.62 (3.94)
	Week 2	2.84 (4.49)	3.74 (7.07)
	Week 3	3.06 (4.28)	4.13 (6.67)
	Week 4	2.76 (3.98)	3.04 (7.68)
Wholegrain cereals	Week 1	4.44 (5.15)	4.29 (6.36)
	Week 2	4.10 (4.86)	4.32 (5.77)
	Week 3	4.46 (5.22)	5.70 (7.05)
	Week 4	3.42 (3.73)	5.31 (5.59)
White cereals	Week 1	12.87 (10.47)	8.18 (6.78)
	Week 2	10.83 (8.30)	8.88 (6.73)
	Week 3	10.71 (7.72)	9.06 (9.92)
	Week 4	9.89 (8.83)	8.45 (6.14)
Full Fat items	Week 1	16.65 (9.48)	16.65 (10.07)
	Week 2	17.28 (9.40)	18.60 (24.85)
	Week 3	16.41 (8.80)	12.53 (9.07)
	Week 4	15.52 (8.60)	14.70 (10.20)
Reduced fat items	Week 1	3.89 (5.39)	2.31 (2.64)
	Week 2	3.64 (5.69)	4.16 (5.76)
	Week 3	4.15 (7.13)	3.54 (4.85)
	Week 4	3.70 (5.11)	6.96 (10.05)

Table 7.11 The Effect of the Intervention on Each of the 4 Weeks' Purchases.

7.2.1 Results for each food category

Using SPSS, General Linear Model ANOVA Repeated Measures (GLM ANOVA RM) tests were run (Field, 2005) on the food categories, both comparing intervention and control groups to calculate the effect of the intervention. Table 7.6, above, shows the results collectively, the results are shown in detail below.

Data distribution

The data from the till receipts has been found not to follow a normal distribution curve in most cases. This can be explained by the nature of the information collected. In some cases people will not have purchased any of a category of food at all, which can be the desired situation in some cases. However, some people might have purchased large quantities. For some categories of foods, the majority of people have been in the minimal or no purchase end of the curve with small numbers of people across the range to the highest level of purchases. This produces a non-normal distribution but it is a fact, seen in the study population's normal shopping. For the cases where a non-normal distribution was found, the data was transformed thus:

If no purchases were made the data was categorized "0", if any purchases were made, the data was all categorized as "1" regardless of the quantity bought. Binary Logistic Regression tests were run on this transformed data.

"The statistical power of a study is the probability that the study will have a significant result if the research hypothesis is true" (Aron and Aron 2009:p.213)

7.2.2 Fruit and vegetables

Fruit and vegetables showed a normal distribution; the repeated measure ANOVA (Field, 2005) within subjects effects test was used and showed a statistically significant increase ($p < 0.001$) in the purchases of fruit and vegetables in the intervention group. The Within Subjects Contrast in the intervention group only, was significant as follows; between weeks 1 and 2, $p = 0.019$, between weeks 1 and 3, $p < 0.001$ and between weeks 1 and 4, $p < 0.001$.

A histogram (Figure 7.1) showing the normal distribution of fruit and vegetable purchases follows on page 228.

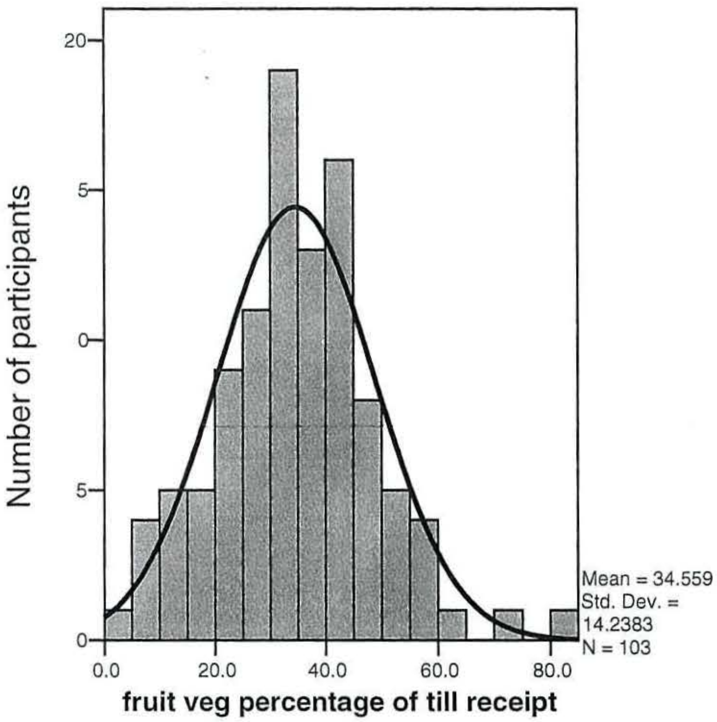

Figure 7.1 Fruit and vegetables purchases showing normal distribution

In Figure 7.2, below the graph shows the fruit and vegetable purchases of the intervention and control groups. For fruits and vegetables the aim was that the intervention group should *increase* purchases of this category of foods. The control group showed a random pattern of fruit and vegetables purchased as a percentage of their total shopping. In the control group in week one, fruit and vegetables comprised 38.8% of the food purchased, week two 31.8%, week three 40.3% and week four 36.7%. Although there was an increase in week 3 in the control group, it shows a random pattern and is not significant (p=0.06) and a decrease from week 1 to week 4. In the intervention group, they increased their purchases of fruit and vegetables each week; week one 30.4%, week two 35.4%, week three 36.5% and week four 40% which was highly significant (p<0.001). Post hoc power calculations were conducted using G Power version 3.1.0. (Faul et al., in press). The F test showed the power of the study to detect differences between the intervention and control groups to be 0.90. the effect in the intervention was 0.9 (or the effect of the difference between the 2 groups). A further post hoc calculation for the intervention group only indicated that the study was also very powerful in detecting a difference over time, with a power of 0.98.

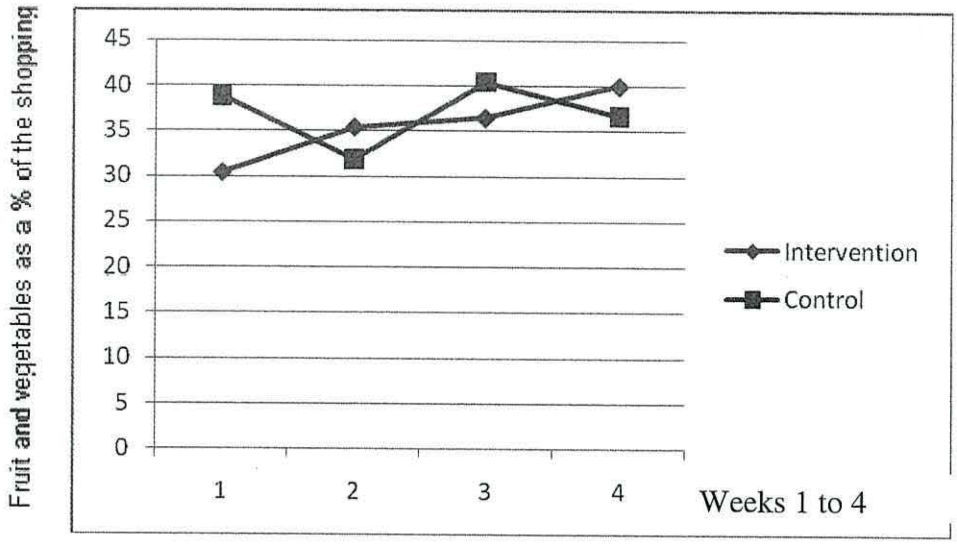

Figure 7.2 Comparison Fruit and Vegetable Purchases between Intervention and Control Groups

The Within Subjects Contrasts test between control and intervention groups showed an increase, which was significant in the intervention group (p=0.019) over the month. The Between Subjects (both groups) Effects were not significant (p =0.554). The Within Subjects Contrast in the intervention group only was significant as follows; between weeks 1 and 2, (p=0.019), between weeks 1 and 3, (p<0.001) and between weeks 1 and 4, (p<0.001). In the intervention group, the Within Subjects Effects was also significant (p<0.001).

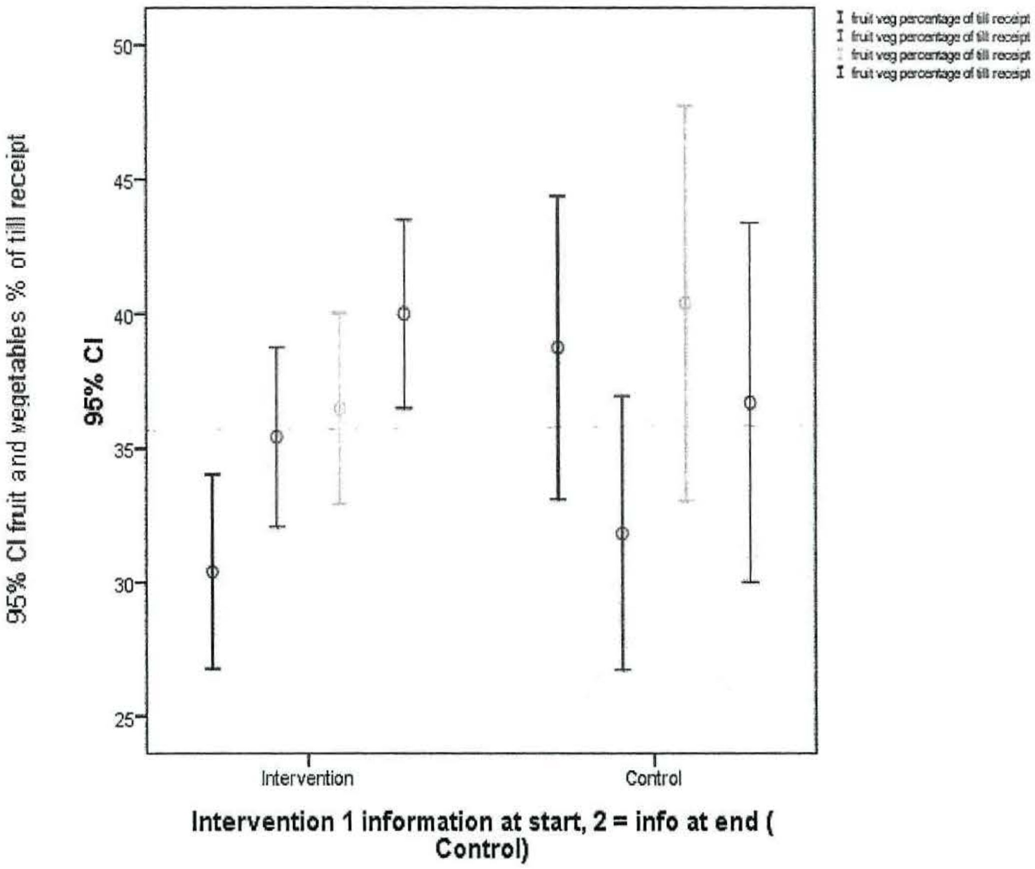

Figure 7.3 Error Bars for Fruit and Vegetables

7.2.3 Saturated Fats

In the case of saturated fats the repeated measures ANOVA showed no significant difference in Between Subjects Effects (the intervention and control groups) (p=0.513). However for the intervention group, the effect of the intervention did find a significant difference (p <0.001) between the 4 weeks' purchases. However, saturated fats showed a non normal distribution. The distribution shows that circa 50% of the participants purchased very small quantities of saturated fat items also very small numbers of participants purchased saturated fat products, ranging from 5% to nearly 30% of their shopping being saturated fat items.

Additional analysis was run on the non normal distribution data. As "0" was the desired case the data was binary transformed. The non normal distribution curve (Figure 7.4) was typical of all the categories of foods purchased where a non normal curve was found. The reason why they were non normal was similar in all those cases, in that a high proportion of the study population bought very small quantities, or none at all of the products, whilst very small numbers of the study population bought larger amounts. Binary coding is a standard approach for statistical analysis where a large proportion of the data is "0" and the remaining data is for small numbers. The binary logistic regression found a significant change (p=0.002) in the case of saturated fats. Thus both methods of analysis identified a significant change in the intervention group and not in the control group.

The non normal distribution as seen below in Figure 7.4 was typical of the distribution found in the following categories:

Saturated fats

Polyunsaturated fats (PUFAs)

Monounsaturated fats (MUFAs)

Wholegrain products

White cereal products

Ready Meals

Reduced fat items

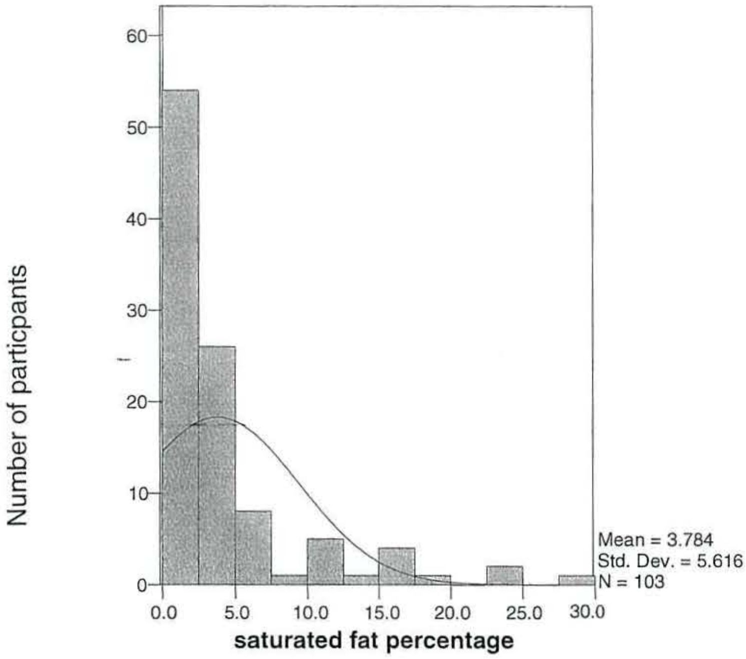

Figure 7.4 Distribution of saturated fat purchases

Figure 7.4 above, shows that over 50% of the study population's shopping comprised of between 0% and 2.5% saturated fat items. 25% of the participant's shopping comprised of between 2.5 and 5% saturated fat items and the remaining range of the participant's shopping was from 5% rising to the highest percentage of saturated fat items purchased was 30% of the shopping for 3% of the participants.

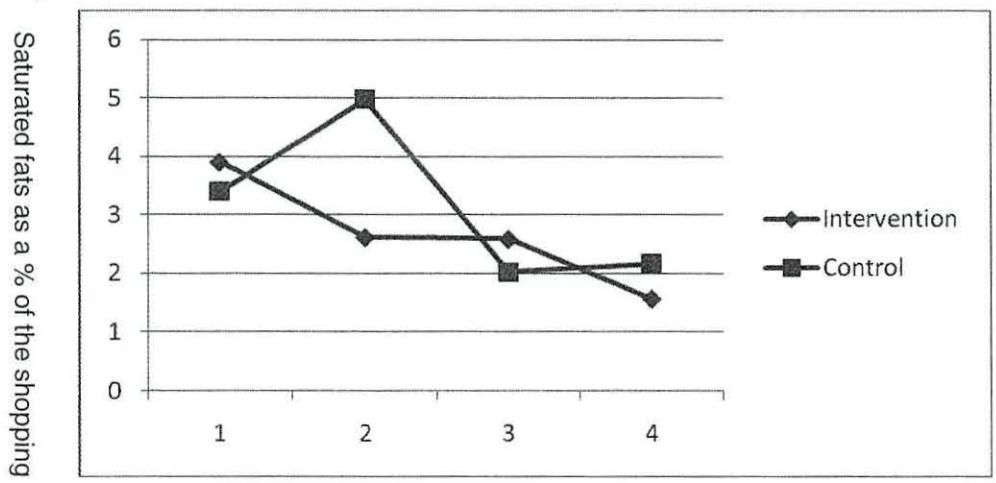

Figure 7.5 Comparison Saturated Fat Items Purchased Between Intervention and Control Groups

In Figures 7.4 and 7.5, for saturated fats the aim was that the intervention group should *decrease* purchases of this category of foods. The control group showed a random pattern of saturated fats purchased as a percentage of their total shopping. In the control group in week one, saturated fats comprised 3.4% of the food purchased, week two 5%, week three 2% and week four 2.2%. Although there was a decrease in week 3 in the control group, it showed as a random pattern. In the intervention group, there was a decrease in purchases of saturated fats in most weeks: week one 3.9%, week two 2.6%, week three 2.6% and week four 1.6%.

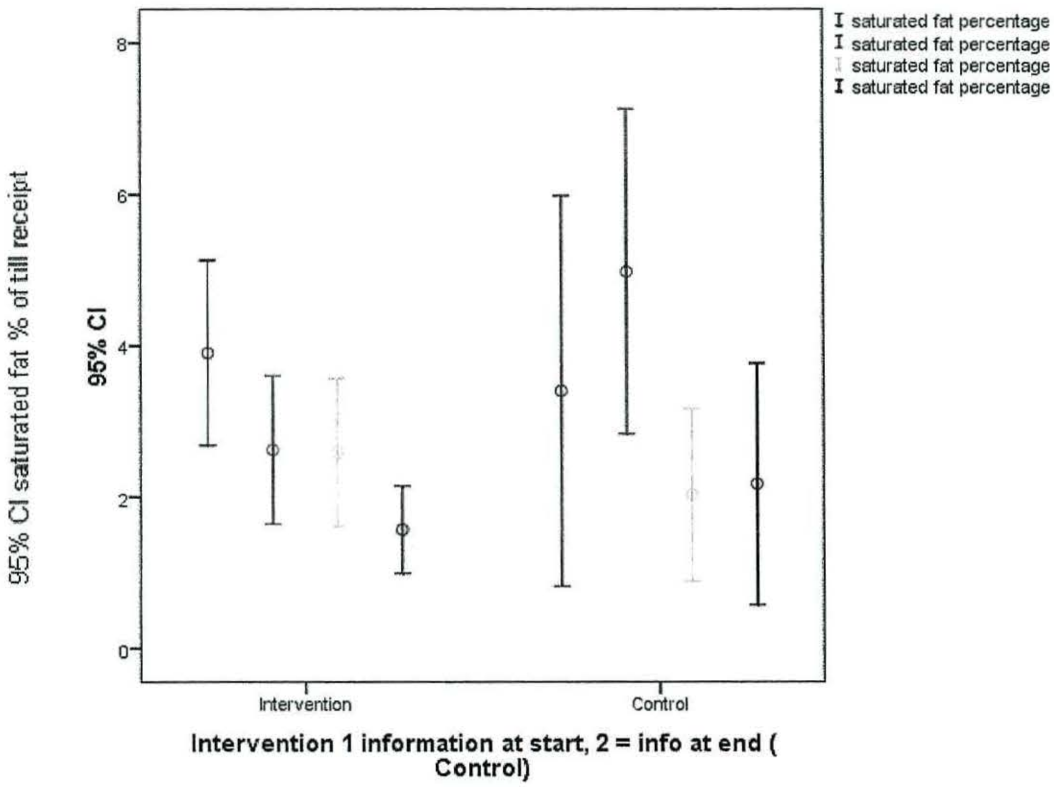

Figure 7.6 Saturated Fats Error Bars

7.2.4 Polyunsaturated fats (PUFAs)

As in the case of the quantities of saturated fats purchased, very low quantities of polyunsaturated fats were bought, with 75% of people buying none at all. Examples of Polyunsaturated fats are corn oil and sunflower seed oils and products made from them, such as Flora. It is perhaps not surprising that very small quantities were purchased in this "real world" experiment, as for example in the case of a family, possibly only the adults would be using small amounts of PUFA products and cooking oil or a tub of spread could last several weeks. In the cases of Polyunsaturated and Monounsaturated fats it was highly probable that no statistically significant changes would be found.

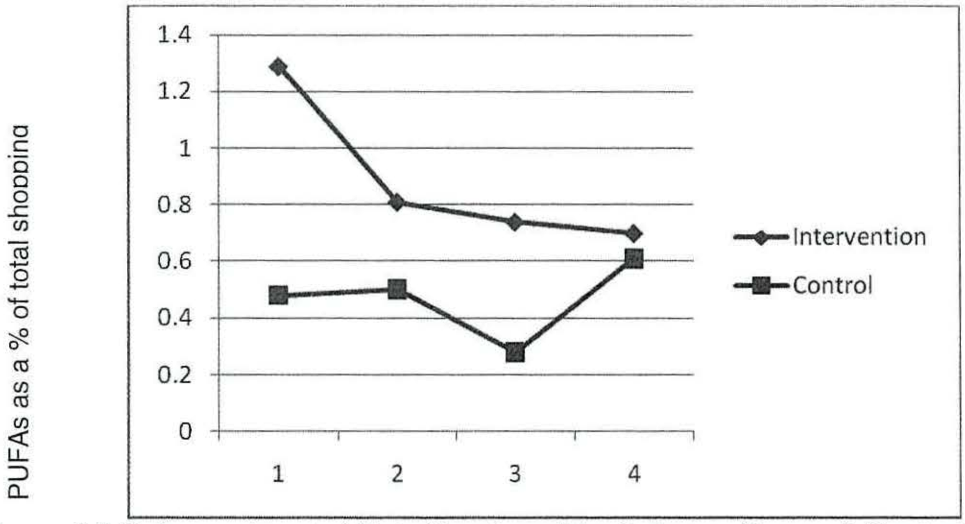

Figure 7.7 Polyunsaturated Fats Purchased by Intervention and Control

Figure 7.7, Polyunsaturates, for this item, there were several possible outcomes of how changes might be seen. The expectation was that the intervention group may show a *change* in their purchases from saturated fats (e.g. butter) to polyunsaturated (PUFA) fat items such as sunflower or corn oil and margarines such as Flora (a sunflower oil spread), or monounsaturated fats (MUFAs). This would show as either an increase in purchases of PUFAs, or a *reduction* in polyunsaturates changing to monounsaturates. The intervention information provided stated that MUFA has beneficial effects in reducing LDL Cholesterol (the atheroslclerotic harmful cholesterol) whilst leaving the beneficial HDL cholesterol alone. PUFAs reduce both types of cholesterol. Therefore the change would be looking for a greater increase in purchases of MUFA products rather than PUFAs, therefore all situations could be likely to be found, i.e. no change, increase or a slight reduction in purchases. Although this may seem contradictory, as stated above, the information regarding fats does seem to cause a great deal of confusion and with such small amounts being purchased, statistically significant changes were not expected to be seen.

The control group showed a random pattern of PUFAs purchased as a percentage of their total shopping. In the control group in week one, PUFAs comprised of 0.48% of the food purchased, week two 0.51%, week three 0.28% and week four 0.61%. Although there was a decrease in week 3 in the control group, it showed a random pattern. The intervention groups' purchases of PUFAs did reduce each week; week one 1.29%, week two 0.81%, week three 0.74% and week four 0.71%.

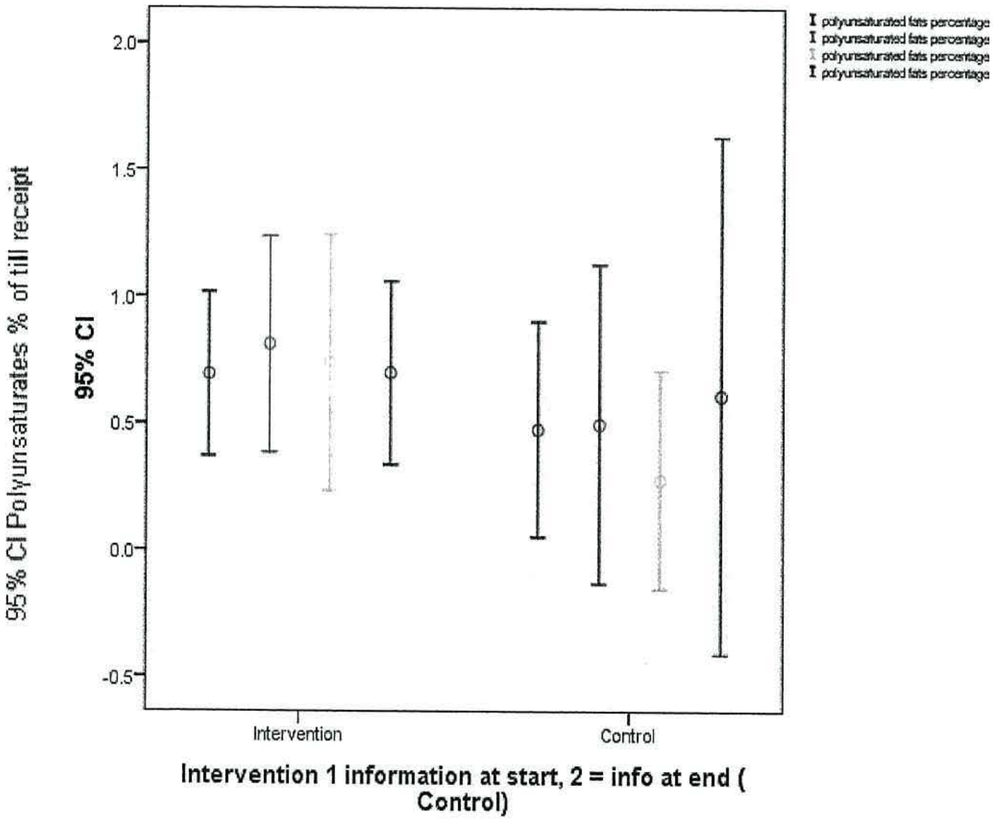

Figure 7.8 Polyunsaturates Error Bars

7.2.5 Monounsaturated fats (MUFAs)

MUFAs, consumed in small quantities have the effect of reducing the LDL harmful cholesterol (Glossary) and do not affect the beneficial HDL cholesterol. The expectation in the intervention group was that people would *change* from purchasing saturated fats such as butter, to MUFAs. As with PUFAs, a non normal distribution was found and a binomial logistic regression analysis was undertaken.

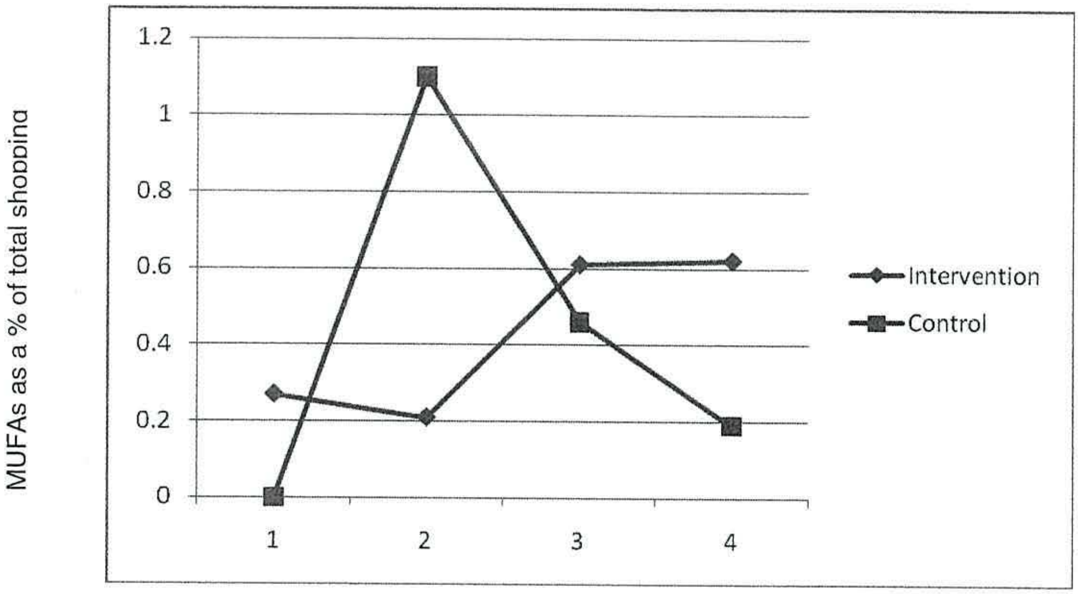

Figure 7.9 Comparison Between Intervention and Control Group Purchases of Monounsaturates Over 1 Month

The graph above (Figure 7.9) shows a decrease in purchases between weeks 1 and 2 in the intervention group but an increase in weeks 3 and 4. Ideally, the intervention group would *increase slightly* their purchases of Monounsaturated fats (MUFAs) by changing from saturated fats such as butter to the healthier MUFAs. For the MUFAs purchased, the control group show completely random levels, with none at all purchased in week one, 1.1% of total shopping in week two 0.51% in week three and 0.21% in week four. The intervention group shows a slight drop in week two, from 0.31% in week one, to 0.21% in week two, increasing to 0.61% in week three and 0.62% in week four.

This would be the desired change if the MUFAs were a substitute for saturated fats but it is also the case that the required change would be less quantity consumed of any fat, so it is difficult to use the statistical figures as an accurate indicator of what is required. The changes found were not statistically significant under either general linear model or binomial logistic regression analysis. A study designed to emphasise the measurement specific quantities of types of fats consumed, linked with an education programme could be the subject for further research.

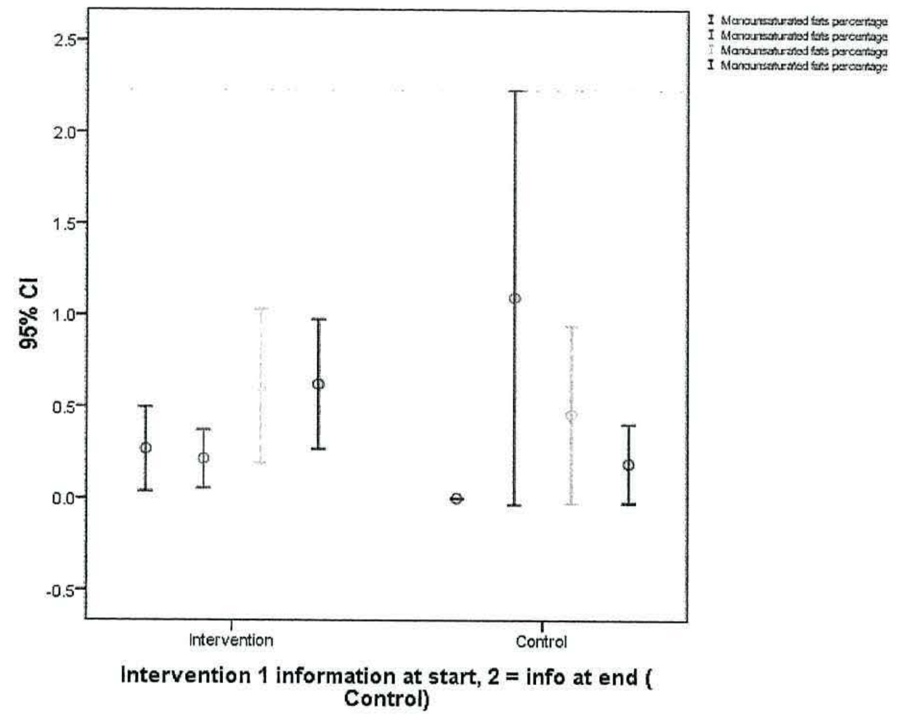

Figure 7.10 Monounsaturates error bars

7.2.6. Ready Meals

The items in "Ready Meals" category included pizzas, quiches, complete ready meals and composite dishes, such as Lasagne. These were used to indicate salt intake as these made up dishes generally have a higher salt content compared to fresh single ingredients (FSA McCance and Widdowson, 2002c). For this food item, it was intended that the intervention group would *decrease* their purchases of ready meal items. The amount of ready meals purchased did decrease very slightly in the intervention group, from 3.21% of the total items purchased in week one to 2.81% in week 4 but it was not statistically significant. In the control group in week one, ready meals comprised 2.62% of the food purchased, week two 3.74%, week three 4.13% and week four 3.04%. Although there was an increase in week 3 in the control group, it showed a random pattern and was not significant.

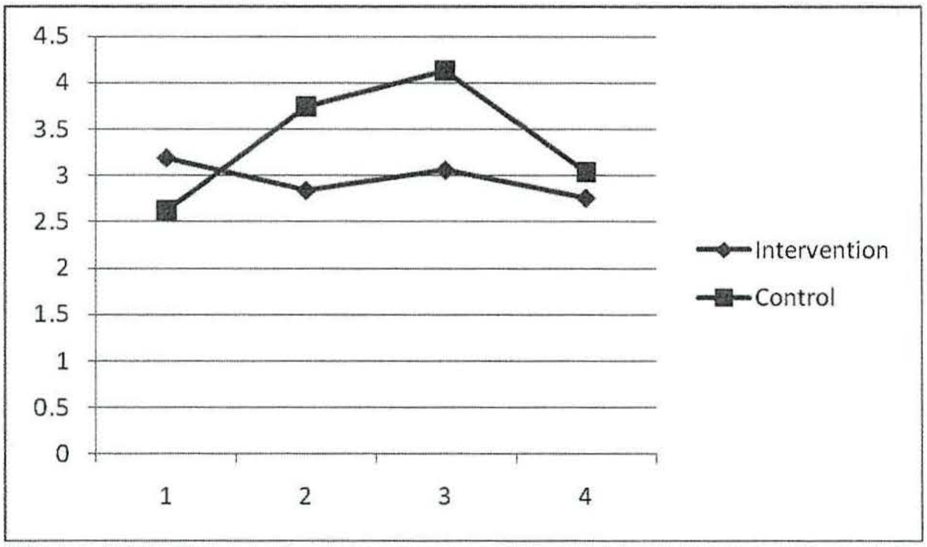

Figure 7.11 Comparison between intervention and control's purchases of ready meals over 1 month

Figure 7.11 shows ready meals purchases. The intervention group did purchase fewer ready meals than the control group. In week one 3.19% of their total shopping was ready meals, week two 2.84%, week three 3.06% and week four 2.76%.

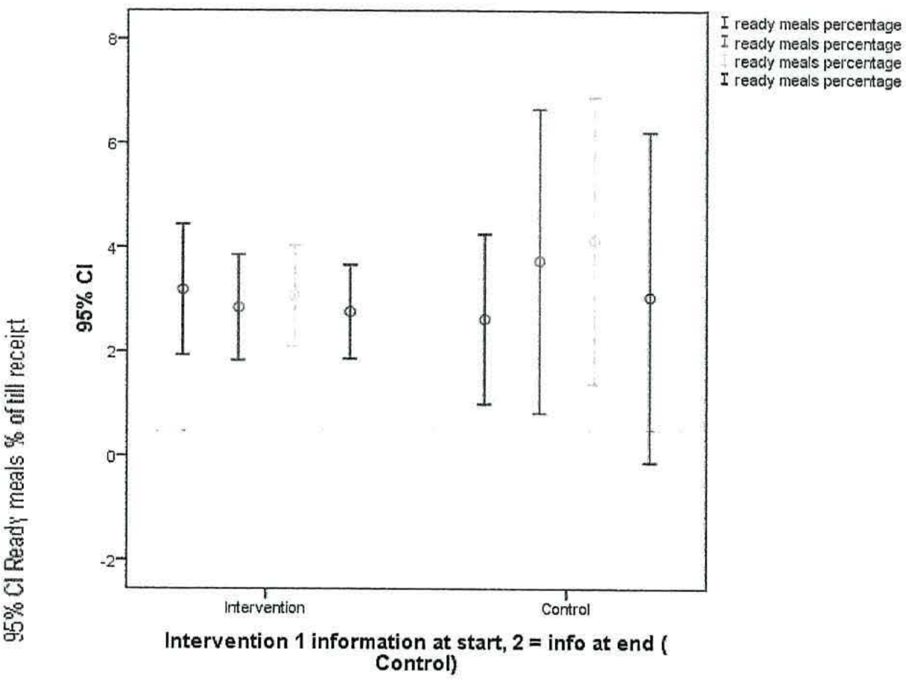

Figure 7.12 Ready Meals Error Bars

7.2.7. Wholegrain products

For wholegrain products, Figure 7.13, it was intended that the intervention group would *increase* their purchases of wholegrain products but there was not a clear improvement in the intervention group, in fact there is an overall decrease from week 1 to week 4; week one, 4.44%, week two, 4.1%, week three, 4.5% and week four 3.4%. The control group however did show an increase from week one, 4.31%, week two, 4.3%, week three, 5.71% and week four 5.31%. Binomial logistic regression analysis did not show any significant changes for either the intervention or control group.

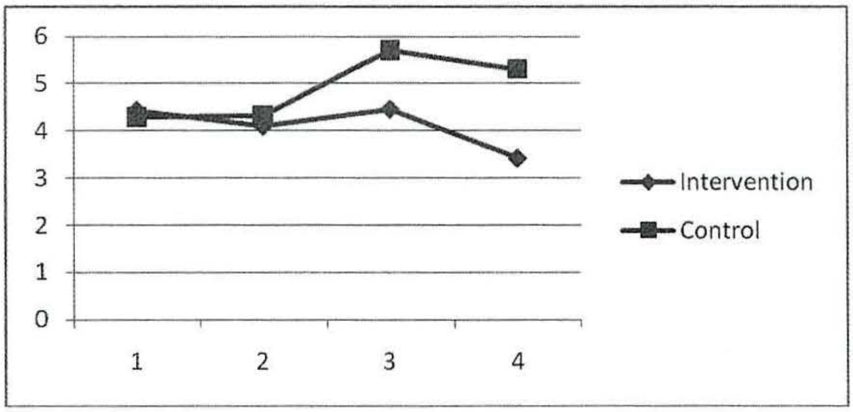

Figure 7.13 Comparison of Wholegrain Products Purchased Between Intervention and Control Groups

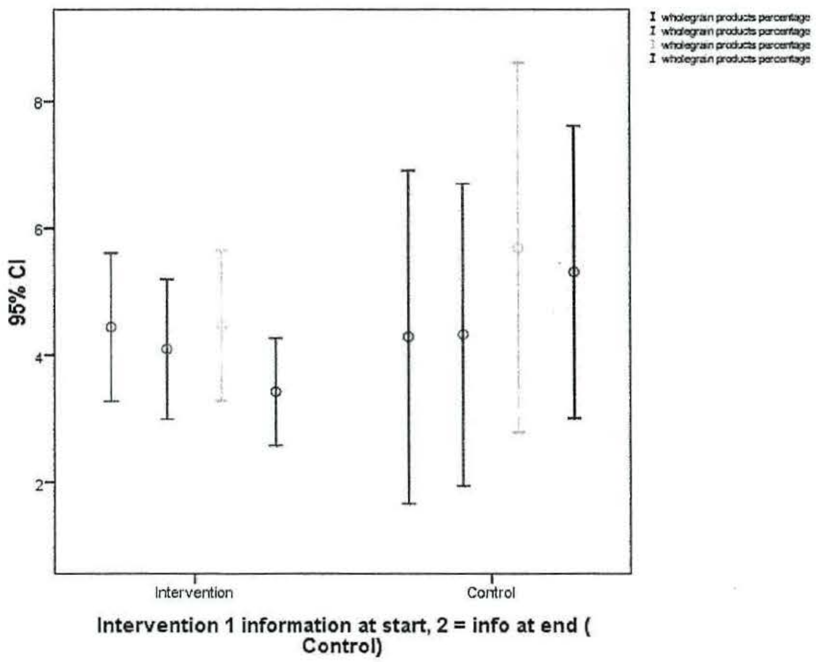

Figure 7.14 Wholegrain Cereals Error Bars

7.2.8. White cereals

For white cereals (figure 7.15), it was intended that the intervention group should *decrease or change* their purchases of white cereals to wholegrain versions. The intervention groups' purchases decreased each week as follows; from 12.91% in week one, 10.83%, week two, 10.71% week three and 9.91% in week four (p=0.037). Whereas the control groups' purchases of white cereals remained fairly consistent with small increases in weeks 2 and 3 at 8.2% week one, 8.9% week two, 9.1% week three and 8.5% in week four.

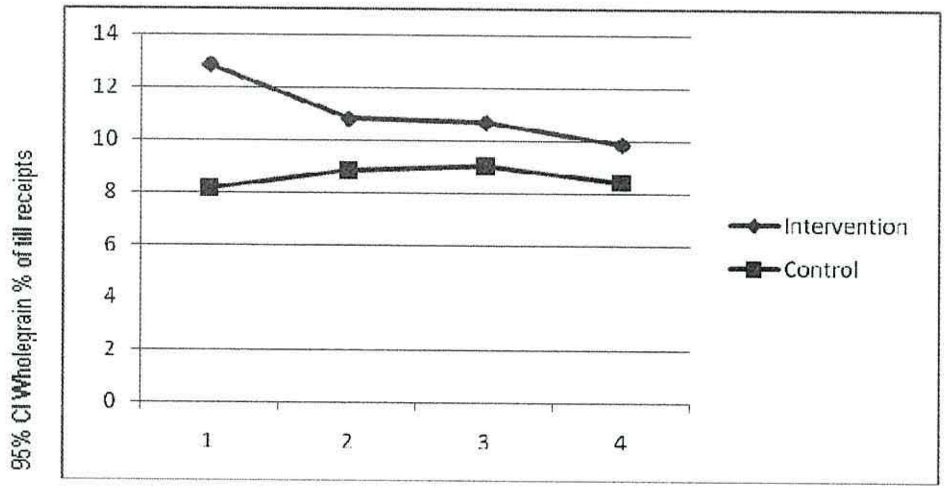

Figure 7.15 Comparison Between Purchases of White Cereal Products Between Intervention and Control Groups in Study 3

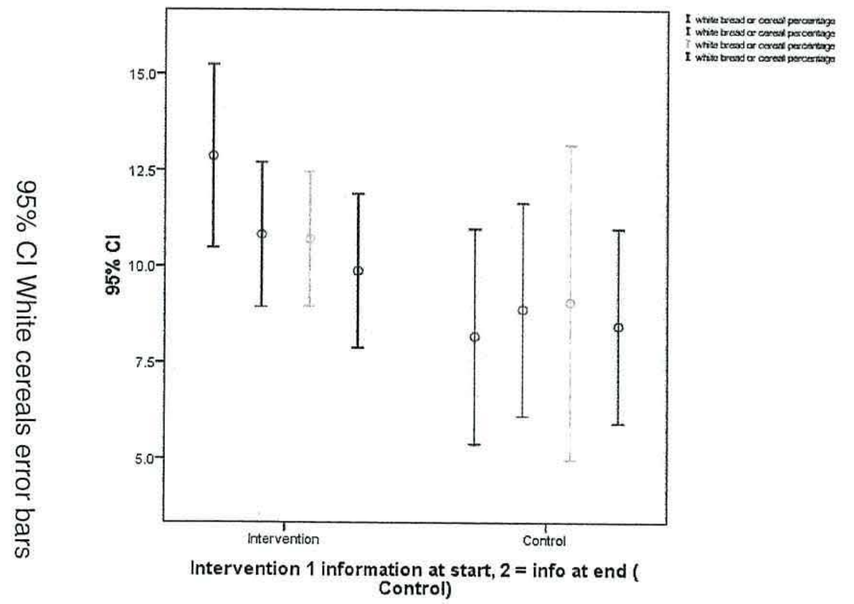

Figure 7.16 White Cereals Error Bars

7.2.9 Full fat products

Full fat items showed a normal distribution. For Full Fat foods (Figure 7.17), the aim was that the intervention group should *reduce* their purchases of full fat items to choosing some alternative low fat products. The intervention group showed an overall reduction in full fat items purchased, although week two showed an increase from 16.7% in week one to 17.3% but was followed by reductions in weeks three, 16.4% and in week four 15.5%, the test of Between Subjects Effects showed the difference between the intervention and control was not significant (p= 0.531). The control group showed random levels of purchasing with week one being the same as the intervention group at 16%, followed by 18.6% in week two, dropping to 12.5% in week three but increasing to 14.8% in week four. The test of Within Subjects Contrasts in the intervention group was not significant (p=0.461).

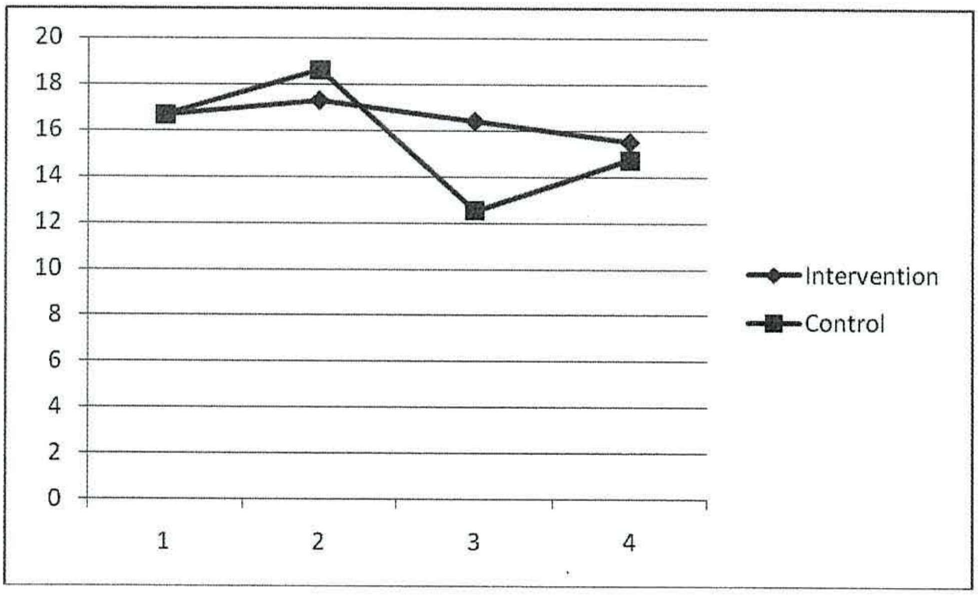

Figure 7.17 Comparison between purchases of full fat products between intervention and control groups in study 3

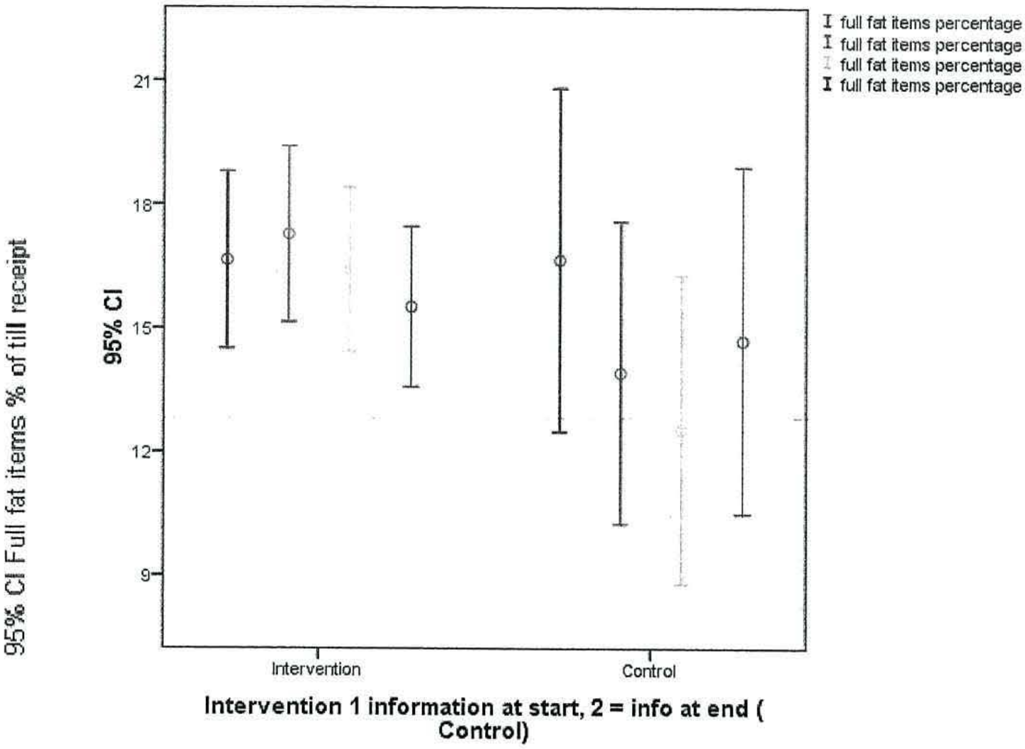

Figure 7.18 Full fat items error bars

7.2.10. Reduced fat products

For reduced fat foods, figure 7.19, it was intended that the intervention group would *increase* their purchases of reduced fat items. There was a marked increase in the control group from 2.3% in week one to 4.2% in week two and 7% in week four but a drop in week three at 3.5%. The intervention group did not show an increase overall. Week one at 3.9% dropped in week two to 3.6% but rose in week three to 4.2%, dropping again to 3.7% in week four.

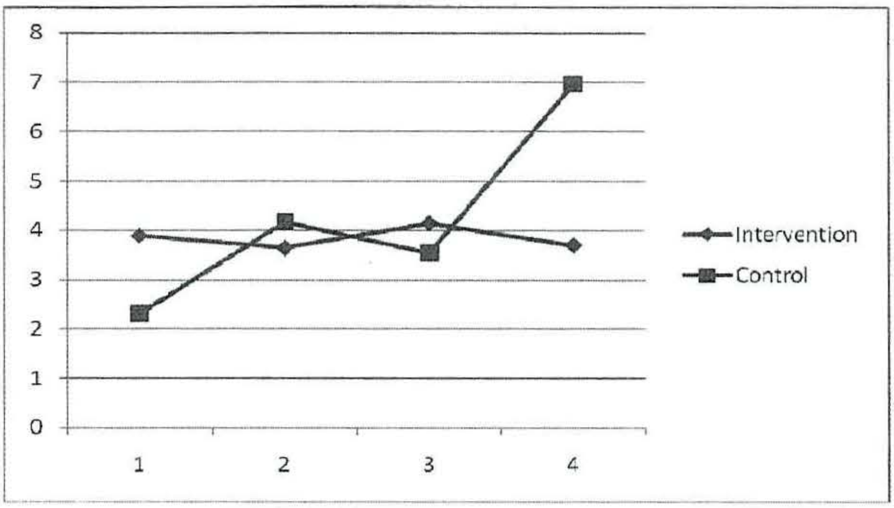

Figure 7.19 Comparison between purchases of reduced fat products between intervention and control groups in Study 3

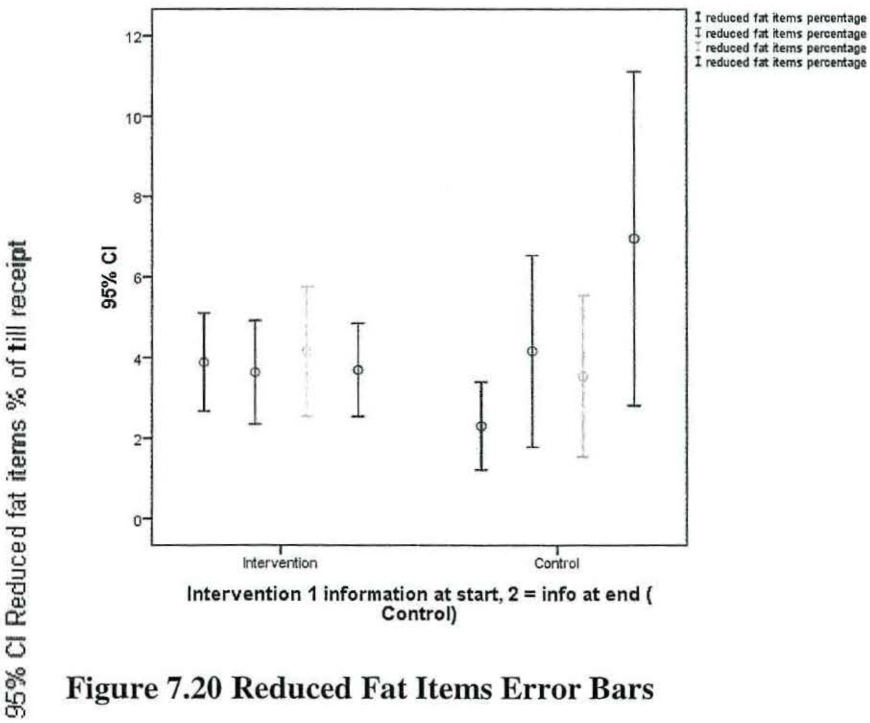

Figure 7.20 Reduced Fat Items Error Bars

7.3 Discussion

Only two categories of foods showed a normal distribution. This, coupled with the very small amounts purchased of some items made it difficult to demonstrate statistically significant changes. It can be seen that in the case of, fruit and vegetables the intervention has had a positive statistically significant effect, showing a statistically significant increase in purchases over the 4 weeks. In the case of the purchases of saturated fats a decrease was required and a statistically significant decrease was found. White cereals also required a decrease in purchases and again, a statistically significant decrease was found. In the case of the remaining categories Polyunsaturated fats showed a non-statistically significant increase in the intervention group and a drop in the control group, as did monounsaturated fats. The intervention group also indicated a trend of decrease in full fat items purchased, while the control group indicated a trend of increase in purchase of full fat foods. There was also a change in the amount of reduced fat items bought. However, in these categories the changes found were not statistically significant but, in terms of trends, indications of change are found.

An area where there was no discernable effect of the intervention was in wholegrain products. The control group increased their wholegrain purchases steadily, whilst the intervention group remained fairly consistent with their purchases for the first 3 weeks but dropped in the 4th week.

Category	Desired change	Intervention	Control	Intervention within subjects effects	Intervention within subjects contrasts	Between subjects effects
Fruit and vegetables	increase	Increase achieved	No change	$p<0.001$	$p<0.001$	$p=0.554$
Saturated fats	decrease	Increase achieved	No change	$p<0.001$	$p<0.001$	$p=0.513$
PUFAs	Minimal increase	Increased	Increased	$p=0.560$	$p=0.400$	$p=0.226$
MUFAs	Increase	Increase achieved	No change	$p=0.119$	$p=0.099$	$p=0.969$
Ready meals	decrease	Decrease achieved	Increased	$p=0.902$	$p=0.492$	$p=0.572$
Whole grains	increase	Decreased	Increased	$p=0.384$	$p=0.115$	$p=0.337$
White cereals	decrease	Decrease achieved	No change	$p=0.115$	$p=0.037$	$p=0.050$
Full fat items	decrease	Decrease achieved	Increased	$p=0.613$	$p=0.461$	$p=0.531$
Reduced fat items	increase	Increase achieved	Increased	$p=0.930$	$p=0.802$	$p=0.642$

Table 7.12 Required Changes, those achieved and significance

Study 3 also examined people's use of labels attempting to understand how and why they use them. Interventions were developed to improve understanding of labels. The use of till receipts to measure change revealed the quantities of the different types of foods the participants purchased. What was surprising generally about the study populations' sample purchases of all fats, whether saturated fats, PUFAs or MUFAs was how little was actually purchased.

Fat type	Intervention group % of total shopping	Control group % of total shopping
Saturated fat items	2.7%	2.3%
Monounsaturated fats	0.4%	0.6%
Polyunsaturated fats	0.9%	0.5%

Table 7.13 Percentage of the shopping of different types of fats

In addition there were perhaps surprisingly few ready meals purchased by the participants. This category was included as it is likely to be one of the higher sources of sodium and salt, as opposed to homemade dishes from basic ingredients.

The systematic review by Cowburn and Stockley identified the need for research into the understanding and use of labels, particularly in "real life" supermarket use. Although only 3 food categories (fruit and vegetables, saturated fats and white cereals) showed statistically significant changes in the intervention group, a trend of change in the desired direction was indicated in table 7.14:

Green up arrow	↑	Desired change = increase	Increase achieved
Green down arrow	↓	Desired change = decrease	Decrease achieved
Red up arrow	↑	Desired change should be decrease ↓	Unwanted increase
Red down arrow	↓	Desired change should be increase ↑	Unwanted decrease
Amber arrow	→	No change required →	No change achieved

Table 7.14 Key for trends shown in table 7.15

Item	required	Intervention	Control
Fruit and vegetables	↑	Yes ↑	No change →
Saturated fats	↓	Yes ↓	No change →
PUFAs	→	Increased ↑	Increased ↑
MUFAs	↑	Yes ↑	No change →
Ready meals	↓	Yes ↓	Increased ↑
Whole grains	↑	Decreased ↓	Increased ↑
White cereals	↓	Yes ↓	No change →
Full fat items	↓	Yes ↓	Increased ↑
Reduced fat items	↑	Yes ↑	Increased ↑

Table 7.15 Changes ideally required and trends seen in Study 3 Participants' Purchases Over 1 Month

For the intervention group of the 9 items examined, statistically significant increases of fruit and vegetables were found also in the case of purchases of saturated fats a statistically significant decrease was found, which were possibly the two most important food groups. Indications of a trend of changes in the desired direction were found in 7 categories, however 6 of these were not statistically significant. Only in one category, the wholegrains did the changes appear to be contrary to the desired change. An increase in intake was looked for in the intervention group but not found, whereas an increase was found in the control group. In the polyunsaturates category no change or a slight increase was looked for and this was found. In the control group, there was no change in items purchased in 4 categories and an increase in 3 categories where the desired change was a reduction in purchases of the items. In the case of reduced fat both groups increased their purchases. Whether these changes could be sustained could be the subject of further research.

It was difficult to demonstrate statistically significant changes in all categories of foods; possible reasons for this have been explained above. Because of normal purchasing patterns to obtain a fuller picture, a repeat study with much larger numbers and over a longer period, possibly a year, would be able to show changes (whichever direction) in the products purchased on an occasional basis. Despite this study being with 103 participants and over a period of a month, statistically significant changes were found in some categories.

7.4 Recruitment analysis

There follows a qualitative thematic content analysis (Smith, 1992) to examine reasons for the low rates of recruitment, undertaken with participants who responded by sending the initial recruitment form but did not continue.

7.4.1 Qualitative analysis of the reasons for low response.

The qualitative analysis to ascertain the reasons for low response in Study 3 was undertaken by telephone interview. The ethics application had included interviewing participants and had been approved.

7.4.2 Sampling method

Each participant's forms and receipts had been put in alphabetical order and the 1st 14 people who had sent in the initial recruitment form but did not continue were contacted. It was decided to conduct the interviews by telephone for 2 reasons, firstly it would be possible to interact with them and adapt the questions rather than the limiting restrictions of a fixed postal paper questionnaire. Also it would be clear when the required number had been achieved, there were concerns after previous low responses.

7.4.3 Method for response evaluation

A thematic content analysis was undertaken (Smith, 1992). The conversations were recorded with their permission. The responses were transcribed by listening to the recorded conversations and writing the answers down by hand, then grouped into themes following the format of the questions and are provided in tabular form below in Table 7.16.

7.16 Qualitative analysis of the responses of those who completed the recruitment form to undertake Study 3 but did not continue

Question	Responses – people said they;
1 **Why did you take place in the 1st place?**	thought it could be interesting liked to eat healthily and wanted to know more about it noticed new labels and wanted to understand them wanted to understand "E" numbers wanted to know more about losing weight
2 **Why didn't you carry on?**	shopped at different supermarkets so thought that excluded them shopped at market and butchers so till receipts are not complete shopped daily and thought study only wanted weekly shopping thought it was complicated had received the intervention material did not need to continue
3 **What do you think might have put people off?**	were concerned the study was being conducted by a dietitian who might criticize their choices didn't know what they should be eating and didn't want to expose their ignorance did not want to shop at the same supermarket were too busy, looked complicated were concerned about information on till receipts, might need receipt to exchange an item were concerned about security, till receipts show loyalty card numbers, what information is shown on till receipts?
4 **Was providing till receipts a concern?**	stated it was not a concern to them but could see it might be to others might need receipt in the future to exchange goods didn't want to be criticised for unhealthy choices "cream cakes" Didn't want personal items to be scrutinized
5 **In what way might providing till receipts be a concern ?**	were concerned there might be criticism of junk food or other items they don't want scrutinized felt a dietitian might be critical of items like unhealthy food did not want to show ignorance about how much they should be eating (healthy food) were concerned about what was going to be done with the information
6 **Did providing till receipts seem intrusive?**	did not feel it was intrusive, although one commented her husband did think it intrusive felt although they did not feel it was intrusive, others might one did not feel it was intrusive at first but having sent 1 receipt, decided it was felt security was an issue and stated they had cut the details off The detailed shopping information was felt to be intrusive "if overweight".

Question	Responses – people said they;
7 **Did the recruitment form explain clearly**	more than half the respondents commented that they understood the instructions clearly some had to read it a few times before they understood it stated they did understand it but it was complicated felt it was not flexible enough to fit in with their shopping habits, shopped at supermarket for groceries, butchers for meat and greengrocers for fruit and vegetables
8 **Were there any questions that put you off?**	shop irregularly so would not have weekly receipts or difficult to remember to save all receipts for a week were confused and were not sure whether they should send all receipts at once had lost their receipts, did not get round to it
9 **Which?** *(Questions?)*	had to shop at the same supermarket didn't buy food with labels on didn't want a dietitian scrutinizing their receipts and choices
10 **Was the £50 prize an incentive?**	Not really would have done it without the prize if they had time They wouldn't expect to win and were cynical about competitions
11 **Were the booklet and FoLaG useful?**	Very useful, very good, colourful, attractive The GDA explanation particularly useful
12 **What do you think would increase responses in future?**	To be able to shop at any supermarket Not using till receipts Make it less prescriptive, i.e. not having to shop weekly Make it simpler Don't say you are a dietitian, then people won't worry about criticism of unhealthy choices Difficult for single people as they don't shop often, choose families, they do more shopping
13 Any other comments	

7.5 Findings for Study 3; Low Recruitment content analysis

There is evidently some interest in food labels and wanting to understand them more. This has been shown both by this small interview sample, people expressed an interest in knowing more about food labels but did not continue their participation in the study for the reasons given below. Also it was shown in Study 1 – 'Identifying the Use of Food Labels', that a high percentage of people (64%) read labels and wanted to know more. The people interviewed for this analysis were sufficiently interested to send the recruitment form and the first till receipt. The themes raised by the respondents are discussed below. A thematic content analysis was undertaken (Smith, 1992).

Themes

7.5.1 Confusion

It is not surprising that people stated they were confused as the numerous labelling options are in themselves confusing. People were also unsure or confused about exactly what was required for the survey. For future studies in this field very clear phrasing of the questions is required. Pilot studies are a valuable exercise to eradicate ambiguity, which may lead to misleading answers, or phrasing questions in the simplest manner can elicit more accurate responses. The Calon Lân study was piloted originally in 2002.

Confusion was the first factor, which reduced possible responses. It is likely that of the 2000 recruitment forms given out in schools, a high proportion never reached the parents, probably still lurking with other detritus in the bottom of schoolbags. In the case of primary schools it could be that the children did not understand sufficiently and were just confused what to do with it. Possibly secondary school pupils would be much more likely to forget it, not having a particular interest in food labelling themselves.

Further confusion was apparent from discussion with the participants in the telephone survey that they perceived the whole project was seen as confusing and were confused as to exactly what was expected of them. Much clearer, simple explanations could improve response rates.

The original rationale for asking for participants to use the same supermarket if possible, was to measure the effect on purchases, of the different labelling systems, i.e. the Traffic lights or GDA by shopping at one supermarket which predominantly used one system. Tesco had introduced the GDA information strip in 2006, Asda and Co-op were introducing the traffic lights system at the start of 2007 and in 2006 Sainsbury had introduced their "Wheel of Health" (Traffic Lights based), although nearest Sainsbury store was in Rhyl, some participants returned receipts from there and further afield, across North Wales and into England. Only a limited number of manufacturers were displaying the traffic lights guide on their packaging at the time of data collection. Asda, Co-op and others had only introduced traffic lights across a limited range of products at the time of the data collection. Amongst the first that were in the stores early in 2007 were McCain, Moy Park, Covent Garden and Avondale, some of these companies' products are not purchased on a regular basis.

In practice trying to analyze the differing effect of the 2 types of labelling was found to be impractical, firstly because of the low response numbers made analysis not meaningful. Principally though, both types of labelling were available in all supermarkets. Products from manufacturers who were members of the Institute of Grocery Distributors and Food and Drink Federation, for example Nestle, Kelloggs and other large manufacturers, displayed the GDA strip on their products and these were available across a range of supermarkets but these supermarkets also stocked products from manufacturers with traffic lights labelling. Bernard Matthews, Co-op, Boots, Budgens, Londis, Virgin Trains and Kettle Chips have adopted a combined option giving both types of information by using traffic lights colouring on the GDA strip.

Thus both types were available in some supermarkets, providing up to 9 types of labelling information:

1. Traffic Lights
2. Traffic lights in the form of Sainsbury's "Wheel of Health"
3. Guideline Daily Amounts
4. Guideline Daily Amounts in traffic lights colours
5. Standard "Big Four" in tabular format per 100g

6. Standard "Big Four" in tabular format per serving
7. Standard "Big Eight" in tabular format per 100g
8. Standard "Big Eight" in tabular format per serving
9. Ingredients listed in weight order Side tracked

7.5.2 Complete till receipts records for a week

Another theme was that people did not feel able to collect all receipts for a week's shopping. There were several reasons put forward, such as some shopping might be done at a market or butchers where a receipt might not be given. People thought it difficult to remember to save all the receipts. This was perhaps evidenced by the fact that not all participants provided all till receipts for the total complete week's foods. The main weekly shopping till receipt had been asked for, i.e. a complete week's shopping on 4 receipts over a month. Some did provide 4 receipts over the month but it was evident that some items were purchased elsewhere, e.g. where no fruit or vegetables appeared on a till receipt and the participant stated they purchased these at a farm shop or market. These participants were excluded as they did not provide information on the full range of nutrient groups for analysis. This further reduced the final total number of participants.

7.5.3 Security

Security of information was an aspect that concerned some people. Working in the NHS, being accustomed to treating patient information with complete confidentiality, together with following the Ethics Committee's requirements for patient confidentiality, it was a surprise that participants were concerned about this aspect. They stated did not mind giving the information to the researcher but were concerned as to what might be done with it, despite the fact that it had been explained that the information would not be passed on to anyone and it was anonymous. Considerable prominence has been made in the media about identity fraud, people are perhaps unsure as to what can be used by whom fraudulently and some were anxious about giving any information.

However, many people happily sign up to loyalty/shopping/club cards, the principal purpose of which is to collect data that the supermarkets can use for their own benefit. Whenever a loyalty card is used at any supermarket, the purchases made are recorded exactly in detail. For all customers who take up the offer to use one, the supermarkets collect vast amounts of data about them. Whenever they present their loyalty card, the till computer sends all the transaction details to a computer at headquarters where the data is added to the customer's record. The computer records everything bought, the quantity, which products, what day and what time the customer has been in the supermarket.

One of the functions of the loyalty card is marketing, for example, using the date and time information together with the security video cameras in the supermarket which monitor the customer's movement through the store and can be traced to see which shelves or displays were looked at, which ones were ignored and how people make buying decisions. This information will be used to adjust and improve the appeal to increase sales.

The loyalty card is also used for stock control as the store knows exactly what is sold and automatic stock differential lists are created and products are dispatched to restock as the purchases are made. Trends in sales can also be seen, population demographics are forecasted and appropriate products are promoted or discontinued accordingly.

Another use is that the information is compiled and customers are allocated into bands, information about the families of customers can also be kept. If a customer buys baby food or nappies, it is likely that they have a young child. The shopper would then be bracketed into an age category, though it is probable that the supermarket would know the customer's age already, having filled in their date of birth on the application form for the card. Appropriate (in the case of family with children, vouchers for nappies or baby food) money off discounted vouchers are then sent to the customer, as an incentive to return to the same chain, which increases sales.

The information can be sold to third parties who will use the information to build demographic representations of the family. Some loyalty cards state they will not sell on information but the small print on the original application may require a tick if people do not want the information passed on. The supermarkets would perhaps argue that applying for the card and completing the application form have given implicit consent. They are making the presumption that all the small print has been read and that by not ticking the box for refusal to pass information on, people have consented. This standard would not be acceptable for research and an ethics committee would not pass an application that did not explain clearly to the participants what their consent covered in detail. Any research where data was to be shared would require detailed explanation and signed consent, rather than the opposite. Such as; "if you don't want your information passed on tick here ."

Newer, recently issued loyalty cards are smart-cards, with an embedded chip. This chip is scanned as the customer enters the supermarket triggering their location

It was surprising that despite accepting and using loyalty cards, where a very large amount of "Big Brother" type monitoring and data collection is done by supermarkets and possibly passed on to others that people were concerned about an NHS dietitian collecting data, which had been made clear would not be passed on. Perhaps people are unaware of the amount of data that is collected by the cards and what it is used for. Future studies could emphasise more clearly the requirements of the Ethics Committee and Data Protection Act, to reassure participants.

7.5.4 Perceived criticism

People perceived that a dietitian would criticize their purchases "especially if overweight". Even though for a postal questionnaire the researcher would not necessarily know the respondent's weight. However, Study 3 survey did ask for an estimate of weight in 4 option categories (underweight, about right, overweight and very overweight).

Question 5 asked "Which items have you changed?" and gave a list of options (Appendices 8.6 and 8.7). One respondent did not understand how you could change the items. When questioned, she asked "How could you change Calories?" The respondent was thinking of changing to alternatives, whereas the question was intended to ask whether changes in amount, or in other cases, her "alternatives" would apply as in types of products had been changed, such as a full fat product substituted by a reduced fat one.

7.5.5 Shopping limited to one supermarket chain

Evidently a major factor that deterred people was the request to shop at the same supermarket for all 4 weekly shopping trips. People thought being able to shop at any supermarket would increase responses in future surveys in answer to question 10. In fact the form stated "please shop at the same supermarket if possible" and some people who completed did send till receipts from more than one supermarket.

7.6 Reflection on low response rates

There were therefore concerns on 4 principal counts;

1. That a dietitian would criticize their purchase choices.
2. That shopping at the same supermarket did not suit their shopping pattern.
3. Security was an issue with some people
4. There was some confusion and misunderstanding of what was required.

If a similar survey was to be repeated, making it very much simpler with far fewer limitations could increase responses, emphasize that participants could shop anywhere. It would also be important to be more explicit about requesting *all* till receipts from whatever source, for each week's shopping as some people shop on a daily basis. This would perhaps not help recruitment but should give full details of purchases that would increase accuracy. The fact that a dietitian was the researcher did put some people off. Whether it is ethically necessary to state the profession of the researcher would be a decision for the ethics committee.

The highest rate of return was in the 'Face to face' group. Rather than receiving a form via school, this group each received a personal explanation of what was required, which may have been a major factor in completion. Another factor with this group was that they met the researcher, rather than being an unknown faceless entity. This contact may have provided greater reassurance and also removed some of the confusion/misunderstanding as the participants had an opportunity to question the researcher.

The main themes evolving from this thematic content analysis are;

- When recruiting the public avoid any ambiguity, make explanations clear and simple. Design the survey as simply as possible for the participants.

- Concerns about confidentiality could be alleviated by a detailed description of Ethics Committee requirements and data protection measures in place.
- Concerns about criticism by a dietitian would not exist if either a) the researcher was not a dietitian or b) it was not stated.
- Meeting the researcher, who could explain and respond to any concerns was an asset to recruitment
- Offering a financial reward was not found to be an incentive.

7.7 Reflections on Study 3

The intervention group demonstrated, in contrast with the control group, that the changes in purchase choices were found to be significant in 3 categories of foods; a significant increase in fruit and vegetable purchases ($p<0.001$), and significant decreases in purchases of saturated fats ($p<0.001$) and white cereals ($p=0.037$) were found. The information provided showed trends of improvement in the purchasing choices successfully in 4 additional categories. This study demonstrated that positive changes in improving peoples' food purchasing choices can be made by using educational interventions. It also used itemised supermarket till receipts to calculate changes in food purchasing in several categories of foods. The conclusions drawn from this research are that people can be capable of changing their food choices when shopping for healthier products using nutrition and labelling information. The information was developed with the Study 2 participants and in collaboration with several groups of local contributors. In addition till receipts provide valuable, accurate and sufficiently detailed information to measure these changes.

The supermarkets collect vast amounts of information via the loyalty cards. Much of this information will be commercially sensitive but the supermarkets would have the ability to separate data into different categories. For example, for future research in this field, sales volume information would not be necessary, non-food items could be excluded. Supermarkets could provide not only specific details of types of foods purchased but also this information could be related to barcode information and linked to the nutritional analysis of each item.

Using till receipts on an anonymous basis to calculate nutritional intakes on either a small or even a national scale would appear to be relatively simple to achieve if the supermarkets would cooperate. Research involving individuals to identify their understanding would be more difficult but again, with the cooperation of supermarkets promoting and supporting such research, this could be achieved.

It did appear from the responses that what people had been asked to do was perceived as complicated and time consuming, people said they were too busy, people made reference to these points. Further studies of this nature could be simplified so the minimum information required would be requested with a very simple step-by-step explanation provided. People were also concerned about security of the information they were providing, perhaps a clearer explanation of what security measures were in place and the fact that the ethics committee had to approve the process might provide reassurance. Another concern for people was that a dietitian was the researcher and some felt their shopping choices would be criticised. Again an explanation of the purpose of the study with assurances that the researcher was not concerned with their actual choices may reassure. Also, a future ethics committee could decide whether it would be necessary to state that the researcher was a dietitian, in the interests of unbiased participants for similar research.

Chapter 8 will reflect on and discuss the research undertaken, the findings and make recommendations for future research.

Chapter 8

Discussion, reflections and recommendations

8.1 Discussion of the findings

This research was initiated because of the researcher's role as the dietitian in a cardiac rehabilitation service, the Calon Lân programme. The patients in the programme were required to change some of their customary dietary habits to improve their health in order to reduce the risk of further coronary events. In parallel with the needs of the Calon Lân patients, trends in the UK population, have over a period of years, shown increasing health problems related to poor diet, resulting in associated increased costs to the National Health Service (NHS).

The background to this work has been to investigate methods of change in eating habits, through education using an action research methodology. Furthermore, indications of change have been measured using till receipts. The participants in the principal study were members of the general public. The research intervention was used in a real life situation, i.e. the study population were undertaking their normal shopping in supermarkets, for their own families. This was one of the new aspects of this research as previous studies had used artificial workshop situations to assess understanding of labels and nutrition.

The Calon Lân survey confirmed that the local population did indeed have risks of CHD and some dietary habits that were of concern and needed addressing. Many patients on the cardiac rehabilitation programme had said they had wanted to improve their diet but were unsure of exactly which foods to choose. Study 1-'Identifying the use of food labels', showed that people did read food labels but felt they did not understand them.

Clinical practice and this research had shown that many people were confused about several specific areas of nutrition, for example the difference between sodium and salt; and the differences between types of fats. They also said they were confused by food labels. Individuals cannot begin to make the correct changes without understanding the basics of nutrition. To make appropriate choices the ability to interpret the nutrition information on food labels is also necessary. Reflection on these initial findings led to this investigation of effective methods for dietary change.

Further reflection on the health promotion pathways, the views of the participants and the findings from Study 2-'Knowledge of Nutrition and Refining the FoLaG tool' which identified a lack of understanding of the functions of nutrients and the amounts required, led to the design of Study 3-'Evaluation and measuring'. Explanations to aid the understanding of nutrition and food labelling were developed in collaboration with the participants. The findings from Studies 1 and 2 together with the conclusions drawn from the literature review were used to develop Study 3. This examined the effectiveness of the 'Food Label Guidance Tool' (FoLaG) and 'Nutrition and Labelling information booklet'. The study was designed to compare participant's changes in food purchased compared with those of the control group, who were not given any intervention information until after completion of the shopping period and collection of till receipts. Study 3 showed that positive changes to a healthier diet can be achieved by changing food choices as a result of greater knowledge and understanding, via short, concise educational interventions in a 'real-life' situation. Itemized supermarket till receipts were used to measure and compare changes in purchase choices.

8.2 Summary of results of each stage

After the initial identification of a perceived problem ('Reconnaissance', Lewin; Elliot, 1991) with diet and understanding nutrition, the action research pathway's next stage was the reconnaissance, fact finding, through the Calon Lân survey (2004). This showed that amongst the respondents in Anglesey the mean BMI was 26.6 with 42% of men and 32% of women overweight (BMI 26-30) and 1 in 4 men (25%) and 1 in 5 women (20%) being classified as obese (BMI>30). The survey showed areas where diet needed to be improved, such as very low intakes of fruit and vegetables. Amongst the survey population 34% ate only 1 piece of fruit or vegetables a day, 29% ate 2 and 17% ate 3 portions, which means that 80% were eating only 3 or fewer portions per day. Although indications of frequent use of saturated fats were seen, it was not possible to calculate actual intakes of these from the survey but the Welsh figure for saturated fats is higher than the rest of the UK at 37.6 grams, i.e. 38.3% of calories are obtained from saturated fats, the national target percentage being 11% (COMA 2000). Salt was also the highest in the UK at 7.9g per day, in Wales the national average is 7.7g, whilst the COMA target figure is 6g maximum. As has been seen, improvements to the diet can reduce risk factors for CHD. A route to improving dietary intake was planned using education relating to nutrition and food labels, which led to the initial study. The first research questions were designed to discover whether people read and whether they felt they understood food labels.

Study 1 – Identifying the use of Food Labels

'Taking the First Action Step' (Lewin; Elliot, 1991), was Study 1. The results from Study 1 showed that 64% of the participants read labels but 75% said they did not understand them. 74% of the study population wanted to know more about labels. Study 1 also showed that as people age, they read labels less and less each year, by the same amount in both sexes. At the time Studies 1 and 2 were conducted, neither the Traffic Lights nor the GDA formats of food labelling had been introduced in the UK. The only nutritional information available on food labels was either the ingredients list in weight order or the nutrition panels showing the nutrient content of the "Big Four" or "Big Eight". What was surprising was the fact that such a high percentage of people read the nutrition information on food labels considering an even higher proportion stated they did not understand them. Reflection on these findings suggested there was some willingness to try to understand or learn more; possibly they read the labels primarily to look at the parts they did understand (e.g. Calories). Reflection on the requirements of the study population led to the next stage.

Study 2 – Knowledge and understanding and refining the FoLaG tool

Finding out what people do and do not know about nutrition

The findings from Study 1, that people did read labels, did not understand them but wanted to know more led to 'Evaluation and Reflection' (Lewin; Elliot, 1991), in Study 2 to discover exactly how much people knew about their nutritional needs, both the functions of the nutrients and their daily requirements (quantity). Also Study 2 explored what they understood about food labelling and found similar proportions to Study 1, that 66.6% of the participants read labels and 73.3% stated they did not understand them.

The survey of the participants' understanding of the functions and quantities of nutrients found the highest level of knowledge of both quantities and function was in relation to Calories, with 50% of the participants stating the correct amount and 60% correctly stating the function. It was possibly to be expected that calories would be the aspect understood the most as both literature reviewed and clinical experience has shown that people generally do have some understanding of Calories. However it was perhaps surprising that the level of correct answers was not higher. The lowest level of knowledge was for sodium, with only 3.3% correct for both quantity and function. Both from clinical experience, literature reviewed and in the studies it was seen that people were confused about the difference between salt and sodium. During the course of these Studies the FSA had run a health promotion campaign in 3 parts to raise awareness of salt in order to reduce intake. Despite the first 2 parts of the campaign being run just before Study 3, it was surprising that more people did not know the quantity for salt, although as there was no comparative pre-campaign figure to compare with it could be that 40% of the participants being correct may have been a significant improvement on their original knowledge

The Study 2 population had a higher proportion of correct answers for the function of Calories, carbohydrates, protein and fibre, with the lowest correct percentage for the function of fats, saturated fats and sodium. Whereas fewer people gave correct answers for the specific quantities of carbohydrates, fats, saturated fats, protein or sodium. It was also found in Study 2 that the knowledge amongst the men was considerably lower than that of the women in most categories, with many of the function boxes left blank.

The preliminary Study 1, considered the extent of label use and understanding, followed by Study 2, which assessed the level of nutritional knowledge. The action research collaboration with various groups including Study 2 participants developed the intervention materials for use in Study 3. Reflection on the findings from the Calon Lân survey, Studies 1 and 2 led to the design of the final stage, Study 3.

Study 3 – Evaluation and measuring changes

'Reflection and Taking Amended Step', Lewin; Elliot, 1991) led to Study 3, which was designed to test whether educational information could change people's shopping and therefore eating habits in a real life situation. To indicate whether any changes in shopping choices had occurred, till receipts were compared over a period. The study was a quasi-experimental design, with intervention and control groups. Nine food categories were chosen to measure changes. For the intervention group of the 9 food categories examined, the intervention was found to be statistically significant in the desired direction showing increases in fruit and vegetables ($p<0.001$) and statistically significant decreases in saturated fats ($p<0.001$) and white cereal ($p=0.037$). The intervention was seen to be significant in 3 food categories and effective in 7 out of 9 where trends in changes were seen in the desired direction, however 6 of these were not statistically significant. In the control group, there was no change in items purchased in 4 categories and an increase in 3 categories where the desired change was a reduction in purchases of the items. These results showed a trend of positive change in the right direction in the intervention group with little or no change in the control group. It was perhaps over ambitious to try to detect changes in such a wide range of categories, over a relatively short period (a month) with a study population, which was not large (n=103). However, despite the sample being somewhat small, it was still sufficient for the trends to be seen. Much larger regional or national studies undertaken with the cooperation of major supermarkets using national media to promote the healthy changes could produce significant improvements to people's food choices. The final stage, further reflection, is discussed below in point 8.6.

8.3 Reflection on Traffic Lights and GDA labelling versus other systems

The two alternative types of labelling introduced during the course of this research by the FSA and the IGD/GDF were intended to help people to understand food labels. It was likely to be a source of confusion that two new and different messages were being provided, at the same. The GDA system gives the % of daily requirements provided by a portion of the food in question. The Traffic Lights system shows via a colour coded system whether a food is High, Medium or Low in fats, saturates, sugars and salt, per 100grams of the food, although some manufacturers use the traffic lights to indicate levels of fats etc. per portion, a further possible source of confusion for the consumer.

It could be argued that people could need even less information than the new types of labelling, as in the case of the New Zealand "Pick the Tick". The system is so simple, the product either merits the tick or not. People can see at a glance whether it has been graded as a 'healthier' product, they don't have to read levels or portion sizes. The FSA Research Report (FSA 2004) did examine a similar option. However, in a conversation with the research department of the Food Standards Agency (July 2008), to discuss their research relating to the use of a "Healthy Logo" option (Figure 8.1) the participants in their research stated they wanted more information than would be provided by this type of logo.

Figure 8.1 FSA Healthy logo label

Figure 8.2 New Zealand Pick the Tick logo

As people have become accustomed to increasingly sophisticated marketing techniques, it could also be that the logo above (Figure 8.1) was rejected on aesthetic grounds, whereas the New Zealand "Pick the Tick" could be considered visually appealing and has a very catchy title. In addition, the "Pick the Tick" has the additional authority of the New Zealand National Heart Foundation, which is an added marketing point. It is likely that people would respect the credibility of the organisation and relate the healthy message, that the food in question has passed the criteria to be awarded the tick, to foods that are healthier for the heart. This again follows the health promotion models, i.e. understanding, credible source, belief, followed by action – choosing that product. However, the FSA logo has no added information other than a symbol, which is supposed to represent a healthy person. There was no writing offering any explanation. When shown to people for this research, some thought it showed aircraft, or physical activity. If the FSA conducted their research with only the 2 versions of the same symbol (which is understood to be the case) it is unlikely that a high level of positive responses would result. There is no credible source of information telling people which organisation has approved the product or what it means. The Food Standards Agency rejected the single 'approved' symbol as their research found people wanted more detailed information about the nutrient content of the food. In addition, people had commented that if a product had the mark and had been judged to meet the criteria set, that would be accepted. However, how would people know whether a product, which did not carry the mark, had been rejected as too high in fats/sugars/salt, or it might be low in fats/sugars/salt but just not analysed, selected and marked. The FSA's research population were unsure about the use of a single logo, particularly one without any information as to its authority. Many of the study population remained confused by the GDA labelling. A systematic review (Grunert and Wills 2007) found that people showed a resistance to being coerced or dictated to by the instructional element of the Traffic Lights system and wanted to make up their own minds.

8.4 Current Literature – recent research, labelling use and nutrition education

Recently (2009) the FSA has conducted research which found a combination of GDA %, the words High, Medium, Low together with traffic lights colour coded GDA strips was the most effective in helping customers and propose the use of an integrated front of pack label incorporating the two systems (Dietetics Today 2009).

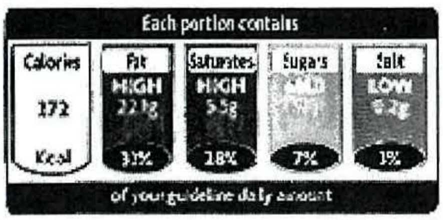

Figure 8.3 Traffic lights and GDA front of pack labelling combined (Dietetics today 2009)

Some manufacturers have also started to use this system.

Figure 8.4 Traffic Lights and GDA combined on 'Kettle Chips' 2009

Research to test the effectiveness of an interactive multimedia programme to influence eating habits was carried out in the USA (Irvine, et al. 2004) which used computers with interactive CD-ROM which provided text based nutritional counselling. It was found to be effective, showing significant increases (P<0.001) in fruit and vegetable consumption and reduction in fat intake (P<0.001). These were the only two nutritional factors tested. Irvine's research showed similar results to Study 3, that significant increases in fruit and vegetable consumption and reduction in fat intake were achieved with an educational intervention. Further studies could compare methods of providing intervention information.

Kolodinsky et al. (2007) compared dietary intake in college students where no food labelling was used (college dining) and found that those with greater nutrition knowledge resulted in healthier food choices. The Kolodinsky study supports the findings of this study that knowledge about nutrition improves food choices. However it was a study undertaken with a limited study group (university students) and limited to food choices made in a college dining room. Studies with a wider population and including shopping in a real-life situation would be beneficial.

A systematic review of European research on consumer response to nutrition information on food labels (Grunert and Wills, 2007) examined research in 15 EU countries on how consumers perceive, understand, like and use nutrition information on food labels. A number of the studies reviewed by Grunert and Wills had been published in academic journals but also reviewed was work undertaken as market research for interested stakeholders, such as supermarkets, and food manufacturers, which were less scientific, were not reported to the same standards and possibly biased in favour of the manufacturer. Common to much of the literature reviewed and this research Grunert and Wills found a consistent high interest in nutrition, label reading and use, supporting the findings in this thesis. Participants generally were aware of the link between food and heath, interested in nutrition and getting nutritional information.

However this nutritional interest varied across the EU, with Northern countries, such as Nordic countries, Netherlands and the UK most interested and Southern countries, France, Greece and Spain not enthusiastic about receiving more information. Common to most studies was a recurrent theme that certain demographic groups have a higher interest in nutrition information. The findings supported this research, that women are generally more interested than men, parents with children at home have more interest. That women are more interested in labels was also seen in research in Canada (Smith et al. 2000). Grunert and Wills (2007) also found there was an age effect that older people are generally more interested due to specific health concerns, although Study 2, in this research found that as people age, their interest decreased by a factor of 1.47% per year. As far as nutritional knowledge Grunert and Wills's review supported the findings in this research that there is generally a good understanding of calories but confusion about nutrients. For 5 questions testing nutrition knowledge, correct answers varied from 19 to 51%, again this supports the findings in Study 2. Grunert and Wills review reported that a good deal of research has been done on *liking* i.e. whether consumers liked the concept of simplified labels and front of pack signposting in general and in particular which formats they preferred. Across the studies reviewed, consumers liked simplification, they find it difficult to interpret the various nutrients but wanted to know and understand more about exactly what the new (Traffic lights and GDA) formats mean, yet are wary of having someone having made decisions for them even if this 'someone' may have good credibility, also they do not want to feel coerced into making choices they do not want. Surprisingly, in contrast to the findings in this research, Grunert and Wills found that the Traffic Light system was mostly less liked, despite providing the most simplification, the Traffic Lights were not popular, being characterised as 'too didactic' or 'paternalistic' and similar reactions have been observed for health logos. Comparisons between Traffic Lights and GDA were less clear, particularly as the GDA research was conducted by Tesco (possible bias as this is the system used by Tesco). The GDA was found to score higher although monochrome GDA label was less well understood. A combination colour coded GDA with Traffic Lights colours outperformed the simple Traffic Lights system. The overriding result regarding the various new front of pack labelling was that participants in the studies generally found them easy to understand. Grunert and Wills found few studies where the consumers perceived the healthiness of a product from the information provided and stated that little is known about the inference made when processing nutrition information on packages.

Grunert and Wills (2007) also found, as with Cowburn and Stockley's (2005) systematic review that very little work had been done in a real-world situation using nutrition labels. One study in the Netherlands (Steenhuis, I. et al., 2004) did examine the use of fat labels in supermarkets and measured fat intake by a food frequency list. The experimental group were compared with another control group, which were given educational material but no labels. No significant changes in fat intake were found. Some real-life supermarket research (Sainsbury, 2006;Tesco, 2006) stated that after introduction of not colour coded GDA (Tesco) and 'The Wheel of Health' (Sainsbury) sales of some of the healthier products went up and comparable products with less favourable nutrient information went down. However, this evidence is less scientific as there was no control and detailed figures were not reported. Another study undertaken in a real-life situation (Waitrose 2005) followed participants on a "think aloud" shopping trip and found that with a product such as yoghurt, which is generally regarded as healthy, people tended not to look at nutritional information. Products such as sandwiches and ready meals, choices were made by appearance, expected taste and convenience, with nutrition information playing almost no role. This Waitrose study was not scientific and very small, with only 8 in the focus group and 10 people in a supermarket.

Grunert and Wills's (2007) systematic review found four major conclusions across the studies reviewed.

- Firstly that there is widespread interest for nutrition information on food packets but that the degree of interest varies, supporting the findings of the studies in this thesis.

- Secondly, consumers like the idea of simplified front of pack information, although preferences for different formats vary related to ease of use and not being "told" what to eat. Many like colour coding but some regarded reds and greens as "too pushy".
- Thirdly most consumers believe they understand the most common formats (Traffic Lights and GDA) in that they can interpret key information in an experimental situation.
- Fourthly, there is little insight into how labelling is used in a real-world shopping situation and how it may affect consumers dietary patterns. This was undertaken in this thesis.

Comparing the reviews of Grunert and Wills (2007) and Cowburn and Stockley (2005), the findings from both, as to whether consumers look at labels were largely identical, as were the conclusions about demographic differences, also the nutrients which people are most interested in (fat, calories and sugar).

No further research has been found examining explaining food labels combined with nutritional education material, as an intervention to improve eating habits.

8.5 Reflections

The studies undertaken for this thesis found that the population's dietary intake did require changes to improve health and reduce risk of CHD. Although having small numbers of participants, the following studies did find; from Study 1 that the participants read labels but did not understand them. Study 2 showed their low levels of knowledge and understanding of nutritional requirements, both function and quantity of nutrients required. Providing the information in isolation is rarely sufficient to achieve change in general, however it has been seen in Finland (Puska et al., WHO, 1994) that nutrition education from an early age, throughout school life and across communities can improve health, as part of a programme of measures. The new *Appetite for Life* (Welsh Assembly Government 2007) is a positive step in the right direction for Wales, similar strategies are needed for all parts of the United Kingdom.

There have been positive steps in the approach towards the attitude for health promotion in Wales. The *'Health Challenge Wales'* programme is a marketing device to promote health across Wales, tackling aspects of lifestyle improvements. Using an action research methodology, at each stage the actions of the participants and the findings of the quantitative studies are reflected upon, thus leading to the design and progression of the series of studies, was an invaluable methodology. It was found to be particularly suitable for a mixed methodology, where qualitative aspects of the studies were undertaken in tandem with the quantitative studies. This type of approach works particularly well in studies with a mixture of study population groups and methods, as at each stage reflection on progression is a fundamental requirement, whilst following a democratic route, at the same time as avoiding any outside influence on the participants by the researcher/practitioner.

8.5.1 Strengths and Limitations

The strengths of the research undertaken were as follows:

- that the 'Calon Lân Survey' clearly identified a high incidence of risk factors for CHD and CVD. It also indicated specific areas of nutritional intake, which needed to improve because foods were eaten in the wrong proportions e.g. very low intake of fruit and vegetables.
- Study 1-'Identifying use of Food Labels', showed a positive interest in reading labels and despite study 1 participants all being referred to dietitians, this was felt to be a strength and an advantage as this study was intended to find out if people actually read labels and this group may have had an increased interest. They could also be considered as members of the general public as their appointments with the dietitians were all first time visits, so at that stage it would be likely that they would have no more knowledge of food labelling than anyone else. The study was not intended to discover their knowledge of nutrition but whether they actually read labels and whether they felt they had problems understanding them. The findings were representative of this group but were supported by other research discussed above.
- Study 2- 'Knowledge of Nutrition and Refining the FoLaG tool' used a combination of a quantitative and qualitative thematic content analysis. Despite small numbers this study showed clearly that knowledge of nutrition, both function and quantities required was poor. The action research reflection on the findings up to this stage led

to a clear pathway to the design of Study 3. Furthermore, the action research pathway, working with participants developed the interventions used in Study 3. Positive feedback from the participants and their needs directed the design of the intervention materials.

- These intervention materials were used in Study 3, a further strength was that they were found to be effective and statistically significant improvements to the diet were found.

The limitations of the research undertaken were as follows:

- The principal limitation was the difficulty encountered in recruiting large numbers.
- The data required for Study 2 involved a testing questionnaire, which asked people to state both the specific quantity of nutrients they thought they needed together with the physiological functions of the various nutrients. Several people stated they found this very difficult, confrontational and felt it exposed their ignorance, although other studies have used similar formats to ascertain knowledge (BEUC, 2005). Thirty people were recruited for Study 2. Those who did take part commented very favourably on their increased understanding of nutrition and labelling and the usefulness of the FoLaG, and were involved with its further development. However, as discussed above, using an alternative form of questionnaire such as providing multiple choice answers giving the correct answer amongst say 4 incorrect options would provide the option of a correct answer and the aim of Study 2 was to find out what people did not know. If people left a blank space, this was an answer, i.e. *they did not know*, which was what Study 2 intended to discover.
- Recruiting large numbers for Study 3 was even more difficult; with circa 3,000 request forms being distributed with only 103 people completing the study over 4-5 weeks, this has been examined in Chapter 8. The lower numbers of participants limit the strengths of the findings but were sufficient to show that changes in the required direction were achieved.

- A strength resulting from this low recruitment was the study undertaken using thematic content analysis on 'non-completers' from those recruited to Study 3. This study provided interesting reasons why people did not continue after initially sending in the recruitment form and initial till receipts and could benefit future researchers in this field.

A further strength was felt to be that the action research methodology, which combined mixed methods including surveys, questionnaires, telephone interviewing and a quasi-experimental design study, which used both qualitative and quantitative analysis was the ideal methodology incorporating reflection-in- action and on-action at all stages. This was felt to provide a flexible reactive approach ideally suited to the subject matter of the research.

8.6 Recommendations Future research how this study helps

Both Cowburn and Stockley (2005) and Grunert and Wills (2007) undertook systematic reviews, which confirmed widespread interest in nutritional information but found little scientific research carried out in a real life situation. Although the emphasis for both these reviews was concentrating on use of nutritional information and comparing the effectiveness of the different systems developed, no research has been found incorporating this aspect with examining *change* in purchases as a result of specific information as an intervention. Although this research does address change in a real-life situation, it has, of necessity been conducted with relatively small numbers and a much larger scale study, ideally in collaboration with supermarkets but rigorously scientifically executed would be invaluable and further add to knowledge.

Motivation

Further research could be undertaken into what motivates some people to eat healthily whilst others do not

Programmes on food choices could be undertaken, over a longer period, with a view to studying the effects of different types of education interventions on different population groups. These could include different age groups, including young children. In Study 2 the group with lower levels of nutrition and labelling knowledge was men, therefore targeting education at men and boys could be beneficial. Despite female emancipation and the role of 'modern men' merging more, with the roles traditionally held to be female, the men in these studies were less interested in reading labels and had lower levels of nutritional knowledge.

Advertising is obviously effective; the companies selling the best-known high volume sales products spend billions of pounds promoting their goods to increase sales. Public funded health promotion advertising generally has miniscule funding by comparison (FSA had no health promotion budget in 2007 and only £3million in 2008, FSA 2008). Research could be undertaken to analyse the outcomes of different methods of informing people in the most cost effective way. Some research could be undertaken in schools with primary and secondary pupils to educate the next generation of parents how to feed their families correctly and well.

It is highly likely that a contribution to the rise in overweight and obesity is not only the type of foods eaten but also the quantity people eat, the portion size. Further research to improve diets could examine what are the most effective methods of educating people to eat food in appropriate amounts. Research needs to be undertaken to find effective methods of education in relation to appropriate portion sizes.

Reflection on the whole process and the findings have suggested thoughts, which may form the direction of future studies.

1. There is a need for dietary change
2. Comparison between the effectiveness of methods to provide information, i.e. what is the best content, media/method to get people to take notice, believe the message and act on it?
3. What are the most effective methods to recruit sufficient participants?
4. What methodology should any future research follow?
5. It has been shown that change can be made but in this research, small numbers of participants and length of time for Study 3 (1 month), limited the significant changes to 3 categories of foods. For the likelihood of significant changes to be seen in more categories the research should be undertaken over a longer period with larger numbers of participants.

Further studies indicated from the findings of this research:

- An educational intervention study, replicating that done in this thesis using routinely collected supermarket data on a much larger scale.
- On a large scale, there would be greater opportunities for comparison between intervention materials, still using till receipts to measure dietary intake and change with the use of nutrition information.
- A detailed examination of people's understanding of labels related to food choices, coupled with a more intensive large scale education programme could improve people's understanding of nutrition and labelling, leading to improved healthier food purchases.
- Research in collaboration with major supermarkets using loyalty card information to compare nutrition in specific areas nationally.
- Develop a system using till receipts to estimate household nutrient intakes for use on a national scale. In addition, further work is required to develop the linked nutritional information held on products to barcodes, to facilitate easier coding of foods prior to nutritional analysis of till receipts.
- Design and evaluate health education intervention programmes based on examples of supermarket trolleys containing food and drink with low, medium and high fat contents in order to reduce the fat content of the household diet. The 'healthy trolley' model, if successfully piloted, could be used in addition to the current 'Eatwell Plate' model devised originally by the HEA and FSA. This model may also be used to increase the consumption of fruit and vegetables.
- The use of itemised supermarket till receipts, as a tool for providing consumers with feedback on their household's diet also needs to be explored further.

Many government initiatives aimed at tackling health problems are frequently short-term and many excellent programmes cease because of fixed short-term funding. A long-term comprehensive, coherent action plan needs to be made for *as long as it takes* as in the case of Finland. The policy in Finland has also been to increase education in nutrition from an early age to improve the health risks. This has started in the UK, in Wales the *Appetite for Life* strategy will increase nutrition education in all schools in Wales, incorporating nutrition holistically across the curriculum.

8.7 Conclusion

This research showed there is an interest and willingness to improve dietary knowledge and intake, both from the government, many of the population and participants. In this research it was found that increasing people's knowledge about nutrients, their functions and amounts needed and their understanding of labels did improve food-shopping choices, and consequently what people ate. Further studies comparing the relative merits of the different types of labelling need to be conducted, with a view to designing a uniform, less complicated labelling method, which can be easily understood by the majority of people, although research (FSA, 2009) would appear to be following this route.

It is difficult for government agencies such as the FSA to set health promotion campaigns at the correct level to suit a wide section of the public. Health promotion campaigns such as the FSA's salt promotion may be aimed at the "hard to reach" sectors of the population, where it is possible that the highest salt intakes are likely to occur. Providing too much information is likely to lose the attention of the audience, the primary intention seems to have been to raise awareness, which may have been successful. Following health promotion models pathways it was found that educational information material could aid understanding of nutritional requirements and food labelling, with the aim of changing people's shopping behaviour to make healthier choices.

As described in Chapter 8, when loyalty cards are used at supermarkets, the purchases made are recorded exactly in detail; supermarkets collect vast amounts of data about customers and their purchases. Everything bought is recorded, the quantity, which products and a full customer profile. Some of the information collected could be used for a national dietary survey, if the supermarkets could be encouraged to share the information that was not commercially sensitive.

A much larger study examining the effect of education in supermarkets, using the information on barcodes, electronic advice systems could be developed linked to the barcodes of products selected. People could state the number and ages of people in their family and as they shop, information could be produced showing how many

Calories per person the shopping contains, how well balanced it is in relation to the range of nutrients. This may seem paternalistic or 'nanny state-ish' but it could be an optional programme available to use if people wished.

Which is the priority when working to achieve improved diet? Much of the research on food labelling focuses on the use of each type of label and seems to presume that people already understand their nutritional requirements. The understanding and knowledge of nutrition would appear to be a fundamental prerequisite, how can people make decisions on purchases from labels without understanding their nutritional requirements. Do people actually change their purchases due to the nutrition information label or is it rather, the understanding of the function and quantities of nutrients required? This research has shown that changes to healthier choices when shopping can be achieved by providing information, which provides greater understanding of nutrition and labelling. An experiment combining the use and understanding of label reading, a nutritional information intervention group and a control group in a real-life situation on a large scale would ideally be the next stage as a follow up to this research.

To improve the diet of the nation, methods could be developed in cooperation with the major supermarkets, such as instant scanning of barcodes, linked to nutrition information databases which could bring about the development of new exciting opportunities to improve the diet using novel new information technology techniques. If linked with action research principles of democratic involvement significant improvement in the population's knowledge and understanding of nutrition and labelling information, healthy changes in diet could be achieved.

The long term cost benefits both to the NHS and to the individual should outweigh costs of the staff and resources required to achieve this if planned effectively. Health education interventions can be effective, particularly if the population is empowered, understands and is involved in the process. The overarching point is that any research or programme for change is likely to achieve far greater success if the participants are consulted and involved in a democratic process, and further steps are taken after reflection, following the action research fundamental principle.

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Appendix 1

Glossary

AICR American Institute for Cancer Research

BMI **Body Mass Index**

BMI is calculated as follows: weight in Kilograms divided by height in metres squared.

$$\text{e.g. } \frac{65kg}{1.7 \times 1.7} = \frac{65}{2.89} = 22.49$$

Ideal range of BMI is between 19 and 25 therefore 22.49 is in the centre of the range and ideal.

<16 = severely underweight 16-19 = underweight 20-25 = normal range

26-30 = overweight 31-40 = obese >40 = Morbidly obese

A simple waist measurement can be used as a guide

>94cm (37") in men and >80cm (32") in women is indicative of central obesity

BP Blood Pressure, the measurement of both the Diastolic – the initial powerful pump against the arteries and Systolic blood pressure, the pressure measured against the arteries on relaxation of the heart.

Normal blood pressure	Systolic up to 140mmHg Diastolic up to 90 mmHg
Upper limit of normal	Systolic 140-160 mmHg Diastolic 90-95 mmHg
High Blood Pressure	Systolic above 160 mmHg Diastolic above 95mmHg

(ref World Health Organisation)

C Calorie or kilo calorie, calorie

A unit of measurement defined as 4.184 absolute joules or the amount of energy it takes to raise the temperature of one gram of water from 15 to 16 degrees Celsius (or 1/100th the amount of energy needed to raise the temperature of one gram of water at one atmosphere pressure from 0 degrees C to 100 degrees C). Food Calories are actually equal to 1,000 calories (1 food Calorie = 1 kilocalorie).

CA Consumer's Association, this organisation publishes "Which?"

CHD Coronary Heart Disease

Chol Cholesterol. Cholesterol levels may be given as TC – Total cholesterol, or broken down into the constituent parts as follows: HDL, LDL, VLDL, and ratio, please refer to each abbreviation for explanations

CINDI Countrywide Intervention for prevention of Non Communicable diseases Index

COMA Committee on Medical Aspects (of health) 1991 & 1994

Communities First An initiative by the Welsh Assembly Government, their Flagship Programme to tackle deprivation in Wales. The Communities First Programme exists to provide local people with opportunities to play an active role in shaping the future of their community.

CVD Coronary Vascular Disease

DfES Department for Education and Skills

DoH Department of Health. Government department which governs health

EEC European Economic Community, became EC European Community, now:

EU European Union The European Union (EU) is a union of twenty-five independent states based on the European Communities and founded to enhance political, economic and social co-operation. Formerly known as European Community (EC) or European Economic Community (EEC). Date of foundation: 1st November, 1993. New members since 1st January, 1995: Austria, Finland, Sweden. For the ten new members as of 1st May, 2004, see below. Those using the currency, the Euro (EUR): **Member states** Austria, (EUR) Belgium (EUR) Denmark. Finland (EUR), France (EUR), Germany (EUR), Greece (EUR), Ireland (EUR), Italy (EUR) Luxembourg (EUR) Netherlands (EUR) Portugal EUR) Spain (EUR), Sweden, United Kingdom of Great Britain and Northern Ireland. Ten countries have **joined the EU on 01-05-:2004.** Cyprus (Greek part), the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia

FAO Food and Agriculture Organization
Food and Agriculture Organization of the United Nations: www.fao.org

FDF Food and Drink Federation. The body representing the UK food and drink manufacturing industry. **FDF** works with government, NGOs and consumers to develop industry positions on issues relating to food and drink.
www.fdf.org.uk/

FoLaG Food Label Guidance Tool as used in this thesis

FSA Food Standards Agency Independent but Government funded watchdog established to protect the public's health and consumer interests in relation to food safety. Provides information on a variety of food related topics looking at all aspects of food safety, labelling, nutrition etc. www.food.gov.uk/

GDP Gross Domestic Product GDP is defined as the total value of all goods and services produced within that territory during a specified period (most commonly, per year). GDP differs from gross national product in excluding inter-country income transfers, in effect attributing to a territory the product *generated* within it rather than the incomes *received* in it.

GI Glycaemic Index. An index showing the blood glucose raising effect of a carbohydrate. A high Glycaemic Index food raises the blood sugar quickly, requiring a surge of insulin to deal with the excess raised blood sugar. The theory behind Glycaemic index is that the body "rushes" to cope with the excess glucose and produces more insulin than is needed in a "panic" effect therefore when the blood glucose has been brought down to normal levels, the body experiences a hypoglycaemic effect (low blood sugar) and craves sugary items to bring the blood glucose levels back to within the normal range.

HDA The Health Development Agency is a Special Health Authority. The HDA has three core functions: - research and evidence: to establish and maintain an evidence base of what works in public health practice standard setting: to provide advice on developing and setting standards developing the capacity and capability of the public health workforce to deliver the public health strategy to agreed standards and to improve the quality of service

The HDA provides public health practitioners with clear evidence of what works in public health practice. This includes identifying gaps in the evidence to be filled with new research and to disseminate to the field practical guidance on public health interventions which have been shown to work.

HDL High Density Lipoproteins Cholesterol is carried round the body by lipoproteins. The larger molecules, as in High Density

Lipoproteins have a beneficial effect, carrying excess cholesterol to the liver for disposal and excretion.

HEA Health Education Authority. A government department with the remit for health education

IHD Ischaemic heart Disease

ICU Intensive Care Unit

LDL Low Density Lipoproteins Cholesterol is carried round the body by lipoproteins. The LDL are small molecules which can transfer across cell membranes easily. These are the culprits which start to form plaques in coronary arteries and high levels of LDL cholesterol can lead to Atherosclerosis which in turn can lead to narrowed and blocked arteries.

LHB Local Health Board. The five Health Authorities in Wales were replaced in 2003 by 20 Local Health Boards. Their remit covers all aspects of GP services, practice nurses, nursing homes, pharmacy dispensing, dental services.

Macronutrients These are the foods consumed in larger quantities, usually measured in grams, such as Carbohydrates, fats and proteins.

Micronutrients These are foods which, although essential, are only required in very small amounts, usually measured in micrograms such as minerals and vitamins.

MUFAs Monounsaturated Fatty Acids. Major sources are Olive oil and rapeseed oil. They have the effect of lowering the harmful LDL cholesterol but leaving the beneficial HDL cholesterol alone.

MI Myocardial Infarction

NDNS National Diet and Nutrition Survey

NHS National Health Service

NHSS National Healthy School Standard
The National Healthy School Standard (NHSS) is jointly funded by the Department for Education and Skills (DfES) and the Department of Health (DH) and hosted by the Health Development Agency (HDA). The overall aim is to help schools become healthy and effective providing an environment that is conducive to learning and that encourages pupils to achieve. It is part of the Government's drive to reduce health inequalities, promote social inclusion and raise educational standards through school improvement.

NICE	National Institute of Clinical Excellence NICE is the independent organisation responsible for providing national guidance on the promotion of good health and the prevention and treatment of ill health. On 1 April 2005 NICE joined with the Health Development Agency to become the new National Institute for Health and Clinical Excellence (also to be known as NICE).
NPHS	National Public Health Service. The sector of the NHS dealing with public health
NSF	National Service Framework National service frameworks (NSFs) are long term strategies for improving specific areas of care. They set measurable goals within set time frames.
PCO	Primary Care Organisation. GP surgeries, the interface with the NHS
PCTs	Primary Care Trusts The 302 PCTs covering all parts of England receive budgets directly from the Department of Health. Since April 2002, PCTs have taken control of local health care in England while 28 new strategic Health Authorities monitor performance and standards.
POLYOLS	Polyols are sugar alcohols, they are classified as food additives, their use is controlled by the Sweeteners in Foods Regulations 1995. The most commonly used ones are: Isomalt (E593) Lactitol (E966) Maltitol (E965) Mannitol (E421) Sorbitol (E420) Xylitol (E967)
PUFAs	Polyunsaturated fatty acids. Higher concentrations are found in corn oil, sunflower oil, walnut oil and fish oils. Whilst having some beneficial effects, they lower both the harmful LDL and the beneficial HDL cholesterol.
RPH Nutr	Registered Public Health Nutritionist
SACN	Scientific Advisory Committee on Nutrition, replaced COMA
SC	Secondary Care, NHS hospitals provide acute and specialist services, treating conditions which normally cannot be dealt with by primary care specialists or which are brought in as an emergency.

It covers medical treatment or surgery that patients receive in hospital following a referral from a general practitioner (GP). Secondary care is made up of NHS, foundation, ambulance, children's and mental health trusts.

SPSS Statistical Package for the Social Sciences, analysis software

TC Tertiary Care, rehabilitation, chronic, long term or terminal care. These areas are often catered for in separate more local units.

Tg Triglycerides. This is a type of lipid or fat found in the blood which causes the blood to become more "sticky" and therefore forms clots more easily. Raised Triglycerides are usually caused by raised blood sugar, as in diabetes or in cases of excess alcohol, usually seen in alcoholics.

UK United Kingdom

VLDL Very Low Density Lipoproteins. These are minute particles of a version of LDL cholesterol and exacerbate the problem described in LDL.

WAG Welsh Assembly Government

WCH Wales Centre for Health

WCRF World Cancer Research Fund

WHS Welsh Health Survey

WIMD Welsh Index of Multiple Deprivation

WHO World Health Organization, based in Geneva Switzerland

Appendix 2

The following appendices A7 –10 are included as an illustration of a health promotion campaign, which was run by the government's Food Standards Agency over a 2-year period and are discussed in Chapter 2 on page 61.

Appendix 2.1

First phase of the Food Standards Agency's salt health promotion campaign

http://news.bbc.co.uk/1/hi/magazine/3679994.stm accessed 16.6.2008

AD BREAKDOWN

The Magazine's review of advertising

Seinfeld-esque delivery in a cheeky, every-slug accent

THE PRODUCT: Salt. Or, to be more accurate, less salt.

THE BRIEF: Get a slug to explain to Britons, on behalf of the Food Standards Agency, why salt is bad. After all, if there's one thing slugs know - besides slime - it's that salt can be deadly.

THE SCRIPT: Sid, a giant slug with a chirpy accent and Seinfeld-esque delivery, confronts a shopper in a parking garage to explain why salt can be dangerous to humans, as well as common pests.

WHAT'S GOING ON: Sid's presence becomes known when a woman drops her car keys in a puddle of slime, presumably left by the slug.

"Need a hand?" Sid asks, chuckling at his own wit. (Get it? He has no hands.) "Ha ha. My dad used to love that joke, but now - he's dead!"

Dead? Goodness. Sad for Sid, isn't it? He's a sympathetic character, this slug, with a yeah-life's-not-always-been-kind-but-things-go-on attitude, and though he's been thrown a few curveballs, he's willing to share the lessons he's learned.

Sid sighs: "My dad taught me so much. He said, 'Sidney, stay away from fast cars, loose women, and salt."

Sensible advice, for a slug, but the people who represent the salt companies are a little irked by the advert, saying that some will make the connection that because salt easily takes out slugs, that just a shake on your food will take you down, too.

'Excuse me? Giant slug with a message, here'

"Salt certainly kills slugs in your garden but if Sid were a human being it would actually be keeping him alive," Salt Manufacturers Association general secretary Peter Sherratt says. "We all have the equivalent of about cupful of salt at work in our bodies at any time and it is absolutely essential to us.

"We realise that Sid is intended as a fun character but the message he carries is a serious one that is incorrect and potentially very damaging to the image of an essential product."

They've taken the issue to the Advertising Standards Authority, which is now assessing the complaint and deciding whether or not it will be investigated.

Minnie Moll, a managing partner at HHCL/Red Cell, the agency that created Sid, isn't surprised the salt people are unhappy with the spokeslug's position on their product.

But she says Sid has an important message to convey, and the way the agency chose to do that was through humour (and the words of a sweet, six-foot garden pest.)

"The first thing we wanted to do," Moll says, "is not hector. We wanted a creative way where that we could speak with humour, with honesty. We think that if you can communicate with humour, you'll take people along with you."

But Tim Ambler, who is a senior fellow at the London Business School, specialising in marketing, isn't charmed by Sid and his chirpy anti-salt pronouncements, and he goes so far as to say the advertisement won't be an effective one.

A garden pest with a message? Different

Why? "Because, as the salt manufacturers are complaining, it's an exaggeration. It's unbalanced," he says. "Simply saying that salt will kill you is an exaggeration. Anything in excess will kill you."

But the point of the advert is to get people thinking about the excesses of salt.

Moll believes the charm of this advert comes via its star, and that Sid's clear commitment to his cause - advertising people really do speak like this - softens the message, making it more palatable.

"What's his motivation in this scene? Sid is just a big-hearted slug on a mission," Moll says. "What is important is that he's not talking down to consumers."

Ad Breakdown is compiled by Jennifer Quinn *publics' perceptions*

If someone had told me that I'd ever find a slug cute, I'd have seriously doubted their sanity. But he is, isn't he? Slime aside... **H, Reading, UK**

In all fairness the ad doesn't say "eating salt will kill you" it says "too much salt can lead to a heart attack". I think it's a great ad (like the "don't let a bad turkey ruin your Christmas" one) as there are unfortunately lots of people who do need reminding of these things!! **Liz, UK**

If a giant slug ever chased me though an underground car park, I think I would have a heart attack no matter how much care I'd taken over my diet. A sympathetic character? Um, not in my book. I'd file Sid alongside talking blue telephones and "Calm down dear it's only a commercial". **Kat, Derby, UK**

My kids are noticing the billboards and are understanding the meaning thanks to Sid. At least the message is getting through to some of the less cynical amongst us. **Jeremy, Colchester**

I would just like to check whether Mr Hall from Bath watches Eastenders, or any other soaps for that matter ... these programmes are full of larger than life parasites. **Oliver Harrison, Nottingham, UK**

Clever idea translates to unpleasant ad. After the first viewing I now try to bloke the thing out. Could this be a sign that it is not engaging its audience ... or even alianating them? **Barrie Blewett, London**

Salt companies and health authorities will never agree. Let's let them slug it out between them! **Jamie**

The salt companies need to stop whining and also stop treating us like idiots. Most of us (!) aren't stupid and we know full well that Sid's talking about an excess. The same probably goes for loose women, too.
Phil, Staffs, UK

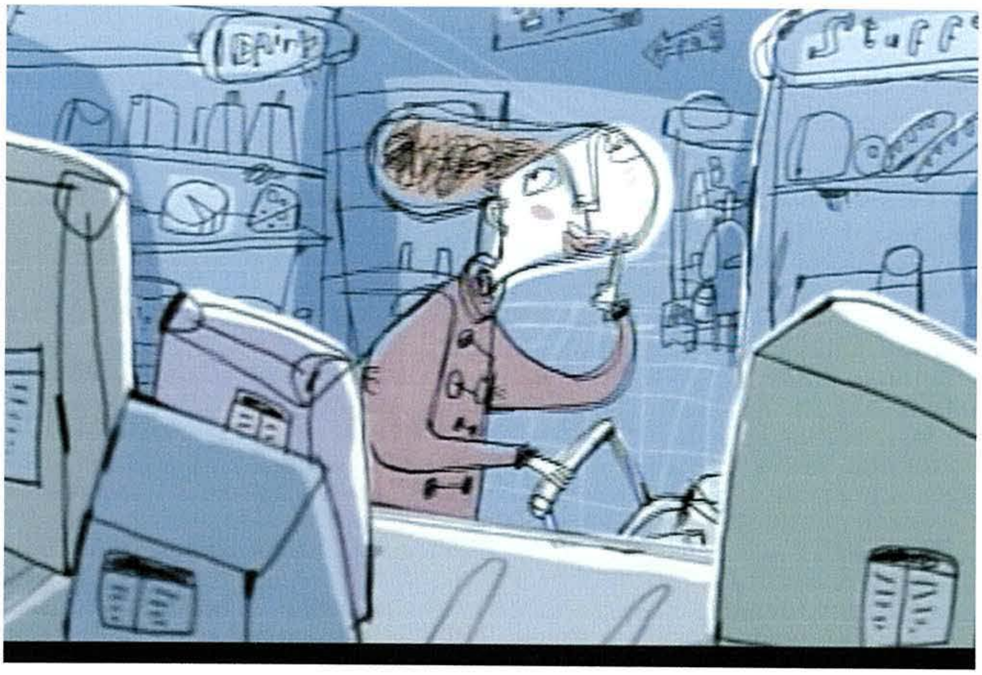
Does the government really have to spend millions on an advertising campaign to say that something is bad for us ? Are we all so stupid that we can't work this out for ourselves ? **Malcolm, Brierley Hill**

Is it just me who really doesn't enjoy watching a slimy, overgrown slug on TV? **Michael Hall, Bath,**

I think the message conveyed to the public from this advert was a little abstract, 'clever' and fun. Its easy to watch the advert and not understand the message, a good opportunity to explain to the public has gone amiss. They should have kept it simple, as I really don't think the people it was targeted at would have understood the message. Keep it plain, hard hitting and simple. **Jason Buksh,**
Michael Walmsley, Leeds

Whilst the manufacturers are quite correct that we all need a small amount of salt in our bodies. We are able to obtain this from the food in our shops, in fact we are constantly being informed that there is too much salt in processed food. Therefore why would we want to add more! The salt manufacturers are just scared that their profits will be affected.
Lesley, MK

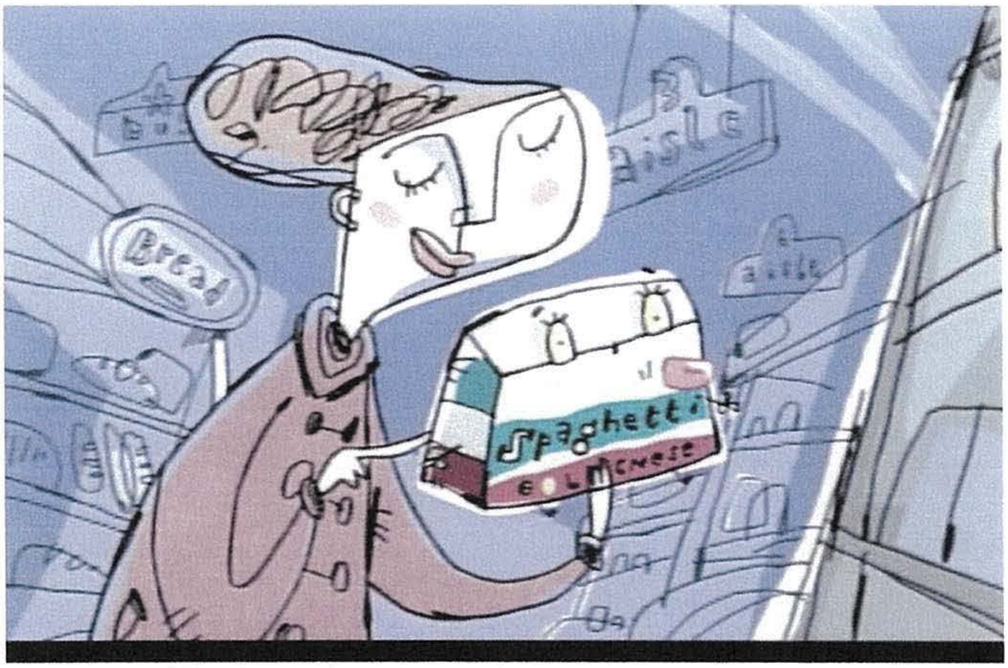
The second phase of the Food Standards Agency's Salt health promotion campaign.



1. A woman is wondering what to buy and is confused by labels

2. The food characters are boasting about how low their salt levels are

Appendix 2.2

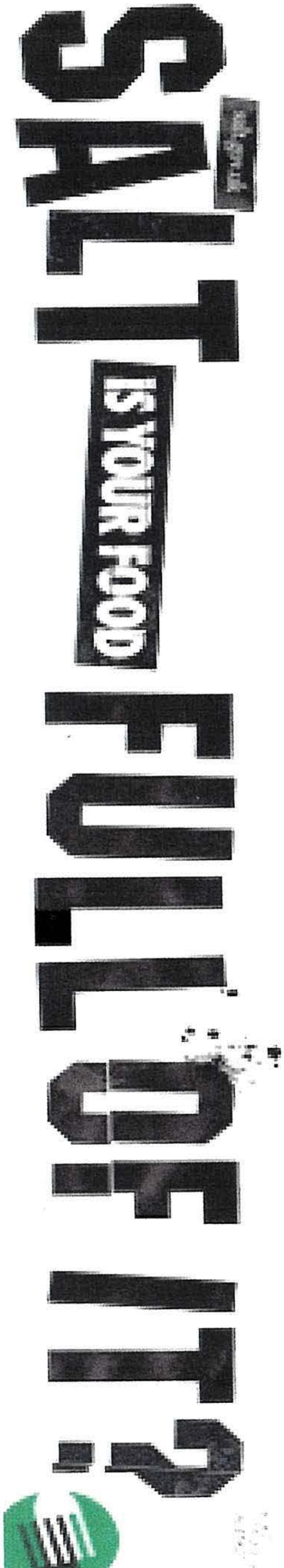


3. The woman reads the labels and chooses a lower salt product

4. Finally the daily guideline for salt is emphasized.

Appendix 2,3

Third and final phase of the Food Standards Agency's salt health promotion campaign



Appendix 3 Nutritional Information

3.1 Description of specific nutritional information on labels

The description below of food labelling and nutrition is included for clarification as the studies that follow will examine people's understanding of these topics. To avoid repeated referencing throughout the following descriptive list, the information is taken from 2 principal sources which are the Food Standards Agency's website http://www.food.gov.uk and The Manual of Dietetic Practice 2001 and 2007.

Product name

This is required to be a clear description of the product for example 'pilchards in tomato sauce'. If the product has a non-descriptive brand name e.g. 'Marmite', some indication of its nature must be given i.e. 'yeast extract'. The name must also indicate if the product has undergone any form of processing e.g. 'UHT milk' or 'smoked mackerel'. In addition, descriptions must not be misleading. Some foods have customary names e.g. 'cream crackers', these do not contain cream but the name is considered to be sufficiently familiar not to be misleading. Other foods have 'prescribed' names with strict rules e.g. 'margarine', which must contain 80% fat, if it contains less it must be given an alternative name such as 'spread'.

Ingredients

These must be listed in descending order of weight. If water is the first item listed then water is the largest ingredient by weight. In 2000 the EC increased requirement for Quantitative Ingredients Declaration (QUID, 2000), food labels now have to state the quantity of ingredients which:

- Appear in the name of the food or which are usually associated with that name by consumers. e.g. 'pork sausages 70% meat'
- Are emphasised on the label by words, pictures or graphics
- Are essential to characterise the food and to distinguish it from products with which it might become confused because of its name or appearance

For example that listed below is from a strawberry yoghurt ingredients list:

"Ingredients: Yoghurt, strawberries (11%) sugar, dextrose, Glucose-fructose syrup, stabilisers, pectins, Carob bean gum, Guar gum, Flavourings, Citric acid".

Food Additives

A food additive is a substance added to food for functional purposes. These include preservatives, antioxidants, emulsifiers and stabilisers, colours, sweeteners, flavour enhancers and flavourings. The safety of food additives is rigorously tested and periodically re-assessed. All additives currently allowed for use in EU member countries have been evaluated by the European Food Safety Authority and given an 'E' number, some are natural some are synthetic. The 1996 Regulations state the way in which additives in foods are declared on labels. Those used in pre-packaged foods must be listed in the ingredients list as follows:

- The appropriate category name of the function e.g. preservative
- This must be followed by their specific name e.g. sulphur dioxide or E number - E220

Foods containing artificial sweeteners require a declaration that the food contains sweeteners or sweeteners and sugar. There are additional requirements for foods containing Aspartame, stating that it is a source of phenylalanine and polyols. Excessive consumption may have a laxative effect. For people with Phenylketonuria, any "hidden" sources of Phenylalanine need to be stated.

Non pre-packed foods or foods packed on the premises, such as loose cakes or bread rolls from a bakery where they are sold, only have to declare the presence of the following categories of additives; antioxidants, artificial sweeteners, colours, flavour enhancers or preservatives. This information can be given on a nearby notice.

Consumer attitudes to additives

Consumers often view additives with great suspicion believing them to be undesirable in principle, synthetic in nature and a common cause of 'allergies' (Grunert 2002).

Many of these concerns are misplaced, in general food additives fulfil a useful purpose retarding microbial spoilage, prolonging shelf life and improving taste, colour and texture. A large number of food additives are natural or nature identical substances. They can even be nutrients such E300, Ascorbic Acid (Vitamin C) which is used as an anti-oxidant.

The food industry has responded to consumer concerns by carefully assessing the need for additives and reducing the level of use as much as possible, particularly the use of Azo food dyes in soft drinks and sweets and substituting more natural alternatives. Reduced use of preservatives is not always desirable as it can significantly reduce shelf life of perishable foods and could increase the risk of food poisoning if people are tempted to ignore 'use by' dates to avoid food wastage.

The example of the public's perception of a negative ingredient, the 'E' numbers, may cause some people to avoid various items but their decision may be based on inaccurate information. In fact many occur naturally, a few examples of the natural items are listed below:

E300	Ascorbic acid is vitamin C from vegetable/fruit sources
E306	Tocopherols - vitamin E
E100	Curcumin (yellow) a plant product
E101	Riboflavin is vitamin B_2 (yellow)
E140	Chlorophyll (green) obtained from plants
E150a	Caramel (brown/black) obtained from sugars
E160a	Alpha, beta, and gamma carotene vitamin A (orange), from plants
E160c	Capsanthin (red/orange) paprika extract from peppers
E160d	Lycopene (red) from tomatoes
E162	Beetroot red (purple red, also used for pink) from beetroot

It is ironic that the E number classification system, that was originally intended as a way of providing assurance, that as the additive's safety had been evaluated, it came to be regarded by the public as a symbol of undesirable food.

As a result many manufacturers are printing the chemical name rather than the E number, which is a permitted option.

Allergens

Until recently substances that were part of a compound ingredient comprising less than 25% of the finished product, did not have to be itemised separately. This meant that potentially allergenic substances such as small amounts of wheat, gluten or traces of nuts did not appear on the ingredient list, making it difficult for people who wished to, to avoid them. New food labelling regulations, implementing a 2003 EU directive came into force in the UK at the end of 2005 (European Union Directive, 2003). One of the main purposes of the changes was to remove the 25% rule to ensure that all allergenic ingredients as defined in the directive are included in the ingredients list.

Durability

This must be indicated by a 'use by' or 'best before' date. There is an important difference between the two. Highly perishable fresh foods, such as dairy products or meat must display a 'use by' date and after this time it should be assumed that the food is no longer safe to eat. To minimise the risk of food poisoning, these should be observed. The 'best before' date applies to foods with a long shelf life of weeks, months or even years, such as breakfast cereals, rice, pasta or tinned goods. After the date there may be some deterioration in quality or flavour but the food will not necessarily be unsafe to eat. In all cases, special storage requirements such as 'refrigerate' must be shown close to the 'use by' or 'best before' date.

Quantity

Under separate weights and measures legislation, most foods are required to state the amount provided either quantity e.g. 200g or 500ml or number e.g. 6 jam tarts. Net weight or volume may be indicated by the 'e' symbol, (not to be confused with "E" numbers) which means the amount or quantity sold is an average figure and the contents may vary slightly within strictly defined limits it is shown on labels as "e 200g". A11.4

In 2007 new legislation reversed the directive that imperial measures could not be used and pounds and ounces can once again be shown legally.

100g information

There are few foods that are eaten in quantities of 100g but this figure helps to make equivalent comparisons between products. It also provides the percentage of the nutrient in the product, for example one that contains 80g of fat per 100 grams equates to 80% fat. Anecdotally, when this is pointed out to patients, the majority has not realised this and find understanding 100g much easier.

Per Serving

This explains nutritional information per average serving, a weight judged appropriate by each manufacturer, no legal guidelines were in place up to 2008 but it is an area that has come to the attention of the FSA and work is being undertaken to standardize portion sizes. There is in practice currently (2008) a wide variation in portion sizes. If smaller than average portions sizes are specified, the nutrition information per portion will indicate lower figures for Calories or fat in high fat/Calorie foods than would be the case for a portion size that is more commonly consumed. This is an area that does need addressing, as a significant contribution to the obesity problem is likely to be the fact that foods are eaten in portions, which cumulatively exceed the total daily requirements.

Energy

The body's energy supply is derived from nutrients that can be oxidised to provide energy. The amount of energy released from food is expressed as either kilojoules (kJ or megajoules MJ) or as kilocalories (kcal) or Calorie. The joule is scientifically the more accurate method of quantifying energy. In dietetic practice, the kilocalorie remains the most commonly used unit of quantification. This is partly because the general public is far more familiar with the term, in the form of Calorie (see below and glossary). It is the amount of energy (Calories) that the food will release when eaten. A kilo joule is 4.2 kilocalories.

Kcal

These are the same as Calories. A calorie (lower case c) is the measurement of the amount of heat required to raise 1 cubic centimetre (cc) of water 1^0 Centigrade. A Kilocalorie or Calorie (upper case C) is the measurement of the amount of heat required to raise 1000cc of water 1^0 Centigrade. It is Kilocalories (or Kcals on labels), which are used in nutrition values.

For nutrition labelling purposes energy content is derived using a conversion factor of 4 kcal/g for carbohydrate and sugars rather than 3.75 kcal/g used by standard UK food tables. The energy content declared on food labels will therefore be slightly higher than food table values. Energy expressed in Joules is an area of confusion for the public and perhaps an unnecessary complication on labels, education could be provided to explain this.

Protein

Protein is important for body growth and repair. Most adults in the UK get sufficient protein for their needs. The COMA report 1991 stated no change required in UK protein consumption, therefore protein is not included as a nutrient category in these studies. Protein's energy yield is 4 kcal (17kJ) per gram.

Carbohydrate

Carbohydrate (CHO) is mainly sugars and starch. Some labels state how much of the total carbohydrate is sugars and the remainder is mostly starch. The energy yield from carbohydrate is 3.75 kcal (16kJ) per gram. The information shows the total carbohydrate amount and the proportion that is total sugars, stated as "of which sugars". Total sugars include added sugars, such as sucrose and naturally occurring sugars, e.g. those found in fruit and milk.

Starch

We should obtain 55% of our energy from starch (COMA, 1991), in preference to fats and sugars from which energy should be acquired in smaller proportions. (Foods high in starch include bread, breakfast cereals, rice, pasta and potatoes).

Sugars

The definition 'Total sugars' is stated in the EU Directive 90/496/EEC on nutrition labelling of foodstuffs. This includes all monosaccharides and disaccharides present in food but exclude polyols. For manufactured products 60g per 100g is proposed for 'High' sugar by the Food Standards Agency's (FSA) Expert Group. Stakeholders' views are being sought on this figure. The criteria for 'High' 'Medium' and 'Low' figures for each nutrient are shown in table 4.9, p115. The Food Standards Agency's criteria per portion stated on pack, only applies to foods sold in portions greater than 250g. This includes both sugars, which occur naturally in fruit and milk, and added sugars. The names for added sugars listed on labels often end in "ose" such as glucose, sucrose, maltose and dextrose.

Fats

There are different types of fats which have differing effects on the body. Fats are an essential component of the diet and have vital functions in the body but although some types are beneficial (in apporopriate quantities), others can have a detrimental effect. In addition fats are energy dense Energy derived from fats provide 9 kcal (37 kJ) per gram (Food Standards Agency, 2002b). Eating fats in too large a quantity can result in weight gain, overweight and obesity. Limited descriptions of types and effects of fats are given below.

Saturated fat

Saturated fats can raise blood cholesterol levels, which can cause atherosclerosis and heart disease (WHO, 2003; DoH, 2004a). For a healthy heart it is important to cut down on saturated fat (WHO, 2003; DoH, 2004a), found mainly in animal fats, pastries, sausages, butter, cheese, full fat dairy products, cakes and biscuits.

Monounsaturated and Polyunsaturated fat

Cholesterol is carried round the body by Lipoproteins (NHS, 2008). LDL (Low Density Lipoprotein, Glossary) cholesterol builds up in the blood vessels and causes narrowing in the arteries. HDL (High Density Lipoprotein) cholesterol is beneficial. It is a large molecule that travels round the body "mopping up" A11.7

excess cholesterol and taking it to the liver for disposal via the bile (NHS, 2008). Monounsaturates lower LDL cholesterol but leave the beneficial HDL cholesterol alone (Hooper et al., 2004). Lowering the LDL cholesterol helps to prevent heart disease. Polyunsaturates lower both LDL and HDL blood cholesterol levels, which is not as advantageous. It is better to eat moderate amounts of foods rich in monounsaturates (olive oil and rapeseed oil and foods made from them) and some polyunsaturates (sunflower oil and soya oil), rather than foods rich in saturates. However even the beneficial fats still provide 9 kcals per gram, they are equally as high in Calories as saturated fats. Reducing the total fat also helps to reduce cholesterol levels (WHO, 2003; DoH, 2004).

Dietary fibre

The EC directive on Nutrition Labelling provided no agreed definition of dietary fibre for nutrition labelling purposes and as a result, a variety of methods have been used to measure fibre content in food. Until recently the UK Government favoured the Englyst method of analysis, which measures non-starch polysaccharide (NSP) for which there is data in the UK food tables. Most other countries use the Association of Analytical Chemists (AOAC) method that measures a wider variety of dietary constituents including resistant starch. The food industry requires a universal definition of fibre so it is expected that the AOAC method will become the Europe wide standard. This will necessitate the revision of UK food tables.

Fibre helps prevent constipation and bowel problems. Insoluble fibre adds bulk to the diet, is not digested and passes through the body. Soluble fibre helps to reduce cholesterol. Good sources of fibre are baked and other beans, high-fibre breakfast cereals, oats, wholemeal bread, fruit and vegetables.

Sodium

The labelling requirement is to list the sodium content in grams, whereas the UK food analysis tables use milligrams. As it is a micronutrient, milligrams would be more usual and accurate but grams are used so that the measurement on labels is consistent. It is not required to list salt on labels although a number of products do show salt in addition to sodium.

It is the sodium part of salt (sodium chloride) which has an effect on hypertension. Most sodium in food is from salt. More than two-thirds of the sodium we eat comes from processed foods. The law requires sodium to be stated on labels rather than salt because there are other sources of sodium in processed foods. These include sodium bicarbonate (baking soda) and monosodium glutamate (MSG). Confusion between salt and sodium was further compounded by health promotional advertising by the FSA, informing people that they "should have no more than 6g salt a day", despite sodium being stated on labels. The maximum recommended allowance for sodium is 2.5 times less than that for salt, 6g a day equates to 2.5g sodium (Scientific Advisory Committee on Nutrition 2003). The understanding of the study participants is explored in the studies in chapters, 5, 6 and 7.

Alcohol

Alcohol provides 7kcal (29 kJ) per gram, which is in addition to the Calories provided by the non-alcohol component. For example beer and wine contains carbohydrate which provides Calories, as well those from the alcohol. Currently information on labels for alcoholic drinks is limited. Low to moderate consumption of alcohol (one or two drinks per day) reduces the risk of CVD, high intakes, especially binge drinking increases the risk of CVD (DoH, 1995; WHO, 2002).

Permitted phraseology on labels

Laws govern food labelling strictly (Food Safety Act, 1990), the following descriptions are taken from the 1990 Act. Manufacturers make statements on labels which although providing information, they can also be used as a marketing tool e.g. 'low-fat', 'reduced-sodium' and 'high-fibre'. Although by law these claims should not be misleading, there are no legal definitions for quantities (except for butter, margarine and other spreadable fats). A food cannot claim to be 'reduced calorie' unless it is much lower in calories than the usual version, this is indicated as 20% less than the standard product but a defined level is still awaiting formal legislation.

Claims such as 'low sugar' and 'reduced sugar' are important on foods and drinks such as sweets, biscuits and soft drinks and again should not mislead. The 1990 Food Safety Act protects consumers from misleading claims.

Statements and Pictures on labels

Food packaging pictures must not mislead. If yoghurt contains real raspberries it may state "Raspberry Yoghurt" and may show a picture of raspberries on the pot. If it does not contain any real fruit but only an artificial flavour, the label may only state "Raspberry flavoured yoghurt". Yoghurt that gets its flavour from artificial flavouring, and not from fruit, cannot state that it contains fruit, nor have a picture of the fruit on the pot. People should not be misled or confused, this research will consider people's understanding of food labelling.

Nutrition labelling format

Food labelling regulations Part 2 1996, lay down a prescribed format for the nutritional labelling of foods in accordance with the 1990 EC Directive. Nutrition labelling giving specific nutrient breakdown is voluntary except where a nutritional or health claim is made. If nutrition information is given, it must comply with strict rules governing its format. Most pre-packaged foods in the UK now provide it. The minimum amount of nutrition information that can be given is the list of ingredients in weight order. The next additional information that can be provided is Group 1 or 'Big 4' format, which comprises:

Energy expressed as kJ and kcal per 100g/100 ml
Protein g/100 g or 100 ml
Carbohydrate g/100 g or 100 ml
Fat g/100 g or 100 ml

Nutritional data per 100g	
Energy	221kJ/52kcal
Protein	1.7g
Carbohydrate	8.7g
Fat	1.2g

Table A3.1 Example of Minimum nutritional data, Group 1 "Big Four" required on food labels to be provided in tabular form in UK A11.10

Alternatively, Group 2 can provide more detailed information, also knows as 'The Big 8' described below.

Energy expressed as kJ and kcal per 100 g/100 ml

Protein g/100 g or 100 ml

Carbohydrate g/100 g or 100 ml *of which sugars* g/100 g or 100 ml

Fat g/100 g or 100 ml *of which saturates* g/100 g or 100 ml

Fibre g/100 g or 100 ml

Sodium g/100 g or 100 ml

Nutrient	**Amount per 100 g/100 ml**
Energy expressed as kJ and kcal	180kJ/43Kcal
Protein g	0.6g
Carbohydrate g	5.2g
of which sugars g	3.7g
Fat g	2.2g
- *of which saturates* g	1.3g
Fibre g	1.2g
Salt g	0.7g
of which Sodium g	0.3g

Table A3.2 example of "Big Eight" labelling from a soup.

In the example above, the manufacturer has added an extra line for salt, the legal requirement is for sodium.

The quantity of any nutrient for which a claim is made must also be declared. Values per quantified serving may be given in addition, but not instead of values per 100 g or 100 ml. The amounts of starch, polyols, monounsaturates, polyunsaturates and cholesterol can also be listed if desired.

Typical values for a slice of Granary Bread, showing the "per serving column:

	per 100g	**per serving 16g**
Energy	497kcal	80kcal
Protein	7.0g	1.1g
Carbohydrate	66.6g	10.7g
Of which Sugars	18.8g	3.0g
Fat	22.6g	3.6g
Of which saturates	9.8g	1.6g
Fibre	3.2g	0.5g
Sodium	0.6g	0.1g

Table A3.3 The Big Eight items as seen on a British Food Label plus per serving information

Labelling relating to micronutrients

The rules governing the labelling of vitamins and minerals are more complex. These micronutrients can only be declared if a food provides a significant proportion (greater than 15% or 1/6th) of the recommended daily amount (RDA) for each vitamin or mineral listed. If a vitamin or mineral is declared in the nutrition labelling panel, Group 1 nutrition information must be given. If a claim is made referring to a Group 2 nutrient e.g. 'high in fibre' then information on all Group 2 nutrients should be given.

A3.2 Food labelling information

Accuracy of food values

Nutrition information on food labels is mainly estimated using published data on food composition (FSA, McCance and Widdowson, 2002) as the alternative laboratory analysis is an expensive option for food manufacturers and is prone to sampling errors. There will therefore be some variability between the declared values and those determined by analysis. An acceptable margin for error is not specified by law and should reflect the type of food. For example a food consisting of chunks of meat and vegetables in a sauce will be inherently more variable than a homogenous food such as chocolate and this has to be reflected in the acceptable margin for error. At the time of writing, the EU is working on drawing up specific recommendations for quantities.

Recommended Daily Amounts (RDAs)

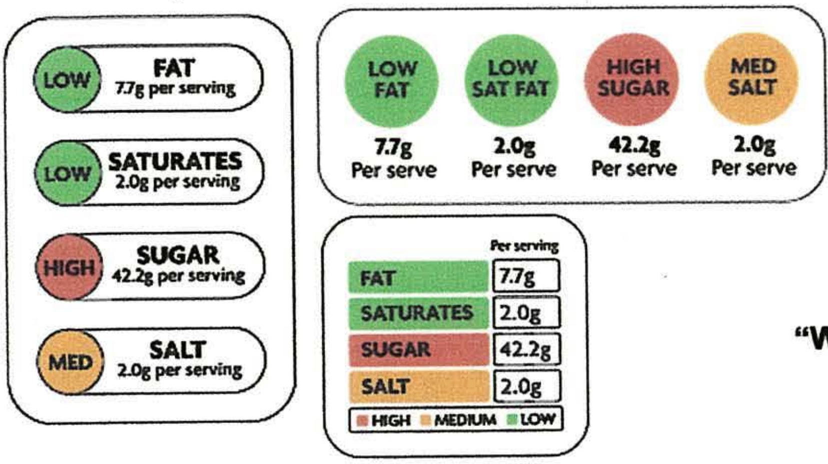
The Recommended Daily Amounts (RDAs) of vitamins and minerals against which amounts in foods are compared in the nutrition panel, are a set of data for adults produced especially for labelling purposes. Although the values are similar to UK Reference Nutrient Intake (RNI) for adult males, they are not identical. Dietary reference standards have been in use in the UK since 1950, originally confined to recommended daily allowances (RDA) (DHSS, 1969). In 1991 a major review replaced the RDA figures with a range of reference standards for different applications (DoH 1991). These standards are now referred to as dietary reference values.

Format per 100g

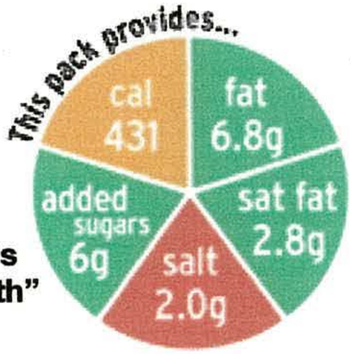
The requirement to give information per 100g or 100ml rather than per portion may be confusing to consumers because foods are not always supplied or eaten in these amounts. Although the 100g information is useful to compare say the percentage fat content of similar products, people might find it difficult to do the mental arithmetic to judge whether 2 sausages will provide less fat than a portion of chicken pie. One obvious and useful point of the 100 g format is that if a food contains 80g of fat per 100g it is 80% fat.

"Traffic lights" indicators are being used as guides by several organizations:

Three examples of the Food Standards Agency's proposed labels



Sainsbury's "Wheel of Health"



Traffic Light Diet™

A uniquely simple, visual, fridge magnet food management system

The Traffic Light Diet food management system is a simple, easy to use, visual approach to establishing a healthy balanced diet, and a common sense approach to weight loss. Colour-coded and sized for easy identification http://www.trafficlightdiet.com

Green for go

Eat 5 portions of these foods for free.

Amber for caution

Balance the numbers and you can eat well whilst losing weight.

Red for danger

We all deserve a treat - only include these items occasionally

Pharmacy "raising awareness label issued by NHS Wales 2006

before you request your medicines

what medicines do you really need

ahead - order only what you need

Ask your pharmacist for further information

NHS GIG

2 examples of Waitrose's Traffic Lights label

Braille

Cooking instructions

Storage and allergy advice

Ingredients list in weight order

Country of origin and manufacturer's address

Nutrition panel "Big Eight" GDA and traffic lights altogether

Label from Co-operative Sausages showing all legal Requirements are complied plus additions e.g. Braille

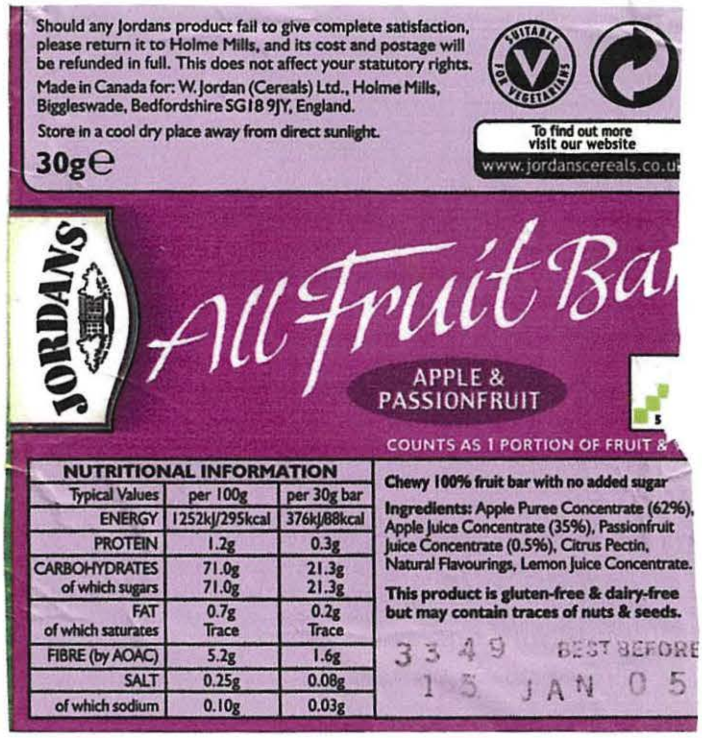
Use by date
Storage information

Average weight "e"

Traffic lights labelling

Percentage pork content

Content by number



The Nutrition Information panels on the 2 similar products above have differences in the information which does not help the consumer's understanding:

1. Tesco lists the values per bar first and the values per 100g second. Jordans lists the information the opposite, with the values per 100g first.

2. Jordan lists Salt and gives the "of which Sodium" values as well.

3. Other information: Tesco state "Suitable for vegetarians" and use a symbol which looks like 3 leaves, Jordan just use a logo which state "suitable for vegetarians" round a large V

4. Tesco list the ingredients in a continuous list in a 6 point text, Jordans use 8 point. Tesco print in white on a deep pink background, this is harder to read than the Jordans label printed in black on a pale pink background, which is easier to read

5. Jordans also state in bold that the product is gluten free and dairy free but may contain traces of nuts and seeds.

6. Other information given includes a stamped "best before date" and that the Jordans product counts as 1 portion of the daily 5 fruit/vegetables.

7. Storage instructions, place of manufacture, general descriptions of product are also given.

350g ℮

Less than 5% Fat per 100g

No artificial preservatives, flavours or colours

5 mins Microwave only

Each pack contains

Calories	Sugar	Fat	Saturates	Salt
405	7.4g	11.2g	4.2g	1.2g
20%	8%	16%	21%	20%

of your guideline daily amount

Keep refrigerated

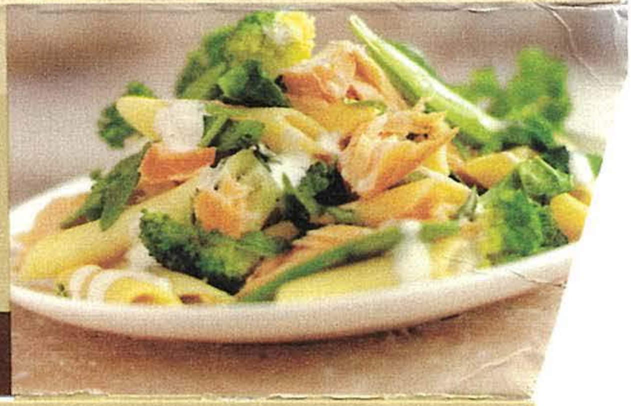
23FEB Display until

23FEB Use by

5 051277 453179 >

TESCO NATURALLY GOOD FOOD...

Hot smoked salmon primavera



1 portion of **VEGETABLES** Nutritionally **BALANCED**

Hot smoked salmon and egg pasta, broccoli, sugar snap peas and spinach, served with a crème fraîche dressing.

Microwave

- **Suitable for microwave heating only.**
- **Remove outer packaging.**
- **Peel film lid back and remove dressing pot.**
- Re-cover and heat on full power.
- Stir before serving.
- Dressing to be served cold.

650 watt Category B	750 watt Category D	850 watt Category E
5 mins	4 mins	3 1/2 mins

- Adjust times according to your particular oven.
- All appliances vary, these are guidelines only.
- Check food is **piping hot** throughout before serving.

- **Not suitable for oven heating.**
- **Not suitable for home freezing.**

Storage

- Keep refrigerated.
- Use by: see front of pack.

Allergy advice

- **Contains milk, wheat, gluten, egg, fish, mustard.**
- **Recipe:** No nuts.
- **Ingredients:** Cannot guarantee nut free.
- **Factory:** No nuts.

Caution

- This product can contain **minor bones.**

Ingredients

Cooked Free Range Egg Pasta (34%)
Broccoli (20%)
Hot Smoked Salmon (17%)
Crème Fraîche Dressing (14%)
Spinach (7%)
Sugar Snap Peas (6%)

Cooked Free Range Egg Pasta contains: Water, Durum Wheat Semolina, Egg.
Hot Smoked Salmon contains: Salmon, Salt.
Crème Fraîche Dressing contains: Yogurt, Reduced Fat Crème Fraîche, Malt Vinegar, Vegetable Oil, Water, Egg, Tarragon, Cornflour, Sugar, Salt, Parsley, Mustard Powder, Black Pepper.
Packaged in a protective atmosphere.

Nutrition

Typical Composition	Each pack (350g) contains	100g contain
Energy	**1700kJ**	**485kJ**
	405kcal	**115kcal**
Protein	**28.7g**	**8.2g**
Carbohydrate	**47.6g**	**13.6g**
of which sugars	7.4g	2.1g
Fat	**11.2g**	**3.2g**
of which saturates	4.2g	1.2g
mono-unsaturates	3.9g	1.1g
polyunsaturates	2.8g	0.8g
Fibre	**6.0g**	**1.7g**
Sodium	**0.5g**	**0.2g**

Each pack contains the equivalent of **1.2g** of salt.

Guideline daily amounts for a typical adult

	Guideline daily amount	Each pack	% guideline daily amount
Calories	2000kcal	405kcal	20%
Sugar	90g	7.4g	8%
Fat	70g	11.2g	16%
Saturated fat	20g	4.2g	21%
Salt	6g	1.2g	20%

For further information, please visit: **www.tesco.com**

Our promise

We are happy to refund or replace any Tesco product which falls below the high standard you expect. Just ask any member of staff. This does not affect your statutory rights.
We are here to help:
Tesco Stores Ltd., Cheshunt EN8 9SL, U.K.
Freephone 0800 50 55 55, Mon–Sat, 9am–6pm.
Shop on-line at www.tesco.com

Additional information

350g ℮ UK LR006 EC

Produced in the U.K. for Tesco Stores Ltd.
© Tesco 2007. SC102285 247A

These 2 products are very similar, the 2 types of labelling, GDA and traffic lights can be compared, the Coop label shows both types and in addition uses traffic lights guidance on the "Big Eight" nutrition panel

Ingredie

Lemon and Dill Sauce (30%) (Semi-skimmed Milk, Water, Cream Cheese*, Cornflour, Concentrated Lemon Juice, Onion, Dill, Wheat Flour, Fish Stock (Cod, Plaice, Maize Starch, Sugar, Palm Oil, Salt, Black Pepper Oil), Salt, White Pepper), Poached Farmed Salmon (25%), Baby New Potatoes (16%), Broccoli (12%), Green Beans (6%), Sliced Leek (6%), Baby Spinach (2%), Lemon Peel.
*No rennet

Allergy Advice: Contains Fish, Wheat, Gluten, Milk
Caution - This product may contain small bones.

Origin

Made in UK using Scottish or Norwegian Farmed Salmon and Vegetables from Various Countries for Co-operative Group (CWS) Ltd., Manchester M60 4ES. www.co-op.co.uk

Nutrition

Typical Values	per 100g	per pack		GDA Average adult
Energy value	360 kJ	1430 kJ		
(Calories	85 kcal	**340** kcal)		2000 kcal
Protein	7.7 g	30.8 g		45 g
Carbohydrate	7.5 g	30.0 g		230 g
(of which **Sugars**	2.2 g	**8.6** g)	Low	90 g
Fat	2.7 g	**10.6** g	Med	70 g
(of which **Saturates**	0.8 g	**3.1** g)	Low	20 g
Fibre	1.1 g	4.5 g		24 g
Sodium	Trace g	0.2 g		2.4 g
Salt	0.1 g	**0.5** g	Low	6 g

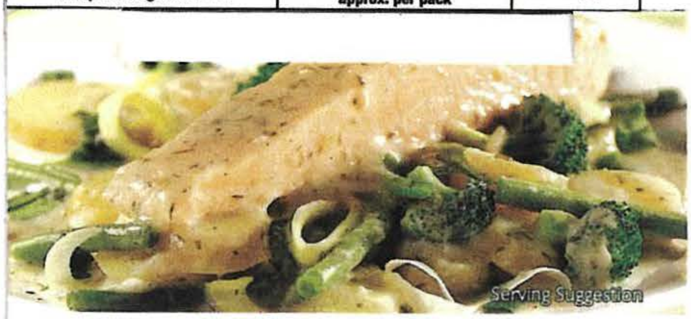
GDA = Guideline Daily Amounts

The co-operative healthy living salmon steamer with lemon & dill sauce. Salmon fillet with a lemon and dill sauce with new potatoes, broccoli florets, sliced leeks, green beans & baby spinach.

25% salmon.

healthy living less than 3% fat

Use by 14 FEB Keep in fridge 2 to 5°C	Calories 340	Fat 10.6g	Saturates 3.1g	
	Microwave only	Sugars 8.6g	Salt 0.5g	Serves 1 400g ℮
	approx. per pack			



The co-operative healthy living salmon steamer with lemon & dill sauce.

healthy living less than 3% fat

Heating Guidelines

Microwave		
watt.	minutes	
	heat	stand
650/B	6	1
850/E	4	1

- **remove sleeve.**
- **do not pierce film lid.**
- transfer to a microwaveable plate
- heat on full/100% power for the following minutes
- do not heat more than once

Caution

Open with care, hot steam will escape

Advice

Storage- Not suitable for home freezing

Contact Us

Freephone 0800 0686 727 7 days a week
Freepost Co-op Freepost-MR9473 Manchester M4 8BA
Email customer.relations@co-op.co.uk

Packaging

Tray: (5) PP Film: (7) Mixed Plastics Sleeve: Board
For your local recycling centre visit www.wasteconnect.co.uk

Packaged in a protective atmosphere

BFF211

5 000128 746120 >

The own brand Tesco label above has the nutritional information panel printed on the reverse and could only be read after purchasing and removing the wrapper. It does have a "V" symbol indicating suitability for vegetarians, however the label below , also from Tesco had a leaf indicating suitability for vegetarians, showing that there is great inconsistency in the use of symbols. A further inconsistency, although having no nutritional connection is the variety of symbols used to indicate recyclable steel.

An example of the inconsistency found in labelling

The Co-operative supermarkets pride themselves on a "Clear labelling" policy, yet the same product bought within the same week, from the same branch provides differing information.

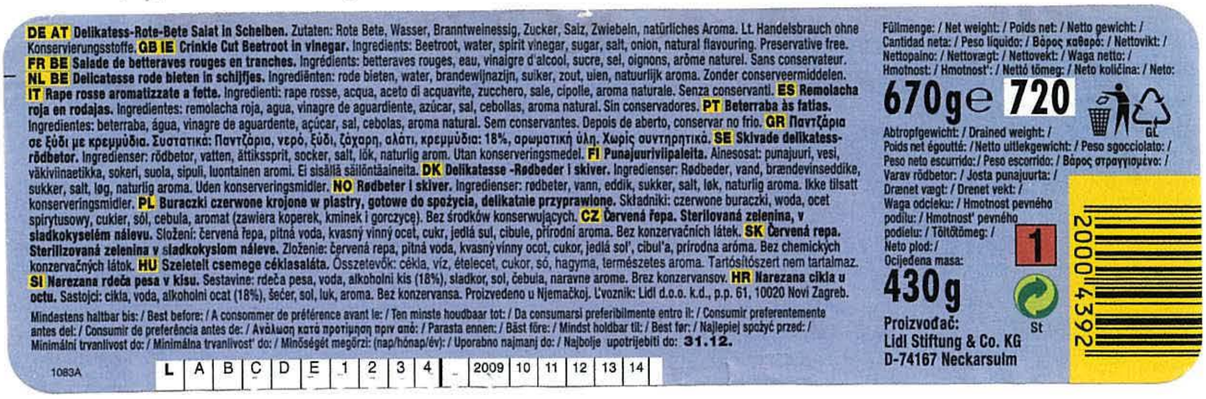
Appendix 4.7

Above is an example of particularly illegible nutrition information, not only is the print very small, less than 8 point but it is white against a light background and printed round a corner.

Below, a later version of the same product has improved the legibility of the nutrition information slightly but it is still smaller than 8 point and is still against a low contrast background.

Examples of labelling that is not only difficult read but also to estimate nutritional values

1. Information from a jar of beetroot



2. An example of print being smaller than 8 point
and low contrast i.e. dark print on a dark background

Grŵp Iechyd Lleol

Ynys Môn
Anglesey

Local Health Group

17 Stryd Fawr, Llangefni, Ynys Môn / 17 High Street, Llangefni, Anglesey LL77 7LT
Ffôn/Tel: (01248) 751229 Ffacs/Fax: (01248) 751230
E-bost/E.mail: Anglesey.LHG@nwales-ha.wales.nhs.uk

Personalised address *Date*

Each of these to be printed individually

Dear *Personalised name*

Calon Lân Food and Lifestyle Questionnaire 2002

The aim of the Anglesey Local Health Group is to improve the health of the people living on the island. We are concerned about the levels of heart disease, cancer and diabetes, but without real understanding of the situation it is very difficult to plan services and improve health care. We would like to investigate ways of preventing many of these diseases happening in the first place, but in order to do this, we need to know where to target any new plans.

You may have heard about a detailed survey we are doing this autumn as part of the Calon Lân (Healthy Heart) project. This has the support of all the Island's GPs and their staff and the support of the British Heart Foundation. We are sending questionnaires to 5,000 adults living on Anglesey, to help us understand the health needs of everyone. 5,000 names and addresses were randomly selected, and your name was one of those selected.

This letter is to inform you of your selection, and to ask if you would kindly take part in this survey. I must stress this survey is very important, and in order that the results show the health of the people of Anglesey accurately, it is very important that every questionnaire that is sent out is completed and returned. I would be most grateful if you could complete the slip at the foot of this letter and return it to the Local Health Group in the stamped addressed envelope provided.

You may be assured of complete confidentiality. If you choose to take part, the questionnaire will have an identification number for mailing purposes only. This is so that we may check your name on the mailing list when your questionnaire is returned. Your name will never be placed on the questionnaire and your name will not be linked to any of the information you give us. If you choose not to take part in this survey, your name will be removed from the selection list immediately.

Cadeirydd/Chair : Dr Wil Roberts Rheolwr Cyffredinol/General Manager : Kevin Spencer
A Sub-Committee of the North Wales Health Authority

The results of this survey will be used by the Local Health Group to assess the real health needs of the people on Anglesey, and to plan services and work with the local hospital Trust and Local Authority to improve health and social care. You may receive a summary of the results if you wish, and details of how to do this will be included with the questionnaire.

As an additional incentive we are offering four cash prizes of £50 to be drawn from completed questionnaires.

The Calon Lân team would be most happy to answer any questions you might have. Please write, telephone or email to the above address.

I am asking you, on behalf of the health care professionals on Anglesey, to take part in this survey: your contribution will count and will help to shape the health and social care services of the future.

Yours sincerely

Dr W H Roberts
Chair – Anglesey Local Health Group

Calon Lan Food and Lifestyle Questionnaire 2002

Please tick one of the following options:

☐ I am interested in the survey and would like to take part.

☐ I am unable to take part now, but would be interested in the future.

☐ I am not able to take part in the survey.

Signature: ____________________________

Name and address generated by database

APPENDIX 5.2

1 Calon Lân Food and Lifestyle questionnaire 2002

Calon Lân
Healthy Heart Campaign

Ynys Môn Local Health Group, working with the local authority, North West Wales NHS Trust and voluntary services, are trying to combat the high levels of heart disease, and other preventable diseases on the island.

Calon Lân (Healthy Heart) is a project which was launched in February 2001 by Ms Jane Hutt, AM. The aim of the project is to improve the health of the people living on Anglesey by introducing joint projects such as the annual clinics in GP surgeries for people with Coronary Heart Disease, extending the Exercise by Invitation Scheme to people with heart disease, and introducing the Calon Lân Cardiac Rehabilitation Team.

One of the main aims of the Local Health Group is to improve the health of the local population, and in order to do this we need your help.

This Questionnaire is designed to help us to find out about your eating and lifestyle habits. It is designed to help us help you. It will be totally confidential. The information obtained will be used to plan to improve health on the island.

Please take the time to complete it. All information will remain confidential and will only be used to analyse the average eating and lifestyle habits of the population, the vital information we get from your answers will help to improve health. It may seem long but it should take about 20 minutes to half an hour. If you have any queries, please contact the Local Health Group, telephone number 01248 751229, and ask for a member of the Calon Lân team who will be happy to help you.

Thank you

This is an NHS health project and has no commercial connection.

Please use the black ball point pen provided to complete the questions, thank you.

There are 15 x £50 cash prizes to be drawn from completed forms returned.

Calon Lân Food and Lifestyle questionnaire 2002

CALON LÂN
YMGYRCH CALON IACH
HEALTHY HEART CAMPAIGN

We do appreciate the time taken, thank you for your participation. Please fill in the boxes with a black ball point pen.

1. Background information

		Male	Female
1.1	Gender	1 ☐	2 ☐

1.2 Year you were born 3 19 __ __

		Single	Married /partner	Separated /divorced	Widowed
1.3	Marital status	4 ☐	5 ☐	6 ☐	7 ☐

1.4 How many people in your household are aged 18 & over?

8|____|____| Persons

1.4a How many children under the age of 18 are in your household?

9|____|____| Persons

1.4b Was this questionnaire forwarded to you from an old address ?

10 ☐ No *(go to 1.4d)*
11 ☐ Yes
12 ☐ Not sure

1.4c Is your home still in the county of Ynys Môn?

13 ☐ Yes
14 ☐ No

If no, please return in envelope provided. If yes, please provide new address below. Thank you.

1.4d What is the name of the town or village that you live in (or near) and what is your postcode?

Town/village name...

15 ☐☐ Postcode

New address if you have moved: ....

....

....

Formal Education

1.5 What is the highest level of education you have completed ?
(please tick one box only)

- 16 ☐ Still in full-time education *(go to 2)*
- 17 ☐ Primary school
- 18 ☐ Secondary school (or up to age 14, 15 or 16)
- 19 ☐ Sixth form (or up to age 17 or 18 years)
- 20 ☐ Professional or technical qualification or diploma
- 21 ☐ University/polytechnic degree course or higher
- 22 ☐ Other (*please say what*)

....

Employment

1.6 *(Do not answer if in full-time education)*

What is your current situation ?
(please tick one box only)

Who is the primary earner?

YOU		*PARTNER* (if applicable)
23 ☐	Are you currently employed	31 ☐
24 ☐	In a full time paid job *(go to 1.6b)*	32 ☐
25 ☐	In a part time paid job *(go to 1.6b)*	33 ☐
26 ☐	Fully retired from paid employment	34 ☐
27 ☐	Training or employment scheme	35 ☐
28 ☐	Unemployed, seeking work	36 ☐
29 ☐	Unemployed, because sick or disabled	37 ☐
30 ☐	Looking after home/family	38 ☐

1.6a *(Only answer if you are <u>not</u> in paid work)*

Have you ever had a paid job ?

- 39 ☐ Yes *(answer 1.6b about your most recent job)*
- 40 ☐ No *(go to 1.6c)*

A24

1.6b Please describe your current (or most recent) work

(if retired, then describe the job before retirement)

(a) What is (or was) the full title of your job ? 41

(b) What are the main things you do (or did) in your job ? 42

(c) Which of the following best describes this work ?

- ☐ 43 Employee (not a supervisor of other employees)
- ☐ 44 Employee (manager or supervisor of other employees)
- ☐ 45 Self-employed (not employing others) *(go to (f))*
- ☐ 46 Self-employed (employing others) *(go to (f))*
- ☐ 47 None of the above *(please say what)*..................................

(d) What is (or was) the name of your employer ?...48

(e) Description of your employer's business 49

(f) Was this work within the last 10 years ?

- ☐ 50 Yes
- ☐ 51 No, not in the last 10 years

1.6c Do you provide more household income than anyone else ? (including pensions etc)

- ☐ 52 Yes, I do provide all or the most household income - *(go to 2)*
- ☐ 53 No, someone else provides more income
- ☐ 54 I am one of the joint income providers

1.6d ***(Only answer if someone else provides the same or more income)***

(a) What is (or was) the full title of the job of this person?

(If no current job or retired, then describe most recent)

....55

(b) What are the main things he/she does (or did) in the job ?

....56

(c) Which of the following best describes this work?

- 57 ☐ Employee (not a supervisor of other employees)
- 58 ☐ Employee (manager or supervisor of other employees)
- 59 ☐ Self-employed (not employing others)
- 60 ☐ Self-employed (employing others)
- 61 ☐ None of the above *(please say what)*..................................

(d) Name of this person's employer

62...

(e) Description of this employer's business

63...

(f) Was this work within the last 10 years ?

- 64 ☐ Yes
- 65 ☐ No, not in the last 10 years

2. Health Services and Health Status

2.1 How many times did you visit the Doctor in the last 12 months? Include hospital in or outpatient Do not include visits to dentist

66|_____|_____| times

2.2 Do you receive any disability allowance?

No	Yes, temporarily	Yes, permanently
67 ☐	68 ☐	69 ☐

2.3 During the last year estimate how many days you were ill and unable to do normal things?
Do not include normal pregnancy

70|_____|_____| days or none ☐

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2.4 During the last 12 months have you been diagnosed with or treated for any of the following?

	Yes	No
High blood pressure (Hypertension)	71 ☐	80 ☐
High blood Cholesterol	72 ☐	81 ☐
Diabetes	73 ☐	82 ☐
Heart Attack	74 ☐	83 ☐
Angina (chest pain during exercise)	75 ☐	84 ☐
Chronic bronchitis or emphysema	76 ☐	85 ☐
Rheumatism or Arthritis	77 ☐	86 ☐
Back Pain	78 ☐	87 ☐
Gastritis or ulcer	79 ☐	88 ☐

Other, please specify..

2.5 Have you experienced any of the following symptoms during the last 30 days?

	Yes	No
Chest pain during exercise	89 ☐	100 ☐
Joint pain	90 ☐	101 ☐
Back pain	91 ☐	102 ☐
Neck and shoulder pain	92 ☐	103 ☐
Swollen feet/ankles	93 ☐	104 ☐
Varicose veins	94 ☐	105 ☐
Eczema	95 ☐	106 ☐
Constipation	96 ☐	107 ☐
Headache	97 ☐	108 ☐
Insomnia	98 ☐	109 ☐
Depression	99 ☐	110 ☐
Toothache	100 ☐	111 ☐

		good	reasonably good	average	rather poor	poor
2.6	**How would you assess your present state of health**	112 ☐	113 ☐	114 ☐	115 ☐	116 ☐

2.7 **Have you taken any medication during the past 7 days?**

	Yes	No
For high blood pressure	117 ☐	127 ☐
For high cholesterol	118 ☐	128 ☐
For headache	119 ☐	129 ☐
For other aches & pains	120 ☐	130 ☐
For coughs and colds	121 ☐	131 ☐
Sedatives	122 ☐	132 ☐
Vitamins and/or minerals	123 ☐	133 ☐
Contraceptives	124 ☐	134 ☐
HRT	125 ☐	135 ☐
Other prescribed medication	126 ☐	136 ☐

Please specify...137

		No, I don't feel stressed at all	Yes, but not more than is usual for people in general	Yes, more than is usual for people in general	Yes, my life is almost unbearable
2.8	**Have you been feeling stressed, tense or under pressure in the last 30 days**	138 ☐	139 ☐	140 ☐	141 ☐

		In last 12 months	1-5 years ago	Over 5 years ago	Never	Don't know
2.9	**When was the last time your blood pressure was checked?**	142 ☐	143 ☐	144 ☐	145 ☐	146 ☐

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		In last 12 months	1-5 years ago	Over 5 years ago	Don't know	Never
2.10	When did you last have your cholesterol tested?	147 ☐	148 ☐	149 ☐	150 ☐	151 ☐

		None	Don't know	1- 10	Over 10	All/dentures
2.11	How many teeth are you missing? 32 is a full set	152 ☐	153 ☐	154 ☐	155 ☐	156 ☐

2.12 How many times have you seen a dentist in the last 12 months? 157 |___|___| times

		More than once a day	Once a day	Less than once a day	Never
2.13	How often do you brush your teeth?	158 ☐	159 ☐	160 ☐	161 ☐

3. SMOKING

		No, nobody	Yes, someone smokes
3.1	Do you or any family members smoke at home?	162 ☐	163 ☐

		None, not applicable	Almost never	Under 1 hour per day	Between 1 and 5 hours	Over 5 hours
3.2	How many hours do you spend at your workplace where someone smokes?	164 ☐	165 ☐	166 ☐	167 ☐	168 ☐

		No	Yes	
3.3	Have you ever smoked in your life?	169 ☐	170 ☐	if no go to question 4.1
3.4	Have you ever smoked at least 100 cigarettes, cigars or pipefuls in your lifetime?	171 ☐	172 ☐	if no go to question 4.1

Remember the £50 prizes!

3.5 Have you ever smoked daily (or almost daily) for at least 1 year?

No	If so, how many years?
173 ☐	174 |___|___|

3.6 Do you smoke at present?

Yes, daily	Yes, occasionally	Not at all
176 ☐	177 ☐	178 ☐

	Yesterday or today	2 days-1 month ago	1-6months ago	6m-5 years ago	Over 5 years ago	Over 10 years ago.
3.7 When did you last smoke?	179 ☐	180 ☐	181 ☐	182 ☐	183 ☐	184 ☐

	Cigarettes	Pipe	Cigars	Other/self Roll	Not Applicable
3.8 What do you smoke or did you smoke in the past?	185 ☐	186 ☐	187 ☐	188 ☐	189 ☐
3.8a How many do you smoke per day? Fill in number.	190 |___|___|	191 |___|___|	192 |___|___|	193 |___|___|	

	No	Yes	Not sure	Don't smoke
3.9 Would you like to stop smoking?	194 ☐	195 ☐	196 ☐	197 ☐

	No	Yes, in last Month	Yes, in last 12 months	Yes, over 12 months ago
3.10 Have you tried to stop smoking?	198 ☐	199 ☐	200 ☐	201 ☐

	Yes, very	Yes, slightly	Not much	Not at all concerned
3.11 Are you concerned about the harm smoking could do to you?	202 ☐	203 ☐	204 ☐	205 ☐

	Doctor	Dentist	Family	Health Professional	Other who?
3.12 During the past year have been advised to stop smoking by any of these?	206 ☐	207 ☐	208 ☐	209 ☐	210 ☐

who?...

A30

4. DIET and FOOD HABITS

		No	Yes
4.1	Do you eat breakfast at all?	211 ☐	212 ☐

4.2 Cooking fat or oil

What type of cooking fat or oil do you use most often?

Vegetable oil, eg. Olive oil, Rapeseed oil, sunflower oil, etc. please state type 213

Lard, dripping, butter. etc. Please state type ....214 Don't know 215 ☐

4.3 **Butter/spread**

What brand of butter or spread do you most often eat on bread ?

Brand name and type (eg Anchor half fat, Gold unsalted low fat)

216...

Here is an example of how you may complete the section on bread, use the same method to complete all these sections:

Suppose you eat:- white bread on five days of the week,
you never=N eat softgrain and
only occasionally or Less than once a week =L do you eat ordinary brown bread.
You eat wholemeal bread on two days, and Ryvita crispbread about once a week.

Making sure you ringed one figure on every line you would complete the section like this:-

No. days/week
7 6 ⑤ 4 3 2 1 L N White bread
7 6 5 4 3 2 1 L Ⓝ Softgrain (eg Mighty white)
7 6 5 4 3 2 1 Ⓛ N Brown bread (not wholemeal)
7 6 5 4 3 ② 1 L N Wholemeal, granary
7 6 5 4 3 2 ① L N Crispbread

4.4 **How many days a week do you buy and eat the following meals outside the home ?**
(estimate for a usual week)

Please make sure you ring one figure on every line.

L = Less than once a week *or occasionally* N = Never

No days/week
7 6 5 4 3 2 1 L N 217 Shop/workplace sandwiches

7 6 5 4 3 2 1 L N 218 Takeaway food, eg Fish & Chips, Burgers, Chinese, Indian or Pizzas

7 6 5 4 3 2 1 L N 219 Workplace restaurant or canteen meals

7 6 5 4 3 2 1 L N 220 Pub snacks/meals

7 6 5 4 3 2 1 L N 221 Cafe/restaurant/hotel meals

4.5 Milk

What kind of milk do you personally use most often ?
(Please tick one)

- 222 ☐ Ordinary milk, fresh or dried
- 223 ☐ Semi-skimmed milk
- 224 ☐ Fully-skimmed milk, fresh or dried
- 225 ☐ Other milk (eg Goats, soya, evaporated, condensed etc)
- 226 ☐ I do not use milk

4.6 How many cups of coffee or tea do you usually drink each day? 227 Coffee |____|____| cups 228 Tea |____|____| cups

If none go to 4.8

		None	1	2	3	Sweetener
4.7a	**How many sugars do you take in coffee?**	229 ☐	230 ☐	231 ☐	232 ☐	233 ☐
4.7b	**How many sugars do you take in tea?**	234 ☐	235 ☐	237 ☐	238 ☐	239 ☐

4.8 Bread, Pasta and Rice

L = Less than once a week *or occasionally* N = Never

7 6 5 4 3 2 1 L N 240 White bread

7 6 5 4 3 2 1 L N 241 Softgrain (eg Mighty white)

7 6 5 4 3 2 1 L N 242 Brown bread (not wholemeal)

7 6 5 4 3 2 1 L N 243 Wholemeal, granary

7 6 5 4 3 2 1 L N 244 Crispbread or other bread

7 6 5 4 3 2 1 L N 244a Pasta

7 6 5 4 3 2 1 L N 244b Rice

4.9 How many slices of bread per day? 245 |____|____|

4.10 Salt

(a) Is salt generally used in <u>cooking</u> the foods you eat ?

- 246 ☐ Yes
- 247 ☐ No
- 248 ☐ Don't know

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(b) **Do you add salt to your meals at the table ?**
(please tick one)

- 249 ☐ No
- 250 ☐ When the food is not salty enough
- 251 ☐ Almost always before tasting

4.11 During the past 12 months have you been advised to change your diet for health reasons by any of the following?

- 252 ☐ Yes, by a Doctor
- 253 ☐ Yes, by a Dietitian
- 254 ☐ Yes, by other health professional
- 255 ☐ Yes, by family
- 256 ☐ Yes, by others
- 257 ☐ No

4.11(a) Which of the following applies to you?

- 258 ☐ Slimming/weight reducing diet
- 259 ☐ Diabetic diet
- 260 ☐ Other medical diet *(please state which)* ....
- 261 ☐ Vegetarian/vegan diet (See below 4.11)
- 262 ☐ Other specific diet *(please describe)* ....
- 263 ☐ Not on a diet

	No	Yes, 1 Person	Yes, 2 or more people	Yes, the main cook is a vegetarian
4.11(b) Is anyone in your house a vegetarian?	264 ☐	265 ☐	266 ☐	267 ☐

If none, go to 4.12

	Eat eggs dairy foods, cheese. Milk, yogurt	Eat no meat at all	Eat chicken but no red meat	Eat fish but no meat	Vegan, no ani produc
4.11(c) If you are a vegetarian, please tick categories	268 ☐	269 ☐	270 ☐	271 ☐	272 ☐

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4.12 **L = Less than once a week *or occasionally*** **N = Never**

Vegetables **Please make sure you ring one figure on every line.**

No. days/week

7 6 5 4 3 2 1 L N 273 Potatoes or potato products

7 6 5 4 3 2 1 L N 274 Leafy vegetables (eg lettuce, cabbage, spinach)

7 6 5 4 3 2 1 L N 275 Other green vegetables (eg. green beans, cauliflower, broccoli)

7 6 5 4 3 2 1 L N 276 Salads

7 6 5 4 3 2 1 L N 277 Peas or sweetcorn

7 6 5 4 3 2 1 L N 278 Root vegetables (eg carrots, swedes, parsnips)

7 6 5 4 3 2 1 L N 279 Baked beans

7 6 5 4 3 2 1 L N 280 Other pulses (eg beans, lentils)

4.13 **L = Less than once a week *or occasionally*** **N = Never**

Fruit

No. days/week

7 6 5 4 3 2 1 L N 281 Fresh citrus fruits (eg oranges, grapefruit)

7 6 5 4 3 2 1 L N 282 Other fresh fruit (eg apples, pears, bananas)

7 6 5 4 3 2 1 L N 283 Dried fruit (but not in cakes or puddings)

7 6 5 4 3 2 1 L N 284 Berries, soft fruit

7 6 5 4 3 2 1 L N 285 Tinned fruit

4.14

How many portions of fruit a day, (think of a medium apple as an average portion) 286 |____|____| Number

	None	1	2-3	4-5	over 5
4.14a How many portions of fruit/ vegetables do you think you should eat daily?	☐ 287	☐ 288	☐ 289	☐ 290	☐ 291

4.15 **L = Less than once a week *or occasionally*** **N = Never**

Meat and Fish

7 6 5 4 3 2 1 L N 292 Beef (including minced beef, but not beefburgers)

7 6 5 4 3 2 1 L N 293 Lamb

7 6 5 4 3 2 1 L N 294 Pork, **Continued**

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4.15 continued

Meat and Fish	L = Less than once a week *or occasionally*	N = Never
7 6 5 4 3 2 1 L N	295 Bacon or ham	
7 6 5 4 3 2 1 L N	296 Chicken, turkey or other poultry or game	
7 6 5 4 3 2 1 L N	297 Tinned meat (eg luncheon meat, corned beef)	
7 6 5 4 3 2 1 L N	298 Sausages, beefburgers	
7 6 5 4 3 2 1 L N	299 Meat pies, pasties	
7 6 5 4 3 2 1 L N	300 Liver, kidney, heart or other offal	
7 6 5 4 3 2 1 L N	301 White fish, cod, plaice but not battered or crumbed	
7 6 5 4 3 2 1 L N	302 White fish, battered or crumbed	
7 6 5 4 3 2 1 L N	303 Oily fish,(eg salmon, tuna, mackerel, sardines)	
7 6 5 4 3 2 1 L N	304 Shellfish (eg prawns, crab, mussels)	

Tick more than one box if necessary for this question	Local village shop or small supermarket	Market or Farm shop	Large major Supermarket	Internet	Other where? ....
4.16 Where does your family do the main shopping for food?	305 ☐	306 ☐	307 ☐	308 ☐	309 ☐

	Never	Daily or over once a week	Weekly	about twice a month	Monthly
4.17 How often do you shop?	310 ☐	311 ☐	312 ☐	313 ☐	314 ☐

4.18

How often do you eat the following snacks? L = Less than once a week *or occasionally* N = Never

No. days/week	
7 6 5 4 3 2 1 L N	315 Crisps and savoury snacks
7 6 5 4 3 2 1 L N	316 Chocolates or sweets
7 6 5 4 3 2 1 L N	317 Biscuits
7 6 5 4 3 2 1 L N	318 Cakes

4.19 If you eat breakfast, please tell us what you eat:

No. days/week	
7 6 5 4 3 2 1 L N	319 No, never
7 6 5 4 3 2 1 L N	320 Yes cereal or toast
7 6 5 4 3 2 1 L N	321 Yes, cereal and toast
7 6 5 4 3 2 1 L N	322 Yes light cooked breakfast, eg Boiled egg
7 6 5 4 3 2 1 L N	323 Yes, a full cooked breakfast

5. Alcohol

If teetotal, go to question 6.

5.1 Do you ever drink alcohol ?

- 324 ☐ No, never *(go to 6)*
- 325 ☐ Only on special occasions (eg anniversaries, weddings)
- 326 ☐ Less than once a week
- 327 ☐ Once a week
- 328 ☐ More than once a week

EXAMPLE

Here is an example of how you may complete this section.
Suppose that over the last week you drank : two and a half pints of normal strength beer on Friday, two pints of low alcohol lager and one measure of whisky on Saturday, and three glasses of wine on Wednesday.

You would complete the section like this:-

Mon	Tue	Wed	Thu	Fri	Sat	Sun	
					2		Pints of shandy, low alcoholic drinks
				2½			Pints of ordinary strength beer, lager
							Pints of strong beer, lager, cider etc
							Bottles/cans of alcopops (eg Hooch)
							Single glasses of sherry, vermouth, port etc
		3					Glasses of wine
					1		Single measures of spirits/liqueurs

5.2 Think back carefully over the last seven days. Write in the number of each of the types of alcoholic drinks you consumed on each day. Try to remember where you were and who you were with on each day. This may help you to remember what you had to drink.

Now fill in the number of alcoholic drinks (if any) which you have had over the last seven days

Mon	Tue	Wed	Thu	Fri	Sat	Sun		
							Pints of shandy, low alcoholic drinks	329
							Pints of ordinary strength beer, lager, cider etc	330
							Pints of strong beer, lager, cider etc	331
							Bottles/cans of alcopops (eg Hooch)	332
							Single glasses of sherry, vermouth	333
							Glasses of wine	334
							Single measures of spirits/liqueurs	335

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5.3 Would you say that last week was fairly typical of what you usually drink in a week?

- 336 ☐ No, I normally drink quite a lot more than this
- 337 ☐ Not really, I normally drink a little more than this
- 338 ☐ Yes, this was a fairly typical week
- 339 ☐ Not really, I normally drink a little less than this
- 340 ☐ No, I normally drink quite a lot less than this

5.4 In terms of your health, how safe would you describe your current level of drinking?

- 341 ☐ Very safe
- 342 ☐ Moderately safe
- 343 ☐ Rather unsafe
- 344 ☐ Very unsafe
- 345 ☐ Don't know

5.5 In the past year have you been advised to drink less by any of the following?

- 346 ☐ Yes, by a Doctor
- 347 ☐ Yes, by other health professional
- 348 ☐ Yes, by family member
- 349 ☐ Yes, by other – who?...
- 350 ☐ No, never

6. Personal Health, Height, Weight and activity

6.1 What is your height ?

- 351 ☐ Height in feet and inches
- 352 ☐ OR metres (and centimetres)

6.2 What is your weight in light clothing ?

- 353 ☐ Weight in stones and lbs
- 354 ☐ OR kilograms

Remember the £50 prizes!

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6.3 Which of the following do you feel best describes you ?
(please tick one box only)

- 355 ☐ I am very underweight
- 356 ☐ I am underweight
- 357 ☐ I am about the right weight
- 358 ☐ I am a little overweight
- 359 ☐ I am very overweight
- 360 ☐ Don't know

6.4 Physical Activity

What leisure or sporting activities do you take part in ? Think back carefully over the last seven days. Write down for each day up to <u>two</u> of your more active leisure or sporting activities, and tick to show how long each lasted.

EXAMPLE ......

Here is an example of how you may complete this section.
Suppose that over the last week you exercised for one hour on Monday, three & ½ hours on Wednesday, ten minutes on Friday, ½ hour of exercise on Saturday,

You would complete the section like this:-

Mon	Tue	Wed	Thu	Fri	Sat	Sun	State type, eg walking, jogging swimming etc
1 hr							*Swimming 1 hour*
		3½ hrs					*Round of golf*
				10 mins			*10 minutes exercise jogging*
					½ hr		*Half hour walking*

Mon	Tue	Wed	Thu	Fri	Sat	Sun	State type, eg walking, jogging swimming etc
							361
							362
							363
							364
							365
							366
							367

A38

6.5 Thinking of the other activities that occupy you during the day (eg work) indicate below how much of your time you spend doing each of the following.

(please tick one box on each line)

Much of the time	Some of the time	None of the time	
368	369	370	Sitting or standing *(tick one box on this line)*
371	372	373	Light manual work *(tick one box on this line)*
374	375	376	Heavy manual work *(tick one box on this line)*
377	378	379	Walking *(tick one box on this line)*
380	381	382	Driving *(tick one box on this line)*

6.6 Is the week of activities you have described above a typical week ?

- 383 No, I usually exercise much more
- 384 Not really, I usually exercise a little more
- 385 Yes, this was a fairly typical week
- 386 Not really, I usually exercise a little less
- 387 No, I usually exercise much less

6.7 How do you travel to work?
If you don't work go to 6.8

- 3889 I don't work or I work at home
- 389 Walk
- 390 Cycle
- 391 Bus, train or car

6.8 Do you think you take enough exercise to stay healthy ?

- 392 No, nothing like enough
- 393 No, but nearly enough
- 394 About right
- 395 Not sure

6.9 Would you consider yourself a person who "fidgets"?

- 396 Yes, a lot
- 397 Yes, a little
- 398 No, I don't move much

6.10 Have you been advised to increase your physical activity by any of the following in the past 12 months?

- 398 No
- 399 Doctor
- 400 Other Health Professional
- 401 Family member
- 402 Other

CALON LÂN HEALTHY HEART CAMPAIGN

General

.1 **In the last 12 months have you changed any of the following for health reasons?**

	No	Yes	In the next 12 months: I intend to change	I don't intend to change
I eat less fat	☐ 403	☐ 404	☐ 405	☐ 406
I have changed the type of fat I eat	☐ 407	☐ 408	☐ 409	☐ 410
I eat more vegetables	☐ 411	☐ 412	☐ 413	☐ 414
I eat more fruit	☐ 415	☐ 416	☐ 417	☐ 418
I eat less sugar	☐ 419	☐ 420	☐ 421	☐ 422
I eat less salt	☐ 423	☐ 424	☐ 425	☐ 426
I have been trying to lose weight	☐ 427	☐ 428	☐ 429	☐ 430
I drink less alcohol	☐ 431	☐ 432	☐ 433	☐ 434
I do more exercise	☐ 435	☐ 436	☐ 437	☐ 438
I have stopped smoking	☐ 439	☐ 440	☐ 441	☐ 442

7.2 **In your opinion what are the most important reasons for premature death amongst adults?**

☐ 443	Wrong Diet	☐ 449	Lack of vitamins, minerals
☐ 444	Stress	☐ 450	Strenuous work
☐ 445	Overweight	☐ 451	Genetic factors
☐ 446	Alcohol	☐ 452	Difficult living conditions
☐ 447	Smoking	☐ 453	Lack of health services
☐ 448	Lack of exercise	☐ 454	Other, please specify........................

State which you think is the single most important cause of premature death

....

A40

Lastly .....

Please explain below if you had <u>any</u> difficulty in completing this questionnaire

....

....

....

....

..... and please add any other comment if you wish

....

....

....

....

....

....

....

....

....

....

Thank you very much for all your help.

Please return this questionnaire in the PRE-PAID envelope provided (you do not need a stamp) to:

Calon Lân Survey Team, Ynys Môn Local Health Group,
17 High Street, Llangefni, Anglesey LL77 7LT
Tel: 01248 751229

APPENDIX 5·2

Calon Lân
Ymgyrch Calon Iach

Mae Grŵp Iechyd Lleol Ynys Môn yn gweithio ar yr ynys gyda'r Awdurdod Lleol, Ymddiriedolaeth GIG Gogledd Orllewin Cymru a'r gwasanaethau gwirfoddol i geisio goresgyn y lefelau uchel o glefyd y galon a chlefydau eraill y mae'n bosib eu rhwystro.

Project gafodd ei lansio ym mis Chwefror 2001 gan Ms Jane Hutt, AC, yw Calon Lân (Calon Iach). Nod y project yw gwella iechyd y bobl sy'n byw ar Ynys Môn. Fe fyddwn ni'n cyflwyno projectau ar y cyd fel:

- **clinigau blynyddol mewn meddygfeydd MT i bobl sydd â Chlefyd Coronaidd y Galon**
- **ymestyn y Cynllun Gwahoddiad i Ymarfer i bobl sydd â chlefyd y galon**
- **cyflwyno'r Tîm Adsefydlu Cardiaidd Calon Lân.**

Un o brif amcanion y Grŵp Iechyd Lleol yw gwella iechyd pobl leol. I wneud hyn rydyn ni angen eich help chi.

Pwrpas yr Holiadur yma yw casglu gwybodaeth am eich arferion bwyta chi, ac am y ffordd rydych chi'n byw. Mae wedi'i lunio i'n helpu ni i'ch helpu chi. Fe fydd yn gwbl gyfrinachol. Fe fyddwn ni'n defnyddio'r wybodaeth i gynllunio sut i wella iechyd pobl yr ynys.

Fe fyddwn ni'n falch iawn petaech chi'n rhoi ychydig funudau o'ch amser i lenwi'r Holiadur. Fe fydd yr holl wybodaeth yn gwbl gyfrinachol, a bydd yn cael ei defnyddio dim ond er mwyn dadansoddi arferion bwyta trigolion Ynys Môn, a dadansoddi'r ffordd y maen nhw'n byw. Fe fydd eich atebion chi'n rhoi gwybodaeth hanfodol i ni fydd yn helpu i wella iechyd. Efallai bod yr Holiadur yn ymddangos yn faith, ond ddylech chi ddim cymryd mwy nag 20 munud i hanner awr i'w lenwi. Mae croeso i chi gysylltu â'r Grŵp Iechyd Lleol, rhif ffôn 01248 751229, os hoffech chi ofyn unrhyw gwestiwn. Gofynnwch am aelod o'r tîm Calon Lân a fydd yn hapus i'ch helpu chi.

Diolch yn fawr

Un o brojectau iechyd y GIG yw hwn, a does dim cysylltiad masnachol o gwbl.

Wrth ateb y cwestiynau, defnyddiwch y feiro ddu a gawsoch. Diolch.

Fe fyddwn ni'n rhoi 15 gwobr o £50 yr un – enwau'r enillwyr i'w tynnu o'r ffurflenni sy'n cael eu hanfon yn ôl.

A42

2 Holiadur Bwyd a Ffordd o Fyw Calon Lân 2002

Diolch i chi am eich amser, ac am eich cyfraniad. Defnyddiwch feiro ddu i lenwi'r bocsys os gwelwch yn dda.

1. Gwybodaeth Gefndirol

		Gwryw	Benyw
1.1	**Cenedl**	1 ☐	2 ☐

1.2 Ym mha flwyddyn y cawsoch chi'ch geni? 3 19 __ __

		Sengl	Priod /partner	Wedi gwahanu /wedi ysgaru	Gweddw
1.3	**Statws priodasol**	4 ☐	5 ☐	6 ☐	7 ☐

1.4 Faint o bobl yn eich tŷ chi sy'n 18 oed a throsodd?

8|_____|_____| Person

1.4a Faint o blant o dan 18 oed sydd yn eich tŷ chi?

9|_____|_____| Person

1.4b A gafodd yr holiadur ei anfon ymlaen o hen gyfeiriad ?

10 ☐ Na *(ewch i 1.4d)*

11 ☐ Do

12 ☐ Ddim yn siŵr

1.4c Ydych chi'n dal i fyw ar Ynys Môn?

13 ☐ Ydw

14 ☐ Nac ydw

Os nac ydych, anfonwch yr holiadur yn ôl yn yr amlen barod. Os ydych, rhowch y cyfeiriad newydd ar waelod y dudalen. Diolch

1.4d Beth yw enw'r dref neu'r pentref lle'r ydych chi'n byw (neu'r agosaf) a'r côd post?

Enw'r dref/pentref...

15 ☐☐ Côd post

Cyfeiriad newydd os ydych wedi symud: ....

....

....

Holiadur Bwyd a Ffordd o Fyw Calon Lân 2002

YMGYRCH CALON IACH CALON LÂN HEALTHY HEART CAMPAIGN

Addysg Ffurfiol

1.5 Beth yw'r lefel uchaf o addysg a gawsoch ?
(rhowch √ mewn un bocs yn unig)

- 16 ☐ Yn dal mewn addysg lawn amser *(ewch i 2)*
- 17 ☐ Ysgol Gynradd
- 18 ☐ Ysgol Uwchradd (neu hyd at 14, 15 neu 16 oed)
- 19 ☐ Chweched dosbarth (neu hyd at 17 or 18 oed)
- 20 ☐ Cymhwyster proffesiynol neu dechnegol neu ddiploma
- 21 ☐ Cwrs gradd prifysgol neu goleg polytechnig neu uwch
- 22 ☐ Arall *(nodwch beth os gwelwch yn dda)*

....

Cyflogaeth

1.6 ***(Peidiwch ag ateb os ydych mewn addysg lawn amser)***

Beth yw'ch sefyllfa bresennol ?
(rhowch √ mewn un bocs yn unig)

Pwy sy'n ennill y prif gyflog?

CHI		*PARTNER* (os yw'n berthnasol)
23 ☐	Ydych chi'n cael eich cyflogi ar hyn o bryd	31 ☐
24 ☐	Mewn swydd lawn amser gyda chyflog *(ewch i 1.6b)*	32 ☐
25 ☐	Mewn swydd ran amser gyda chyflog *(ewch i 1.6b)*	33 ☐
26 ☐	Wedi ymddeol o swydd gyda chyflog	34 ☐
27 ☐	Cynllun hyfforddi neu gynllun cyflogi	35 ☐
28 ☐	Yn ddi-waith, ac yn chwilio am waith	36 ☐
29 ☐	Yn ddi-waith, oherwydd salwch neu anabledd	37 ☐
30 ☐	Edrych ar ôl y tŷ/teulu	38 ☐

1.6a ***(Atebwch y cwestiwn yma dim ond os dydych chi ddim mewn gwaith gyda chyflog)***

Ydych chi wedi cael swydd gyda chyflog erioed ?

- 39 ☐ Ydw *(atebwch 1.6b am eich swydd ddiweddaraf)*
- 40 ☐ Nac ydw *(ewch i 1.6c)*

A4

1.6b Disgrifiwch eich swydd bresennol (neu'r un ddiweddaraf) os gwelwch yn dda

(Os ydych wedi ymddeol, yna disgrifiwch eich swydd cyn ymddeol)

(a) Beth yw (oedd) teitl llawn eich swydd? 41

(b) Beth yw (oedd) y prif bethau roeddech yn eu gwneud yn eich swydd? 42

(c) Pa un o'r rhain sy'n disgrifio'r gwaith yma orau?

- 43 ☐ Cael eich cyflogi (ddim yn goruchwylio pobl eraill sy'n cael eu cyflogi)
- 44 ☐ Cael eich cyflogi (yn rheoli neu'n goruchwylio eraill)
- 45 ☐ Yn hunangyflogedig (ddim yn cyflogi rhywun arall) *(ewch i (f))*
- 46 ☐ Yn hunangyflogedig (yn cyflogi rhywun arall) *(ewch i (f))*
- 47 ☐ Dim un o'r rhain *(nodwch beth)*..................................

(d) Beth yw (oedd) enw'ch cyflogwr?..48

(e) Beth yw (oedd) busnes eich cyflogwr? 49

(f) Oedd y gwaith yma o fewn y 10 mlynedd ddiwethaf ?

- 50 ☐ Oedd
- 51 ☐ Nac oedd, ddim yn y 10 mlynedd ddiwethaf

1.6c Ydych chi'n dod â mwy o incwm i'r tŷ nag unrhyw un arall yno? (yn cynnwys pensiynau etc)

- 52 ☐ Ydw, rwy'n dod â'r cyfan o'r incwm sy'n dod i'r tŷ, neu'r rhan fwyaf ohono - *(ewch i.**2**)*
- 53 ☐ Nac ydw, mae rhywun arall yn dod â mwy o incwm i'r tŷ
- 54 ☐ Rwy'n dod â'r un faint o incwm i'r tŷ â rhywun arall

1.6d ***(Atebwch os bydd rhywun arall yn dod â'r un faint o incwm â chi, neu fwy)***

(a) Beth yw (neu oedd) teitl llawn swydd y person yma?

(Os dydi'r person yma ddim mewn gwaith, neu os yw wedi ymddeol, yna disgrifiwch y swydd ddiweddaraf)

....55

(b) Beth yw (oedd) y prif bethau roedd yn eu gwneud yn y swydd ?

....56

(c) Pa un o'r rhain sy'n disgrifio'r gwaith yma orau?

57 ☐ Cael ei gyflogi/ei chyflogi (ddim yn goruchwylio pobl eraill sy'n cael eu cyflogi)

58 ☐ Cael ei gyflogi/ei chyflogi (yn rheoli neu'n goruchwylio eraill)

59 ☐ Yn hunangyflogedig (ddim yn cyflogi rhywun arall)

60 ☐ Yn hunangyflogedig (yn cyflogi rhywun arall)

61 ☐ Dim un o'r rhain *(nodwch beth)*..................................

(d) Enw cyflogwr y person yma

62..

(e) Beth yw (oedd) busnes y cyflogwr yma?

63..

(f) Oedd y gwaith yma o fewn y 10 mlynedd ddiwethaf ?

64 ☐ Oedd

65 ☐ Nac oedd, ddim yn y 10 mlynedd ddiwethaf

2. Gwasanaethau Iechyd a Statws Iechyd

2.1 Sawl gwaith wnaethoch chi ymweld â'r meddyg yn y 12 mis diwethaf, gan gynnwys ymweld fel claf allanol/mewnol mewn ysbyty? Peidiwch â sôn am ymweliadau â'r deintydd

66|_____|_____| gwaith

2.2 Ydych chi'n cael lwfans anabledd?

Nac ydw	Ydw, dros dro	Ydw, yn barhaol
67 ☐	68 ☐	69 ☐

2.3 Yn ystod y flwyddyn ddiwethaf, sawl diwrnod fuoch chi'n sâl ac yn methu gwneud pethau arferol?
Peidiwch â chynnwys beichogrwydd normal

70|_____|_____| diwrnod dim un diwrnod ☐

A46

2.4 Yn ystod y 12 mis diwethaf ydych chi wedi cael diagnosis neu driniaeth ar gyfer ynrhyw un o'r rhain?

	Ydw	Nac ydw
Pwysedd gwaed uchel	71 ☐	80 ☐
Colesterol gwaed uchel	72 ☐	81 ☐
Clefyd siwgr (diabetes)	73 ☐	82 ☐
Trawiad ar y galon	74 ☐	83 ☐
Angina (poen yn y frest wrth ymarfer)	75 ☐	84 ☐
Bronchitis cronig neu emffysema	76 ☐	85 ☐
Crud Cymalau neu Arthritis	77 ☐	86 ☐
Poen cefn	78 ☐	87 ☐
Llid ar y stumog neu friw *(Gastritis/Ulcer)*	79 ☐	88 ☐

Arall, nodwch ba gyflwr ....

2.5 A ydych wedi cael unrhyw un o'r symptomau yma yn ystod y 30 diwrnod diwethaf?

	Ydw	Nac ydw
Poen yn y frest wrth ymarfer	89 ☐	100 ☐
Poen yn y cymalau	90 ☐	101 ☐
Poen cefn	91 ☐	102 ☐
Poen yn y gwddf a'r ysgwyddau	92 ☐	103 ☐
Traed/fferau (migyrnau) wedi chwyddo	93 ☐	104 ☐
Gwythiennau chwyddedig (*varicose veins*)	94 ☐	105 ☐
Ecsema	95 ☐	106 ☐
Rhwymedd	96 ☐	107 ☐
Cur pen	97 ☐	108 ☐
Methu cysgu	98 ☐	109 ☐
Iselder	99 ☐	110 ☐
Dannoedd	100 ☐	111 ☐

Holiadur Bwyd a Ffordd o Fyw Calon Lân 2002

	da	eithaf da	cymedrol	eithaf gwael	gwael
2.6 Nodwch beth yw cyflwr presennol eich iechyd	112 ☐	113 ☐	114 ☐	115 ☐	116 ☐

2.7 Ydych chi wedi cymryd unrhyw feddyginiaeth yn y 7 diwrnod diwethaf?

	Ydw	Nac ydw
Ar gyfer pwysedd gwaed uchel	117 ☐	127 ☐
Ar gyfer colesterol uchel	118 ☐	128 ☐
Ar gyfer cur pen	119 ☐	129 ☐
Ar gyfer unrhyw boen arall	120 ☐	130 ☐
Ar gyfer tagu (peswch) ac annwyd	121 ☐	131 ☐
Tawelyddion	122 ☐	132 ☐
Fitaminau a/neu fwynau	123 ☐	133 ☐
Atal cenhedlu	124 ☐	134 ☐
HRT	125 ☐	135 ☐
Meddyginiaeth arall gawsoch chi gan y meddyg	126 ☐	136 ☐

Nodwch ba feddyginiaeth..137

	Na, dydw i ddim yn teimlo dan unrhyw straen	Ydw, ond nid mwy nag sy'n arferol i bobl yn gyffredinol	Ydw, mwy nag sy'n arferol i bobl yn gyffredinol	Ydw, mae fy mywyd bron yn annioddefol
2.8 Ydych chi wedi bod yn teimlo dan straen, neu o dan bwysau yn y 30 diwrnod diwethaf	138 ☐	139 ☐	140 ☐	141 ☐

	Yn y 12 mis diwethaf	1-5 mlynedd yn ôl	Dros 5 mlynedd yn ôl	Byth	Ddim yn gwybod
2.9 Pryd gawsoch chi fesur eich pwysedd gwaed diwethaf?	142 ☐	143 ☐	144 ☐	145 ☐	146 ☐

A48

		Yn y 12 mis diwethaf	1-5 mlynedd yn ôl	Dros 5 mlynedd yn ôl	Ddim yn gwybod	Byth
2.10	**Pryd gawsoch chi brawf colesterol ddiwethaf?**	147 ☐	148 ☐	149 ☐	150 ☐	151 ☐

		Dim	Ddim yn gwybod	1- 10	Dros 10	Pob un/ dannedd gosod
2.11	**Sawl dant rydych chi wedi'u colli? Mae 32 yn set llawn**	152 ☐	153 ☐	154 ☐	155 ☐	156 ☐

2.12 **Sawl gwaith rydych chi wedi gweld deintydd yn y 12 mis diwethaf?** 157 |____|____| gwaith

		Mwy nag unwaith y dydd	Unwaith y dydd	Llai nag unwaith y dydd	Byth
2.13	**Pa mor aml fyddwch chi'n glanhau'ch dannedd?**	158 ☐	159 ☐	160 ☐	161 ☐

3. YSMYGU

		Na, neb	Oes, mae rhywun yn ysmygu
3.1	**Ydych chi neu aelod o'ch teulu yn ysmygu gartref?**	162 ☐	163 ☐

		Dim, amherthnasol	Bron byth	Llai nag 1 awr y dydd	Rhwng 1 a 5 awr	Dros 5 awr
3.2	**Sawl awr rydych chi'n eu treulio yn y gwaith lle mae rhywun yn ysmygu?**	164 ☐	165 ☐	166 ☐	167 ☐	168 ☐

		Nac ydw	Ydw	
3.3	**Ydych chi wedi ysmygu erioed?**	169 ☐	170 ☐	**os na, ewch i gwestiwn 4.1**

		Nac ydw	Ydw	
3.4	**Ydych chi wedi ysmygu o leiaf 100 sigaret, sigar neu bibell yn eich bywyd?**	171 ☐	172 ☐	**os na, ewch i gwestiwn 4.1**

Cofiwch am y gwobrau o £50!

3.5 Ydych wedi ysmygu'n ddyddiol (neu bron yn ddyddiol) am o leiaf blwyddyn?

Na	Os ydych, sawl blwyddyn?
173 ☐	174 |___|___|

3.6 Ydych chi'n ysmygu ar hyn o bryd?

Ydw, bob dydd	Ydw, yn achlysurol	Ddim o gwbl
176 ☐	177 ☐	178 ☐

	Ddoe neu heddiw	2 ddiwrnod - 1 mis yn ôl	1-6 mis yn ôl	6m-5 mlynedd yn ôl	Dros 5 mlynedd yn ôl	Dros 10 mlynedd yn ôl
3.7 Pryd wnaethoch chi ysmygu ddiwethaf?	179 ☐	180 ☐	181 ☐	182 ☐	183 ☐	184 ☐

	Sigarets	Pibell	Sigars	Eraill/Rholio'ch Sigaret eich hun	Amherthnasol
3.8 Beth fyddwch chi'n ei ysmygu neu wnaethoch chi'i ysmygu yn y gorffennol?	185 ☐	186 ☐	187 ☐	188 ☐	189 ☐
3.8a Faint fyddwch chi'n eu hysmygu y dydd? Rhowch y nifer.	190 |___|___|	191 |___|___|	192 |___|___|	193 |___|___|	

	Na	Byddwn	Ddim yn siŵr	Ddim yn ysmygu
3.9 Hoffech chi roi'r gorau i ysmygu?	194 ☐	195 ☐	196 ☐	197 ☐

	Na	Ydw, yn y mis diwethaf	Ydw, yn y 12 mis diwethaf	Ydw, dros 12 mis yn ôl
3.10 Ydych chi wedi ceisio rhoi'r gorau i ysmygu?	198 ☐	199 ☐	200 ☐	201 ☐

	Ydw'n fawr	Ydw, ychydig	Dim llawer	Ddim yn poeni o gwbl
3.11 Ydych chi'n poeni y gallai ysmygu fod yn gwneud niwed i chi?	202 ☐	203 ☐	204 ☐	205 ☐

	Meddyg	Deintydd	Teulu	Gweithiwr Iechyd Proffesiynol	Arall pwy?
3.12 Yn ystod y flwyddyn ddiwethaf ydych chi wedi cael cyngor gan unrhyw un i roi'r gorau i ysmygu?	206 ☐	207 ☐	208 ☐	209 ☐	210 ☐

pwy?...

A50

4. DIET ac ARFERION BWYD

		Nac ydw	Ydw
4.1	**Ydych chi'n bwyta brecwast?**	211 ☐	212 ☐

4.2 Braster coginio (*cooking fat*) neu olew

Pa fath o fraster coginio neu olew fyddwch chi'n ei ddefnyddio ran amlaf?

Olew llysiau, ee Olew olewydd, Olew had rêp, Olew blodyn haul, etc. Nodwch ba fath........................213

Lard, toddion, menyn etc. Nodwch ba fath ....214 Ddim yn gwybod 215 ☐

4.3 Menyn/taeniad (*spread*)

Pa fath o fenyn neu daeniad fyddwch chi'n ei fwyta ar fara ran amlaf?

Enw'r gwneuthuriad a math (ee Anchor half fat, Gold unsalted low fat)

216..

Dyma enghraifft o sut y gallwch lenwi'r adran ar fara. Defnyddiwch yr un dull i lenwi pob un o'r adrannau yma:

Dywedwch eich bod yn bwyta: bara gwyn ar bump diwrnod o'r wythnos
Nid ydych byth=B yn bwyta graen meddal a
Dim ond weithiau neu Llai nag unwaith yr wythnos =Ll yn bwyta bara brown cyffredin. Rydych yn bwyta bara gwenith cyflawn ar ddau ddiwrnod, a Ryvita tua unwaith yr wythnos

Gan wneud yn siŵr eich bod yn rhoi cylch o amgylch un ffigwr, fe fyddech chi'n llenwi'r adran fel hyn:-

Sawl diwrnod yr wythnos?

7 6 (5) 4 3 2 1 Ll B	Bara gwyn
7 6 5 4 3 2 1 Ll (B)	Graen meddal (ee Mighty white)
7 6 5 4 3 2 1 (Ll) B	Bara brown (nid gwenith cyflawn)
7 6 5 4 3 (2) 1 Ll B	Gwenith cyflawn, graneri
7 6 5 4 3 2 (1) Ll B	Bara crimp

4.4 Sawl diwrnod o'r wythnos fyddwch chi'n prynu'r prydau yma y tu allan i'r cartref, ac yn eu bwyta nhw ? *(amcangyfrif ar gyfer wythnos arferol)*

Gwnewch yn siŵr eich bod yn rhoi cylch o amgylch un ffigwr ar bob llinell os gwelwch yn dda.

Ll = Llai nag unwaith yr wythnos *neu'n achlysurol* **B = byth**

Sawl diwrnod yr wythnos?

7 6 5 4 3 2 1 Ll B 217	Brechdanau o siop neu'ch gweithle
7 6 5 4 3 2 1 Ll B 218	Bwyd parod, ee Pysgod a Sglodion, Byrgyrs, Bwyd Tsieineaidd, Bwyd Indian, Pizza
7 6 5 4 3 2 1 Ll B 219	Bwyty neu ffreutur (*canteen*) yn y gwaith
7 6 5 4 3 2 1 Ll B 220	Byrbrydau/prydau mewn tafarn
7 6 5 4 3 2 1 Ll B 221	Bwyd caffi/bwyty/gwesty

Holiadur Bwyd a Ffordd o Fyw Calon Lân 2002

4.5 Llefrith

Pa fath o lefrith fyddwch chi'n bersonol yn ei ddefnyddio amlaf?
(Rhowch √ mewn un bocs)

- 222 ☐ Llefrith cyffredin, ffres neu sych
- 223 ☐ Llefrith hanner sgim
- 224 ☐ Llefrith sgim, ffres neu sych
- 225 ☐ Llefrith arall (ee llefrith gafr, soia, anwedd (*evaporated*), tew (*condensed*) etc)
- 226 ☐ Dydw i ddim yn defnyddio llefrith

4.6 Sawl cwpanaid o goffi neu de fyddwch chi'n arfer eu hyfed bob dydd? 227 Coffi |____|____| cwpanaid 228 Te |____|____| cwpanaid

Os dydych chi ddim yn yfed te na choffi, ewch i 4.8

	Dim	1	2	3	Melyswr
4.7a Sawl siwgr fyddwch chi'n ei gymryd mewn coffi?	229 ☐	230 ☐	231 ☐	232 ☐	233 ☐

	Dim	1	2	3	Melyswr
4.7b Sawl siwgr fyddwch chi'n ei gymryd mewn te?	234 ☐	235 ☐	237 ☐	238 ☐	239 ☐

4.8 Bara, Pasta a Reis

Ll= Llai nag unwaith yr wythnos *neu'n achlysurol* B = Byth

7 6 5 4 3 2 1 Ll B 240 Bara gwyn

7 6 5 4 3 2 1 Ll B 241 Graen Meddal (ee Mighty white)

7 6 5 4 3 2 1 Ll B 242 Bara brown (nid gwenith cyflawn)

7 6 5 4 3 2 1 Ll B 243 Gwenith cyflawn, graneri

7 6 5 4 3 2 1 Ll B 244 Bara crimp neu fara arall

7 6 5 4 3 2 1 Ll B 244a Pasta

7 6 5 4 3 2 1 Ll B 244b Reis

4.9 Sawl tafell (*slice*) o fara bob dydd? 245 |____|____|

4.10 Halen

(a) A fyddwch chi'n defnyddio halen i <u>goginio'r</u> bwyd rydych yn ei fwyta ?

- 246 ☐ Ydw
- 247 ☐ Nac ydw
- 248 ☐ Ddim yn gwybod

A52

(b) Fyddwch chi'n rhoi halen ar eich bwyd wrth y bwrdd ?
(Rhowch √ mewn un bocs)

- 249 ☐ Na
- 250 ☐ Os dydi'r bwyd ddim yn ddigon hallt
- 251 ☐ Bron bob amser cyn ei flasu

4.11 Yn ystod y 12 mis diwethaf a oes un o'r rhain wedi dweud wrthych chi y dylech newid eich diet am resymau iechyd?

- 252 ☐ Oes, Meddyg
- 253 ☐ Oes, Dietegydd
- 254 ☐ Oes, gweithiwr iechyd arall
- 255 ☐ Oes, aelod o'r teulu
- 256 ☐ Oes, rhywun arall
- 257 ☐ Nac oes

4.11(a) Pa un o'r rhain sy'n berthnasol i chi?

- 258 ☐ Diet colli pwysau
- 259 ☐ Diet clefyd siwgr
- 260 ☐ Diet meddygol arall *(nodwch ba un)* ....
- 261 ☐ Diet llysfwytaol/fegan (Gweler **4.11** isod)
- 262 ☐ Diet penodol arall *(disgrifiwch ba un)* ....
- 263 ☐ Ddim ar ddiet

	Na	Oes, 1 person	Oes, 2 neu fwy o bobl	Oes, mae'r prif gogydd yn llysfwytäwr
4.11(b) A oes unrhyw un yn eich tŷ chi'n llysfwytäwr (*vegetarian*)?	264 ☐	265 ☐	266 ☐	267 ☐

Os na, ewch i 4.12

	Yn bwyta wyau, cynnyrch llaeth, caws, llefrith, iogwrt	Ddim yn bwyta cig o gwbl	Yn bwyta cyw iâr ond dim cig coch	Yn bwyta pysgod ond dim cig	Fegan, dim cynnyrch anifeiliaid
4.11(c) Os ydych yn lysfwytäwr, rhowch √ i ddangos y categorïau	268 ☐	269 ☐	270 ☐	271 ☐	272 ☐

4.12 Ll= Llai nag unwaith yr wythnos *neu'n achlysurol* B = Byth

Llysiau **Gwnewch yn siŵr eich bod yn rhoi cylch o amgylch un ffigwr ar bob llinell.**

Sawl diwrnod yr wythnos?

7 6 5 4 3 2 1 Ll B 273 Tatws neu gynnyrch tatws

7 6 5 4 3 2 1 Ll B 274 Llysiau deilog (ee letys, bresych,spinais)

7 6 5 4 3 2 1 L B 275 Llysiau gwyrdd eraill (ee. Ffa gwyrdd, blodfresych, brocoli)

7 6 5 4 3 2 1 Ll B 276 Salad

7 6 5 4 3 2 1 Ll B 277 Pys neu gorn melys (*sweetcorn*)

7 6 5 4 3 2 1 Ll B 278 Llysiau gwreiddyn (ee moron, swêj, pannas)

7 6 5 4 3 2 1 Ll B 279 Ffa pob

7 6 5 4 3 2 1 Ll B 280 Ffacbys eraill (ee ffa)

4.13 Ll= Llai nag unwaith yr wythnos *neu'n achlysurol* B = Byth

Ffrwythau

Sawl diwrnod yr wythnos?

7 6 5 4 3 2 1 Ll B 281 Ffrwythau sitrws ffres (ee orennau, grawnffrwyth)

7 6 5 4 3 2 1 Ll B 282 Ffrwythau ffres eraill (ee afalau, gellyg, bananas)

7 6 5 4 3 2 1 Ll B 283 Ffrwythau sych (ond nid mewn cacennau na phwdin)

7 6 5 4 3 2 1 Ll B 284 Mwyar, ffrwythau meddal

7 6 5 4 3 2 1 Ll B 285 Ffrwythau tun

4.14

Sawl darn o ffrwythau y diwrnod (meddyliwch am afal ganolig ei faint fel un darn) 286 |____|____| Nifer

	Dim	1	2-3	4-5	dros 5
4.14a Sawl darn o ffrwythau / llysiau ydych chi'n meddwl y dylech eu bwyta bob dydd?	☐ 287	☐ 288	☐ 289	☐ 290	☐ 291

4.15 Ll= Llai nag unwaith yr wythnos *neu'n achlysurol* B = Byth

Cig a Physgod

7 6 5 4 3 2 1 Ll B 292 Cig eidion (gan gynnwys briwgig, ond dim bîff-byrgyr)

7 6 5 4 3 2 1 Ll B 293 Cig oen

7 6 5 4 3 2 1 Ll B 294 Porc, Parhad

A 53

YMGYRCH CALON IACH CALON LÂN HEALTHY HEART CAMPAIGN

4.15 parhad

Cig a Physgod **Ll = Llai nag unwaith yr wythnos *neu'n achlysurol*** **B = Byth**

7 6 5 4 3 2 1 Ll B	295	Cig moch neu ham
7 6 5 4 3 2 1 Ll B	296	Cyw iâr, twrci ffowls eraill neu adar hela (*game*)
7 6 5 4 3 2 1 Ll B	297	Cig tun (ee torth gig, corn bîff)
7 6 5 4 3 2 1 Ll B	298	Selsig, bîff-byrgyrs
7 6 5 4 3 2 1 Ll B	299	Pastai cig, peis
7 6 5 4 3 2 1 Ll B	300	Iau, arennau, calon neu offal arall
7 6 5 4 3 2 1 Ll B	301	Pysgod gwyn, penfras, lleden (ond nid mewn cytew na briwsion)
7 6 5 4 3 2 1 Ll B	302	Pysgod gwyn, mewn cytew neu friwsion
7 6 5 4 3 2 1 Ll B	303	Pysgod olewog, (ee eog, tiwna, mecryll, sardîn)
7 6 5 4 3 2 1 Ll B	304	Pysgod cregyn (ee corgimwch, cranc, cregyn gleision)

Ar gyfer y cwestiwn yma, rhowch √ mewn may nag un bocs os bydd angen

	Siop bentref leol neu archfarchnad fach	Marchnad neu siop fferm	Prif Archfarchnad fawr	Rhyngrwyd	Arall ble? ....
4.16 Ble mae'ch teulu'n prynu bwyd fel arfer?	305 ☐	306 ☐	.307 ☐	308 ☐	309 ☐

	Byth	Bob dydd neu fwy nag unwaith yr wythnos	Unwaith yr wythnos	Tua dwywaith y mis	Unwaith y mis
4.17 Pa mor aml fyddwch chi'n siopa?	310 ☐	311 ☐	312 ☐	313 ☐	314 ☐

4.18 Pa mor aml fyddwch chi'n bwyta'r byrbrydau (*snacks*) yma?

Ll= Llai nag unwaith yr wythnos *neu'n achlysurol* **B = Byth**

Sawl diwrnod yr wythnos?

7 6 5 4 3 2 1 Ll B	315	Creision a byrbrydau sawrus (*savoury*)
7 6 5 4 3 2 1 Ll B	316	Siocled neu felysion (losin/da-da)
7 6 5 4 3 2 1 Ll B	317	Bisgedi
7 6 5 4 3 2 1 Ll B	318	Cacennau

4.19 Os ydych chi'n bwyta brecwast, nodwch beth fyddwch chi'n ei gael:

Sawl diwrnod yr wythnos?

7 6 5 4 3 2 1 Ll B	319	Na, byth
7 6 5 4 3 2 1 Ll B	320	Ydw, grawnfwyd (*cereal*) **neu** dost
7 6 5 4 3 2 1 Ll B	321	Ydw, grawnfwyd **a** thost
7 6 5 4 3 2 1 Ll B	322	Ydw, brecwast ysgafn wedi'i goginio, ee wy wedi'i ferwi
7 6 5 4 3 2 1 Ll B	323	Ydw, brecwast llawn wedi'i goginio

YMGYRCH CALON IACH CALON LÂN HEALTHY HEART CAMPAIGN

5. Alcohol

Os dydych chi ddim yn yfed diodydd alcoholaidd o gwbl, ewch i gwestiwn 6

5.1 Ydych chi'n yfed alcohol ?

- 324 ☐ Na,byth *(ewch i 6)*
- 325 ☐ Dim ond ar achlysuron arbennig (ee pen-blwydd priodas, priodasau)
- 326 ☐ Llai nag unwaith yr wythnos
- 327 ☐ Unwaith yr wythnos
- 328 ☐ Mwy nag unwaith yr wythnos

ENGHRAIFFT

Dyma enghraifft o sut y gallwch lenwi'r adran yma.
Dywedwch eich bod wedi yfed y rhain yn ystod yr wythnos ddiwethaf : dau beint a hanner o gwrw cryfder arferol ddydd Gwener, dau beint o lager alcohol isel ac un mesur o wisgi ddydd Sadwrn, a thri gwydraid o win ddydd Mercher

Fe fyddwch chi'n llenwi'r adran yma fel hyn:-

Llun	Maw	Mer	Iau	Gwen	Sad	Sul	
					2		Peint o shandi, diodydd alcohol isel
				2½			Peint o gwrw cryfder cyffredin, lager
							Peint o gwrw, lager, seidar cryf etc
							Poteli/tuniau o alcopops (ee Hooch)
							Un gwydraid o sieri, fermwth, port etc
		3					Gwydraid o win
					1		Un mesur sengl o wirodydd

5.2 Meddyliwch yn ôl dros y saith diwrnod diwethaf. Nodwch faint o ddiodydd alcoholaidd o bob math gawsoch chi bob dydd. Ceisiwch gofio ble'r oeddech chi a gyda phwy oeddech chi ar bob diwrnod. Efallai y bydd hyn yn eich helpu i gofio beth gawsoch i'w yfed.

Nodwch faint o ddiodydd alcoholaidd (os o gwbl) y cawsoch chi yn ystod y saith diwrnod diwethaf.........

Llun	Maw	Mer	Iau	Gwen	Sad	Sul		
							Peint o shandi, diodydd alcohol isel	329
							Peint o gwrw, lager, seidar cryfder cyffredin etc	330
							Peint o gwrw, lager, seidar cryf etc	331
							Poteli/tuniau o alcopops (ee Hooch)	332
							Un gwydraid o sieri, fermwth	333
							Gwydraid o win	334
							Un mesur o wirodydd	335

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5.3 **Yn ystod yr wythnos ddiwethaf, a fyddech chi'n dweud eich bod wedi yfed beth sy'n arferol i chi?**

336 Na, fel arfer byddaf yn yfed llawer mwy na hyn
337 Ddim mewn gwirionedd, rwy'n arfer yfed ychydig mwy na hyn
338 Byddwn, roedd hon yn wythnos arferol
339 Ddim mewn gwirionedd, rwy'n arfer yfed ychydig llai na hyn
340 Na rwy'n arfer yfed llawer llai na hyn

5.4 **O safbwynt eich iechyd, pa mor ddiogel yw'ch lefel yfed bresennol?**

341 Diogel iawn
342 Eithaf diogel
343 Braidd yn beryglus
344 Peryglus iawn
345 Ddim yn gwybod

5.5 **Yn y flwyddyn ddiwethaf, a oes un o'r rhain wedi dweud wrthych chi y dylech chi yfed llai?**

346 Oes, y Meddyg
347 Oes, gweithiwr iechyd arall
348 Oes, aelodo'r teulu
349 Oes, rhywun arall – pwy? ....
350 Na, byth

6. Iechyd Personol, Taldra, Pwysau a Gweithgaredd

6.1 **Beth yw'ch taldra?**

351 Taldra mewn troedfeddi a modfeddi
352 NEU fetrau (a sentimedrau)

6.2 **Beth yw'ch pwysau mewn dillad ysgafn?**

353 Pwysau mewn stonau a phwysi
354 NEU gilogramau

Cofiwch am y gwobrau o £50!

6.3 Pa un o'r rhain sy'n eich disgrifio chi orau?
(Rhowch √ mewn un bocs)

355	Rwyf yn rhy ysgafn o lawer
356	Rhwyf yn rhy ysgafn
357	Mae fy mhwysau tua'r lefel iawn
358	Rwyf ychydig yn rhy drwm
359	Rwyf yn rhy drwm o lawer
360	Ddim yn gwybod

6.4 Gweithgaredd Corfforol

Pa weithagareddau hamdden neu chwaraeon y byddwch yn cymryd rhan ynddyn nhw? Meddyliwch yn ofalus am yr wythnos ddiwethaf. Ar gyfer pob diwrnod, nodwch hyd at ddau o'r gweithgareddau hamdden neu'r chwaraeon mwyaf bywiog y gwnaethoch. Nodwch ba mor hir yr oedd pob un yn para.

ENGHRAIFFT ......

Dyma enghraifft o sut y gallwch lenwi'r adran yma.
Dros yr wythnos ddiwethaf, dywedwch eich bod wedi ymarfer am un awr ar ddydd Llun, tair awr a ½ ar ddydd Mercher, deg munud ar ddydd Gwener a ½ awr o ymarfer ar ddydd Sadwrn, yna

Fe fyddwch chi'n llenwi'r adran yma fel hyn:-

Llun	Maw	Mer	Iau	Gwen	Sad	Sul	Nodwch y math, ee cerdded, loncian, nofio etc
1 awr							Nofio 1 awr
		3½ awr					Rownd o golff
				10 mun			10 munud o ymarfer/loncian
					½ awr		Hanner awr o gerdded

Llun	Maw	Mer	Iau	Gwen	Sad	Sul	Nodwch y math, ee cerdded, loncian, nofio etc
							361
							362
							363
							364
							365
							366
							367

A54

6.5 Meddyliwch am y gweithgareddau eraill y byddwch yn eu gwneud yn ystod y dydd (ee gwaith). Nodwch yma faint o amser fyddwch chi'n ei dreulio ar bob un o'r rhain:

(rhowch ✓ mewn un bocs ar bob llinell)

Llawer o'r amser	Rhywfaint o'r amser	Byth	
368	369	370	Eistedd neu sefyll *(rhowch ✓ mewn un bocs ar y llinell yma)*
371	372	373	Gwaith corfforol ysgafn *(rhowch ✓ mewn un bocs ar y llinell yma)*
374	375	376	Gwaith corfforol trwm *(rhowch ✓ mewn un bocs ar y llinell yma)*
377	378	379	Cerdded *(rhowch ✓ mewn un bocs ar y llinell yma)*
380	381	382	Gyrru *(rhowch ✓ mewn un bocs ar y llinell yma)*

6.6 Ydi'r wythnos yma'n wythnos arferol i chi?

- 383 Na, byddaf fel arfer yn ymarfer llawer mwy
- 384 Ddim mewn gwirionedd, byddaf fel arfer yn ymarfer ychydig mwy
- 385 Ydi, mae'n wythnos arferol
- 386 Ddim mewn gwirionedd, byddaf fel arfer yn ymarfer ychydig llai
- 387 Na, byddaf fel arfer yn ymarfer llawer llai

6.7 Sut fyddwch chi'n teithio i'r gwaith?
Os dydych chi ddim yn gweithio ewch i 6.8

- 3889 Dydw i ddim yn gweithio neu rwyf yn gweithio gartref
- 389 Cerdded
- 390 Beicio
- 391 Bws, trên neu gar

6.8 Ydych chi'n meddwl eich bod yn ymarfer digon i gadw'n iach?

- 392 Na, dim hanner digon
- 393 Na, ond bron digon
- 394 Tua digon
- 395 Ddim yn siŵr

6.9 A fyddwch chi'n eich ystyried eich hun yn berson aflonydd?

- 396 Byddwn, aflonydd iawn
- 397 Byddwn, ychydig
- 398 Na, dydw i ddim yn symud llawer

6.10 Yn y 12 mis diwethaf, oes un o'r rhain wedi dweud wrthych chi y dylech chi wneud rhagor o weithgareddau corfforol?

- 398 Na
- 399 Meddyg
- 400 Gweithiwr Iechyd arall
- 401 Aelod o'r teulu
- 402 Arall

7 Cyffredinol

7.1 Yn ystod y flwyddyn ddiwethaf ydych chi wedi newid un o'r rhain am resymau iechyd?

	Na	Ydw	Yn y flwyddyn nesaf: Rwy'n bwriadu newid	Yn y flwyddyn nesaf: Dydw i ddim yn bwriadu newid
Rwy'n bwyta llai o fraster	☐ 403	☐ 404	☐ 405	☐ 406
Rwyf wedi newid y math o fraster rwy'n ei fwyta	☐ 407	☐ 408	☐ 409	☐ 410
Rwy'n bwyta mwy o lysiau	☐ 411	☐ 412	☐ 413	☐ 414
Rwy'n bwyta mwy o ffrwythau	☐ 415	☐ 416	☐ 417	☐ 418
Rwy'n bwyta llai o siwgr	☐ 419	☐ 420	☐ 421	☐ 422
Rwy'n bwyta llai o halen	☐ 423	☐ 424	☐ 425	☐ 426
Rwyf wedi bod yn ceisio colli pwysau	☐ 427	☐ 428	☐ 429	☐ 430
Rwy'n yfed llai o alcohol	☐ 431	☐ 432	☐ 433	☐ 434
Rwy'n ymarfer mwy	☐ 435	☐ 436	☐ 437	☐ 438
Rwyf wedi rhoi'r gorau i ysmygu	☐ 439	☐ 440	☐ 441	☐ 442

7.2 Yn eich barn chi beth yw'r prif resymau dros farwolaethau cyn amser mewn oedolion?

☐ 443 Diet Anghywir	☐ 449 Diffyg fitaminau, mwynau
☐ 444 Straen	☐ 450 Gwaith caled
☐ 445 Bod yn rhy dew	☐ 451 Ffactorau genetig
☐ 446 Alcohol	☐ 452 Amodau byw anodd
☐ 447 Ysmygu	☐ 453 Diffyg gwasanaethau iechyd
☐ 448 Diffyg ymarfer	☐ 454 Arall, nodwch beth........................

Nodwch beth yn eich tyb chi yw prif achos marwolaeth cyn amser

....

~~A58~~ A60

Yn olaf .....

A gawsoch chi unrhyw anhawster wrth lenwi'r holiadur yma? Os do, nodwch yma beth oedd yr anhawster

....

....

....

....

..... Hoffech chi ychwanegu unrhyw sylwadau eraill?

....

....

....

....

....

....

....

....

....

....

Diolch yn fawr iawn am eich help.

Anfonwch yr holiadur yn ôl atom yn yr amlen barod a gawsoch chi (does dim angen stamp):

Tîm Arolwg Calon Lân, Grŵp Iechyd Lleol Ynys Môn,
17 Stryd Fawr, Llangefni, Ynys Môn LL77 7LT
Ffôn: 01248 751229

A61

Bwrdd Iechyd Lleol
Local Health Board
Ynys Môn
Anglesey

Calon Lân Lifestyle Survey

Introduction

The Calon Lân Lifestyle Survey looked at lifestyle factors, which could affect your health. It focused on the main risk factors for heart disease. The findings from the study were used to plan health services for Anglesey.

A small sample of the findings were:

Method

A postal questionnaire was sent to 1/10th of the adult population of Anglesey, randomly selected from the electoral roll.

2548 people returned completed surveys, out of 5000 sent out, we are very grateful for this good response, thank you, the information was most valuable

Have diagnosis/treatment in last 12 months For High blood pressure

Number	Percent
Yes 583	27%
No 1572	73%

Have diagnosis/treatment in last 12 months For Diabetes

Number	Percent
Yes 110	6%
No 1769	94%

Have diagnosis/treatment in last 12 months For High blood cholesterol

Number	Percent
Yes 355	18%
No 1652	82%

Smoke

How often	Number	Percent
daily	424	32%
occasionally	95	7%
not at all	813	61%

Number of fruit and veg portions per day

Minimum	Maximum	Average
0	15	2

Eat breakfast every day

Number	Percent
Yes 2161	86%
No 353	14%

Type of Milk used

Number	Percent
Full cream	19%
Semi skimmed	62%
Fully skimmed	18%
other	1%

Sugars in tea

Number	Percent
none	61%
1 sugar	17%
2 sugars	12%
3 sugars	1%
sweetener	9%

Vegetarian/vegan diet

Number	Percent
Yes 76	1.5%
No 2440	98.5%

* not all respondents answered all questions so percentages do not always total 100

If you would like further details please contact Pauline Rigby, Calon Lân Dietitian at Anglesey Local Health Board, 17 High Street, Llangefni, Anglesey LL77 7LT

Bwrdd Iechyd Lleol
Local Health Board
Ynys Môn
Anglesey

PRIFYSGOL CYMRU • UNIVERSITY OF WALES
BANGOR

Arolwg Ffordd o Fyw Calon Lân

Rhagarweiniad

Roedd Arolwg Ffordd o Fyw Calon Lân yn edrych ar ffactorau ffordd o fyw, a allai gael effaith ar eich iechyd. Roedd yn canolbwyntio ar y prif ffactorau a allai arwain at glefyd y gallon. Defnyddiwyd canfyddiadau'r astudiaeth i gynllunio gwasanaethau iechyd ar gyfer Ynys Môn.

Dyma rai enghreifftiau o'r canfyddiadau:

Wedi cael diagnosis/triniaeth yn ystod y 12 mis diwethaf
Am Bwysedd gwaed uchel

Nifer	Canran
✓ 583	27%
× 1572	73%

Wedi cael diagnosis/triniaeth yn ystod y 12 mis diwethaf
Am Glefyd siwgr:

Nifer	Canran
✓ 110	6%
× 1769	94%

Wedi cael diagnosis/triniaeth yn ystod y 12 mis diwethaf
Am Golesterol gwaed uchel

Nifer	Canran
✓ 355	18%
× 1652	82%

Yn smocio

Pa mor aml	Nifer	Canran
bob dydd	424	32%
weithiau	95	7%
dim o gwbl	813	61%

Dognau o ffrwythau a llysiau bob diwrnod

Lleiafswm	Uchafswm	Ar gyfartaledd
0	15	2

*ni atebodd pawb bob cwestiwn felly nid yw cyfanswm canrannau pob cwestiwn yn 100

Dull

Anfonwyd holiadur drwy'r post at un rhan o ddeg o boblogaeth oedolion Ynys Môn, a ddewiswyd ar hap o'r rhestr etholiadol.

Cafodd 5000 arolwg eu hanfon allan, ac anfonwyd 2518 ohonynt yn ôl; rydym yn ddiolchgar iawn am yr ymateb da yma; diolch yn fawr i chi, roedd yr wybodaeth yn werthfawr dros ben.

Yn bwyta brecwast bob diwrnod

Nifer	Canran
✓ 2161	86%
× 353	14%

Y math o Lefrith sy'n cael ei ddefnyddio

Math o lefrith	Canran
Hufen llawn	19%
Hanner sgim	62%
Llefrith sgim	18%
arall	1%

Siwgr mewn te

Nifer	Canran
dim	61%
1 siwgr	17%
2 siwgr	12%
3 siwgr	1%
melysydd	9%

Diet llysieuol/figan

Nifer	Canran
✓ 76	1.5%
× 2440	98.5%

Os hoffech gael mwy o wybodaeth, a wnewch chi gysylltu â Pauline Rigby, Dietegydd Calon Lân,
Bwrdd Iechyd Lleol Ynys Môn, 17 Stryd Fawr, Llangefni, Ynys Môn LL77 7LT

Appendix 5.6

Report November 2004

Calon Lân Food & Lifestyle Questionnaire

Authors

Pauline M Rigby RD Senior Dietitian Calon Lân Project
Claire Jones NPHS
Annwen Francis Smoking Cessation Specialist Calon Lân Project

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Authors

Pauline Rigby Calon Lân Dietitian
Claire Jones National Public Health Service
Annwen Francis Smoking cessation specialist Calon Lân

1. Summary

It is important for health improvement and health service planning that investigation into lifestyle and the prevalence of risk behaviours, for example smoking, associated with Coronary Heart Disease (CHD) and other health conditions is undertaken.

As such, a lifestyle survey in the form of a self completion questionnaire was undertaken with a dual purpose, planning but also research into the lifestyle habits of the population of Anglesey. It was mailed to 5,000 randomly sampled individuals in Anglesey in November 2001, following three reminders, administrative checks and data validation 2,540 records were finally available for analysis.

Personal Details

- The following is a summary of the results obtained, including comparisons with national data sets. 31% of participants were in full time paid employment and 33% were fully retired. Unemployed accounted for 2% whilst sick or disabled accounted for 7%

- 38% of the participants reported a secondary school education, 28% had a professional or technical level, 15% had a degree, 3% stated they had only a primary level education. The 2001 census shows that 18% of residents aged 16 to 74 had qualifications at degree level or higher and 32% had no qualifications

- BMI calculations showed that 33% of the participants were the "normal weight", while 48% were classed as being overweight, with 13% of these being obese

- 16% of participants who reported using salt in cooking and 10% of those who almost always added salt to food had also been diagnosed with, or were receiving treatment for high blood pressure. 25% reported having taken medication for high blood pressure recently

- 14% reported having taken medication to reduce cholesterol recently

- 30% of participants did not feel stressed, 53% did but felt it was not more than is usual, 16% felt more stressed than usual and 1% felt life to be almost unbearable

Smoking

32% of participants were current smokers and 57% had smoked at some time in life. 59% were very concerned about the harm of smoking, 6% were not concerned. 31% wished to stop, 8% did not want to stop and 12% were unsure

- . 19% of smokers had tried to stop, 10% within the last month, 22% within the last 12 months and 49% over 12 months ago

- 19% who had made lifestyle changes in the last 12 months had stopped smoking

Alcohol

- 41% of the participants reported drinking alcohol more than once a week

- 1% reported their level of alcohol intake to be very unsafe

- 11% never drank alcohol

- 2% of participants stated they drank 1 unit of shandy a week, with around 4% stating they drank between 2 to 5 units of normal strength beer, cider etc. 1% stated they drank between 3 to 6 units of strong beer, lager or cider. 1% claimed to drink 2 units of alcopops per week. 3% drank 1 to 2 units of sherry, vermouth or other fortified wines. 8% claimed to dring 2 units of wine per week. 5% of participants stated they drank 1 to 2 units of spirits per week.

Physical Activity

- 35% of participants did not think they took enough exercise, 33% thought they took about the right amount of exercise and 7% had been advised by their doctor in the past 12 months to increase their physical activity.

- The Welsh Health Survey showed that 13% of Anglesey's population took no weekly exercise.

- Over 90% of participants reported none or less than one exercise per week of vigorous, moderate or light exercise

- 32% of participants had made lifestyle changes in the last 12 months reported increasing their exercise

Diet

- 45% of participants were trying to lose weight

- Participants who had made lifestyle changes in the last 12 months included: 46% who ate less fat, 46% were eating more fruit, 46% were eating more vegetables, 39% were eating less sugar, 35% were eating less salt, 30% had changed the type of fat, 21% were drinking less alcohol

2. Introduction

The Calon Lân Project was launched in February 2001. The aim of the project was to reduce the risk of Coronary Heart Disease (CHD) by improving the health of the people living on Anglesey through the introduction of projects such as clinics in GP surgeries for people with Coronary Heart Disease (CHD), extending the Exercise by Invitation Scheme to people with heart disease and introducing the Calon Lân Cardiac Rehabilitation Team.

The Calon Lân Food and Lifestyle Questionnaire was designed by Pauline Rigby (Dietitian for the Calon Lân Project Anglesey) with a steering group, using the CINDI (Countrywide Integrated Non Communicable Diseases Intervention) and the Dorset and Somerset models. Ethics committee approval was applied for by Pauline Rigby in 2001 and was approved. The questionnaires were sent out in November 2002 to 5,000 residents on Anglesey, to obtain details of their eating and lifestyle habits.

The survey aims to provide information on a wide range of lifestyle factors that can influence health. Lifestyle is important because for some diseases it is a key determinant and people themselves can substantially alter their risk of ill health.

Despite an array of lifestyle information collected nationally across the UK and in Wales as a whole, it is still important to collect information on a local basis as demographic differences mean there could be significant variation between national and local priorities. Local data can then be used to inform health strategy, assess the effects of health promotion and identify new issues that justify attention, with research planned to test effective means of improving poor lifestyle habits, specifically diet.

3. Background

Heart disease is a major cause of premature death, nationally more than 1.4 million people suffer from angina, 300,000 people have heart attacks and 110,000 people die of heart problems in the UK every year.

The National Service Framework (NSF) for CHD recognises that there is a range of behaviours, which increases the likelihood of an individual developing the disease, most significantly, smoking, alcohol use, low levels of physical activity and poor eating habits.

The NSF has produced standards for reducing heart disease in the population by modifying individual risk related behaviour. The issue for health services for people working to promote health is how best to achieve this.

Coronary Heart Disease on Anglesey

The Isle of Anglesey has a population of 66,714 [1]; just over half the population are females.

Table 1 shows the standardised ratio for residents who have been treated for heart disease. The figures are based on the 1998 Welsh Health Survey, but exclude high blood pressure and therefore differ to figures published by the National Assembly for Wales in the Welsh Health Survey, which include high blood pressure as a proxy for heart disease.

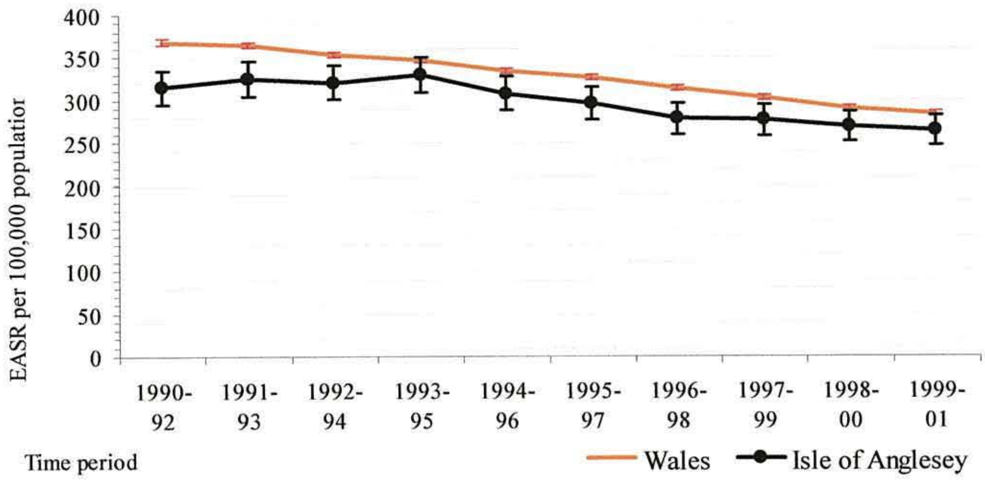
Table 1: Residents who have been treated for heart disease

	Ratio	lcl	ucl	Comparison with Wales
Isle of Anglesey	88.6	66.2	116.2	Low
Wales	100	96.1	104.0	

Source: Welsh Health Survey, 1998

Figure 1 shows the European Age Standardised Rate (EASR) for cardiovascular related mortality on Anglesey and the Wales average between 1990 and 2001. Anglesey experienced consistently lower rates than the average for Wales over the 12 year period. The EASRs have shown a downward trend for Anglesey since 1993. The EASRs for Anglesey and Wales are shown in Table 2.

Figure 1: All cardiovascular disease, European Age Standardised Mortality Rate (3 year rolling averages), all persons, all ages



Source: ONS via HealthShow 2003.1

Table 2: All cardiovascular disease, European Age Standardised Mortality Rate (3 year rolling averages), all persons, all ages

		1990-92	1991-93	1992-94	1993-95	1994-96	1995-97	1996-98	1997-99	1998-00	1999-01
Isle of Anglesey	EASR	**315.0**	**325.5**	**321.0**	**329.7**	**308.3**	**296.7**	**278.8**	**276.7**	**269.0**	**264.9**
	95% CI	294.7, 335.3	305.1, 345.9	300.8, 341.3	309.4, 350.0	288.7, 327.9	277.8, 315.7	260.4, 297.1	258.7, 294.7	251.3, 286.6	247.5, 282.3
Wales	EASR	**368.8**	**365.2**	**354.2**	**347.5**	**334.8**	**327.0**	**314.1**	**303.0**	**290.2**	**283.3**
	95% CI	365.3, 372.3	361.8, 368.6	350.8, 357.6	344.2, 350.8	331.5, 338.0	323.8, 330.2	311.0, 317.2	299.9, 306.0	287.3, 293.2	280.4, 286.3

Source: ONS via HealthShow 2003.1

Anglesey's average EASR for all cardiovascular disease related mortality between 1990 and 2001 was lower than the Wales average.

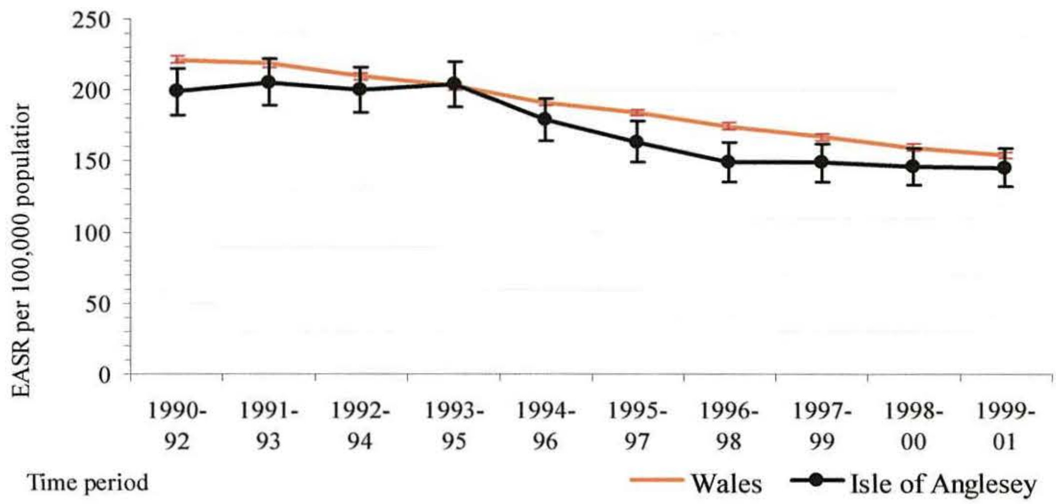
Table 3: All Cardiovascular Diseases, European Age Standardised Mortality Rate, persons, all ages 1990-2001

	EASR	95% CI
Isle of Anglesey	296.6	287.1 to 306.1
Wales	327.7	326.1 to 329.3

Source: ONS via HealthShow Classic 2003.1

The EASR for Ischaemic Heart Disease (IHD) mortality was also lower on Anglesey than the average for Wales. Similarly, a downward trend in death rates was experienced on Anglesey since 1993. The EASRs are shown in Table 4.

Figure 2: Ischaemic Heart Disease, European Age Standardised Mortality Rate (3 year rolling averages), all persons, all ages



Source: ONS via HealthShow 2003.1

Table 4: Ischaemic Heart Disease, European Age Standardized Mortality Rate (3 year rolling averages), all persons, all ages

		1990-92	1991-93	1992-94	1993-95	1994-96	1995-97	1996-98	1997-99	1998-00	1999-01
Isle of Anglesey	EASR	**199.1**	**205.3**	**200.0**	**204.1**	**179.5**	**163.8**	**149.2**	**149.1**	**146.5**	**145.7**
	95% CI	182.7, 215.5	188.9, 221.7	183.8, 216.2	187.8, 220.4	164.3, 194.7	149.5, 178.2	135.5, 162.9	135.6, 162.6	133.2, 159.8	132.5, 158.9
Wales	EASR	**221.4**	**219.3**	**209.8**	**202.9**	**191.6**	**184.3**	**174.5**	**166.8**	**159.7**	**154.5**
	95% CI	218.7, 224.2	216.6, 222.0	207.1, 212.4	200.4, 205.5	189.1, 194.1	181.8, 186.7	172.1, 176.8	164.6, 169.1	157.4, 161.9	152.3, 156.6

Source: ONS via HealthShow 2003.1

The average EASR for IHD mortality on Anglesey was lower than Wales for the period 1990 to 2001.

Table 5: Ischaemic Heart Disease, European Age Standardized Mortality Rate, 1990-2001 all persons, all ages		
	EASR	95% CI
Isle of Anglesey	173.8	166.4 to 181.2
Wales	187.8	186.6 to 189.0

Source: ONS via Health Show 2003.1

4. Calon Lân Questionnaire

Methodology

The questionnaire was sent out in 2002 and was based on core questions from the World Health Organisation's Countrywide Integrated Non-communicable Diseases Intervention Programme (CINDI) survey, which has been used in a number of other countries. The CINDI programme works to improve health and quality of life in communities by reducing premature death, disease and disability from major non-communicable diseases [2]. The Calon Lân Team also included additional questions, which were taken from the Somerset NHS Trust survey which has been carried out every 5 years since 1987.

The questionnaire was piloted locally with a small number (n=10) to check whether the format was easily understood by people and the Welsh translation was also piloted with 10 different people to check that the local welsh used was understood and correct.

5,000 questionnaires were posted to residents of Anglesey aged 18 years and over. The sample was randomly selected from the electoral register. A sample size of 5,000 was chosen as this was the CINDI recommendation. A covering letter/information sheet was included and a post paid reply envelope. Press releases were timed to coincide to generate public interest and maximise the response.

The Calon Lân Team offered 15 cash prizes of £50, (kindly donated by British Heart Foundation as an incentive, particularly aimed at the hard to reach sector) which were drawn from completed and returned forms. Three mail-shots were sent out in total. The first was the original questionnaire with a letter stating the purpose of the questionnaire and instructions. The second was a reminder postcard sent to all those who had not returned the questionnaire after 2 months. The reminder postcard firstly asked people to complete the questionnaire which had been sent, but secondly asked people to request a second questionnaire if they were willing to complete it but had mislaid the first copy. The third mail shot was a second copy of the questionnaire to all those who requested it from the second postcard reminder.

Data from the returned questionnaires were entered into SPSS, which were then routinely checked for errors.

5. Results

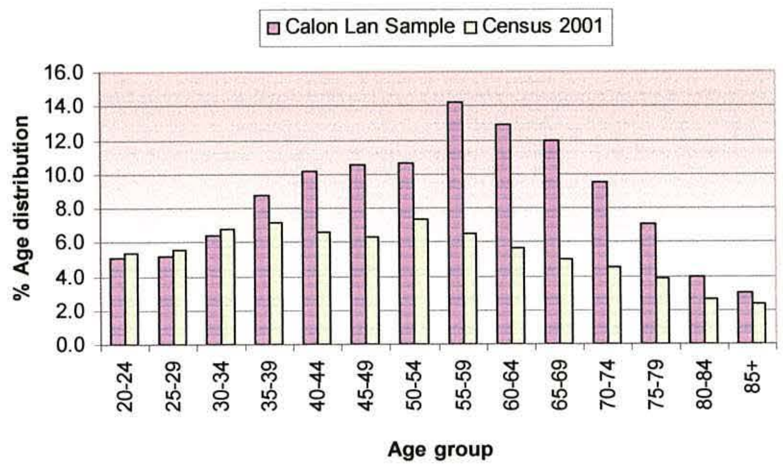
The Calon Lân questionnaire had a response rate of 50.8% after three mail-shots. The following sections present some of the data from the questionnaire. The percentage figure represent the valid percent, that is the total who responded to each question rather than the total sample. Similar data from other sources, including the 2001 Census and the Welsh Health Survey are also provided.

Sample Characteristics

The Calon Lân sample included residents of Anglesey aged 18 years and over. Figure 3 below shows the percentage distribution of the age of respondents. The percentages are compared with the population profile of Anglesey residents aged 20 years and over, based on availability of data by age group from the 2001 Census. The percentage response rate for younger residents was slightly lower compared to the resident population recorded at the 2001 Census. The percentage response rate from 35 year olds and over is higher than the percentage of Anglesey's population aged 35 years and over; responses from 55 to 79 year olds are particularly high.

The Calon Lân sample therefore is slightly under-representative of young people on Anglesey and over-representative of middle to older aged people.

Figure 3: Percentage distribution of age groups for Calon Lân responses and the resident population of Anglesey



Source: ONS via Health Show 2003.1 & Calon Lân Questionnaire

Marital Status

Marital status can influence people's lifestyle. It can affect their income, support and also mental health as some people may feel isolated if living alone or are lone parents.

Table 6 shows the marital status of the Calon Lân respondents; figures from the 2001 Census are also provided.

Table 6: Marital Status		
	Calon Lân %	2001 Census* %
Married or partner	68	54
Single	14	26
Widowed	11	10
Separated or divorced	7	10

*Includes persons aged 16 years and over
Source: Calon Lân & ONS

Level of Education
Poor educational attainment has been linked to poorer health in adulthood. Good educational attainment can lead to increased employment opportunities, which can improve access and choices with regards to various lifestyle factors, for example diet and leisure activities, which impact on health.

38% of the sample reported a secondary school level of education; 28% of the sample had a professional or technical level of education and 15% had a degree level qualification. 3% of the sample stated that they had a primary school level of education and 38% had a secondary school level of education. Data from the 2001 Census shows that 18% of residents aged 16 to 74 years had qualifications at degree level or higher and 32% had no qualifications.

Employment
People in employment are generally healthier than those who are unemployed. Being unemployed can affect self-esteem and mental health while people who go to work have a sense of purpose and enjoy social interaction with colleagues. Unemployment also affects the economic situation of an individual or family, which has consequences for health.

Table 7 shows the employment status of the survey sample and data from the 2001 Census. There is a large difference in the percentage of respondents reporting being currently employed and the Census data. This may be the result of respondents selecting the *full time employment* option for example, rather than being *currently employed*.

Table 7: Employment status		
	Calon Lân %	Census 2001* %
Currently employed	7	53
Full time employment	31	33
Part time employment	12	11
Unemployed	2	5
Permanently sick or disabled	7	8
Self employed	14	9
Retired	33	17

* Includes persons aged 16 – 74 years
Source: Calon Lân & ONS

Health Status

Assessment of own health
Table 8 shows the assessment of own health by respondents. 39% of respondents reported being in good health; 3% assessed their health as being poor. In the 2001 Census, 11% of Anglesey's population reported their health as being 'not good'.

Table 8: Assessment of own health	
	%
Good	39
Reasonably good	30
Average	21
Rather poor	8
Poor	3

Data from other sources show that 22% of Anglesey's resident population reported limiting long term illness in the 2001 Census and the Welsh Health Survey indicates that 33% of Anglesey's population has a limiting long term illness.

Health Services
Over half of the sample had visited their GP between one and five times in the 12 months prior to completing the questionnaire.

Table 9: Number of visits to GP in last 12 months	
Number of visits	%
0	14
1-5	56
6-10	20
11-15	6
16-20	2
21-100	2

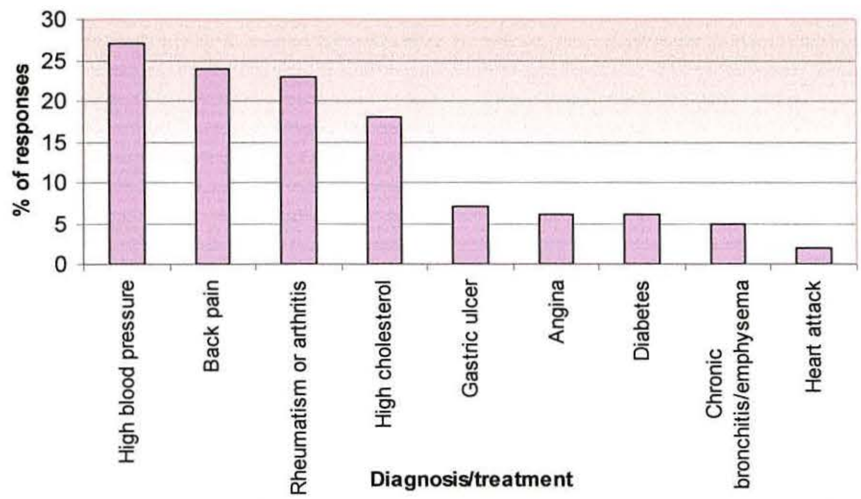
Just over half of the sample had not experienced any days of illness during the last twelve months. 4% reported being ill for the previous 12 month period.

Table 10: Number of days ill in last 12 months	
Number of days	%
0	52
1-5	18
6-10	10
11-15	5
16-20	2
21-300	10
365	4

Diagnosis/treatment

27% of the sample had been diagnosed or had received treatment for high blood pressure in the 12 months prior to the questionnaire; 24% for back pain and 23% for rheumatism or arthritis.

Figure 4: Diagnosis/treatment in last 12 months



Data from the Calon Lân questionnaire are shown in Table 11 below, with some similar variables from the Welsh health Survey.

Table 11: Comparison of similar conditions

	Calon Lân ***Diagnosis/treatment in last 12 months*** **(%)**	**Welsh Health Survey** ***Currently with*** **(%)**
Diabetes	6	3
Arthritis	23	22
Back pain	24	29

Headache symptoms were reported by 48% of the sample; joint pain and back pain were also relatively common among the sample, 45% and 40% respectively. The percentage reporting chest pain, 7%, experienced these symptoms during exercise.

Figure 5: Symptoms during last month

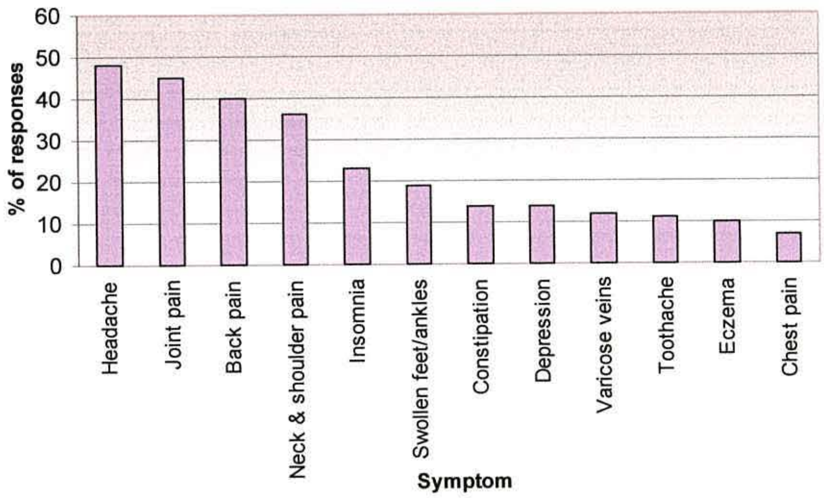


Table 12 shows the percentage of respondents who had taken some form of medication during the last seven days. The most common were vitamins and minerals and medication for headaches.

Table 12: Medication in the last 7 days

	%
Vitamins & minerals	36
Headache	36
Other aches & pains	35
For High blood pressure	25
Coughs & colds	16
For High cholesterol	14
HRT	8
Contraceptives	7
Sedatives	45

Just over half of the sample reported feeling more stressed or tense in the month leading up to the questionnaire than they usually felt.

Table 13: Feeling stressed, tense, in last month	
	%
No	30
Yes, not more than is usual	53
Yes, more than usual	16
Yes, life almost unbearable	1

Lifestyle Factors

People's lifestyles greatly influence their health and the risk of developing chronic diseases such as coronary heart disease. Making healthy lifestyle choices can be increasingly difficult for people in low income groups, as they may have limited resources for a healthy diet or access to leisure facilities. People in lower income groups are also associated with increased prevalence of smoking and drinking; these may be exacerbated as people depend on them to cope with the stress of low income, poor housing or unemployment. All these factors have a negative impact on health, resulting in a gap between the health status of people in low income groups and those in higher income groups who generally experience better health.

Smoking

Smoking is associated with a two to three fold increase in coronary heart disease [3]. It is the predominant cause of lung cancer and increases the risk of mouth, stomach, kidney, bladder and pancreatic cancers. Smokers are also more likely to experience heart disease and chronic bronchitis. There is also an increase risk health problems for non-smokers who are in contact with smokers.

Smoking prevalence

- 32% of the sample reported smoking on a daily basis
- 7% smoked occasionally
- 57% had smoked at some time in life
- 77% of daily smokers had done so for at least one year
- 31% of the sample lived with a smoker
- 16% spent some time in a workplace where someone else smokes

The Welsh Health Survey showed 30% of the sample were smokers.

Smoking cessation

The number of adults in Wales who smoke at least occasionally fell from 37% in 1985 to 31.5% in 1996; the greatest decrease was among males [3].

The Calon Lân survey included questions regarding the perceived harm of smoking and smoking cessation.

- 59% of the sample were very concerned about the harm of smoking
- 6% were not at all concerned
- 31% of the sample wished to stop smoking
- 8% did not want to and 12% were unsure
- 19% of smokers had not tried to stop smoking
- 10% had tried within the last month
- 22% in the last 12 months
- 49% over 12 months ago

Diet

There is a strong association between food and health. Diet is an important factor in weight management and on the development of a number of health problems including heart disease and some cancers.

11% of the sample had been advised by a Doctor to change their diet for health reasons in the last 12 months and 3% had been advised by a Dietitian.

Diet / food types eaten questions analysis

Table 14: Eat breakfast	
	%
Yes	85
No	14

Table 15: Olive/rapeseed oil cooking oil monounsaturated (MUFA)	
	%
MUFA	36
Don't know	1

Table 16: Polyunsaturated (PUFA)oil/ cooking oil	
	%
PUFA	62
Don't know	1

Table 17: Butter, used in cooking	
	%
Butter in cooking	16
Don't know	1

Table 18: Lard or dripping in cooking	
	%
Lard or dripping as cooking fat	7
Don't know	2

Table 19: Butter as spread	
	%
Butter as spread	16
Don't know	0

Table 20: Those buying sandwiches	
	%
1 day	6
2 days	5
3 days	4
4 days	3
5 days	7
6 days	0
7 days	0
Less than once a week	16
never	49

Table 21: Takeaway meals	
	%
1 day	19
2 days	5
3 days	2
4 days	0
5 days	0
6 days	0
7 days	0
Less than once a week	38
never	28

Table 22: workplace canteen meal	
	%
1 day	3
2 days	5
3 days	1
4 days	0
5 days	2
6 days	0
7 days	0
Less than once a week	10
never	70

Table 23: Pub meal	
	%
1 day	11
2 days	2
3 days	0
4 days	0
5 days	0
6 days	0
7 days	0
Less than once a week	45
never	33

Table 24: Café/restaurant meal	
	%
1 day	13
2 days	3
3 days	1
4 days	0
5 days	0
6 days	0
7 days	0
Less than once a week	52
never	25

Table 25: Milk	
	%
Full fat milk	18
Semi-skimmed milk	60
Fully skimmed milk	17
Other milk	1
none	2

Table 26: Coffees per day	
	%
1 per day	19
2 per day	17
3 per day	9
4 per day	7
5 per day	3
6 per day	3
7 per day or more	1
Less than once a day	13

Table 27: Teas per day	
	%
1 per day	7
2 per day	12
3 per day	14
4 per day	18
5 per day	10
6 per day	11
7 per day or more	7
Less than once a day	8

Table 28: Sugars in Coffee	
	%
none	46
1 sugar	19
2 sugars	12
3 sugars	1
Sweetener	9

Table 29: Sugars in Tea	
	%
none	57
1 sugar	16
2 sugars	11
3 sugars	1
Sweetener	8

Table 30: White bread	
	%
1 day	3
2 days	6
3 days	9
4 days	6
5 days	11
6 days	4
7 days	26
Less than once a week	13
never	12

Table 31: Softgrain bread	
	%
1 day	2
2 days	2
3 days	1
4 days	1
5 days	0
7 days	1
Less than once a week	12
never	53

Table 32: Brown bread	
	%
1 day	6
2 days	7
3 days	5
4 days	
5 days	
6 days	
7 days	
Less than once a week	
never	

Salt
66% of the sample used salt in their cooking. The addition of salt to cooked meals is shown below; 13% routinely add salt to their cooked meals.

Table 15: Salt added to meals	
	%
No	42
When food not salty enough	45
Almost always without tasting	13

High salt intake is associated with an increased risk of high blood pressure. 16% of respondents who reported using salt in their cooking also reported having been diagnosed with or received treatment for high blood pressure in the previous 12 months. 39% of respondents who used salt in their cooking had not been diagnosed or treated for high blood pressure during the previous 12 months.

Just under 10% of respondents who almost always added salt to their food had been diagnosed or received treatment for high blood pressure in the previous 12 months. 11% of those who did not add salt had been diagnosed or received treatment for high blood pressure.

Action
As a result of the data provided by the questionnaire, healthy eating sessions had been offered across Anglesey but specifically targeting the areas of social deprivation, Holyhead, Llangefni and Amlwch. The healthy eating programmes included 6 weeks of sessions in the 3 Leisure Centres in these areas, also sessions in Community Centres, workplaces, such as Council offices and private commercial manufacturing businesses and as part of the Cardiac Rehabilitation programme. Research is also planned to test methods of changing poor dietary habits.

The following is an example of the programme taught in these sessions:

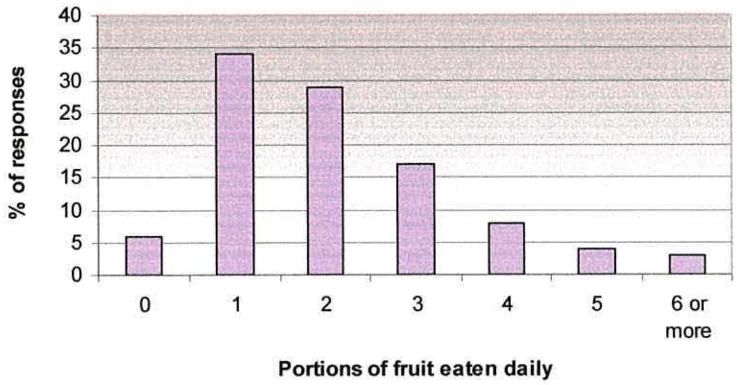
Week 1	**Healthy Eating overview** **Healthy eating for your heart** What we should eat in what proportion Facts about Fats, Salt, Sugar, Alcohol
Week 2	Feeling Hungry? How high and low glycaemic index foods affect us
Week 3	**Food Labels** What the labels mean and what we should look for **Supermarket visit** What to look for when shopping
Week 4	**Portion sizes and motivation** How to manage your intake
Week 5	**Vitamins and Minerals** How much to have and where to find them
Week 6	**Other topics, Recap and evaluation** Any topics requested by the group

Fruit & Vegetables
The sample was asked to indicate how many portions of fruit and vegetables they think should be eaten each day; the responses are shown below. 41% thought 4 to 5 portions should be eaten daily.

Table 15: Portions of fruit/vegetables which should be eaten daily	
	%
None	0.8
1	7
2-3	32
4-5	41
over 5	19

The largest percentage of the sample reported eating one portion of fruit each day, 34%. 6% did not eat any fruit. There was no similar question for vegetables.

Figure 6: Portions of fruit eaten each day



The Welsh Health Survey reported 30% of Anglesey's population ate green vegetables/salad, 6 or 7 days a week; the average for Wales was 24%. Despite the fact that Anglesey's population eats green vegetables/salad, 6% more than Wales the figures gained from the survey still only show that >5% of the population eat 5 pieces of fruit daily.

Action

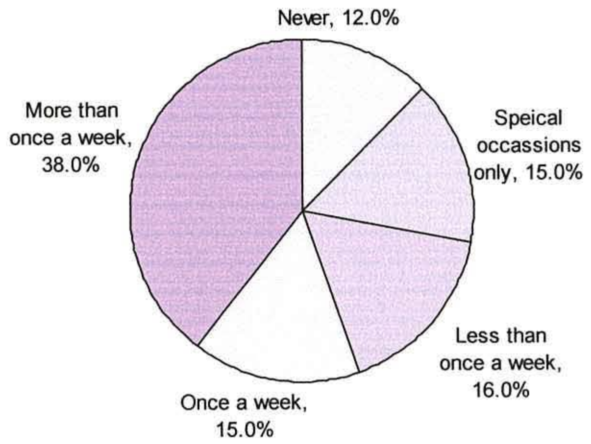
As a result of the findings from the survey, a programme of promoting "5 a day" has been initiated in schools. Fruit and vegetable tasting sessions have been held in several schools and the programme is ongoing. Fruit Tuck Shops have been started in some Primary Schools.

Alcohol Consumption

Sustained heavy drinking has been linked to some cancers, stroke, hypertension, liver disease and depression [4], it can also cause violent behaviour, injury, in addition, other alcohol related problems are unwanted pregnancies and accidents. Increased alcohol consumption can result in unemployment and affect family and social relationships.

Figure 7 below shows 38% of the respondents reported drinking alcohol more than once a week.

Figure 7: Alcohol consumption



62% of the respondents believed their alcohol consumption was very safe; 1% reported their level of alcohol intake to be very unsafe. In the Welsh Health Survey, 11% had harmful levels of alcohol consumption (15 units per week or more for women, 22 or more for men).

3% of respondents had been advised to drink less by a Doctor in the past 12 months and 2% had been advised by their family.

Action

This is an area where it is more difficult to target people with severe or excessive drinking, the nature of a severe problem is that it is often secretive and people generally have to want to seek help. There are organisations such as Alcoholics Anonymous but any contact has to be driven by the individual.

Weight

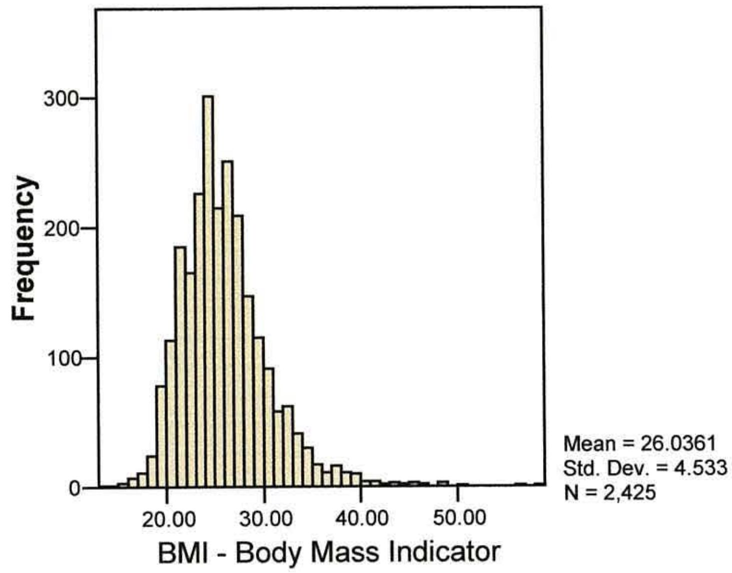
Being overweight or obese can be caused by a poor diet and lack of exercise and is a risk factor for breast and colorectal cancers, cardiovascular and respiratory diseases.

33% of the respondents assessed themselves as being the correct weight; 48% saw themselves as being a little overweight and 13% as being very overweight.

The mean BMI of respondents was 26.0. 54% of the Calon Lân sample and the Welsh Health Survey had a BMI of 25 or over.

It is possible that people under report their weight and over report their height as this has been found to be the case in previous studies[r]. Despite this the BMI statistics were higher than those in the Welsh Health survey.

Figure 8: Distribution of Body Mass Index



ACTION

A programme of Exercise by Invitation is operated. Patients are referred by their GPs to supervised exercise programmes at the Leisure Centres. In addition, Slimming World and/or Weight Watchers by referral are being considered by the Anglesey Local Health Board as a weight loss programme in addition to the individual referrals to the Dietitians currently available. This would enable larger numbers of people to enrol on a weight loss programme than can be seen individually by the Dietitians.

In addition, some of the Cardiac Rehabilitation phase 4 sessions held in the leisure centres are advertised in the centres and additional members of the public join the group for healthy eating and weight reduction courses.

Further groups have requested courses to be run by the Dietitian, such as "Large Ladies" closed swimming sessions preceded by healthy eating/loose weight tutorials. The Dietitian has run several healthy eating/weight loss sessions for Anglesey County Council under their corporate health programme

Physical Activity

Exercise can have positive benefits on health. It can help manage weight, be a form of relaxation and a source of socialising. Low levels of physical activity are linked to heart disease, hypertension, non-insulin diabetes, obesity and osteoporosis.

35% of respondents did not believe they took enough exercise; 33% believed they took about the right amount of exercise and 7% had been advised by their Doctor in the past 12 months to increase their amount of physical activity. The Welsh Health Survey showed 13% of Anglesey's population took no weekly exercise.

Questions measuring the level of physical exercise asked the frequency per week of vigorous, moderate or light exercise lasting more or less than 15 minutes each. Over 90% of respondents reported none or less than one session per week of vigorous, moderate or light exercise.

ACTION

Exercise by Invitation, as mentioned above is operating, GPs refer patients to the programme with the criteria:

Any one or a combination of one or more of the following:

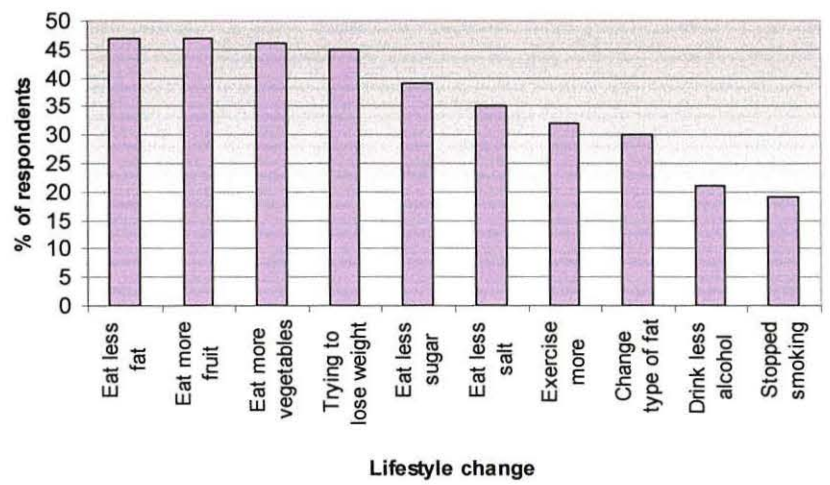
Raised Blood pressure, Diabetes, Raised Cholesterol, Raised BMI, Arthritis, Smokers, depression or Asthma.

The Leisure centre staff are trained to monitor blood pressure and pulse rate and evaluate patients on starting the programme. The programme is tailored to each patient's capabilities and runs for 20 sessions at a subsidised cost of £1.50 per session. On completing the 20 sessions they patient can have free membership of the Leisure centre and they would pay at the normal rate of £3 per session.

Lifestyle Changes

The following chart shows the percentage of respondents who had made changes to their lifestyle in the last 12 months, for health reasons.

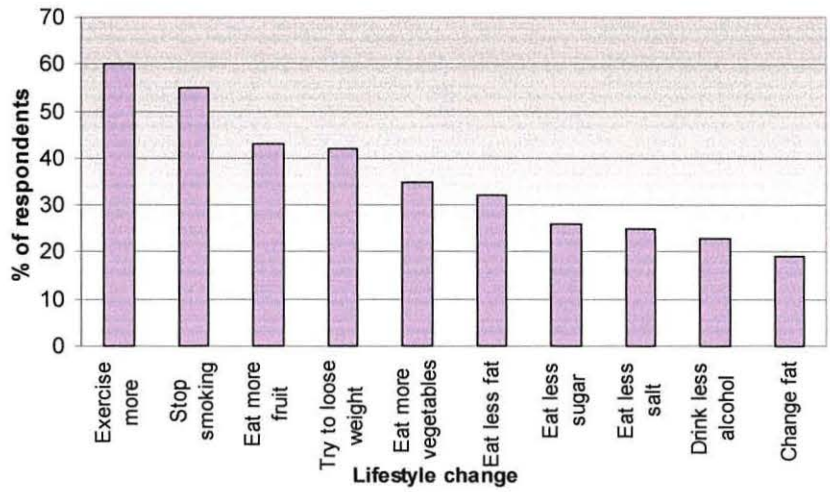
Figure 9: Lifestyle changes in last 12 months



As can be seen, a high percentage of people (>45%) have improved their intake of fruit and vegetables and reduced their fat intake and are trying to lose weight.

The questionnaire also asked about intentions to change lifestyle factors in the next 12 months. Almost 60% of respondents reported that they intended to exercise more in the next 12 months.

Figure 10: Lifestyle changes intended in next 12 months



There are significant numbers of people who intend to make lifestyle changes as detailed above. The same health promoting activities which are listed on page 13 will also be aimed at including people who fall into the "intend to" bracket.

Evidence base for prevention of coronary heart disease

Lifestyle modification can be effective in reducing the risk of coronary heart disease. The following summary of evidence for effective lifestyle interventions is taken from the latest Health Evidence Bulletin for Wales on coronary heart disease [3].

Interventions can be put in place at different levels, including national, societal/community or individual; this summary outlines the effectiveness of lifestyle interventions at an individual level.

The evidence presented here is based on the following levels:

Type I evidence	at least one good systematic review (including at least one randomised controlled trial)
Type II evidence	at least one good randomised controlled trial
Type III evidence	well designed interventional studies without randomisation
Type IV evidence	well designed observational studies
Type V evidence	expert opinion; influential reports and studies

Interventions to prevent or reduce tobacco		
Intervention	*Evidence*	*Type of Evidence*
Nicotine replacement therapy	Effective as part of a strategy to promote smoking cessation	I
Smoking cessation counselling	Can assist smokers to quit	I
Simple physician advice	Small effect on smoking cessation rates	I
Use of buddies in a smokers' clinic	May be of some benefit Research methodology poor in many studies	I
Acupuncture, acupressure, laser therapy or electro-stimulation	No clear evidence it's effective	I
Self-help materials	May increase quit rates but the effect is likely to be small	I
Proactive telephone counselling	Can be effective compared to an intervention without personal contact	I
Groups	Better than self-help and other less intensive interventions for smoking cessation	I

Interventions to reduce overweight and obesity and promote healthy eating		
Intervention	*Evidence*	*Type of evidence*
Dietary education & physical activity interventions	3 of 4 long term studies resulted in no difference in overweight group	I
Reduced or modified dietary fat intake	Trials longer than 2 years suggest a small but potentially important reduction in cardiovascular risk	I
Fish consumption	Consumption at 40-60g daily is associated with markedly reduced CHD mortality in high risk populations	IV
Fat restricted diets	Only as effective as calorie-restricted diets in achieving long-term weight loss in overweight or obese people	I
Psychological interventions to prevent weight gain	Various degrees of effectiveness	I

Interventions to promote physical activity among the adult population		
Intervention	***Evidence***	***Type of evidence***
Primary care based physical activity counselling	Moderately effective in short term	I
Variety of home based, group based or education based interventions	Shown to increase physical activity in adults aged 40 years and over but changes were relatively small and short lived	I
Work-site interventions	Yet to demonstrate a statistically significant increase in physical activity or fitness	I
Health care setting intervention	Can increase physical activity for primary prevention	I
Routine primary care consultation advice	Not an effective means of producing a sustained increase in physical activity	I

References

1. Office for National Statistics. 2001 Census. www.statistics.gov.uk

2. World Health Organisation. CINDI Programme www.euro.who.int/CINDI

3. Health Evidence Bulletin Wales *Coronary Heart Disease. A Bulletin of Research evidence to support the implementation of: Tackling Coronary Heart Disease in Wales: Implementing Through Evidence* January 2004. National Public Health Service for Wales & NHS Wales

4. Department of Health *Saving Lives: Our Healthier Nation* 1999 London: The Stationery Office

5. Department of Health (2000) *National Service Framework for Coronary heart Disease.* London HMSO

6. Office of Population Censuses and Surveys (1993) *Standard Occupational Classification.* London HMSO

7. Food Standards Agency (2003) *Consumer Attitudes to Food Standards*

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NHS Trust

Questions for Study 1

Questionnaire 1, Food label questionnaire

This form will not be given to the participants

Age	Sex	Do you read food labels?	Do you understand food labels?	Would you like to know more about food labels? If so what ?	Comments

Appendix 7.5

Information Sheet May 2004 Version 5

Study Title

Food For Thought, What's in it for you?

1. You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Contact Pauline Rigby on 01407 810081 if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part

Thank you for reading this

2. **What is the purpose of the study?**

This study is to develop a food label information tool, which can be easily understood and will help people to make informed choices about the food they buy and eat.

3. **Why have I been chosen?**

People who are involved in the exercise by invitation programme, or referred to a Dietitian may asked to take part but any member of the public who volunteers to take part may do so.

4. **Do I have to take part?**

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. You are still free to withdraw at any time and without giving a reason.

5. **What will happen to me if I take part?**

You will be asked to look at an information tool called "Food for thought, What's in it for you?" This gives information about nutritional content in labels on food packets. It is designed to help you understand what the labels mean and to understand how much you should eat each day. You will be asked to use it for 1 month when shopping and to comment on whether you found it helpful and to make suggestions as to what could improve it to make it easier to understand, and asked to comment using the feedback form enclosed.

6. **What do I have to do?**

There are no restrictions, all that is asked is that you follow your normal lifestyle and use the tool when shopping to learn about food content, read labels and use the tool to compare different products' nutritional content. If you have been given dietary advice, it should help you understand which foods to choose.

7. **What are the possible benefits of taking part?**

There may be no clinical benefit, however, by learning about food content and understanding food labels you may improve your health by making better-informed choices about the food you purchase and eat and helping others

8. **Will my taking part in this study be kept confidential?**

All information, which is collected about you during the course of the research will be kept strictly confidential. Any information about you, will have your name and address removed so that you cannot be recognised from it.

9. **What will happen to the results of the research study?**

The results of the research, based on your comments, will be used to improve the tool in order to help other people understand food labels better. The results are likely to be published in The British Journal of Nutrition and as a report. If you wish to obtain a copy of the results of the trial, please complete the form below. You will not be identified in any report/publication.

10. **Who is organising and funding the research?**

There is no payment or sponsorship for this work, other than the NHS salary received by the researcher in the course of normal duties.

11. **Who has reviewed the study?**

The North West Wales NHS Trust Ethics Committee Internal Review Panel for Research and Development has given approval for this project. Dr D Healey (Chairman)

12. **Contact for Further Information**

Please contact Pauline Rigby on 01407 810081 if you require further information.

Thank you very much for taking part and helping to help others

---

Send this slip to Dietetics Department, Ysbyty Gwynedd, Bangor, LL64 5QL

I would like to receive a copy of the results please

Name ______________________

Address ______________________

____

____

Instructions

Step 1 - Please read explanation sheet and if you are happy -

Step 2 - Please sign the **yellow** copy of the consent form and put it in the Stamped addressed envelope,

but please do not post it until you have used the tool and completed both questionnaires

Step 3 - Please complete the Questionnaire 1 before reading the tool and put it in the Stamped addressed envelope,

but please do not post it until you have completed the Feedback form *after using the tool.*

Step 4 – Please use the "What's in it for me" tool for a few shopping trips, say 3 or 4 visits, or reading food labels you have at home and use it to try to learn more about nutrition information on food labels.

Step 5 – Please complete the final form, the "Feedback form" and put it in the Stamped addressed envelope with the consent form and questionnaire 1and post to:

Pauline Rigby RD
Dietetics Department
Ysbyty Gwynedd
Bangor
Gwynedd
LL57 2PW

Thank you, your time is very much appreciated

Ymddiriedolaeth GIG
Gogledd Orllewin Cymru
North West Wales
NHS Trust

Patient Identification Number for this trial:

CONSENT FORM

Title of Project: **Food for thought Study, Understanding food labels**

Name of Researcher: Pauline M Rigby

Please initial box

1. I confirm that I have read and understand the information sheet dated May 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, without my medical care or legal rights being affected. ☐

3. I agree to take part in the above study. ☐

________________ ____________ ________________

Name of Participant Date Signature

________________ ____________ ________________

Name of Person taking consent Date Signature

(if different from researcher)

________________ ____________ ________________

Researcher Date Signature

2 copies, 1 for patient; 1 for researcher;

Appendix 7.4

Feedback form Study 2

Feedback form **You have an information "Tool" called "Food for Thought, What's in it for me, Understanding food labels"**

Please read the information on it and use it when shopping. It should help you to understand the labels. When you have used the tool for several shopping trips, could you please complete the questions below:

Is the tool easy to understand? Yes □ No □
If no what did you find complicated?..

Is there anything you felt was not needed?..

Is there anything else you would like included?..

Do you now understand the nutrition information on food labels? Yes □ No □
Did you understand the abbreviations? Yes □ Some □ No □

If no, please state what is unclear or what could be improved....... ....
Do you understand the "This is a lot/This is a little" section? Yes □ No □

I understand but suggest.. would make it better

Do you understand the Daily guidelines for men and women? Yes □ No □

If not what would make it better?..

Do you understand the 5 a day portions? Yes □ No □

If not what would make it better?..

Do you understand the Alcohol section? Yes □ No □

If not what would make it better?..
Do you understand the blood level section? Yes □ No □

If not what would make it better?..

Do you understand the section on fats? Yes □ No □

If not what would make it better?..

How has it helped you make more informed choices about what you buy and eat............................

....

What is the best thing about the tool?...

What is the worst thing about the tool?..

Would you like a panel on labels stating "A portion of this food is ...% of the daily recommended amount"
Yes □ No □

Would you use it in the future? Yes □ No □ Would you recommend it to a friend? Yes □ No □

Any other
comments?...

Thank you for taking part, your comments will help the development of a food labels information tool that will help others make more informed choices about what food they buy and eat

Appendix 7.5

Ysbyty / Ymddiriedolaeth GIG Gogledd Orllewin Cymru
North West Wales NHS Trust

Study 2 Nutrition and Food label information questionnaire

Questionnaire 1

Please complete this **FIRST, *before*** using "What's in it for you" Tool" **Thank you**

Do you understand food labels? Please tick Yes ☐ No ☐

Do you know how much of the following you should have each day?

Label item	**Please write how much you think you should have each day**	**Please write why you think you need each item**
Calories		
Carbohydrate		
Fat		
Saturated fat		
Protein		
Salt		
Fibre		

Which item/s would you like more information on (you may choose as many as you like)

....

....

This is a typical label from a sliced loaf:

Typical values	Per 100g of bread	Per average slice (23.5g)
Energy	1011 kJ 239 kcal	238 kJ 56 kcal
Protein	10.8g	2.5g
Carbohydrate of which sugars	41.9 4.9g	9.8g 1.2g
Fat Of which saturates	3.1g 1.1g	0.7g 0.3g
Fibre	7.2g	1.7g
Sodium	0.6g	0.1g

What would help you to understand it better?

....

....

Would you like another column giving a percentage of how much a portion of each food gives you of the recommended daily amount?

Yes ☐ No ☐

If so have you any comment about that?

....

What do you think about the way the labels are presented, eg. are they easy to read or understand?

....

....

Do you plan your food? Yes ☐ No ☐

or eat what you like? Yes ☐ No ☐

THANK YOU FOR TAKING PART

APPENDIX 7.6 A

Food for thought

What's in it for me?

Understanding Food Labels

5 a day fruit and vegetable portions eg.

1 apple or 1 pear or orange etc
or 2 smaller fruit, eg plums
and a small handful of grapes or cherries etc
and a small bowl of salad
and 3 spoons of vegetables, fresh or frozen
or small tin of baked beans
and 1 glass fruit juice

Abbreviations		
Energy	Kcals (K=Kilo)	Calories
Carbohydrate	CHO	Starch/sugar
Fat	Saturated =	Hard fats
MUFA/ PUFA	Monounsaturated	Polyunsaturated
Sodium/Salt	Na=Sodium	NaCl=Salt
Calcium	Ca	< Less than
Iron	Fe	> More than
RDA	Recommended daily allowance	

Body Mass Index	To convert lbs to kg divide by 2.205	To convert inches to metres divide by 39.4
BMI = Weight	**in Kg divided**	**by ht in Metres^2**
Weight in Kg	eg 64kg	
Height in M^2	1.7 x 1.7(2.89)	=22
Weight in St	eg 10st x14lb	= 140lb
+ weight in lb	eg 10st 7lb	= 147lb x 2.205
Height in Ft	eg 5ft x 12	=60
+ height in "	eg 5ft 7"	= 67 x 39.4

Dietary targets	**Guide for Men**	**Grams**
Energy kCals	2500	Appx
Carbohydrate	50% of energy = 1250 kcals	312g
Protein	<15% = 375 kcals	95g
Fat	<35% = 875kcals	95g
Fibre	18g per day	>18g
Calcium	700mg	700mg
Sodium/Salt	<2.4g Sodium or <6g Salt	<6g
Divide salt by	**2.5 for Sodium**	
Dietary targets	**Guide for Women**	grams
Energy kCals	2000	Appx
Carbohydrate	50% of energy =1000 kcals	250g
Protein	<15% = 300 kcals	75g
Fat	<35% = 700 kcals	<70g
Fibre	18g per day	>18g
Calcium	700mg	700mg
Sodium/Salt	<2.0g Sodium or <5g salt	<5g
Divide salt by	**2.5 for Sodium**	

Typical Values	**High**	**Low**
Energy		
Carbohydrate	10g	2g
Fat	20g	3g
Saturated	5g	1g
Fibre	3g	0.5g
Sodium/Salt	1.5g	0.3g
Calcium	100mg	0mg

Normal levels	**Normal range** mmol/L	**At risk**
Cholesterol	2.5 –4.8	over 6
LDL Cholesterol	under 3	over 4
HDL Cholesterol	over 1.5	under 0.9
Tryglycerides	under 2.3	Under 4.5
Blood Sugar	3-9	Over 10
Blood pressure	130/80	140-160 /90- 100

Fat	**Recommended Intake**	**Men Women**
Total fat	<35% of energy	95g 70g
Saturated fat	<11% of energy	30g 20g
MonoUnsaturated Fatty Acids MUFA	13% of energy	eg. Olive oil & Rapeseed oil
PolyUnsaturated Fatty Acids PUFA	N6 6.5% of energy	eg. Corn oil, Sunflower oil
Trans Fatty Acids	<2% energy	

Typical Values		
	K Calories	K Calories per 100g
Carbohydrate	4 per gram	400 Per 100g= **(%)**
Protein	**4 per gram**	400 Per 100g= **(%)**
Fat	**9 per gram**	900 Per 100g= **(%)**
Fibre		
BMI	19-25 Normal range	25-30 overweight 30+ is Obese

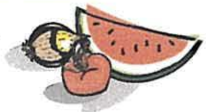
Alcohol Units	**Units as served**	**Per Pub measure**	**KCalories per pub measure**
Bitter Beer	2 per pint	½ pint 500ml	155 per ½pt
Strong Lager	4 per pint	¼ pint 250ml	180 per ¼pt
Average Lager	2 per pint	½ pint 500ml	200 per ½pt
Wine	1/glass	100ml	70 kCals
Spirits	1/glass	25ml	55 kCals
Sherry/Port	1/glass	50ml	70 kCals
Alcopops			

Typical intake	Cals	CHO	Protein	Fat	%
Carbohydrate					
Protein					
Fat total					
Saturated fat					
Mono UFA					
Poly UFA					
Fibre					
Sodium					
Salt					
Calcium					

Food for thought

What's in it for you?

Understanding Food Labels



5 a day fruit and vegetable portions choose 5 from the following:

1 medium apple or 1 pear or 1 orange
2 smaller fruit, eg plums, kiwi
a small handful of grapes or cherries etc
a small bowl of salad
3 spoons of vegetables, fresh or frozen
a small tin of baked beans (only once)
a glass fruit juice (only once)

Abbreviations	**found on labels**	
Energy - Cals	Kcals (K=Kilo)	Calories
	Kj = Kilo Joules	1 cal = 4kj
Carbohydrate	CHO	Starch/sugar
part of which	Sugars	Sugars
Fat	Saturated =	Hard fats
MUFA/ PUFA	Monounsaturated	Polyunsaturated
Sodium/Salt	**Na=Sodium**	**NaCl=Salt**
Calcium	**Ca**	
Iron	**Fe 14.8g**	
RDA	Recommended Daily Allowance UK Dietary Reference Values 1991	

1 unit →	Max per day →	Men 3-4 Units →	Women 2-3 Units
1 unit = 9g Alcohol	**Units as served**	**Pub measure**	**KCalories per pub measure**
Bitter Beer	2 per pint	1 pint 550ml	170 per pint
Strong Beer or Lager 6%	3 per pint	1 pint 550ml	300 per pint
Standard Lager 4%	2 per pint	1 pint 550ml	175 per pint
Wine 12%	1 per glass	100ml	70 kCals
Spirits 40%	1 per glass	25ml	55 kCals
Sherry/Port 20% Alcohol	1 per glass	50ml	70 kCals + mixer's cals
Alcopops 5.5% Alcohol	1.5 per bottle	½ pint 275ml	107 per bottle

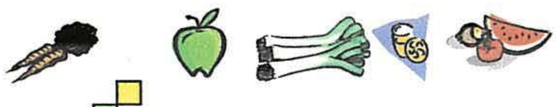
Typical Values On labels	**High** This is a lot per 100g	**Low** This is a little per 100g
Sugars	10g	2g
Fat	20g	3g
Saturated fat	5g	1g
Fibre higher is better	3g	0.5g
Sodium (Na)	**0.5g**	**0.1g**
Salt (NaCl)	1.5g	0.3g
Divide salt by	**2.5 for sodium**	
Multiply Sodium by	*2.5 for Salt*	salt is Sodium Chloride

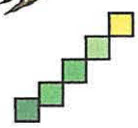
Normal blood levels	**Ideal range** mmol/Litre	**Raised levels**
Cholesterol	2.5 – 4.8	over 5
LDL Cholesterol bad	under 3	over 4
HDL Cholesterol good	Over 1.5	under 0.9
HDL Cholesterol good	should be >20%	of total chol.
Tryglycerides bad	under 2.2	over 2.3
Blood Glucose	fasting 3-5	over 6
Blood pressure	**Normal range** 120 - 139 /80-89	**Raised-high** 140-180 /90- 110

Dietary targets Daily	**Guide for Men** Maintain weight	Loose weight
Energy kCals	**2500**	**1800**
Carbohydrate grams	300	225
Protein grams	95	70
Fat grams	90	70
Of which saturates	30	20
	this is part of the total Fat	
Fibre (more is better)	20g per day	
Calcium	700mg per day	
Sodium	**2.4g** or less	
Salt	**6g** or less	

Fat	**Recommended Intake**	**Men Women**
Total fat	<35% of energy	95g 70g
Saturated fats	<11% of energy	30g 20g
These are found in animal fats on meat	and avoid lard dripping, butter	avoid cream, full fat milk,
MonoUnsaturated Fatty Acids MUFA	13% of energy these are best	eg. Olive oil & Rapeseed oil
PolyUnsaturated Fatty Acids PUFA	6.5% of energy these are OK	eg. Corn oil, Sunflower oil
Trans Fatty Acids	<2% energy	
Saturated fats	*Raise*	Cholesterol
Monounsaturated	fats leave HDL	alone √
Polyunstaurated	fats lower both	LDL & HDL X

Dietary targets	**Guide for Women** Maintain weight	Loose weight
Energy kCals	**2000**	**1500**
Carbohydrate grams	250	180
Protein grams	75	55
Fat grams	75	55
Of which saturates	25	15
	this is part of the total Fat	
Fibre (more is better)	18g per day	
Sodium	**2.0g Sodium** or less	
or Salt	**5g salt or less**	
Calcium (Ca)	700mg per day	
If pregnant	800 – 1000 mg Calcium daily	
Lactation	**1200 mg Calcium daily**	





Fat	= 9 calories per gram
CHO	= 4 calories per gram
Protein	= 4 calories per gram
Alcohol	= 7 calories per gram

To lose weight
1800 calories a day for men
1500 calories a day for women

	Question	Cardiac Rehab group	N	General Public group	N
1	Is the tool easy to understand	Mostly Some parts	6 5	Most Some Complicated	3 3 5
2	If no what is complicated	Typical intake	5	BMI, typical intake	5
3	Is there anything not needed	Typical intake	6	Typical intake BMI Blood levels	5 4 5
4	Anything you would like included	Guide for how much I should eat to lose weight	6	Guide for losing weight	5
5	Do you understand nutrition information on food labels	Partly	6	A bit	5
6	Do you understand the abbreviations section	Yes	5	Yes	4
7	What is unclear in the abbreviation section	What are joules What are Monounsaturated	6 5	What are joules Please explain fats	5 4
8	Do you understand the daily guidelines	Yes but it seems complicated	5	Yes but it seems complicated	4
9	What would make it better	Leave out the % calculations	4	Put amounts to eat of each item to eat for normal and to lose weight	5
10	Do you understand the 5 a day portions	Yes	6	Yes	5
11	What would make it better	Just list them, we can count to 5!	6	Just list them	5
12	Do you understand the alcohol section	Yes	6	Yes	5
13	What would make it better	Add recommended amounts	6	Add recommended amounts	5
14	Do you understand the blood level section	Not completely, need fuller explanation of LDL, HDL etc.	6	Not really	5
15	What would make it better	Explanation of LDL HDL , which foods we should eat to change it	6	Don't want this in	5
16	Do you understand the fats	A bit	3	Not really	5
17	What would make it better	More explanation	6	More explanation	5
18	How has it helped you choose foods	Has helped me understand the labels and how much I should be eating	4	Helped to understand labels but I want more explanation	4
19	What is the best thing	Small, handy, comprehensive	6	Convenient, can look at it when shopping, lots of info	5
20	What is the worst thing	Writing too small (1) needs colour	3	Needs colour, needs simplification, needs a leaflet to explain in more detail	5
21	Would you like % of RDA for portions	On labels yes	4	On labels yes	5
22	Would you use it again	Yes	5	Yes, but changed in line with the comments	5
23	Would you recommend it to a friend	Yes	4	A new one yes	4
24	Any other comments				

Table X.X Focus groups comments

Appendix 7.7

Calculations for parameters for correct answers for amount and functions of nutrients for Study 2

Carbohydrate (CHO)

The COMA report (DoH 1991) stated that carbohydrate should provide 50% of daily Calories. To equate to within ±15% of the recommended intake of Calories this would be 1700 to 2300 kcals for women, for the lower figure 1700 kcals this would equate to 212g (50% of 1700 = 850÷ 4 kcals/g = 212g carbohydrate). The upper figure for women would be 287g CHO. For men the figures for kcals of 2125 to 2875 would equate to 265g CHO to 359g CHO.

Fat.

The COMA report (DoH 1991) stated that total fat should provide less than 35% of energy, using the same parameters as above. For women this equates to 35% of 2000kcals = 700kcals being provided by total fat, @ 9kcals per gram = 77g of total fat, ±15% of 77g the range of "correct" answers is 65g to 88g daily. For men this equates to 35% of 2500 = 875kcals @ 9kcals per gram = 97g total fat, ±15% of 97g, giving a range of 82g to 111g total fat.

Saturated Fat

As stated above, there is no requirement for saturated fat at all as the essential fatty acids, which we cannot synthesise (linoleic acid *n6* omega-6 and alpha-linoleic acid *n3* omega-3) are not saturated fats and can be obtained from vegetable sources and eggs. The COMA 1994 guideline for the daily limit of saturated fat is that it should comprise of less than 11% of energy. The parameters used for Calories and Fat described above are applied to saturated fat as follows:

Women: 2000kcals 11% = 220kcals ÷ 9kcals per gram = maximum 24g saturated fat ± 15% the range is 20g to 28g. One woman stated 30g, as 2g differential is an extremely small amount, this has been included in the correct answers. Men: 2500kcals 11% = 275kcals ÷ 9kcals per gram = 30g saturated fat ± 15% the range is 25g to 35g. As we do not actually *need* any saturated fat at all, therefore all figures lower than the minus - 15% are included as correct.

Protein

The same parameter of ± 15% of COMA (DoH 1991) recommended amount equates to: COMA stated dietary target <15% of energy. Based on nitrogen balance studies, the UK dietary reference values (DRVs;DH 1991) assume that healthy adults consume a mixed diet require 0.75g protein per kilogram of their ideal *(not actual)* body weight in kilograms (Manual of Nutrition 2001).

Women: 2000kcals x 15% = 300kcals ÷ 4kcals per gram = 75g ± 15% = range 64g to 86g. Men: 2500kcals x 15% = 375kcals ÷ 4kcals per gram = 94g ± 15% = range 80g to 108g. One woman stated 90g, the range upper limit for women is 86g but as 4g of protein in an insignificant amount, this answer has been accepted as correct.

Salt

Salt is Sodium Chloride, the COMA (DoH 1991) dietary targets for salt or equivalent as Sodium is 6g salt, 2.4g Sodium, this is a maximum recommend amount, the actual physiological requirement is small, in the region of 69-460mg/day, 6g of salt is 6000mg, the calculation for +15% follows but all answers given lower that the recommended upper limit have been accepted, as they are correct.

Men and Women: 6g x 15% = 7g.

Fibre

The average UK diet contains approximately 12g of fibre or Non Starch Polysaccharides (NSP) per day (Bingham et al. 1990; MAFF 1998). We should be eating at least 18g of NSP/fibre per day (DoH 1991), although the COMA target for NSP/ fibre is 18g per day of the recommended daily intake has been estimated as 24g by the (Association of Official Analytical Chemists AOAC) method of analysis i.e. that now used for most food labelling (JFSSG 1999). 18g to 24g has been used as the dietary target but as this is a minimum ± 15% of 24g has been used for the calculation as a guide. The answers giving specific correct amounts of NSP have been accepted using both target figures:.

Men and women: 24g x ± 15% = 20g - 28g

18g x ± 15% = 15g – 21g

Therefore the range incorporating both systems of measurements would be from 15g to 28g, although slightly higher amounts would not be detrimental.

Appendix Study 2 responses

The figures judged as appropriate are highlighted:

Number of calories stated as required by participants	Gender	Number
1000	Female	1
1000- 1500	Female	1
1100	Female	1
1200	Female	1
1500	Female	3
1500 – 1700 to lose weight	Female	1
1700	Female	1
1800	Female	3
2000	Female	6
2000	Male	1
2500	Female Male	1 2
500	Male	1

Table A1. Responses for amounts of calories

Reasons given by participants for the need for Calories	Gender	Number
Gives you energy	Female Male	10 3
Energy growth and repair	Female	2
To maintain body weight and to provide energy	Female	3
To maintain health	Female	1
To allow body to function	Female	1
To maintain health	Female	1
To live	Male	1
To keep body going	Female	1
To lose weight	Female	1

Table A2. Reasons given by participants for the function of Calories

How much Carbohydrate do you need each day?	Gender	Number
500g	Female	1
200g	Female	3
half your calories	Female	1
100g	Female	1
50g	Female	1
40g	Male	1
20g	Male	1
3 portions	Female	1
Plenty (insufficiently accurate)	Male	1
1 portion	Female	1

Table A3. responses for amount of Carbohydrate

Why do you need Carbohydrates?	Gender	Number
Gives you energy	Female	15
Necessary to give bulk	Female	1
Vitamins	Female	1
Stated at lecture	Male	1

Table A.4. responses for function of Carbohydrates

How much fat do you need?	Gender	Number
4g	Female	1
6g	Female	1
9g	Female	1
10g	Female	1
15g	Female	1
20g	Female	1
70g	Male	1
70g	Female	2
75g	Female	1
80g	Female	1
100g	Female	1
100g	Male	1
1-1.5 ounces	Female	1
2.5 teaspoons	Female	1
not too much (not an indication of specific calorie amount, so not counted as correct).	Female	1

Table A.5. responses for quantity of fat

Why do we need fat?	Gender	Number
Stored Energy	Female	1
Essential fatty acids	Male	1
Energy	Female	1
Insulate the body	Female	1
Warmth, maintain weight	Female	1
For our skin (only very partially correct, not included in correct answers)	Female	1

Table A.6. responses for function of fat

How much Saturated fat do you need?	Gender	Number
50g	Female	1
30g	Female	1
25	Female	1
20	Female	2
under 20g/100g per day	Female	1
10	Female	1
1g	Female	1
1g	Male	1
Nil	Male	1
Least as one can	Female	1

Table A.7. responses for quantity of saturated fat

What is the function of saturated fat?	Gender	Number
For your organs to work x	Female	1
Not good for you	Female	1
Too much clogs up the arteries	Female	1
Provides energy and insulation	Female	1
Bad fats, don't need much	Female	1
I don't think you need this	Female	1

Table A.8. responses for function of saturated fat

How much protein do you need?	Gender	Number
200g x 1	Male	1
200g	Female	1
150g	Female	1
90g	Female	1
80g	Female	1
75g	Female	1
50g	Female	1
30g	Male	1
8 ounces	Female	1
2 portions	Female	1

Table A.9. responses for quantity of protein

Why do you need protein?	Gender	Number
Vitamins, Minerals, slow release energy	Female	1
To build tissue	Female	1
Growth and repair	Female	3
Good for bones	Female	1
To help body regenerate	Female	1
Blood	Female	1
Necessary for energy and building muscle etc.	Female	1
Help muscles to be strong and help in growth	Female	2
Provide energy and essential nutrients	Female	1
Growth	Female	2
Energy, good hair, skin	Female	1
Body Building	Male	1
Muscle	Male	1
To help body regenerate	Male	1
Growth and repair	Male	1

Table A.10. responses for function of protein

How much salt do you need?"	Gender	Number
as little as possible	Female	1
0.5g	Female	1
a few pinches for cooking and no more	Female	1
2g	Female	1
3 or less	Female	1
less than 5g x 1 woman	Female	1
5g	Female	2
Less than a teaspoon 5-6g x	Female	1
6g	Male	1
6g	Female	2
2 tablespoons	Male	
10	Female	

Table A.11. responses for quantity of salt

What is the function of salt?"	Gender	Number
To maintain electrolyte balance in the body	Female	1
Muscles	Female	1
For taste	Female	1
To bring out flavour in food	Female	1
You sweat salt, used in digestion	Male	1
Haemostatic regulation	Female	1
Muscle cramp	Female	1
To replace lost salts, sweating etc, healthy blood	Female	1
Replace lost minerals	Female	1

Table A.12. responses for function of salt

How much fibre do you need each day?	Gender	Number
300g	man	1
100	Female	1
50g	Female	1
25	Female	2
15g	Female	1
10g	Female	1
Quite a bit	Female	1
1 portion + 5 fruit	Female	1
Plenty	Male	1
As much as you like	Male	1

Table A.13. responses for quantity of fibre

What is the function of fibre?	Gender	Number
Health bowels	woman	1
Digestion	women	2
Digestion	man	1
Aids digestion and excretion	man	1
Help you go to the toilet	woman	1
Regular	woman	1
To enable the bowels to work well	woman	1
For our bowels	woman	1
Roughage	woman	1
To keep one regular and to bulk food	woman	1
To add bulk	woman	1
Keep food moving through the digestive system	woman	1
Bulk food, slow release energy	woman	1
Speeds through the digestive tract	woman	1
Get rid of waste in the body and detox the body	woman	1

Table A.14 responses for function of fibre

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food

Ydych chi'n deall Labeli Bwyd?

Pauline Rigby, Dietegydd Calon Lân Ynys Môn

Rwyn edrych am wirfoddolwyr i gwblhau 3 holiadur byr a chyflwyno derbynneb siopa wythnosol 4 gwaith

Bydd yr wybodaeth a gyflwynir ***yn parhau'n gyfrinachol*** ac ni throsglwyddir i unrhyw un

Byddwch yn derbyn gwybodaeth i'ch helpu i ddeall y labeli bwyd

Os gallwch chi helpu, mae'n bwysig bod eich siopa'n **normal**, **realistig, union**. Croeso i chi ddileu unrhyw eitemau nad ydynt yn eitemau bwyd os dymunwch

Y nod yw *canfod yr hyn sy'n helpu pobl fwyaf*
Felly siopa go iawn, gwirioneddol yn unig all ddweud wrthyf beth all eich helpu chi ac eraill. Nid prawf yw hwn!

Gwobr £50

Bydd gan bawb sy'n cwblhau'r holiaduron ac yn cyflwyno 4 derbynneb siawns i ennill

Gwnewch gofnod o'r rhif a'r cyfeiriad e-bost a ffoniwch neu anfonwch e-bost at Pauline Rigby os hoffech gymryd rhan erbyn 16 Mawrth

01407 810081
prigby@systemyze.co.uk

Do you understand Food Labelling?

Pauline Rigby, Anglesey Calon Lân Dietitian

I am looking for volunteers to complete 3 short uestionnaires and to give 4 main weekly shopping till receipts

The information you give will ***remain confidential*** and not passed on

You will be given information about food labels

If you could help, it is important that your shopping is **normal, realistic, actual**, shopping. Feel free to blank out any non-food items if you wish

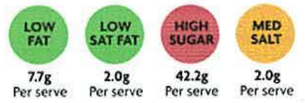
The aim is *to find out what helps people the most,* so only real, genuine shopping can tell me what can help you and others. It is not a test!

£50 Prize draw

all those who complete the questionnaires and provide *4* receipts will be entered

Please take the number and email address and phone or email Pauline Rigby if you would like to take part by March 16th

01407 810081
prigby@systemyze.co.uk



Traffic Lights

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BANGOR
1884

Guideline daily amounts

Ydych chi'n deall Labeli Bwyd?

Pauline Rigby, Dietegydd Calon Lân Ynys Môn

Rwyn edrych am wirfoddolwyr i gwblhau 3 holiadur byr a chyflwyno derbynneb siopa wythnosol 4 gwaith

Bydd yr wybodaeth a gyflwynir ***yn parhau'n gyfrinachol*** ac ni throsglwyddir i unrhyw un

Byddwch yn derbyn gwybodaeth i'ch helpu i ddeall y labeli bwyd

Os gallwch chi helpu, mae'n bwysig bod eich siopa'n **normal**, **realistig, union**.
Croeso i chi ddileu unrhyw eitemau nad ydynt yn eitemau bwyd os dymunwch

Y nod yw *canfod yr hyn sy'n helpu pobl fwyaf*
Felly siopa go iawn, gwirioneddol yn unig all ddweud wrthyf beth all eich helpu chi ac eraill. Nid prawf yw hwn!

Gwobr £50

Bydd gan bawb sy'n cwblhau'r holiaduron ac yn cyflwyno 4 derbynneb siawns i ennill

Gwnewch gofnod o'r rhif a'r cyfeiriad e-bost a ffoniwch neu anfonwch e-bost at Pauline Rigby os hoffech gymryd rhan erbyn 9 Mawrth

01407 810081
pauline.rigby@angleseylhb.wales.nhs.uk

SJ/16-02-07/BILLYNY/AMRYW/Food Labelling poster.w

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BANGOR

Food Labelling

I am Pauline Rigby, an NHS Dietitian doing research with Bangor University, trying to find how people read and understand food label nutrition information. The aim is to help people understand the labels, so that they can understand what they're buying more easily.

I am looking for volunteers to complete 2 short questionnaires and to give your main weekly shopping till receipt 4 times over a month to 6 weeks. Till receipts give an accurate indication of what you and your family eat much more easily than asking for a detailed food diary. I am only interested in key food items so you can cross out any non-food items if you wish. As you are probably aware, the supermarkets collect information about what you buy from clubcards to analyse shopping trends and manage stock control. However they will not release that information.

How you can help me:

I would ask you to do your main weekly shop at the *same supermarket chain if possible* for all of the 4 shopping trips, it may be a different branch if you wish *and keep the till receipt*

How I can help you:

The aim is to find what helps people the most, *so only regular normal shopping* can tell me what can help you and others

You will be given information to help you understand the food label information better.

✂ ____

Which supermarket do you shop at for most of your food shopping?

Asda **Co-op** **Lidl** **Somerfield** **Morrison** **Tesco** Other________________
(please circle one) *(please state)*

The information you give will remain confidential and will not be passed on to anyone.

I consent to providing 4 till receipts and completing the questionnaires:

Surname ______________________ Signed ______________________

Forename ______________________ Phone number ______________________

Address ______________________ Mobile No ______________________

______________________ Email ______________________

Post Code ______________________

Would you like correspondence in *(please circle)* **English** or **Welsh**?

Please return this completed reply in the FREEPOST envelope
attached* to your 1st main weekly shopping till receipt *(please write your name on the receipt)

If you have any queries, please phone me on 01248 751784 or email on
Pauline.Rigby@AngleseyLHB.wales.nhs.uk

Many thanks for agreeing to take part

£50 Prize draw *to enter,* **complete the questionnaires and provide 4 receipts**

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BANGOR

Traffic Lights

Guideline daily amounts

Labeli Bwyd

Pauline Rigby ydw i, dietegydd NHS. Rydw i'n gwneud ymchwil ym Mhrifysgol Bangor, i geisio deall sut mae pobl yn darllen ac yn deall gwybodaeth am faeth ar labeli bwyd. Y nod yw helpu pobl i ddeall y labeli, fel y bydd yn haws iddyn nhw ddeall beth maen nhw'n ei brynu.

Rydw i'n chwilio am wirfoddolwyr i lenwi dau holiadur byr ac i roi derbynneb til o'ch prif drip siopa wythnosol bedair gwaith.

Byddwch yn cael gwybodaeth i'ch helpu i ddeall y wybodaeth ar y labeli bwyd yn well.

Byddwn yn ddiolchgar iawn pe baech yn gallu helpu, mae'n bwysig eich bod yn siopa yn y ffordd arferol, ac nad ydych yn newid i brynu'r hyn rydych chi'n credu byddwn i'n dymuno, rydw innau hefyd yn prynu creision ac ati!

Hoffwn i ofyn i chi wneud eich prif drip siopa wythnosol *yn yr un gadwyn o archfarchnadoedd* am bob un o'r 4 trip siopa; gallwch fynd i gangen wahanol os dymunwch

Ym mha archfarchnad yr ydych yn siopa am y rhan fwyaf o'ch bwyd?

Asda **Co-op** **Lidl** **Somerfield** **Morrison** **Tesco** Arall_______________
(rhowch gylch o gwmpas un) *(nodwch)*

Y nod yw darganfod beth sy'n helpu pobl fwyaf
felly dim ond siopa go iawn sy'n gallu dweud wrthyf
beth allai eich helpu chi ac eraill. Dydy hyn ddim yn brawf!

Bydd y wybodaeth a rowch yn cael ei chadw'n gyfrinachol ac ni chaiff ei rhoi i neb arall.

Rydw i'n cytuno i roi 4 derbynneb til a llenwi dau holiadur:

Enw ____________________ Llofnod ____________________

Rhif ffôn ____________________ Cyfeiriad ____________________

E-bost ____________________ Cod Post ____________________

Rhowch y ffurflen hon wedi ei llenwi yn y blwch wedi ei farcio "Arolwg Labeli Bwyd" yn y cyntedd gyda'r dderbynneb til o'ch prif drip siopa wythnosol ***(ysgrifennwch eich enw ar y dderbynneb)***

Diolch yn fawr am gytuno i gymryd rhan

Bydd *pawb* sy'n llenwi'r holiaduron ac yn rhoi 4 derbynneb yn cael eu henwau wedi eu rhoi yn yr het a

wobr o £50

Traffic Lights

BANGOR

Food Labelling

Guideline daily amounts

Study 3 Q1

Do you understand nutrition information on food labels? Number [ ] [1] [2]

Thank you very much for agreeing to take part

Your contribution to this study is essential to develop useful information

1. **Before** your next main weekly shopping trip, please use the labelling information provided reading the nutrition labels when shopping, to help you understand food labels more.
2. **After,** please send the 3 till receipts from your normal main weekly shopping or longer e.g. fortnightly, if that is normal for you in the envelope provided, together with this form.

It would be helpful if you could provide a few details about yourself and your family

Male [ ] **Female** [ ] **Age** [ ] **Number in household** [ ]
(Please tick)

Ethnicity: White Black Asian Chinese Other ____________
*(Please circle **one**)* *(please state)*

What are the ages and gender of your children? (e.g. Boys 5 & 12, Girl 7)____________

Please describe your weight Underweight About right Slightly overweight Very overweight
*(Please circle **one**)*

Education achieved Early school leaver GCSE or O level A level/s Degree
*(Please circle **one**)*

Occupation____________

Which supermarket do you shop at most often?

Asda Co-op Lidl Somerfield Morrison Tesco Other____________
*(please circle **one**)* *(please state)*

Do you read food labels? Never Always Sometimes
*(Please circle **one** word)*

If never why not?____________

If yes - What do you look for? Calories Fat Sugar Salt Vegetarian
*(please circle **all** which apply*

use by "e" numbers Ingredients nuts other (*Please state)*____________

Thank you for your help

£50 Prize draw ***all*** **that complete the questionnaires and provide** ***4*** **receipts will be entered**

The FREEPOST address is very short, but it is correct

YT
FREEPOST
AWARD

A110

Goleuadau traffig

BANGOR

Labelu Bwyd

Canllawiau cyfeintiau dyddiol

Astudiaeth 3 C1

Ydych chi'n deall gwybodaeth maeth ar labeli bwyd? Rhif ☐ ☐1 ☐2

Diolch yn fawr iawn am gytuno i gymryd rhan

Mae eich cyfraniad yn hanfodol i ddatblygu gwybodaeth ddefnyddiol

Byddai o gymorth os gallech ddarparu ychydig o fanylion am eich hun a'ch teulu

Gwryw ☐ **Benyw** ☐ **Oed** ☐ **Nifer yn y tŷ** ______________________
(Rhowch ✓)

Ethnigrwydd: Gwyn Du Asiaidd Tsieineaidd Arall ________________
*(rhowch gylch o gwmpas **un**)* *(nodwch os gwelwch yn dda)*

Beth yw oed eich plant ac a ydyn nhw'n ferched neu'n fechgyn? (e.e. Bechgyn 5 & 12, Merch 7)________

Disgrifiwch eich pwysau Rhy denau O gwmpas y pwysau iawn
*(rhowch gylch o gwmpas **un**)* Ychydig dros bwysau Ymhell dros bwysau

Safon addysgol Wedi gadael ysgol yn gynnar TGAU neu lefel O Lefel A Gradd
*(rhowch gylch o gwmpas **un**)*

Gwaith____

Ym mha archfarchnad byddwch yn siopa amlaf?

Asda Co-op Lidl Somerfield Morrison Tesco Arall________________
*(rhowch gylch o gwmpas **un**)* *(nodwch os gwelwch yn dda)*

Fyddwch chi'n darllen labeli bwyd? Byth Bob amser Weithiau
*(rhowch gylch o gwmpas **un** gair)*

Os na fyddwch pam ddim?____

Os byddwch - Am beth rydych yn chwilio? Caloriau Braster Siwgr Halen Llysfwytäwr
*(rhowch gylch o gwmpas **pob un** sy'n berthnasol)*

defnyddiwch erbyn rhifau "e" cynhwysion cnau arall
*(Nodwch os gwelwch yn dda)*__________________

1. **Cyn** eich prif daith siopa nesaf, defnyddiwch yr wybodaeth labelu ar gael trwy ddarllen y labeli maeth pan fyddwch yn siopa, i'ch helpu i ddeall labeli bwyd yn fwy.
2. **Yna**, anfonwch 3 derbynneb til o'ch prif daith siopa wythnosol arferol neu fwy, e.e. bob pythefnos, os yw hynny'n arferol i chi yn yr amlen a ddarparwyd, ynghyd â'r ffurflen hon.

Diolch am eich cymorth

Bydd *pawb* sy'n llenwi'r holiaduron ac yn rhoi 4 derbynneb yn cael eu henwau wedi eu rhoi yn yr het a

wobr o £50

Mae'r cyfeiriad RHADBOST yn fyr iawn, ond mae'n gywir

YT
AWARD
FREEPOST

Number [ ] [1] [2]

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Food Labelling

	*(please circle **one**)*	
Since you had the first questionnaire, have you read labels more?	Yes	No
Are you confused by labels?	Yes	No
Do you look at the new labels, traffic lights, Guideline etc?	Yes	No

Which have you noticed **most**
*(please circle **one**)*

Traffic lights

or

(Guideline Daily Amounts %)

Please describe anything about the new labels which helps you understand what is in food more

....

Which part or parts of labels do you find confusing?______________________________

On food labels which parts ***don't*** you understand? *(Please circle **all** that apply)*

kcals   kjoules   Carbohydrates   of which sugars   100g

Traffic lights   Guideline daily amounts   Sodium   Salt   Fats   of which saturates   Fibre

Do you know many calories do you think you should have a day? *(Please circle **one** number)*

500   1000   1500   2000   2500   3000   4000   5000

Do you know the daily max. guideline for salt intake?   Don't know   10g   6g   1.5g   0.5g

Which items have you **changed**?
*(please circle **all** that apply)*

Calories   Fat   Saturated fat   Protein   Salt

Carbohydrate   Sugar   Additives   e numbers   Fibre

Other ____

Do you understand labels now?   Yes   No   Partly   *(Please circle **one**)*

Which information did you find most useful?

Nutrition and labelling booklet	[ ]
"What's in it for you" card	[ ]
Neither	[ ]

Which part was most useful.......................................

Which part was least useful.......................................

Do you think manufacturers should print labels in Welsh? *(Please circle)*   Yes   No

Would you like any more information, if so what?____

Would you like a copy of the results? *(Please circle)*   No   Yes   in English   or   Welsh

***all* completed the questionnaires and *4* receipts will be entered in the**

£50 *Prize draw*

Thank you

Please return by July 2007

Astudiaeth 3

Rhif [ ] 1 [ ] 2 [ ] arfarchnad

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BANGOR

Labeli Bwyd

Ers I chi ateb ye holiadur cyntaf, ydych wedi darllen labeli'n fwy? *(rhowch gylch o gwmpas un)* Ydw Nac Ydw

Ydych chi'n cael anhawster i'w deall? Ydw Nac Ydw

Ydych chi'n edrych ar y labeli newydd, y goleuadau traffig, arwyddbyst etc.? Ydw Nac Ydw Nc

Ar beth rydych chi wedi sylwi fwyaf? *(rhowch gylch o gwmpas un)* Goleuadau traffig neu Arwyddbyst

Disgrifiwch unrhywbeth ymwneud ar labeli newydd sy'n helpi chi deall mwy amdano bwyd?

....

Pa rhan neu rannau o'r labeli sy'n anodd eu deall?________________________

Ar labeli bwyd pa rannau NAD ydych yn deall? *(rhowch gylch o gwmpas pob un sy'n berthnasol)*

kcals kjoules Carbohydrates of which sugars 100g Traffic lights

Guideline daily amounts Sodium Salt Fats of which saturates Fibre

Ydych chi'n gwybod faint o galoriau dylech eu bwyta mewn diwrnod? *(rhowch gylch o gwmpas un rhif)*

500 1000 1500 2000 2500 3000 4000 5000

Ydych chi'n gwybod beth yw canllawiau ar gyfer yr uchafswm halen dylech eu fwyta bob dydd?

(rhowch gylch o gwmpas un) Ddim yn Gwybod 10g 6g 1.5g 0.5g

Pa rannau yr ydych wedi eu newid? *(rhowch gylch o gwmpas pob un sy'n berthnasolun)*

Calories Fat Saturated fat Protein Salt

Carbohydrate Sugar Additives e numbers Fibre

Arall___________________________________

Ydych chi'n deall labeli bwyd erbyn hyn? *(rhowch gylch o gwmpas un)* Ydw Nac Ydw Yn Rhannol

Pa wybodaeth oedd y mwya ddefnyddiol?

Nutrition and labelling booklet [ ]

"What's in it for you" card [ ]

Dim un ohonyn nhw [ ]

Pa rhan oed y mwya ddefnyddiol?..

Pa rhan oed y lleia ddefnyddiol?..

Ydych chi'n meddwl y dylai cynhyrchwyr argraffu labeli yn Gymraeg? *(rhowch gylch)* Ydw / Nac Ydw

Hoffech chi gael rhagor o wybodaeth, ac os felly, beth?___________________________

Hoffech chi gael copi o'r canlyniadau? *(rhowch gylch o gwmpas un)* Byddwn / Na Gymraeg neu Saesneg

---

Peidiwch ag anghofio, Pawb sy'n llenwi'r holiadur ac yn rhoi 4 derbynneb til yn cael eu henwau wedi rhoi mewn het am

wobr o £50.

Diolch yn Fawr

Food for thought

What's in it for you?

Understanding Food Labels

Abbreviations found on labels	
Energy – Cals = Kcals (K=Kilo) = Calories	
Kj = Kilo Joules	1 cal = 4kj
Carbohydrate - CHO = total starch & sugar	
of which Sugars = sugars only	
Fats (see over) Saturated = Hard fats	
MUFA= Monounsaturated PUFA=Polyunsaturated	
Salt /Sodium NaCl=Salt Na=Sodium	
Calcium=Ca > =More than < =Less than	
Iron = Fe	Fe = 10-15mg per day

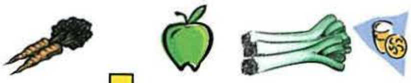
RDA = Recommended Daily Allowance
DRV = UK Dietary Reference Values 1991

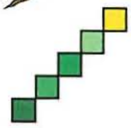
Typical values on labels	High This is a lot per 100g	Low This is a little per 100g
Sugars The **sugars** part of carbohydrates	10g	2g
Fat	20g	3g
Saturated fat	5g	1g
Fibre higher is better	3g	0.5g
Sodium (Na)	**0.5g**	**0.1g**
Salt (NaCl)	1.5g	0.3g
Divide salt by 3 for sodium		
Multiply Sodium by 3 for salt - salt is Sodium Chloride		

Dietary targets Per day	Guide for men Maintain weight	Loose weight
Energy kCals	**2500**	**1800**
Carbohydrate grams	300	225
Protein grams	95	70
Fat grams	90	70
of which saturates this is part of the total Fat	30	20
Fibre (more is better)	20g per day	
Calcium	700mg per day	
Sodium	**2.4g** or less	
Salt **Maximum**	**6g** or less	

Dietary targets Per day	Guide for women Maintain weight	Loose weight
Energy kCals	**2000**	**1500**
Carbohydrate grams	250	180
Protein grams	75	55
Fat grams	75	55
of which saturates	25	15
Fibre (more is better)	18g per day	
Calcium	700mg per day	
Sodium	**2.0g** or less	
Salt **Maximum**	**5g** or less	

Calcium (Ca) 700mg If pregnant800 – 1000 mg
if breast feeding **1200 mg Calcium daily**





Fat = 9 calories per gram
CHO = 4 calories per gram
Protein = 4 calories per gram
Alcohol = 7 calories per gram

To lose weight
1800 calories a day for men
1500 calories a day for women

Alcohol max units **Men 3** **Women 2**

1 unit = 9g Alcohol

	Units as served per Pub measure		KCalories per pub measure
Bitter Beer	2 per pint	1pint 550ml	170 per pint
Strong Beer or Lager 6%	3 per pint	1pint 550ml	300 per pint
Lager 4%	2 per pint	1pint 550ml	175 per pint
Wine 12%	1per glass	100ml	70 cals
Spirits 40%	1 per glass	25ml	55 cals
Sherry/Port 20% Alcohol	1 per glass	50ml	70 cals + mixer's cals
Alcopops 5.5% Alcohol	1.5 per bottle	½ pint 275ml	107 per bottle

Fats All fats are high in calories
to lose weight cut down on fats to cut calories

LDL Cholesterol (**L**ethal) LDL builds up fat in the arteries **we want to lower LDL** cholesterol

HDL Cholesterol (**H**ealthy) HDL Collects excess cholesterol and excretes it **we want to increase HDL**

Recommended intake – fat/day	Men	Women
Total fat intake <35% of energy	**95g**	**70g**
Saturated fats <11% of energy	**30g**	**20g**

Saturated fats ***raise*** the **LDL (bad)** cholesterol
These are found in hard animal fats, eg. on meat, lard, dripping, butter, full fat milk, cream and cheese
Avoid hidden **saturated** fats in pastries, pork pies etc

Mono**U**nsaturated **F**atty **A**cids **MUFA**
13% of energy, these are best, olive and rapeseed oil
Monounsaturated fats leave HDL alone- good
Use spreads made from olive oil

Poly**U**nsaturated **F**atty **A**cids **PUFA**
Polyunsaturated lower *both* **LDL and HDL**
PUFAs should provide 6.5% of our energy, these are ok eg. Corn oil, Sunflower oil and spreads eg. Flora

Trans Fatty Acids should be <2% of our energy
Trans fats and **hydrogenated fats** act like **saturated** fats therefore they are **BAD**

5 a day fruit and vegetable portions choose 5 different items from the following:

1 medium apple or 1 pear or 1 orange
2 smaller fruit, e.g. plums, kiwi
a small handful of grapes or cherries etc
a small bowl of salad
3 spoons of vegetables, fresh or frozen
a small tin of baked beans
a glass of 100% fruit juice

E Number	Type of Additive: Natural or Nature identical colours:
E100	Curcumin (yellow)
E101	Riboflavin (yellow)
E120	Cochineal (red)
E140	Chlorophyll (green)
E150a	Plain Caramel (brown/black)
E160a	Alpha-, beta,- and gamma carotene (yellow/orange)
E160b	Annatto (yellow/red)
E160c	Capsanthin (paprika extract)(red/orange)
E160d	Lycopene (red extract from tomatoes)
E162	Beetroot red (betanin) (purple red)
E163	Anthocyanins (red/blue/violet)

	Type of additive: Synthetic colours: AZO dyes.
E102	Tartrazine (yellow) Azo dye
E104	Quinoline (yellow) Azo dye
E110	Sunset yellow FCF or Orange Yellow Azo dye
E122	Carmosine (Azorubine) (red) Azo dye
E123	Amaranth (purple red) Azo dye
E124	Ponceau 4R (Red) Azo dye
E127	Erythrosine (pink/red) Azo dye
E128	Red 2G Azo dye
E129	Allura Red AC Azo dye
E132	Indigo Carmine (Indigotine) (blue) Azo dye
E142	Green S Azo dye
E150b-d	Caustic sulphite caramel, ammonia caramel, sulphite ammonia caramel (brown/black)
E151	Brilliant Black PN or Black PN Azo dye
E154	Brown FK Azo dye
E155	Brown HT Azo dye
E180	Litholrubine BK (Pigment Rubine or Rubine) Azo dye

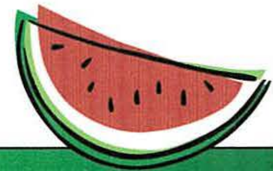
	Type of additive: natural Preservatives
E260 – E263	Acetic acid (vinegar) and acetates
E270	Lactic acid (from milk)
E280-E283	Proprionic acid and proprionates
E300	Ascorbic acid (vitamin C)
E301-E304	Ascorbates and Ascorbyl palmitate
E200	Sorbic acid
E201-E203	Sodium, potassium and calcium sorbates

Preservatives which can exacerbate asthma and urticaria in some people:

E210	Benzoic acid
E211-E213	Sodium, potassium and calcium Benzoates
E221	Sodium benzoate
E212	Potassium benzoate
E213	Calcium benzoate

E214 Ethyl 4-hydroxybenzoate (ethyl para-hydroxybenzoate
E215 Ethyl 4-hydroxybenzoate, sodium salt (sodium ethyl para-hydroxybenzoate)
E216 Propyl 4-hydroxybenzoate, (propyl para-hydroxybenzoate)
E217 Propyl 4-hydroxybenzoate, sodium salt (sodium propyl para-hydroxybenzoate)
E218 Methyl 4-hydroxybenzoate, (methyl para-hydroxybenzoate)
E219 Methyl 4-hydroxybenzoate, sodium salt (sodium methyl para-hydroxybenzoate)

This list is not comprehensive, there are more natural preservative e numbers
Ask a Dietitian for more information



What's in it for you?

Food and Food labels - an explanation

TRAFFIC LIGHTS LABELS

LOW FAT	LOW SAT FAT	HIGH SUGAR	MED SALT
7.7g Per serve	2.0g Per serve	42.2g Per serve	2.0g Per serve

Calories

Carbohydrate

Protein

Fats

Salt

Fibre

Additives

Use by

Sell by

Pauline M Rigby RD © 2007

Calories	Sugar	Fat	Saturates	Salt
256	3.1g	4.8g	1.4g	1.1g
13%	3%	7%	7%	18%

GUIDELINE DAILY AMOUNTS LABELS

Appendix 8.9

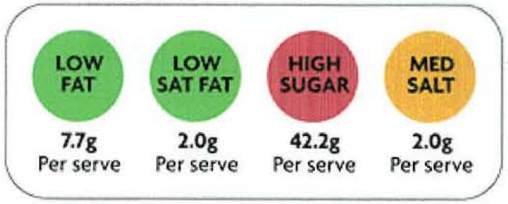
New types of labelling

The Food Standards Agency is introducing a "Traffic lights" labelling system

Red - stop, eat small amounts, this food is high in sugar, fat or salt-less healthy

Amber meaning eat medium amounts, this food is an OK choice

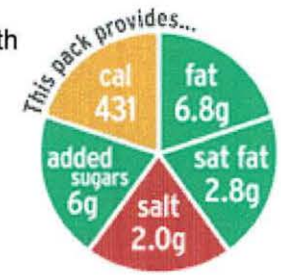
Green for go ahead, this food is low in fat, saturated fat, sugar and/or salt, you can eat plenty of these foods, these are the healthier choice



This food is high in sugar, medium in salt but low in fats

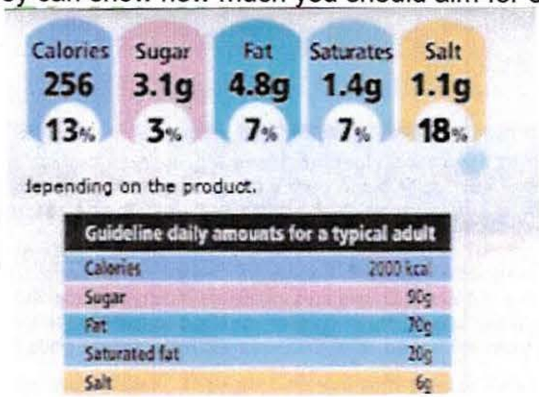
Sainsbury have adopted the same "Traffic lights" colour guide for their

"Wheel of Health



Guideline daily amounts

Tesco with other food manufacturers have produced a label showing how much of your daily needs are provided, by a serving of the product, as a percentage. They can show how much you should aim for each day.



Why should we eat more fruit and vegetables? – Because they contain,

Phytochemicals and antioxidants in fruit and vegetables, they have beneficial effects, they help to protect against diseases such as heart disease and cancer, raw fruits, vegetables and salads may give the most protection.

Vitamin A	Is essential for healthy skin, retina and cornea
Carotenes	We need these for growth and development
Vitamin Bs	Are involved in energy release
Vitamin C	We need this for healthy skin and tissue and absorption of iron
Vitamin D	helps to control calcium and store it in bones
Vitamin E	prevents damage – prevents fatty build up in cells
Vitamin K	is essential for normal blood clotting
Folate	We need this for red blood cells Folic acid supplements for those planning pregnancy (400µg a day)

Try to have 5 a day, for example; a glass of pure fruit juice, a banana
Vegetable soup, 5 dried apricots and a portion of veg or salad
That's 5 and if you have more that's even better!

Fresh, frozen, tinned and dried fruit and veg all count.
So do 100% pure fruit juices and baked beans.
It is important to have a variety and try different colours, not 5 of the same item

Alcohol – have some alcohol free days

Sensible drinking, maximum 3 units daily for men and 2 units for women. A unit is a small glass of wine or 25 ml spirits (standard pub measure) or ½ pint beer

Statements on labels

"Use by" Date. This is on highly perishable foods such as dairy products, meat or fish, both cooked and raw. After the date shown, you should assume the food is no longer safe to eat.

"Best before" is for foods with a long shelf life, months or years, such as biscuits, rice, pasta or canned foods. After this date, the food may taste less fresh but it will not necessarily be unsafe to eat.

"Sell by" is a guide for the vendor, on short shelf life foods, such as bags of salad.

Nutrition claims, eg. "Low fat" currently legislation only applies to the following:

Reduced calories or low energy	Source or rich source of protein
Sources of vitamins or minerals	Cholesterol free

Protein

Most people in the UK get enough protein from their food so it is not always printed on labels. 2 to 3 average sized portions of meat, fish, or alternatives daily, such as beans and pulses will give you enough protein. Other sources of protein are milk, yogurt, eggs, nuts, cheese and also in bread and cereals.

Fibre

Fibre is often called "roughage", it is only found in plant foods such as cereals, grains, seeds, peas, beans, vegetables and fruit, wholegrain or granary bread, wholegrain pasta, oats, oat and bran based breakfast cereals, nuts, brown rice, The scientific term is Non Starch Polysaccharides (NSP).

We need about 18g of fibre a day but 24g will become the figure as the method of measuring fibre is changing.

Soluble fibre helps to reduce LDL cholesterol and fat absorption
Fibre prevents constipation by increasing bulk and speeds passage through the colon (large intestine), this may help to reduce bowel cancer and diverticulitis.

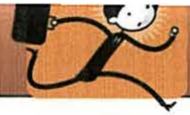
More is better!	Better	low
Fibre per 100g of a food	**3g**	**0.5g**

Additives

Food additives are governed by a number of Food Regulation Acts. Labels have to state the category name of the function e.g. preservative, followed by the name, e.g. sulphur dioxide or E number e.g.E220. If an additive has more than one function, the name describing its main function must be used

E numbers are used for both natural additives such as vinegar (Acetic Acid) E260 and artificial additives such as Acesulfame potassium (Acesulfame K) E950. There is no obvious order to the numbering and natural or artificial additives If there is a specific substance you are allergic to, it is best to find out its specific e number, rather than avoid them all.

Calories



Energy in food is measured in kilo calories or kilo joules, a measure of heat. Written as Kcal or kJ on food labels. 1 calorie is the amount of energy (or heat) required to raise 1 cubic centimetre of water 1° centigrade. 1 calorie = 4 joules

The amounts of energy from the main types of nutrients are:

Carbohydrate:	4 kcal per gram or 16 kJ
Protein:	4 kcal per gram or 17 kJ
Fat:	9 kcal per gram or 37 kJ
Alcohol:	7 kcal per gram or 29 kJ

We need enough calories to keep our bodies "ticking over" plus calories for all activities. **If we eat more calories than we need, the body stores this energy as fat. The more energetic the exercise, the more calories we use.**

An average adult man needs 2500 kcal per day and a woman 2000 kcal. This will vary with activity and size. To lose weight eat 500 kcal less a day

Carbohydrate

Carbohydrates are made up of starches and sugars giving 4 calories a gram

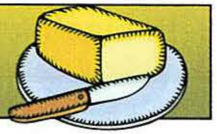
We need to eat more starch and less sugar. When there is a separate figure for sugars, you can work out whether the carbohydrates are mostly starch or mostly sugar. Below is part of a food label from a slice of bread, it is mainly starch: 40g per 100 g or 40%, part *of which* is sugar = 4g per 100g or 4% making it a low to medium sugar food.

	Per 100g	Per portion
Carbohydrate	**40g**	**15g**
of which Sugars	**4g**	**1.5g**

A lot	A little
Hi sugar	Low sugar
10g	**2g**

Carbohydrates should provide 50% of your energy, or calories. If you are eating 2000 calories a day 50% is 1000 calories @ 4 calories per gram = 250g carbohydrate. **It is the fats we add to Carbohydrates, such as butter, which are fattening, not the carbohydrates.**

Fats



There are 2 main types of fats, saturated and unsaturated. Fats can be obvious and visible – fat on meat, spreads, butter and oils and invisible hidden fats, used in cooking, pastries, cakes, crisps, mayonnaise etc.

Saturated fats tend to be hard and waxy, like lard, cheese and butter, this is the type of fat, which raises blood cholesterol, increasing your risk of a heart attack. These are mainly from animal sources. On labels the total fat is stated also the amount *of this total fat* which is unsaturated.
Trans fats and Hydrogenated fats act like saturated fats.

Unsaturated fats**,** Monounsaturates and Polynsaturates are generally liquid at room temperature, like olive or rapeseed oil and spreads made from them tend to be softer like spreads made from sunflower oil. They are mainly from plant sources These have a good effect on cholesterol used instead of saturated fats.

Fats give 9 calories per gram, so fats are a very concentrated source of calories, keep them to a minimum

This table shows how much fat is in a high fat and low fat food:

	A lot	A little
TOTAL Fats per 100g	**20g**	**3g**
of which saturated	**5g**	**1g**

Part of a food label showing how much fat is in 100g

Fat – TOTAL	**60g**
of which saturated	**20g**

The item above is 60g per 100g = 60% fat, of which 20g is **saturated**

2 types of essential fatty acids must be supplied from food in small amounts:

Omega-3, found in oily fish, nuts, rapeseed and soya oil

Omega-6, found in vegetable oils, sunflower, corn and soya oil and spreads made from them.

Both these have vital health giving properties but too much is not beneficial Changing from butter to moderate amounts of olive oil spread can help.

Sodium and Salt

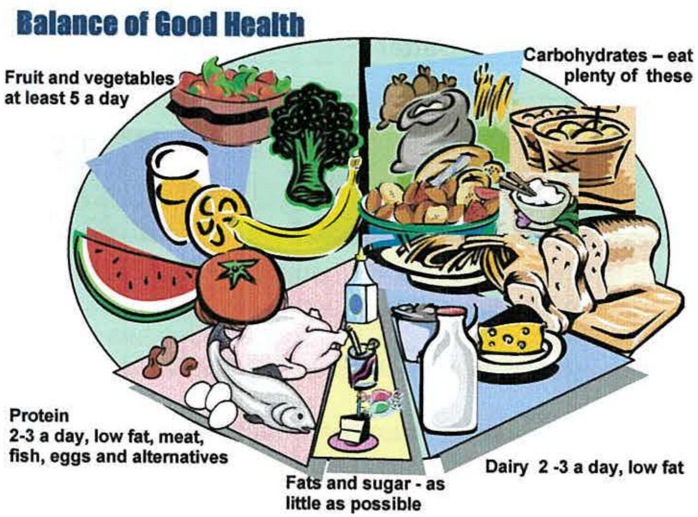
Salt is **Sodium Chloride**, **Sodium** is vital in regulating fluid balance and blood pressure in the body, too much **Sodium** can raise blood pressure.
We need less than 6g a day of Salt or 2.5g Sodium.!

Sodium is shown on labels, because Sodium is also present as Bicarbonate of Soda and Monosodium Glutamate but some labels give salt content as well.

Per 100g	**This is a lot**	**This is a little**
Sodium (Na)	**0.5g**	**0.1g**
Salt (NaCl)	1.5g	0.3g
Divide salt by 3 for **Sodium**		
Multiply Sodium by 3 for Salt	salt = **Sodium Chloride**	

British eat about 9g salt a day (about 2 teaspoons). About two thirds of this is added by manufacturers in processed foods, of the remaining third about half is added in cooking or on the plate and the remainder occurs naturally in food.

Salt substitutes still contain salt and sea salt has the same amount of Sodium as table salt. It is Sodium that can raise blood pressure.



E Rhif	Math o Ychwanegolyn: Lliwiau Naturiol neu'r un lliw â natur:
E100	Curcumin (melyn)
E101	Riboflavin (melyn)
E120	Cochineal (coch)
E140	Chlorophyll (gwyrdd)
E150a	Caramel plaen (brown/du)
E160a	Alpha-, beta,- a gamma carotene (melyn/oren)
E160b	Annatto (melyn/brown)
E160c	Capsanthin (paprika extract)(coch/oren)
E160d	Lycopene (extract Coch o domatos)
E162	Beetroot coch (betanin) (piws coch)
E163	Anthocyanins (coch/glas/fioled)

	Math o Ychwanegolyn: lliwiau synthetig: lliwiau AZO.
E102	Tartarzine (melyn) lliw Azo
E104	Quinoline (melyn) lliw Azo
E110	Melyn yr Haul FCF neu Felyn Oren lliw Azo
E122	Carmosine (Azorubine) (coch) lliw Azo
E123	Amaranth (piws coch) lliw Azo
E124	Ponceau 4R (coch) lliw Azo
E127	Erythrosine (pinc/coch) lliw Azo
E128	Red 2G lliw Azo
E129	Allura Red AC lliw Azo
E132	Indigo Carmine (Indigotine) (glas) lliw Azo
E142	Gwyrdd S lliw Azo
E150b-d	Caustic sulphite caramel, ammonia caramel, sulphite ammonia caramel (brown/du)
E151	Brilliant Black PN neu Ddu PN lliw Azo
E154	Brown FK lliw Azo
E155	Brown HT lliw Azo
E180	Litholrubine BK (Pigment Rubine neu Rubine) lliw Azo

	Math o ychwanegolyn: amddiffynwyr naturiol
E260 – E263	Asetic asid (finegr) ac asetadau
E270	Lactic asid (o lefrith)
E280-E283	Proprionic asid a proprionates
E300	Ascorbic asid (fitamin C)
E301-E304	Ascorbates a Ascorbyl palmitate
E200	Sorbic asid
E201-E203	Sodium, potassium a calcium sorbates

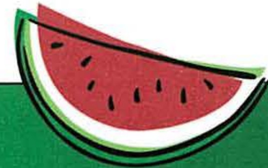
Amddiffynwyr a all gynhyrfu asthma ac wrticaria mewn rhai pobl:

E210	Benzoic asid
E211-E213	Sodium, potassium a calcium Benzoates
E221	Sodium benzoate
E212	Potassium benzoate
E213	Calcium benzoate

E214 Ethyl 4-hydroxybenzoate (ethyl para-hydroxybenzoate
E215 Ethyl 4-hydroxybenzoate, sodiwm halen (sodiwm ethyl para-hydroxybenzoate)
E216 Propyl 4-hydroxybenzoate, (propyl para-hydroxybenzoate)
E217 Propyl 4-hydroxybenzoate, sodiwm halen (sodiwm propyl para-hydroxybenzoate)
E218 Methyl 4-hydroxybenzoate, (methyl para-hydroxybenzoate)
E219 Methyl 4-hydroxybenzoate, sodium salt (sodium methyl para-hydroxybenzoate)

Nid yw'r rhestr hon yn gynhwysfawr, mae mwy o rifau e amddiffynnol
Gofynnwch i ddietegydd am wybodaeth bellach

Beth mae'n ei olygu i chi?



Bwyd a labeli bwyd - eglurhad

Labeli goleuadau traffig

7.7g fesul cyfran	2.0g fesul cyfran	42.2g fesul cyfran	2.0g fesul cyfran

Caloriau

Carbohydrad

Protin

Braster

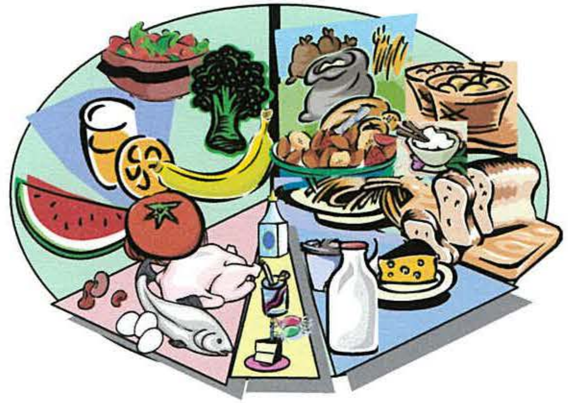
Halen

Ffibr

Ychwanegolion

Defnyddio erbyn

Gwerthu erbyn



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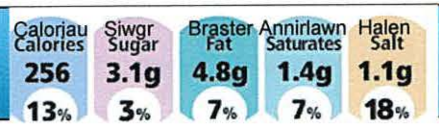


Canllaw labelu cyfaint dyddiol

Appendix 8.10

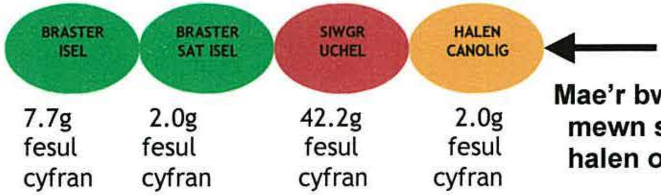
Mathau newydd o labelu

Mae'r Asiantaeth Safonau Bwyd yn cyflwyno system labelu "Goleuadau Traffig"

Coch – stopiwch, bwytewch gyfeintiau bach, mae'r bwyd yma'n uchel mewn siwgr, braster neu halen.

Oren yn golygu cymedrol, bwyta cyfeintiau canolig, mae'r bwyd hwn yn ddewis IAWN

Gwyrdd ewch ymlaen, mae'r bwyd yma'n isel mewn braster, braster dirlawn a/neu halen, gallwch fwyta digon o'r bwydydd hyn, dyma'r dewis iachach



Mae'r bwyd hwn yn uchel mewn siwgr, canolig mewn halen ond isel mewn braster

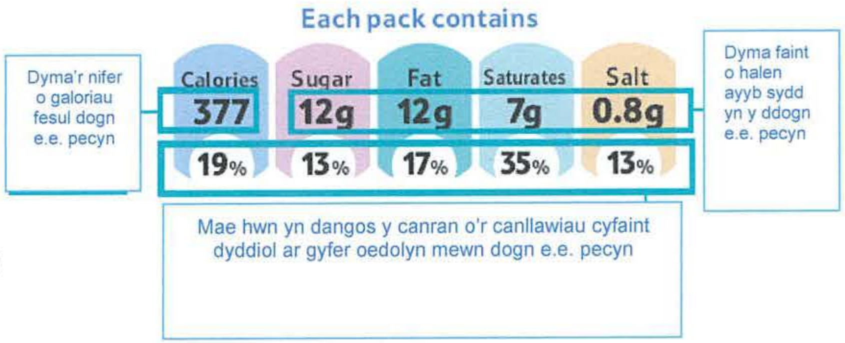
Mae Sainsbury wedi mabwysiadu'r un canllaw "Goleuadau traffig" ar gyfer

"Olwyn Iechyd"

"Mae'r pecyn hwn yn cynnig…."

Canllaw labelu cyfaint dyddiol

Tesco gyda chynhyrchwyr bwyd eraill wedi cynhyrchu label yn dangos faint o'ch anghenion dyddiol a ddarperir, trwy weini'r cynnyrch, fel canran. Maent yn dangos faint y dylid anelu ato bob dydd hefyd.



Ffytocemegau a gwrthocsidau mewn ffrwythau a llysiau, mae ganddynt effeithiau buddiol, maent yn helpu i amddiffyn yn erbyn afiechydon fel clefyd y galon a chanser, ffrwythau amrwd, llysiau a saladau i gynnig yr amddiffyniad mwyaf.

Fitamin C	Rydym angen hwn ar gyfer croen a meinwe iach ac mae'n helpu i amsugno haearn
Carotenes	Rydym angen y rhain ar gyfer twf a datblygiad
Folate	Rydym angen hwn ar gyfer celloedd gwaed coch Atodion asid ffolig i'r sawl sy'n cynllunio beichiogrwydd (400µg y dydd)

Ceisiwch gael 5 y dydd, er enghraifft; gwydraid o sudd ffrwythau, banana, cawl llysiau, 5 bricyll a chyfran o lysiau neu salad
Dyna 5 ac os ydych yn cael mwy, mae hynny'n well fyth!

Mae ffrwythau a llysiau ffres, wedi rhewi, tun a sych i gyd yn cyfrif a 100% o sudd ffrwythau ffres a ffa pob.
Mae'n bwysig cael amrywiaeth, nid 5 o'r un peth

Alcohol - gwnewch yn siŵr eich bod yn cael dyddiau di-alcohol
Yfed synhwyrol, mwyafswm o 3 uned y dydd i ddynion a 2 uned i ferched. Mae uned yn wydraid bach o win neu 25 ml o wirodydd (mesur safonol mewn tafarn) neu ½ peint o gw

Datganiadau ar labeli

Dyddiad "Defnyddio erbyn". Bwyd hynod ddarfodus fel cynnyrch llaeth, cig neu bysgod, wedi'i goginio ac amrwd. Dylech dybio nad yw'r bwyd bellach yn ddiogel i'w fwyta ar ôl y dyddiad a ddangosir.

"Gwell cyn" ar gyfer bwydydd oes silff hir, misoedd neu flynyddoedd, fel bisgedi, reis, pasta neu fwyd tun. Ar ôl y dyddiad hwn, gall y bwyd flasu'n llai ffres ond ni fydd yn angenrheidiol yn anniogel i'w fwyta.

"Gwerthu erbyn" yw'r canllaw i'r fendor, ar fwydydd â bywyd silff byr, fel bagiau salad.

Honiadau maeth e.e. "Braster isel" ar hyn o bryd mae deddfwriaeth yn berthnasol i'r canlynol yn unig:

Gostyngiad mewn calorïau neu egni isel	Ffynhonnell neu ffynhonnell dda o brotin
Ffynonellau fitaminau neu fwynau	Heb golesterol

Mae'r rhan fwyaf o bobl yn y D.U. yn cael digon o brotin o'u bwyd felly nid yw'n cael ei argraffu ar labeli bob amser. 2 i 3 cyfran gymedrol o gig, pysgod neu gynnyrch dyddiol fel ffa a ffylsiau yn rhoi digon o brotin. Ffynonellau eraill protin yw llaeth, iogwrt, wyau, cnau, caws a hefyd mewn bara a grawnfwyd.

Mae ffibr yn cael ei alw'n "fras fwyd", mae mewn bwydydd planhigion fel grawnfwyd, graen, hadau, pys, ffa, llysiau a ffrwythau, bara grawn cyflawn neu graneri, pasta grawn cyflawn, ceirch, grawnfwyd brecwast ceirch a bran, cnau, reis brown. Y term gwyddonol yw Polysaccharides Di-Starts(NSP).

Rydym angen tua 18g o ffibr y dydd ond 24g fydd y ffigwr wrth i ddull mesur ffibr newid.

Mae ffibr toddadwy yn helpu i ostwng colesterol LDL ac amsugno braster.
Mae ffibr yn atal rhwymedd trwy gynyddu bwlc ac yn cyflymu'r symud trwy'r colon (coluddyn mawr), gall hyn helpu i ostwng canser y coluddyn a llid y diferticwlwm.

Mae mwy yn well!	Gwell	isel
Ffibr fesul 100g o fwyd	**3g**	**0.5g**

Mae ychwanegion yn cael eu rheoli gan nifer o Ddeddfau Rheoli Bwyd. Mae labeli'n gorfod nodi enw categori'r swyddogaeth e.e. ataliol, gyda'r enw i ddilyn e.e. sulphur dioxide neu rif E e.e.E220. Os bydd ychwanegion yn cynnwys mwy nag un swyddogaeth, mae'n rhaid defnyddio'r enw sy'n disgrifio'r prif swyddogaeth.

Defnyddir rhifau E ar gyfer ychwanegion naturiol ac ychwanegion fel finegr (Asetic Asid) E260 ac ychwanegion artiffisial fel Acesulfame potasiwm (Acesulfame K) E950. Nid oes unrhyw drefn amlwg i'r rhifo ac ychwanegion naturiol neu artiffisial. Os bydd gennych alergedd i sylwedd arbennig, mae'n well canfod y rhif e penodol, yn hytrach na'u hosgoi i gyd.

A121

Mae'r egni mewn bwyd yn cael ei fesur mewn caloríau cilo neu kilo joules, mesur gwres. Ysgrifennir fel Kcal neu kJ ar labeli bwyd. 1 calori o egni (neu wres) sydd ei angen i godi 1 centimedr cwbig o ddŵr 1° centigred. 1 calori = 4 joules

Y cyfaint egni o'r prif fathau o faeth yw:
Carbohydrad: 4 kcal fesul gram neu 16 kJ
Protin: 4 kcal fesul gram neu 17 kJ
Braster: 9 kcal fesul gram neu 37 kJ
Alcohol: 7 kcal fesul gram neu 29 kJ

Rydym angen digon o galoríau i'r corff "weithio" a chaloríau ar gyfer yr holl weithgareddau. **Os byddwn yn bwyta mwy o galoríau nag ydym ei angen, mae'r corff yn ei storio fel braster. Po fwyaf egniol yw'r ymarfer, y mwyaf o galoríau a ddefnyddir.**

Bydd dyn angen 2500 kcal y dydd a merch angen 2000 kcal.
Bydd hyn yn amrywio yn ôl gweithgaredd a maint. I golli pwysau, dylid bwyta 500 kcal yn llai y dydd

Mae Carbohydradau wedi eu gwneud o starts a siwgr gan roi 4 calori fesul gram

Rydym angen bwyta mwy o starts a llai o siwgr. Pan fydd yna ffigwr ar wahân ar gyfer siwgr, gallwch weithio allan a yw'r carbohydradau'n starts yn bennaf neu'n siwgr yn bennaf. Mae'r isod yn rhan o label bwyd o dafell o fara, mae'n starts yn bennaf: 40g fesul 100 g neu 40%, rhan ohono'n *siwgr* = 4g fesul 100g neu 4% sy'n ei wneud yn fwyd melys isel i gymedrol.

	Fesul 100g	Fesul cyfran
Carbohydradau	**40g**	**15g**
yn cynnwys siwgr	**4g**	**1.5g**

Llawer	Ychydig
Uchel mewn siwgr	sel mewn siw
10g	**2g**

Dylai carbohydradau ddarparu 50% o'r egni, neu galoríau. Os byddwch yn bwyta 2000 calori'r ddydd 50% yn 1000 calori @ 4 calori fesul gram = 250g carbohydrad. **Y braster a ychwanegir at garbohydradau, fel menyn, sy'n frasterog, nid y carbohydradau.**

Mae yna 2 brif fath o fraster, dirlawn ac annirlawn. Gall braster fod yn amlwg ac yn weladwy – braster ar gig, haenau, menyn ac olew ac anweladwy mewn braster cuddiedig, a ddefnyddir wrth goginio, pestri, cacennau, creision, mayonnaise ayyb

Mae brasterau dirlawn yn tueddu i fod yn wacsi, fel lard, caws a menyn, dyma'r math o fraster sy'n codi colesterol gwaed, gan gynyddu'r risg o drawiad y galon. Mae'r rhain o ffynonellau anifeiliaid yn bennaf. Ar labeli, nodir y cyfanswm braster hefyd cyfaint *y cyfanswm braster* sy'n annirlawn.
Mae braster trans a hydrogenaidd fel braster dirlawn.

Mae braster annirlawn, monoannirlawn a poliannirlawn yn gyffredinol yn hylif ar dymheredd ystafell, fel olew olewydd neu had rêp ac mae haen o'r rhain yn tueddu i fod yn feddalach fel haen o olew blodyn yr haul. Maent o ffynonellau planhigyn yn bennaf. Mae gan y rhain effaith da ar golesterol yn hytrach na braster dirlawn.

Mae braster yn rhoi 9 calori fesul gram, felly mae braster yn ffynhonnell cryno iawn o galorïau, cadwch hwy i'r lleiafswm

Mae'r tabl hwn yn dangos faint o fraster sydd mewn bwyd braster uchel a braster isel:

	Llawer	Ychydig
CYFANSWM braster fesul 100g	**20g**	**3g**
Dirlawn	**5g**	**1g**

Rhan o label bwyd sy'n dangos faint o fraster sydd mewn 100g

Braster – CYFANSWM	**60g**
Dirlawn	**20g**

Mae'r eitem uchod yn 60g fesul 100g = 60% o fraster, 20g yn **annirlawn**

2 fath o asidau brasterog hanfodol i'w cyflenwi o fwyd mewn cyfaint bach:

Omega-3, mewn pysgod olew, cnau, had rêp ac olew soya

Omega-6, mewn olew llysieuog, blodyn haul, corn ac olew soya a haen a wnaed o'r rhain.

Mae gan y ddau yma nodweddion iechyd hanfodol ond nid yw gormod yn fuddiol
Gall newid o fenyn i gyfaint cymedrol o haen olew olewydd helpu.

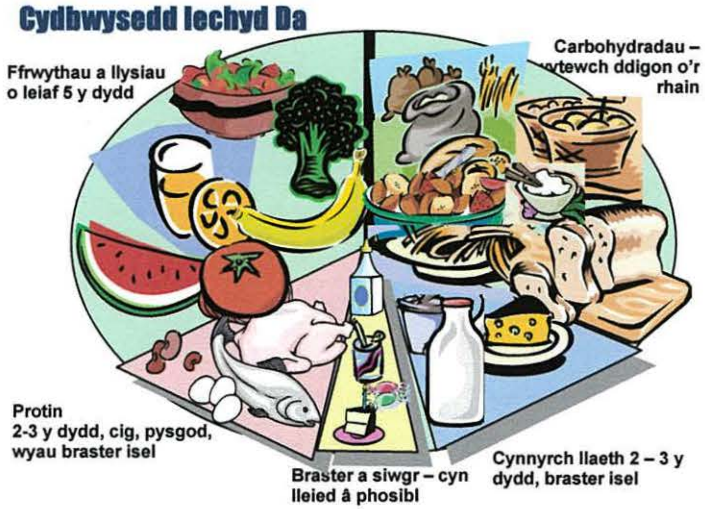
A128

Mae halen yn cynnwys **Sodiwm Clorid**, **Sodiwm** ac yn hanfodol i reoleiddio balans hylif a phwysau gwaed yn y corff, gall gormod o **Sodiwm** gynyddu pwysau gwaed.
Rydym angen llai na 6g y dydd o halen neu 2.5g Sodiwm!

Dangosir Sodiwm ar labeli, gan fod Sodiwm hefyd yn bresennol fel Bicarbonad o Soda a Monosodiwm Glutamate ond mae rhai labeli yn rhoi cynnwys halen hefyd.

Fesul 100g	**Mae hyn yn lawer**	**Mae hyn yn ychydig**
Sodiwm (Na)	**0.5g**	**0.1g**
Halen (Nhacl)	1.5g	0.3g
Rhannu halen gyda 3 ar gyfer **Sodiwm**		
Lluosi Sodiwm gyda 3 ar gyfer Halen	Halen = **Sodiwm Clorid**	

Mae Prydeinwyr yn bwyta tua 9g o halen y dydd (tua 2 lwy de). Mae cynhyrchwyr yn ychwanegu tua dwy ran o dair o hwn mewn bwyd wedi'i brosesu, o'r drydedd rhan sy'n weddill, mae tua hanner yn cael ei ychwanegu wrth goginio neu ar y plât a'r gweddill yn naturiol yn y bwyd. Mae amnewidyn halen yn dal i gynnwys halen ac mae halen y môr yn cynnwys yr un faint o sodiwm â halen bwrdd. Sodiwm sy'n gallu codi pwysau gwaed.



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University of Wa
Bangor
LL57 2AS

Dear

March 2007

I am Pauline Rigby, the Anglesey Calon Lân Dietitian. You may recall that you kindly completed the Calon Lân Lifestyle questionnaire in 2003. Thank you very much for your time, the information we received was very helpful for planning Anglesey's health promotion programme and cardiac rehabilitation service. We are very grateful for your cooperation. I have enclosed a summary of some of the findings.

As a further stage of the survey, I'm doing research at Bangor University. I have found that people find it difficult to understand nutrition information on food labels. This research is trying to find how people read and understand food label nutrition information, it can be very confusing, especially now two new types of labelling are appearing on products. The aim is to help people understand the labels, so that they can understand what they're buying more easily.

If you agree to take part in this further stage, the information you provide will help to develop easy to understand labelling information for use on Anglesey.

I am looking for volunteers to complete 2 short questionnaires and to give your main weekly shopping till receipt 4 times.

Till receipts give an accurate indication of what you and your family eat much more easily than asking you to complete a detailed food diary. I am only interested in key food items. You can cross out any non-food items if you wish. As you are probably aware, the supermarkets collect information about what you buy from your clubcards to analyse shopping trends and manage stock control.

This is not commercial, I work for the NHS, you may be assured of complete confidentiality, if you choose to take part you will be given a unique identification number for mailing purposes only. Your name will not be on the questionnaires and any information you give will remain confidential and will not be passed on to anyone, If you do not wish to take part please ignore this letter.

£50 Prize draw, ***all*** **that complete the questionnaires and provide *4* receipts will be entered**

Thank you for your co-operation

Yours sincerely

Pauline M. Rigby

Pauline M Rigby RD
Calon Lân Dietitian

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Prifysgol Cymru Bangor
Bangor
LL57 2AS

Annwyl

Mawrth 2007

Pauline Rigby wyf i, Dietegydd Calon Lân Ynys Môn. Efallai y cofiwch i chi gwblhau holiadur Ffordd o Fyw Calon Lân yn 2003. Diolch yn fawr iawn i chi am eich amser, roedd yr wybodaeth a dderbyniwyd yn ddefnyddiol iawn i gynllunio rhaglen hybu iechyd Ynys Môn a'r gwasanaeth adsefydliad cardiaidd. Rydym yn ddiolchgar iawn am eich cydweithrediad. Rwyf wedi amgáu crynodeb o rai o'r canfyddiadau.

Fel cam pellach o'r arolwg, rwyn cynnal ymchwil ym Mhrifysgol Bangor. Rwyf wedi canfod fod pobl yn ei chael hi'n anodd deall gwybodaeth maeth ar labeli bwyd. Mae'r ymchwil hwn yn ceisio canfod sut mae pobl yn darllen a deall gwybodaeth maeth ar labeli bwyd, gall fod yn ddryslyd iawn, yn arbennig gan fod dau fath newydd o labelu yn ymddangos ar gynnyrch. Y nod yw helpu pobl ddeall y labeli, fel y gallant ddeall beth maent yn ei brynu'n haws.

Os byddwch yn cytuno i gymryd rhan yn y cam pellach hwn, bydd yr wybodaeth a ddarperir yn helpu i ddatblygu dealltwriaeth o wybodaeth labelu ar gyfer Ynys Môn.

Rwyn chwilio am wirfoddolwyr i gwblhau 2 holiadur byr a chyflwyno'r brif dderbynneb siopa 4 gwaith.

Mae derbynebau til yn rhoi syniad cywir o'r hyn rydych chi a'r teulu'n ei fwyta yn hytrach na gofyn i chi gwblhau dyddiadur bwyd manwl. Mae gennyf ddiddordeb mewn prif eitemau bwyd yn unig. Gallwch groesi unrhyw eitemau eraill allan os dymunwch. Fel y gwyddoch efallai, mae'r archfarchnadoedd yn casglu gwybodaeth am yr hyn rydych yn ei brynu gyda chardiau clwb i ddadansoddi tueddiadau siopa a rheoli stoc.

Nid yw hyn yn fasnachol, rwyn gweithio i'r GIG, gallaf eich sicrhau ei fod yn gwbl gyfrinachol, os byddwch yn penderfynu cymryd rhan, byddwch yn derbyn rhif adnabod unigryw ar gyfer postio'n unig. Ni fydd eich enw ar yr holiaduron a bydd unrhyw wybodaeth a roddir yn gyfrinachol ac ni throsglwyddir i unrhyw un, os na fyddwch yn dymuno cymryd rhan gallwch anwybyddu'r llythyr hwn.

***£50 o wobr, bydd gan bawb* sy'n cwblhau'r holiaduron a chyflwyno 4 derbynneb siawns i ennill**

Diolch am eich cydweithrediad.

Yn gywir

Pauline M. Rigby

Pauline M Rigby RD
Dietegydd Calon Lân

SJ/18-04-07/BILLYNY/LLYTHYRAU/2007/Letter for Calon Lân Survey.w

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Calon Lân Lifestyle Survey

Introduction

The Calon Lân Lifestyle Survey looked at lifestyle factors, which could affect your health. It focused on the main risk factors for heart disease. The findings from the study were used to plan health services for Anglesey.

A small sample of the findings were:

Method

A postal questionnaire was sent to 1/10th of the adult population of Anglesey, randomly selected from the electoral roll.

2548 people returned completed surveys, out of 5000 sent out, we are very grateful for this good response, thank you, the information was most valuable

Have diagnosis/treatment in last 12 months For High blood pressure

Number	Percent
Yes 583	27%
No 1572	73%

Have diagnosis/treatment in last 12 months For Diabetes

Number	Percent
Yes 110	6%
No 1769	94%

Have diagnosis/treatment in last 12 months For High blood cholesterol

Number	Percent
Yes 355	18%
No 1652	82%

Smoke

How often	Number	Percent
daily	424	32%
occasionally	95	7%
not at all	813	61%

Number of fruit and veg portions per day

Minimum	Maximum	Average
0	15	2

Eat breakfast every day

Number	Percent
Yes 2161	86%
No 353	14%

Type of Milk used

Number	Percent
Full cream	19%
Semi skimmed	62%
Fully skimmed	18%
other	1%

Sugars in tea

Number	Percent
none	61%
1 sugar	17%
2 sugars	12%
3 sugars	1%
sweetener	9%

Vegetarian/vegan diet

Number	Percent
Yes 76	1.5%
No 2440	98.5%

* not all respondents answered all questions so percentages do not always total 100

If you would like further details please contact Pauline Rigby, Calon Lân Dietitian at Anglesey Local Health Board, 17 High Street, Llangefni, Anglesey LL77 7LT

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Arolwg Ffordd o Fyw Calon Lân

Rhagarweiniad

Roedd Arolwg Ffordd o Fyw Calon Lân yn edrych ar ffactorau ffordd o fyw, a allai gael effaith ar eich iechyd. Roedd yn canolbwyntio ar y prif ffactorau a allai arwain at glefyd y gallon. Defnyddiwyd canfyddiadau'r astudiaeth i gynllunio gwasanaethau iechyd ar gyfer Ynys Môn.

Dyma rai enghreifftiau o'r canfyddiadau:

Wedi cael diagnosis/triniaeth yn ystod y 12 mis diwethaf
Am Bwysedd gwaed uchel

Nifer	Canran
✓ 583	27%
× 1572	73%

Wedi cael diagnosis/triniaeth yn ystod y 12 mis diwethaf
Am Glefyd siwgr:

Nifer	Canran
✓ 110	6%
× 1769	94%

Wedi cael diagnosis/triniaeth yn ystod y 12 mis diwethaf
Am Golesterol gwaed uchel

Nifer	Canran
✓ 355	18%
× 1652	82%

Yn smocio

Pa mor aml	Nifer	Canran
bob dydd	424	32%
weithiau	95	7%
dim o gwbl	813	61%

Dognau o ffrwythau a llysiau bob diwrnod

Lleiafswm	Uchafswm	Ar gyfartaledd
0	15	2

*ni atebodd pawb bob cwestiwn felly nid yw cyfanswm canrannau pob cwestiwn yn 100

Dull

Anfonwyd holiadur drwy'r post at un rhan o ddeg o boblogaeth oedolion Ynys Môn, a ddewiswyd ar hap o'r rhestr etholiadol.

Cafodd 5000 arolwg eu hanfon allan, ac anfonwyd 2518 ohonynt yn ôl; rydym yn ddiolchgar iawn am yr ymateb da yma; diolch yn fawr i chi, roedd yr wybodaeth yn werthfawr dros ben.

Yn bwyta brecwast bob diwrnod

Nifer	Canran
✓ 2161	86%
× 353	14%

Y math o Lefrith sy'n cael ei ddefnyddio

Math o lefrith	Canran
Hufen llawn	19%
Hanner sgim	62%
Llefrith sgim	18%
arall	1%

Siwgr mewn te

Nifer	Canran
dim	61%
1 siwgr	17%
2 siwgr	12%
3 siwgr	1%
melysydd	9%

Diet llysieuol/figan

Nifer	Canran
✓ 76	1.5%
× 2440	98.5%

Os hoffech gael mwy o wybodaeth, a wnewch chi gysylltu â Pauline Rigby, Dietegydd Calon Lân,
Bwrdd Iechyd Lleol Ynys Môn, 17 Stryd Fawr, Llangefni, Ynys Môn LL77 7LT

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Calon Lân Survey DIET and FOOD HABITS

Please circle an answer or put a cross if a box X

1 Cooking fat or oil

What type of *cooking fat or oil* do you use most?

Lard   dripping   butter

Vegetable oil   sunflower oil   olive oil

other..

2 Butter/spread on bread etc

Which brand of butter or spread do you most often use on bread ?

Brand name and type (eg Anchor butter, Gold low fat)

....

3 Salt

Do you normally add salt in cooking?
(please tick one)

Yes ☐
No ☐
Don't know ☐

Do you add salt to your meals at the table ?
(please tick one)

No ☐
When the food is not salty enough ☐
Almost always before tasting ☐

4 How many cups of coffee or tea do you usually drink each day?

Coffee ______ cups   Tea _______ cups

If none go to 5

4.1 How many sugars do you take in coffee?

None   1   2   3   Sweetener

4.2 How many sugars do you take in tea?

None   1   2   3   Sweetener

5 Bread

Which type of bread do you use *most*?

White bread ☐
Softgrain (eg Mighty white) ☐
Brown bread (wholemeal) ☐
Granary or seeded ☐
Crisp bread ☐
Other ....

6 How many days a week do you buy meals outside the home ?

*(please write number of times in a usual **week**)*

Shop, café snacks/meals ....
Workplace bought meals ....
Pub snacks / meals ....
Restaurant or hotel meals ....
Takeaway food, eg Fish & Chips, ...
Chinese, Indian, Burger or Pizzas etc..........

7 Fruit and Vegetables

7.1 How many portions of fruit/ vegetables do you think you should eat daily?

A medium apple is an average portion or a handful of smaller fruit such as cherries or grapes

1   2-3   4-5   over 5

7.2 Your fruit and vegetable intake

*(please write number of times in a usual **week**)*

Vegetables ☐
Salads ☐
Baked beans ☐
Other pulses (eg beans, lentils) ☐
Fresh fruits ☐
Dried fruit ☐
Tinned fruit ☐
Pure fruit juice ☐
Vegetable soups ☐

8 During the past 12 months have you been advised to change your diet for health reasons by any of the following?

Yes, by a Doctor	☐
Yes, by a Dietitian	☐
Yes, by other health professional	☐
Yes, by family	☐
Yes, by others	☐
No	☐

9 Which of the following applies to you?

Not on a diet	☐
Slimming/weight reducing diet	☐
Diabetic diet	☐
Other medical diet *(please state which)*	☐
Vegetarian/vegan diet	☐
Other specific diet *(please state)*	☐

10 Meat and Fish

(please write number of times in a usual ***week****)*

Beef	☐
Lamb	☐
Pork Bacon or ham	☐
Chicken, turkey or other poultry	☐
Tinned meat or fish	☐
Sausages	☐
Meat pies, pasties	☐
Liver, kidney or other offal	☐
White fish, cod, plaice	☐
Oily fish,eg salmon, tuna, mackerel	☐
Shellfish (eg prawns, crab, mussels)	☐

11 Is anyone in your house a vegetarian?

No Yes

12 Where do you/your family do the main shopping for food?

Circle ***more than one*** *if necessary*

Local village shop Market Large major

Farm shop Internet Supermarket

Other - *please state* __________________.

12.1 How often do you shop for food?

Never Daily Weekly Monthly

13 How often do you eat the following snacks?

(please write number of times in a usual ***week****)*

Crisps and savoury snacks	☐
Chocolates or sweets	☐
Biscuits	☐
Cakes	☐
Nuts	☐

14 Breakfast, please tell us what you have:

Nothing never eat breakfast	☐
cereal and/or toast	☐
fruit and/ or yoghurt	☐
light cooked , eg Boiled egg	☐
a full cooked breakfast	☐

15 Height, Weight

15.1 What is your height ?

☐	Height in feet and inches
☐	***OR*** metres (and centimetres)

15.2 What is your weight in light clothing ?

☐	Weight in stones and lbs
☐	***OR*** kilograms

Thank you, your help is much appreciated

All those who complete and return the pre and post questionnaire and 4 till receipts will be entered into the draw for £50

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Local Health Board
Ynys Môn
Anglesey

Arolwg Calon Lân DIET ac ARFERION BWYD

Rhowch gylch o amgylch ateb neu rhowch groes mewn blwch X

1 Braster neu olew coginio

Pa fath o *fraster neu olew coginio* ydych chi'n ei ddefnyddio fwyaf?

Lard   toddion   menyn

Olew llysiau   olew blodyn haul   olew olewydd

arall...

2 Menyn/haen ar fara ayyb

Pa frand menyn neu haen fyddwch chi'n ei ddefnyddio ar fara gan amlaf ?

Enw brand a math (e.e. menyn Anchor, Gold braster isel)

....

3 Halen

Ydych chi fel arfer yn ychwanegu halen wrth goginio?
(rhowch ✓ger un)

- Ydw ☐
- Nac ydw ☐
- Dim yn gwybod ☐

Ydych chi'n ychwanegu halen at fwyd ar y bwrdd?
(rhowch ✓ger un)

- Nac ydw ☐
- Pan na fydd y bwyd yn ddigon hallt ☐
- Bron bob amser cyn blasu ☐

4 Sawl cwpan o goffi neu de fyddwch yn ei yfed bob dydd?

Coffi ______ cwpan   Te _______ cwpan

Os na, ewch i 5

4.1 Sawl siwgr ydych chi'n ei gymryd mewn coffi?

Dim   1   2   3   Melysydd

4.2 Sawl siwgr ydych chi'n ei gymryd mewn te?

Dim   1   2   3   Melysydd

5 Bara

Pa fath o fara fyddwch yn ei fwyta fwyaf?

- Bara gwyn ☐
- Graen meddal (e.e. Mighty White) ☐
- Bara brown (dim gwenith cyflawn) ☐
- Gwenith cyflawn, graneri ☐
- 'Crisp bread' neu fara arall ☐

Arall ....

6 Sawl diwrnod o'r wythnos ydych chi'n prynu prydau y tu allan i'r cartref?

*(nodwch y nifer mewn wythnos **arferol**)*

Siop, caffi byrbrydau/prydau ....

Prynu bwyd yn y gweithle ....

Byrbryd/prydau tafarn ....

Prydau bwyty neu westy ....

Bwyd parod e.e. Pysgod a Sglodion ....

Tsieienaidd, Indian, Byrgyrs neu Pizza ayyb ....

7 Sawl cyfran o ffrwythau/llysiau ydych chi'n meddwl y dylech ei fwyta bob dydd?

Mae afal cymedrol yn gyfartaledd neu lond llaw o ffrwythau llai fel ceirios neu rawnfwyd

1   2-3   4-5   dros 5

7.2 Bwyta ffrwythau a llysiau

*(nodwch sawl gwaith mewn **wythnos** arferol)*

- llysiau ☐
- Saladau ☐
- Ffa pob ☐
- Corbys eraill (e.e. ffa, ffacbys) ☐
- Ffrwythau ffres ☐
- Ffrwythau sych ☐
- Ffrwythau tun ☐
- Sudd ffrwythau pur ☐
- Cawl llysiau ☐

8 Yn ystod y flwyddyn ddiwethaf, ydych chi wedi derbyn cyngor i newid eich diet am resymau iechyd gan un o'r canlynol?

Ydw, Meddyg	☐
Ydw, Dietegydd	☐
Ydw, gan weithiwr proffesiynol arall	☐
Ydw, gan y teulu	☐
Ydw, gan eraill	☐
Nac ydw	☐

9 Pa un o'r canlynol sy'n berthnasol i chi?

Dim ar ddiet	☐
Diet colli pwysau	☐
Diet diabetig	☐
Diet meddygol arall *(nodwch pa un os gwelwch yn dda)*	☐
Diet llysfwytäwr/fegan	☐
Diet penodol arall *(nodwch)*	☐

10 Cig a Physgod

*(nodwch sawl gwaith mewn **wythnos** arferol*

Cig Eidion	☐
Cig Oen	☐
Porc, bacwn neu ham	☐
Cyw iâr, twrci neu ddofednod arall	☐
Cig neu bysgod tun	☐
Selsig	☐
Pastai gig	☐
Iau, aren neu offal arall	☐
Pysgod gwyn, penfras, lleden	☐
Pysgod olewog, eog, tiwna, macrell	☐
Pysgod cregyn (e.e. corgimwch, cranc, cregyn gleision)	☐

11 Ydy rhywun yn y tŷ yn llysfwytäwr?

Nac ydy   Ydy

12 Ble'r ydych chi/eich teulu yn siopa bwyd yn bennaf?

*Rhowch gylch o amgylch **mwy nag un** os bydd angen*

Siop bentref leol   Marchnad   Prif siop fawr

Siop fferm   Rhyngrwyd   Archfarchnad

Arall - *nodwch os gwelwch yn dda*_______.

12.1 Pa mor aml ydych chi'n siopa am fwyd?

Byth   Dyddiol   Wythnosol   Misol

13 Pa mor aml ydych chi'n bwyta'r byrbrydau canlynol?

*(nodwch sawl gwaith mewn **wythnos arferol)***

Creision a byrbrydau sawrus	☐
Siocled neu fferins	☐
Bisgedi	☐
Cacennau	☐
Cnau	☐

14 Brecwast, dywedwch beth ydych yn gael:

Dim byd, byth yn bwyta brecwast	☐
Grawnfwyd a/neu dost	☐
Ffrwythau a/neu iogwrt	☐
Pryd poeth ysgafn, e.e. ŵy wedi'i ferwi	☐
Brecwast llawn wedi'i goginio	☐

15 Taldra, Pwysau

15.1 Beth yw eich taldra?

☐	Taldra mewn troedfeddi a modfeddi
☐	***Neu*** metrau (a cm)

15.2 Beth yw eich pwysau mewn dillad ysgafn?

☐	Pwysau mewn stôn a lbs
☐	***NEU*** gilogram

Diolch yn fawr, gwerthfawrogir eich cymorth

Bydd pawb sy'n cwblhau a dychwelyd y cyn ac ôl-holiadur a 4 derbynneb til yn cael cyfle i ennill gwobr £50

Appendix 8.17 Study 3 Data collection form

Number		Name		
Till receipt	No of	Item	No	% of total
Date	Items			No of items
		Fruit & veg		
		Saturated fat (butter/lard)		
		PUFA		
		MUFA		
		Ready meals		
		Wholegrain cereals/bread		
		White cereals/bread		
		Full fat items		
		Reduced fat items		
		Fruit & veg		
		Saturated fat (butter/lard)		
		PUFA		
		MUFA		
		Ready meals		
		Wholegrain cereals/bread		
		White cereals/bread		
		Full fat items		
		Reduced fat items		
		Fruit & veg		
		Saturated fat (butter/lard)		
		PUFA		
		MUFA		
		Ready meals		
		Wholegrain cereals/bread		
		White cereals/bread		
		Full fat items		
		Reduced fat items		
		Fruit & veg		
		Saturated fat (butter/lard)		
		PUFA		
		MUFA		
		Ready meals		
		Wholegrain cereals/bread		
		White cereals/bread		
		Full fat items		
		Reduced fat items		

Appendix 8.18 Binomial Logistic Regression Analysis

Food type	Weeks	Intervention	25th	median	75th	control	25th	median	75th
Fruit & veg	week 1	sig.	20.375	31.500	40.000	sig.	28.800	38.700	52.900
	2		25.000	35.500	44.400		25.500	33.300	43.200
	3		27.150	35.000	46.050		0.000	0.000	3.450
	4	*p*=0.009	31.150	39.200	48.550		27.050	33.300	48.700
sat fat	1		0.000	2.500	4.825		0.000	0.000	3.050
	2		0.000	0.000	4.000		0.000	0.000	9.150
	3		0.000	0.000	3.450		0.000	0.000	3.450
	4	*p*=0.002	0.000	0.000	2.675	*p*=0.097	0.000	0.000	3.350
PUFA	1		0.000	0.000	1.325		0.000	0.000	0.600
	2		0.000	0.000	0.000		0.000	0.000	0.000
	3		0.000	0.000	0.000		0.000	0.000	0.000
	4	*p*=0.092	0.000	0.000	0.225	*p*=0.420	0.000	0.000	0.000
MUFA	1		0.000	0.000	0.000		0.000	0.000	0.000
	2		0.000	0.000	0.000		0.000	0.000	1.450
	3		0.000	0.000	0.000		0.000	0.000	0.000
	4	*p*=0.941	0.000	0.000	0.000	*p*=0.014	0.000	0.000	0.000
Ready	1		0.000	0.000	3.850		0.000	0.000	4.950
	2		0.000	0.000	5.300		0.000	0.000	4.900
	3		0.000	0.000	4.800		0.000	0.700	5.200
	4	*p*=0.941	0.000	0.000	4.925	*p*=0.636	0.000	0.000	3.800
Wholegrain	1		0.000	3.000	7.800		0.000	2.500	5.350
	2		0.000	2.900	6.300		0.000	2.200	6.950
	3		0.000	3.200	6.800		0.000	3.300	9.300
	4	*p*=0.948	0.000	2.500	5.100	*p*=0.319	1.550	3.900	6.550
white cereals	1		5.300	10.600	19.550		0.000	7.300	13.650
	2		5.450	8.300	15.250		3.450	8.700	11.450
	3		6.500	9.100	13.650		0.600	8.300	13.650
	4	*p*=0.220	3.700	7.900	13.900	*p*=0.996	3.350	7.100	15.000
full fat	1		9.550	15.900	22.325		9.250	13.300	24.200
	2		11.300	17.000	22.800		7.500	11.700	22.950
	3		10.325	15.200	20.675		4.600	12.500	17.500
	4	*p*=0.284	10.500	14.000	20.000	*p*=0.824	7.100	14.300	17.900
red fat	1		0.000	2.000	5.850		0.000	1.800	4.600
	2		0.000	0.000	5.900		0.000	2.200	8.700
	3		0.000	0.600	6.100		0.000	1.800	5.500
	4	*p*=0.948	0.000	1.950	5.275	*p*=0.403	0.000	3.800	6.300

Table A18-1 Binary Logistic Regression results

Binary Logistic Regression test results

	B	S.E.	Wald	Sig.	Exp(B)
group(1)	-.105	.477	.048	.826	.901
satfatyesno(1)	-.693	.428	2.616	.106	.500
Constant	-.113	.448	.064	.801	.893

Table A18 – 2 Saturated fats

	B	S.E.	Wald	Sig.	Exp(B)
group(1)	1.362	.802	2.885	.089	3.904
PUFAyesno(1)	-1.357	.531	6.523	.011	.257
Constant	-1.569	.800	3.851	.050	.208

Table A18-3 Polyunsaturated fats (PUFAs)

	B	S.E.	Wald	Sig.	Exp(B)
group(1)	.480	.688	.487	.485	1.616
MUFAyesno(1)	-1.513	.872	3.008	.083	.220
Constant	-.480	1.067	.202	.653	.619

Table A18-4 Monounsaturated fats (MUFAs)

	B	S.E.	Wald	Sig.	Exp(B)
group(1)	.530	.500	1.124	.289	1.698
readymealyesno(1)	-1.015	.415	5.968	.015	.363
Constant	-.187	.491	.146	.703	.829

Table A18 –5 Ready Meals

	B	S.E.	Wald	Sig.	Exp(B)
group(1)	.266	.742	.128	.720	1.305
whitecerealsyesno(1	.498	1.126	.196	.658	1.646
Constant	1.871	.660	8.040	.005	6.496

Table A18 –6 White cereals

	B	S.E.	Wald	Sig.	Exp(B)
group(1)	-.311	.491	.400	.527	.733
reducefatyesno(1)	-.420	.413	1.034	.309	.657
Constant	.963	.481	4.011	.045	2.620

Table A133 – 7 Reduced fat items

The eatwell plate

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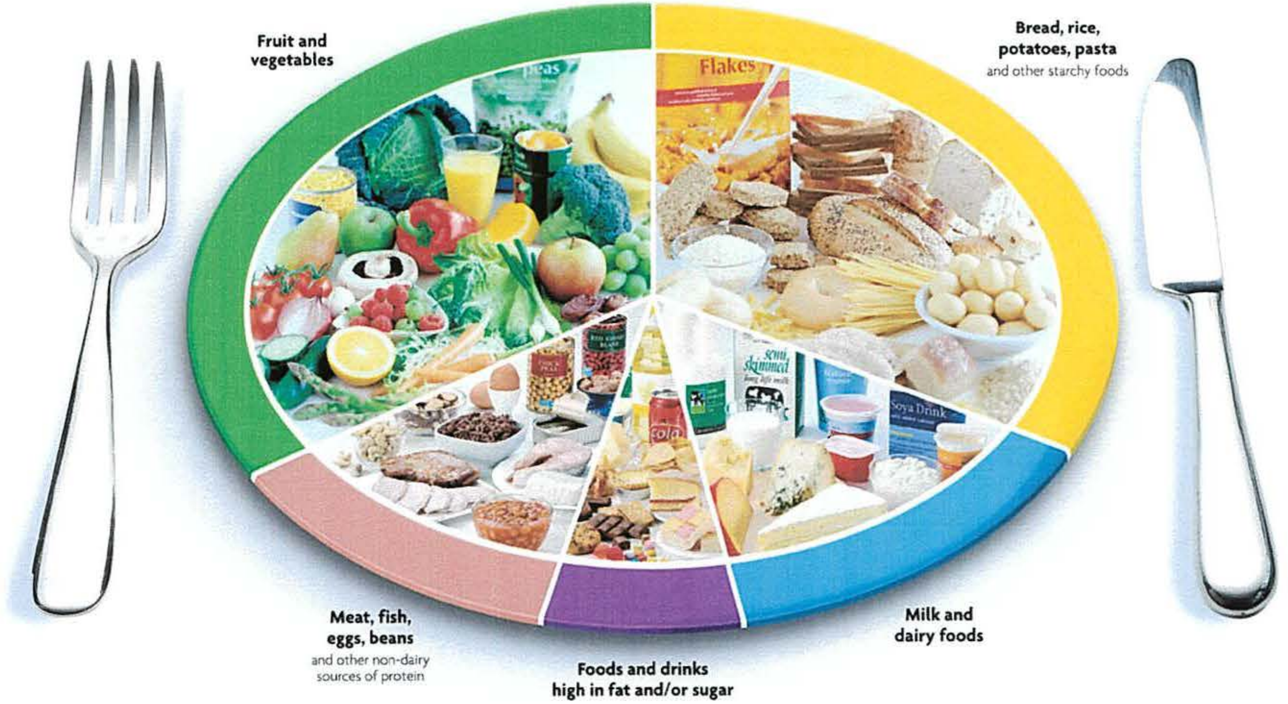
Use the eatwell plate to help you get the balance right. It shows how much of what you eat should come from each food group.



Appendix 10.0

http://www.food.gov.uk/images/pagefurniture/eatwellplatelarge.jpg