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1 **The Process of Scaling Early Childhood Violence Prevention Programs in Jamaica**

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10
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12
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19 submit for publication.

20
21 **Abbreviations:** ECC, Early Childhood Commission; ICT, Irie Classroom Toolbox; IHT, Irie
22 Homes Toolbox, LMIC, low- and middle-income countries; VAC, violence against children

23
24 **Article Summary**

25 This article describes how we applied implementation science principles in the design,
26 implementation, evaluation and scale-up of two early childhood, caregiver-training, violence-
27 prevention interventions in Jamaica.

28
29 **What's Known on This Subject**

30 A key strategy for reducing violence against young children, at school and at home, is through
31 caregiver support programs. There is limited guidance on how to facilitate wide-scale
32 dissemination of these programs in low- and middle-income countries.

33 **What This Study Adds**

34 We describe how we applied implementation science principles in the design, implementation,
35 and initial scaling of two complementary early childhood, violence-prevention caregiver-
36 training programs in Jamaica: the Irie Classroom Toolbox (a teacher-training program) and the
37 Irie Homes Toolbox (a parenting program).

38
39 **Contributors' Statement:**

40 Helen Baker-Henningham, Marsha Bowers and Taja Francis conceptualized and drafted the
41 initial manuscript and reviewed and revised the manuscript.

42 All authors approved the final manuscript as submitted and agree to be accountable for all
43 aspects of the work.

44 **ABSTRACT**

45

46 **Background**

47 Violence is a global public health problem and early childhood interventions are a core
48 component of violence-prevention programming. Interventions to support parents and teachers
49 of young children can prevent violence against children by caregivers and prevent the early
50 development of antisocial behavior. However, there is limited guidance on how to scale-up
51 these programs in low- and middle-income countries.

52 **Methods**

53 In this article, we describe how we applied implementation science principles in the design,
54 implementation, evaluation, and initial scaling of two complementary early childhood,
55 violence-prevention, caregiver-training programs in Jamaica: the Irie Classroom Toolbox (a
56 teacher-training program) and the Irie Homes Toolbox (a parenting program).

57 **Results**

58 We identified seven implementation science principles most relevant to our work in scaling the
59 Irie Toolbox programs and describe how these principles were operationalised in the Jamaican
60 context. The principles are: 1) design programs for scale from the outset, 2) use learning cycles
61 for quality improvement, 3) plan strategically for government agency adoption, 4) provide high
62 quality initial and on-going training and regular supervision, 5) monitor implementation
63 quality, 6) use flexible delivery modes, and 7) plan for program sustainment.

64 **Conclusions**

65 Through applying these principles to scale the Irie Toolbox programs, we aim to promote a
66 consistent approach to reducing violence against children, reducing child behaviour problems,
67 and increasing caregiver and child competencies, across both home and school contexts at the
68 population level. The principles and processes described in this article are relevant to other
69 behaviour change interventions in early childhood development, education and public health.

70

71

72

73 **INTRODUCTION**

74 In low- and middle-income countries (LMIC), approximately two thirds of two-to-four-year-

75 old children experience physical punishment or psychological aggression from caregivers at

76 home.^{1,2} Violence in and around schools, including violence against children (VAC) by

77 teachers, affects over half a billion children each year.³ VAC leads to long-term negative

78 consequences including increased risk for physical and mental health problems, low academic

79 attainment and school drop-out.^{4,5} VAC also leads to high global economic costs, with school

80 violence alone costing an estimated US\$11 trillion in lost wealth due to loss of learning and
81 school drop-out.^{3,6}

82 A key strategy for reducing VAC in early childhood is through caregiver support
83 programs.⁷ Caregiver violence-prevention programs can reduce child maltreatment and child
84 behavior problems.^{8,9} However, few interventions have been implemented at scale and there is
85 limited guidance on how to facilitate wide-scale dissemination, especially in LMIC. In
86 addition, although there is a growing literature from LMIC on early childhood, violence-
87 prevention parenting interventions,¹⁰ the evidence for teacher-training programs is limited with
88 studies conducted primarily in primary and secondary schools.^{11,12}

89 In this article, we describe how we used implementation science principles in the
90 design, implementation, evaluation, and initial scaling of two, complementary, early childhood,
91 violence-prevention programs through the existing early childhood education network in
92 Jamaica including: 1) a teacher-training intervention (The Irie Classroom Toolbox) and 2) a
93 parenting intervention (The Irie Homes Toolbox). Irie is a Jamaican term that means ‘good,
94 ‘pleasing’ and ‘at peace with oneself and the world’. The Irie Toolbox programs target
95 caregivers of children aged two-to-eight years and address two important public health
96 problems: 1) violence against children, and 2) child behavior problems. The aim of this
97 program of work is to support the implementation of evidence-based, early childhood,
98 violence-prevention programs at the population level, across both home and school settings.

99

100

101 **JAMAICAN CONTEXT**

102 There is a recognised need for violence-prevention programs in Jamaica with 84% of Jamaican
103 caregivers with children aged two-to-four years reporting use of corporal punishment within
104 the past month,¹³ and between 88-100% of early childhood teachers using VAC over two days
105 of observation.^{14,15} The high prevalence of VAC by teachers is found despite the legal ban
106 against corporal punishment in Jamaican early childhood institutions, indicating that legislation
107 needs to be accompanied by additional actions.^{16,17} There is no legal ban on parents' use of
108 corporal punishment. Interventions to prevent child behavior problems are also necessary. The
109 prevalence of disruptive behavior disorders among 5-6-year-old children is 12%, with limited
110 access to appropriate services.¹⁸ In addition, we previously reported that 21% of 3-6 year old
111 children had high levels of conduct problems by teacher-report.^{19,20} Conduct problems place
112 children at increased risk of developing behavior disorders and for academic
113 underachievement, school dropout, and crime and violence in adulthood.²¹

114 There are also good opportunities for intervention. Firstly, Jamaica is a pathfinder
115 country in the Global Partnership to End Violence Against Children and violence prevention is
116 a national strategic priority.²² Secondly, over 98% of three-to-six year-old children are enrolled
117 in early childhood educational provision. Interventions integrated into these services are non-
118 stigmatising and conveniently located, thus maximising accessibility and acceptability, with
119 potential for population-level reach. Thirdly, there is a strong organisational structure through
120 The Early Childhood Commission (ECC) to support implementation of violence-prevention
121 programming. The ECC is the government body with oversight for early childhood institutions

122 and has the responsibility for setting and maintaining standards, and providing on-going
123 professional development for teachers.

124

125 **THE IRIE TOOLBOX PROGRAMS**

126 Evidence of Effectiveness in Jamaica

127 In an earlier efficacy trial, we found that training preschool teachers in classroom behavior
128 management and how to promote children’s social-emotional competence reduced child
129 conduct problems and increased child social skills at home and at school among preschool
130 children with heightened levels of conduct problems (Table 1).¹⁹ Benefits were also found to
131 teacher practices and the classroom atmosphere with benefits sustained at 6-month follow-up
132 (Table 2).²³ The preschool teacher-training intervention led to significant benefits to children’s
133 academic achievement, oral language, self-regulation and school attendance in grade one of
134 primary school (Table 2).²⁴ This efficacy trial led to the development the Irie Classroom
135 Toolbox (ICT): an early childhood, teacher-training, violence-prevention program specifically
136 for use within LMIC (Figure 1).²⁰ We evaluated the ICT in an effectiveness trial in preschools
137 and a small trial in Grade 1 of primary school and found large reductions to teachers’ use of
138 VAC and significant improvements in the quality of the classroom environment (Table 1).^{14,15}
139 Benefits were sustained at one-year follow-up (Table 2).¹⁵ Benefits were also found for child
140 behavior, and aspects of child school achievement, and to teachers’ professional well-being and
141 retention.^{14,15}

142 The Irie Homes Toolbox (IHT) is an early childhood, violence-prevention parenting
143 program, developed to complement the ICT, that includes content on understanding child
144 behavior, positive discipline strategies, emotional self-regulation, and child-led play (Figure
145 1).²⁵ It is designed to be delivered by ICT-trained preschool teachers, who are credible to
146 parents, and have knowledge and expertise in using the strategies with children at school. In a
147 small efficacy trial, the IHT was effective at reducing VAC by parents, increasing parent
148 involvement with their child, and reducing conduct problems for children with heightened
149 levels of conduct problems at baseline (Table 1).²⁶ In response to the Covid-19 pandemic, we
150 adapted the IHT for virtual delivery. In a randomized trial, the virtual IHT led to reductions in
151 parents' use of VAC and improved parent attitudes to violence with benefits sustained at nine-
152 month follow-up.²⁷

153 Beginning to Scale

154 The Irie Toolbox programs are designed to be integrated into the existing early
155 childhood education services in Jamaica and delivered and supervised by existing staff. Within
156 the ECC, each educational region has a senior development officer and senior inspector who
157 each have responsibility for a team of eight-to-ten development officers and six-to-eight
158 inspectors respectively. These field officers work at the district level with approximately 50-65
159 preschools each. Each region also has a Community Relations Officer who coordinates
160 parenting programs in the region. We are training and supporting these government staff to
161 implement the programs. Table 3 provides information on these activities. The ICT has been
162 integrated into ongoing teacher-training initiatives and is being scaled-up nationally in Jamaica.

163 The IHT is a more recent program and our next step is to train ECC officers, who have been
164 trained in the IHT, to train and support early childhood teachers to deliver the program.

165 As described above and in tables 1 and 2, the Irie Toolbox programs have proven
166 effectiveness in reducing violence against children at home and at school and in reducing child
167 behaviour difficulties. In the following sections, we focus on how we have utilized seven key
168 implementation science principles, drawn from literature related to scaling-up interventions,²⁸
169 from the initial design phase through to initial scaling of the Irie Toolbox programs.

170
171 **Principle 1. Design for scale:** Scalable interventions need to be designed for scale from the
172 outset.²⁹ This requires a focus on acceptability, relevance, feasibility, and effectiveness of the
173 content and delivery method, involving the beneficiaries, facilitators, supervisors and the
174 government agency responsible for scaling.^{30,31}

175 To design the Irie Toolbox programs, we chose to transport evidence-based content and
176 methods of delivery rather than transporting an existing program. Although transported
177 programs can be effective in new contexts,³² issues with cost and ownership are barriers to
178 scaling and gaining government buy-in. In addition, in previous work, we found that using
179 locally-developed content and methods reduced the amount of support teachers required for
180 effective implementation.²³ To inform intervention design, we used the Active Implementation
181 Framework that states successful programs require an effective innovation, implemented well,
182 within an enabling context.³³ Table 4 illustrates key factors within each category and associated
183 strategies we used to design the ICT and IHT. These factors are relevant for scaling

184 interventions in LMIC across public health,³⁴ early childhood development,³⁵ and education
185 programming.³⁶

186
187
188 **Principle 2. Use learning cycles for quality improvement:** Intervention design,
189 implementation and dissemination involve dynamic, iterative learning cycles.^{29,37} Quality
190 improvement is an ongoing process that requires structured methods to document, analyse and
191 utilise information on program implementation from all stakeholders.

192 To inform adaptations of the Irie Toolbox programs, we embed process and qualitative
193 evaluations within all implementation activities.^{14,20,25,38,39} Data collected includes: reach
194 (numbers enrolled and attendance), user satisfaction, quality of implementation at the level of
195 the facilitator (using facilitator- and supervisor-completed checklists), and at the level of the
196 teacher/parent (using homework assignments, participant feedback, and facilitator
197 observations), and documenting enablers, barriers, and suggestions for improvement from the
198 perspectives of beneficiary parents/teachers, facilitators, supervisors, ECC executive and
199 research team. This data is combined with data from our impact evaluations to make ongoing
200 revisions to the program content (see Table 5 for examples). Developing additional content
201 risks making interventions more complex, thus decreasing scalability.^{29,40} We mitigate these
202 risks by developing flexible programs with a combination of core and optional modules.

203 The data is also used to inform revisions to program delivery. For example, for the ICT,
204 we found that training needs differed according to the educational level of the teachers. A less

205 intensive intervention led to similar reductions in VAC for fully qualified grade one teachers as
206 a more intensive intervention implemented with paraprofessional preschool teachers.^{14,15}

207

208 **Principle 3. Plan strategically for government agency program adoption:** Factors

209 influencing program adoption by government agencies include stakeholder relationships, the
210 demand for the innovation, the fit between the innovation and the context, the presence of
211 program champions, and the human and financial resource capacity of the organisation, in
212 addition to robust evidence of program effectiveness.^{36,37}

213 The most important influences for the adoption of the Irie Toolbox programs were: 1)

214 close alignment of the program with the ECC strategic plan, 2) good fit with the ECC
215 organisational structure, 3) all required resources for parents/teachers, facilitators and
216 supervisors were available, 4) long-standing collaborative relationships between the research
217 and ECC team, and 5) support from external partners, for example, UNICEF Jamaica. To gain
218 government buy-in, we presented videos of the programs in action, feedback from participating
219 parents and teachers, and infographics showing program materials. These resources proved
220 more persuasive than the evidence of effectiveness alone. Framing the programs as promoting
221 caregiver and child competencies, rather than only as violence prevention was also important.

222 As the ECC adopted the programs, we prioritized quality implementation over rapid scale-
223 up by beginning implementation on a small scale in each region, thus building capacity that
224 could be leveraged in future rounds of implementation, and resolving any initial difficulties
225 prior to wider roll-out.

226

227 **Principle 4. Ensure high quality initial and on-going training and regular supervision for**

228 **program facilitators:** Program facilitators require training in new knowledge and skills

229 alongside ongoing supervision to help build these skills in their everyday practice.⁴¹ Effective

230 training programs model the collaborative, interactive methods and the focus on positive

231 relationships, and require structured training and supervision guides.^{42,43}

232 The Irie Toolbox programs involve addressing participants' skills, cognitions and

233 emotions, challenging long-held beliefs and social norms relating to VAC, and dealing with

234 resistance. Facilitators often share these beliefs and social norms and hence we provide

235 opportunity for them to experience the program as participants prior to learning to train others.

236 This also promotes understanding of the content and the rationale for the training techniques

237 used. These include techniques to promote participants' skills (for example, demonstration,

238 practice, scaffolding), motivation (for example, positive feedback, collaborative problem-

239 solving, goal setting) and opportunity to use the strategies (for example, peer support,

240 provision of resources).⁴⁴ We use short, regular trainings where possible, rather than a long

241 period of initial training, as it: 1) prevents cognitive overload, 2) provides timely opportunities

242 for practice 3) allows for group problem-solving around implementation barriers, and 4) helps

243 to build skills over time. Some training techniques are relatively easy for facilitators to learn

244 (for example, demonstration, practice, giving positive feedback, encouraging participation),

245 while other techniques (for example, prompting, scaffolding, collaborative problem-solving)

246 develop over time. Hence, we focus initially on the 'easier' techniques, before focussing on

247 techniques that require advanced facilitation skills. We use structured training and supervision
248 manuals that are valued by government staff, although there is usually an initial adjustment
249 phase before staff are comfortable using a training script.

250 Supportive field supervision of program facilitator is used to promote ongoing quality
251 implementation. Frequency of supervision differs according to the educational level of the
252 facilitators with professional staff requiring less supervision than paraprofessionals. In
253 addition, we recommend more frequent supervision during initial implementation, with
254 reduced supervision after one round of implementation. Where possible, we train supervisors
255 as facilitators first and supervise them as they deliver the program. Then we train in the
256 additional skills required to supervise the program.

257

258 **Principle 5. Monitor implementation quality:** High quality implementation of early
259 childhood interventions predicts increased participant engagement, and better caregiver and
260 child outcomes and is more difficult to sustain as programs scale.⁴⁵⁻⁴⁸ Maintaining
261 implementation quality requires measurements that are reliable, valid, feasible for use by
262 supervisory staff, and with easy to extract data to inform ongoing improvements.

263 For the Irie Toolbox programs, quality assessments include facilitator records,
264 (including participant attendance, session duration, and content checklists), and observational
265 assessments of facilitators' core competencies by supervisors. Although utilising independent
266 observers would be a more rigorous method of measuring quality, embedding quality
267 assessments into ongoing supervision is a pragmatic approach when going to scale. In addition

268 to reducing costs, supervisor-completed assessments serve a dual purpose in guiding
269 supervisors to provide appropriate and timely individual support, and providing aggregated
270 data to inform wider training needs. We also promote reflective practice by encouraging
271 facilitators to complete self-evaluation forms and discussing these reflections during
272 supervision.

273
274 **Principle 6. Use flexible delivery modes:** Virtual interventions are attractive to policy makers
275 and can promote awareness raising and population-level behavior change,⁴⁹⁻⁵⁰ or be used as a
276 supplement to face-to-face programming to promote sustainability.⁵¹ However, there is also
277 some evidence of negative effects, and thus careful testing is required prior to wide-scale
278 implementation.^{52,53}

279 We adapted the Toolbox programs for virtual delivery due to covid-19 related school
280 closures. We illustrate the process using the IHT. The virtual IHT consisted of four
281 components: 1) Weekly, one-hour, virtual IHT sessions for 10 weeks conducted by ECC
282 officers, 2) three SMS messages per week providing information, tips, and encouragement,^{54,55}
283 3) access to a data-free app with weekly uploaded content including one-to-two demonstration
284 videos and an Irie Challenge (homework) and 4) weekly session e-summaries sent via
285 WhatsApp. Although the virtual IHT was effective at reducing VAC by parents (Table 2), we
286 identified several implementation challenges. Only 222/557 parents (40%) downloaded the
287 App; attendance at virtual sessions was lower than previously found for face-to-face sessions
288 (46% versus 69% attendance rate); and poor internet connectivity among facilitators and

289 parents was a limiting factor. In addition, the beneficiary parents were more educated and more
290 likely to be employed than parents in previous studies, suggesting that the virtual intervention
291 was less attractive and/or accessible for more disadvantaged parents. However, 442/557
292 parents (79%) attended at least one virtual session and 292 parents (52.5%) attended five or
293 more (out of ten sessions) indicating reasonable take-up of the virtual groups. In addition,
294 444/499 parents (89%) reported reading the SMS and/or WhatsApp messages. In future
295 studies, SMS and WhatsApp may be effective as a supplement to the Toolbox programs to
296 sustain positive caregiving practices after the end of the initial training.⁵¹ Demonstration videos
297 could be disseminated via health centres, schools, and/or other community venues and via
298 social and broadcast media, rather than via an App. This may support efforts to change social
299 norms related to VAC.⁷ These approaches need to be tested.

300

301 **Principle 7. Plan for program sustainment:** Government services adapt to changes in the
302 political landscape and program sustainment requires ongoing flexibility and adaptation with
303 continued attention to program acceptability, relevance, feasibility and effectiveness, including
304 a program-lead within the government agency.⁵⁶⁻⁵⁸

305 For the Irie Toolbox programs, implementation is through one government sector
306 (education), and hence planning for sustainment is less complex than for multisectoral
307 programs. Sustainment involves working with the ECC to fully integrate the programs into
308 their routine activities, embedding quality monitoring into routine supervisory visits and
309 inspections, and including Irie Toolbox competencies in operational guidelines. For example,

310 the ECC are integrating the ICT into ongoing teacher-training initiatives, the ICT has been
311 aligned with the operational guidelines for early childhood institutions, and we have developed
312 a simple evaluation of teacher practices, adapted from our more complex research
313 measurements,²³ to be used by ECC inspectors as part of their routine visits. A key challenge is
314 the multiple and diverse training needs and competing priorities within the ECC that reduce
315 resource availability to sustain specific programs over time. We work closely with the ECC
316 training manager, advising on appropriate adaptations to the delivery mode of the programs to
317 ensure continued fit within ECC structures and integration into ECC activities.

318

319 Through applying these principles to scale the Irie Toolbox programs, we aim to
320 promote a consistent approach to reducing violence against children and child behaviour
321 problems and increasing caregiver and child competencies, across both home and school
322 contexts, at the population level. In this paper, we only provide a descriptive summary of the
323 implementation processes. In future studies, we will use the RE-AIM (Reach, Effectiveness,
324 Adoption, Implementation, Maintenance) framework to evaluate the implementation of the Irie
325 Toolbox programs at scale.⁵⁹ This framework includes assessments of individual-level impact
326 and institutional- or setting-level impact and thus measures the extent to which evidence-based
327 interventions can be implemented effectively in real-world settings and lead to improvements in
328 public health. We will integrate the RE-AIM framework into a stepped-wedge cluster
329 randomized trial design that is appropriate for service delivery interventions delivered at the
330 level of the cluster (in this case preschools).⁶⁰ We will embed factorial experiments within the

331 larger trial to test implementation strategies in order to identify the optimal level and mode of
332 support required for program facilitators. We will also evaluate the effectiveness of flexible
333 delivery modes for program participants including blended delivery models (combining face-
334 to-face with virtual delivery), and tiered interventions with different intensity interventions
335 delivered according to participants' needs. Identifying successful models for scaling-up early
336 childhood, violence-prevention programs in LMIC is a critical component in reducing the
337 large public health, societal and economic burden associated with violence.

338

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Figure 1. Description of the Irie Toolbox Programs

The Irie Classroom Toolbox

Content: The Irie Classroom Toolbox consists of four modules: 1) Creating an emotionally supportive environment (e.g. use of praise and positive attention, making lessons fun, 2) Preventing and managing child behavior problems (e.g. teaching classroom rules, giving clear instructions, using a discipline hierarchy), 3) Promoting children’s social and emotional skills (e.g. explicitly teaching friendship and emotion skills), and 4) Individual and class-wide behavior planning.

Materials: Intervention materials for teachers include 1) a ‘Tools’ book with simple guidelines on how to use each strategy, 2) an ‘Activity’ book of songs, games, activities and lesson plans, 3) a Resource manual of photocopiable resources (e.g. behavior planning forms, Irie (good news) notes), 4) an Irie Teacher Oath that teachers sign on completion of the program. Teachers also receive resources to use with children including visual aids to teach classroom rules, friendship skills and emotions, and fourteen pictorial social problem-solving stories. Materials are available at www.iriertools.com. Facilitator resources include a scripted training manual, video vignettes, charts to reinforce key points and monitoring tools.

Procedures: The Irie Classroom Toolbox is delivered through a combination of teacher-training workshops and in-class support sessions. Training workshops are delivered by pairs of facilitators with groups of 20-25 teachers. The ICT consists of twenty 90-minute training modules to be delivered over one school year (through full-day workshops, half-day workshops and/or after-school sessions). In workshops, content is introduced through live and video modelling, demonstration and practice, brainstorms and discussions, collaborative problem-solving, goal setting, and small group activities. Each teacher also receives one hour of in-class support every month for 6-8 months to support them in applying the strategies in their classroom. In-class support involves modelling, prompting, and scaffolding, positive feedback, pointing out the effect of the strategies on the children, collaborative problem-solving, and goal setting. Teachers are also given a classroom assignment after each workshop and/or in-class support session to encourage them to use the strategies and engage in reflective practice.

The Irie Homes Toolbox

Content: The Irie Homes Toolbox consists of five modules: 1) promoting positive behavior (e.g. praise, modelling appropriate behavior, child-led play), 2) preventing misbehavior (e.g. giving clear instructions, understanding child behavior, giving children autonomy, teaching household rules), 3) understanding emotions (e.g. regulating own emotions, labelling child’s emotions), 4) managing misbehavior (e.g. redirecting child behavior, withdrawing attention, chillax (time-out), using consequences), and 5) supporting homework.

Materials: Each preschool receives a facilitator kit of reusable resources that include: 1) a scripted training manual, 2) visual aids (e.g. pictures of parents and children to promote discussion), 3) hand-held charts with key points, and 4) the Irie Tower: a tower made from cardboard blocks that acts as a concrete representation of the program. Intervention materials for parents include: 1) a weekly take-home summary card, 2) a weekly Irie Activity Planner (homework assignment record sheet), and 3) an Irie Parent Oath that parents sign on completion of the program.

Procedures: Parents attend 90-minute sessions, once a week for eight weeks in groups of 6-8 parents. Sessions are conducted by a preschool teacher and are held on the preschool compound at the beginning or end of the school day. Parents are introduced to the content via demonstrations, role-plays and group discussions. Facilitators (preschool teachers) use visual aids to prompt discussions, and charts with main points for reinforcement. In addition, parents practice the strategies in pairs within the group and practice child-led play for 10-15 minutes with their child, supported by the facilitator. Home assignments encourage the use of the strategies at home and parents record their progress on a record sheet. There is a focus on providing positive, supportive feedback to parents, making the sessions fun, and collaborative problem-solving. Each session includes: 1) a game or song, 2) feedback from the previous session and discussion of homework assignment, 3) new topic: demonstration, discussion, and practice, 4) introduction of a child-led play or book activity, 5) practicing the activity with their child, and 6) review.

Table 1. Trials of Early Childhood Violence Prevention Interventions in Jamaica

Study	Sample	Intervention	Short-term outcomes
Teacher Training			
<p>Efficacy trial in twenty-four preschools.^{19,23}</p> <p>Children aged 3-6 years</p>	<p>24 preschools randomly assigned to intervention (n=12 preschools, 37 classrooms) or control (12 preschools, 36 classrooms).</p> <p>Three children with the highest level of conduct problems from each class participated in the evaluation of individual child outcomes (113 intervention, 112 control).</p>	<p>Teachers in schools allocated to the intervention were trained in classroom behavior management and how to promote young children social-emotional competence through:</p> <ul style="list-style-type: none"> • Eight full-day teacher training workshops and • Four 1-hour individual sessions of in-class support: once a month for 4 months <p>Intervention used a hybrid of the Incredible Years Teacher Training Program (50%) and the content of the Irie Classroom Toolbox (50%)</p>	<p><u>Teacher Outcomes</u> (measured through observation):</p> <ul style="list-style-type: none"> • Increased teacher positive behaviors: Effect Size (ES)=3.35 (95% CI: 2.70, 3.98) • Decreased teacher negative behaviors: ES=-1.29 (95% CI: -0.87, -1.71) • Increased teacher warmth: ES=2.03 (95% CI: 1.41, 2.67) <p><u>Child Outcomes</u></p> <p><i>Observed class-wide child behavior:</i></p> <ul style="list-style-type: none"> • Increased of class-wide appropriate behavior: ES=0.73 (95% CI: 0.17, 1.30) • Increased class-wide child interest and enthusiasm: ES=0.98 (95% CI: 0.48, 1.50) <p><i>Individual child outcomes:</i></p> <ul style="list-style-type: none"> • Reductions in observed conduct problems at school: ES=-0.42 (95% CI: -0.12, -0.71) • Increased observed friendship skills at school: ES=0.74 (95% CI: 0.41, 1.40) • Decreased teacher-reported behavior difficulties: ES=-0.47 (95% CI: -0.18, -0.76) • Increased teacher-reported social skills: ES=0.59 (95% CI: 0.35, 0.84) • Decreased parent reported behavior difficulties: ES=-0.22 (95% CI: -0.03, -0.42) • Increased child attendance: ES=0.30 (95% CI: 0.05, 0.55)
<p>Pilot study in fourteen primary schools.¹⁴</p> <p>Children aged 6-7 years</p>	<p>14 primary schools randomly assigned to intervention (n=7) or control (n=7). Teachers of grade 1 children participated in the study (27 intervention, 28 control). Four children from each class were randomly selected to participate in the evaluation of individual outcomes.</p>	<p>Teachers in schools allocated to the intervention were trained in selected content from the first three modules of the Irie Classroom Toolbox through:</p> <ul style="list-style-type: none"> • 12 hours of teacher-training workshops • Eight 1-hour individual sessions of in-class support. 	<p><u>Teacher Outcomes</u></p> <ul style="list-style-type: none"> • Reductions in teachers' use of violence against children through observation: ES=-0.73 (95% CI: -0.15, -1.31) • No benefits to teachers' professional well-being: ES=-0.11 (95% CI: -0.63, 0.43) <p><u>Classroom Outcomes</u></p> <p><i>Quality of the classroom environment through observation (using the CLASS K-3)</i></p> <ul style="list-style-type: none"> • Increased emotional support: ES=1.22 (95% CI: 0.57, 1.87) <p><u>Child Outcomes</u></p> <p><i>Observed class-wide child behavior:</i></p> <ul style="list-style-type: none"> • No benefits to class-wide aggression: ES=-0.20 (95% CI: -0.73, 0.33) or prosocial behavior: ES=0.18 (95% CI: -0.36, 0.72) <p><i>Individual child outcomes</i></p> <ul style="list-style-type: none"> • Marginal benefits to a composite of child self-regulation, language and maths reasoning skills: ES=0.25 (95% CI: -0.02, 0.52), p=0.07 • No significant benefit to child behavior difficulties or prosocial skills on the SDQ or to a composite of child academic achievement in reading, spelling and phonics.

Effectiveness trial in seventy-six preschools. ¹⁵ Children aged 3-6 years	76 preschools randomly assigned to intervention (n=38 preschools, 119 classrooms) or control (n=38 preschools, 110 classrooms). Up to twelve children aged 4 years were randomly selected to participate in the evaluation of individual child outcomes (441 intervention, 424 control)	Teachers in schools allocated to the intervention were trained in the Irie Classroom Toolbox through: <ul style="list-style-type: none"> • Five full-day teacher training workshops (30 hours) • Eight 1-hour individual sessions of in-class support 	<u>Teacher Outcomes</u> <ul style="list-style-type: none"> • Intervention teachers used less violence against children (measured through observation) than control teachers: -67.12% (95% CI: -53.52, -80.71). • Benefits to teachers' professional well-being not significant: ES=0.18 (95% CI: -0.03, 0.39) <u>Classroom Outcomes</u> <p><i>Quality of the classroom environment through observation (using the CLASS Pre-K)</i></p> <ul style="list-style-type: none"> • Increased emotional support: ES=0.65 (95% CI: 0.43, 0.88) • Increased classroom organisation: ES=0.49 (95% CI: 0.24, 0.74) • Increased instructional support: ES=0.61 (95% CI: 0.31, 0.97) <u>Child Outcomes</u> <p><i>Observed class-wide child behavior:</i></p> <ul style="list-style-type: none"> • No benefits to class-wide child aggression: ES=0.07 (95% CI: -0.16, 0.29) • Increased class-wide prosocial behavior: ES=0.42 (95% CI: 0.17, 0.71) <p><i>Individual child outcomes</i></p> <ul style="list-style-type: none"> • Increased child inhibitory control through direct testing: ES=0.18 (95% CI: 0.05, 0.32) • Fewer children in intervention schools in the clinical range for behavior difficulties: Odds ratio (OR): 0.46 (0.22, 0.94) • No significant benefits to child behavior difficulties or prosocial skills on the SDQ
Parenting Interventions			
Efficacy trial in eighteen preschools. ²⁶ Children aged 2-6 years	18 preschools randomly assigned to intervention (n=9) or control (n=9) Minimum of 12 parents per school recruited into the study (115 intervention, 108 control)	Parents in intervention schools participated in the Irie Homes Toolbox program. Sessions were held once a week for 8 weeks with groups of six parents on the preschool compound.	<u>Parent Outcomes</u> <ul style="list-style-type: none"> • Reductions in parents' use of violence against their child: ES=-0.29 (95% CI: --0.05, 0.52) • Increases in parents' involvement with their child: ES=0.30 (95% CI: 0.03, 0.57) <u>Child Outcomes</u> <ul style="list-style-type: none"> • No main effects to parent- and teacher-reported child behavior difficulties on the SDQ • Significant reductions in parent-reported child behavior difficulties for children above the 50th percentile on initial behavior difficulties: ES=-0.36 (95% CI: -0.03, -0.68)
Efficacy trial of virtual Irie Homes Toolbox. ²⁷ Children aged 2-6 years	1,113parents (recruited via SMS) randomly assigned to intervention (n=557) or control (n=556)	Parents allocated to the intervention group were invited to participate in the Virtual Irie Homes Toolbox delivered over a 10 week period consisting of: <ul style="list-style-type: none"> • Access to a data free App • 3 SMS messages/week • Weekly 1-hour virtual parenting sessions with groups of 8-9 parents. 	<u>Parent Outcomes</u> <ul style="list-style-type: none"> • Reductions in parents' use of violence against their child: ES=-0.12 (95% CI: -0.01, -0.24) at post-test; ES=-0.13 (95% CI: -0.01, -0.25) at nine-month follow up • Reductions in parents' attitudes towards violence against children: ES=-0.20 (95% CI: -0.10, -0.30) at post-test; ES=-0.14 (95% CI: -0.02, -0.26) at nine month follow-up <u>Child Outcomes</u> <ul style="list-style-type: none"> • Reductions to child emotional problems on the SDQ: ES=-0.17 (95% CI: -0.07, -0.27) • No benefits to child conduct problems on the SDQ

ES: effect size; CI: confidence interval; CLASS: Classroom Assessment Scoring System; SDQ: Strengths and Difficulties Questionnaire;

Table 2. Follow-up Studies of Early Childhood, Teacher-Training, Violence Prevention Programs

Study	Sample	Longer-term outcomes
<p>Follow up of efficacy trial in twenty-four preschools.^{23,24}</p> <p>Children aged 3-6 years on enrolment</p>	<p>24 preschools randomly assigned to intervention (n=12 preschools, 37 classrooms) or control (12 preschools, 36 classrooms).</p> <p><u>Follow-up of teachers at 6 months</u> Teachers were followed-up six months after the end of the intervention.</p> <p><u>Follow-up of individual children in grade one of primary school</u> Five children from each class with the highest level of initial conduct problems in preschool were followed up in grade one of primary school (181 intervention, 183 control).</p>	<p><u>Follow-up 6 months after the end of intervention in the 24 preschools</u></p> <p><u>Observed teacher practices</u></p> <ul style="list-style-type: none"> • Increased teacher positive behaviors: Effect size (ES)=2.70 (95% CI: 2.00, 3.41) • Decreased teacher negative behaviors: ES=-0.98 (95% CI: -0.52, -1.44) • Increased teacher warmth: ES=0.91 (95% CI: 0.46, 1.43) <p><u>Observed class-wide Child Behavior:</u></p> <ul style="list-style-type: none"> • Increased class-wide appropriate behavior: ES=0.50 (95% CI: 0.03, 0.97) • Increased class-wide child interest and enthusiasm: ES=0.78 (95% CI: 0.03, 1.53) <p><u>Individual Child Outcomes (measured in grade one of primary school):</u></p> <p><i>Child behavior</i></p> <ul style="list-style-type: none"> • No significant benefits to observed conduct problems at school: ES=-0.13 (95% CI: -0.32, 0.05) • Marginal benefits to teacher-reported conduct problems: (ES=-0.16 (95% CI: -0.35, 0.02)) and social skills: ES=0.19 (95% CI: -0.01, 0.38) • No benefits to parent-reported conduct problems (ES=0.10 (95% CI: -0.08, 0.30)) and social skills: ES=-0.07 (95% CI: -0.27, 0.14) <p><i>Child school achievement, self-regulation and school attendance:</i></p> <ul style="list-style-type: none"> • Increased academic achievement: ES=0.23 (95% CI: 0.04, 0.42) • Increased oral language skills: ES=0.28 (0.08, 0.48) • Increased self-regulation: ES=0.25 (0.07, 0.43) • Increased child attendance: ES=0.30 (95% CI: 0.10, 0.49)
<p>Follow up of effectiveness trial in 76 preschools.¹⁵</p>	<p>76 preschools randomly assigned to intervention (n=38 preschools, 119 classrooms) or control (n=38 preschools, 110 classrooms).</p> <p>Teachers were followed-up 1 year after the end of the intervention</p>	<p><u>Teacher Outcomes</u></p> <ul style="list-style-type: none"> • Intervention teachers used less violence against children (measured through observation) than control teachers: -53.86% (95% CI: -71.08, -36.65). • Improved teachers' professional well-being: ES=0.26 (95% CI: 0.03, 0.48) • Increased teacher retention in intervention schools: 88% intervention versus 77% control teachers, p=0.03 <p><u>Classroom Outcomes</u></p> <p><i>Quality of the classroom environment on the CLASS Pre-K</i></p> <ul style="list-style-type: none"> • Increased emotional support: ES=0.50 (95% CI: 0.20, 0.79) • Increased classroom organisation: ES=0.42 (95% CI: 0.14, 0.69) • No significant benefits for instructional support: ES=0.29 (95% CI: -0.06, 0.57) <p><u>Child Outcomes</u></p> <p><i>Observed class-wide child behavior:</i></p> <ul style="list-style-type: none"> • No benefits to class-wide child aggression: ES=-0.14 (95% CI: -0.42, 0.16) or prosocial behavior: ES=0.22 (95% CI: -0.08, 0.53)

ES: effect size; CI: confidence interval; CLASS: Classroom Assessment Scoring System; SDQ: Strengths and Difficulties Questionnaire;

Table 3. Training Government Staff to Implement Early Childhood, Violence Prevention Programs

Activity	Training of Government /Educational Staff by Research Team	Government Staff Delivered Intervention
Irie Classroom Toolbox		
National dissemination of a 1-day training for primary school teachers in grades one-to-three	<ul style="list-style-type: none"> • We trained technical staff from the Ministry of Education, Jamaica to deliver a one-day training for primary school teachers. • Technical staff were trained through two full-day workshops 	<ul style="list-style-type: none"> • These technical staff trained all government teachers of grades 1, 2 and 3 as part of a national training initiative. • Over a two year period, approximately 5,000 teachers participated in the one-day workshop. • Teachers were trained in groups of 20-30 participants
Training ECC middle managers in the Irie Classroom Toolbox	<ul style="list-style-type: none"> • We trained 16 middle managers of the ECC (the senior inspector and senior development officer in each of the eight educational regions) to deliver the Irie Classroom Toolbox training. • Middle Managers attended 4 days residential training followed by monthly 1-day trainings for 6 months. 	<ul style="list-style-type: none"> • Middle managers worked in pairs within their region to deliver the Irie Classroom Toolbox training to a group of 20-25 preschool teachers over one school year. • Over 160 preschool teacher participated in this training. • Monthly supervision was provided by the research team.
ECC middle managers train ECC field officers in the Irie Classroom Toolbox	<ul style="list-style-type: none"> • After the middle managers had delivered the Irie Classroom Toolbox training to one group of teachers (see above), we trained them to train the ECC field officers (development officers and inspectors) within their region to deliver the training with preschool teachers. • Middle Managers attended three days of train-the-trainer workshops. 	<ul style="list-style-type: none"> • Middle Managers worked in pairs to train the ECC field officers to deliver the Irie Classroom Toolbox to teachers within their district. • All ECC field officers (n=100) participated in three full-day training workshops with 10-16 field officers in each group. • Supervision was provided by the research team. <p><i>Due to Covid-19, the teacher-training was postponed.</i></p>
Training ECC field officers in selected content from the Virtual Irie Classroom Toolbox	<ul style="list-style-type: none"> • We trained 42 ECC field officers (4-6 officers per educational region) to conduct virtual training sessions from the Irie Classroom Toolbox. • Officers were trained in groups of 14 participants for a total of 24 hours training. • Officers were trained to conduct four individual sessions. Prior to each conducting each session, officers attended two three-hour virtual training sessions (1 demonstration session and 1 practice session). 	<ul style="list-style-type: none"> • ECC field officers worked in pairs to deliver the training to two groups of 20 preschool teachers within their educational region. • Preschool teachers attended 2-hour virtual training sessions once a month for four months. • A total of 840 preschool teachers participated in the training. • The Middle Managers supervised the teacher-training workshops
Irie Homes Toolbox		
Training preschool teachers to implement the Irie Homes Toolbox	<ul style="list-style-type: none"> • We trained two teachers from nine preschools (18 teachers) to deliver the Irie Homes Toolbox to parents of children in their school. • Teachers were trained through two full-day workshops. 	<ul style="list-style-type: none"> • Preschool teachers delivered the Irie Homes Toolbox to 6-8 parents in their school (approximately 60 parents each school term). • The research team provided weekly or fortnightly supervision for the first round of implementation.
Training ECC field officers to deliver the Virtual Irie Homes Toolbox	<ul style="list-style-type: none"> • We trained 6 Community Relations Officers and 24 Field Officers from the ECC to implement the Virtual Irie Homes Toolbox. • Officers were trained virtually with 15 officers per group • Training consisted of three 4-hour virtual workshops prior to intervention implementation followed by weekly 2-3 hour trainings for nine weeks during intervention implementation. 	<ul style="list-style-type: none"> • Community Relations Officers worked with 4 groups of parents and Field Officers worked with 2 groups of parents. • Parents attended 1-hour virtual sessions weekly for 10 weeks in groups of 8-10 parents. • A total of 557 parents were recruited to participate in the training.

Table 4. Designing Scalable Interventions Using the Active Implementation Framework³²

	REQUIREMENTS FOR AN EFFECTIVE, SCALABLE INTERVENTION	STRATEGIES USED TO DESIGN THE IRIE TOOLBOX PROGRAM
Effective innovation	<ul style="list-style-type: none"> • Evidence based content and process of delivery • Acceptable, feasible, and relevant for participants, facilitators and supervisors • Structured, manualised intervention 	<ul style="list-style-type: none"> • Incorporate common core components of evidence-based, violence-prevention programs • Use evidence-based behavior change techniques in intervention delivery • Develop a theory of change for the interventions • Collaborate with end users and key stakeholders in developing the intervention from the outset • Operationalise the content and process of delivery for the Jamaican context based on extensive formative research including: <ul style="list-style-type: none"> - interviews with end users and key stakeholders to identify perceived needs and potential enablers and barriers to program uptake - observations of caregiver-child interaction and the caregiving environment - iterative piloting of the intervention in a diverse sample of preschools • Develop detailed facilitator manuals and associated training resources • Develop resources for participant parents/teachers to support implementation (e.g. content summaries, homework assignments, materials to use with children)
Effective implementation	<ul style="list-style-type: none"> • In-built flexibility: program can be delivered differently according to preferences and needs • High quality training & ongoing support of frontline facilitators • Availability of technical tools to support implementation • In-built monitoring and evaluation system improvements 	<ul style="list-style-type: none"> • Develop a modular intervention that can be delivered flexibly depending on staff and participant availability and participants’ needs • Develop resources that can be used in face-to-face and virtual training to permit blended delivery • Develop clear training and supervision protocols (e.g. documenting content, methods, frequency, duration, group size) • Provide sufficient training and support for staff responsible for training and supervision, with ongoing quality monitoring • Provide opportunities for training new staff • Develop training and supervisory manuals and quality monitoring tools and train senior staff in their use • Collect timely monitoring and evaluation data that is easy to use • Build in iterative feedback loops to ensure lessons learnt inform program revisions
Enabling Context	<ul style="list-style-type: none"> • Alignment with mission and goals of the implementing organisation • Availability of frontline workers and supervisory staff: sufficient staff to implement the program and fit with existing duties 	<ul style="list-style-type: none"> • Form a collaborative group with the Early Childhood Commission to explicitly map how the Irie Toolbox aligns with their Strategic Plan, the Early Childhood Curriculum, the Operational Standards for Early Childhood Institutions and the Inspection Documents. • Develop the intervention so that it can be feasibly delivered using the existing organisational structure and existing staff of the ECC and Ministry of Education.

Table 5. Dynamic Adaptation During Initial Implementation

Rationale for Adaptation	Source of the Evidence	Adaptations to Content
<ul style="list-style-type: none"> • It was challenging for parents and teachers to problem-solve what strategies were most appropriate to deal with different situations and different child behaviors. • Understanding situations from the child’s perspective was also difficult. 	<ul style="list-style-type: none"> - Facilitator reflections on training /in-class support sessions. - Participant feedback during training/in-class support sessions. 	<ul style="list-style-type: none"> • We designed additional content to ensure participants developed a better understanding of young children’s behavior and the reasons for child ‘misbehavior’. • We placed greater emphasis on children’s emotions and thoughts when discussing child behaviors.
<ul style="list-style-type: none"> • Self-identifying as an Irie Parent or an Irie Teacher - was a powerful motivator for parents and teachers to adopt the strategies introduced through the programs. 	<ul style="list-style-type: none"> - Facilitator reflections on training /in-class support sessions. - Qualitative interviews with participants and facilitators 	<ul style="list-style-type: none"> • We included explicit references to being an Irie Parent / Irie Teacher throughout the program (e.g. in discussions, problem-solving activities, practice activities, homework assignments). • Parents/teachers sign an ‘I am an Irie Parent/Teacher’ oath on completion of the program.
<ul style="list-style-type: none"> • Some parents and teachers viewed corporal punishment as severe physical discipline only. Terms such as ‘touch’, ‘brush off’ are used to describe corporal punishment that involves slapping. • Similarly, psychological aggression (e.g. threatening to hit a child, yelling) is not perceived as violence. 	<ul style="list-style-type: none"> - Facilitator reflections on training /in-class support sessions. - Participant feedback during training/in-class support sessions. - Qualitative interviews with participants and facilitators 	<ul style="list-style-type: none"> • We have included clear definitions of violence against children using common terminology used in Jamaica. • We explicitly link the use of positive discipline, and refraining to use corporal punishment and psychological aggression, as the behavior of an Irie Parent/Teacher.
<ul style="list-style-type: none"> • Although the frequency of teachers’ use of violence against children reduced by 67% in our effectiveness trial, 72% of teachers continued to use corporal punishment and 55% continued to use psychological aggression. • Teachers reported resorting to violence when they were frustrated by children’s behavior. 	<ul style="list-style-type: none"> - Quantitative and qualitative evaluation of intervention trials 	<ul style="list-style-type: none"> • We have designed additional content to increase teachers’ executive function skills and self-regulatory capacities. • This includes strengthening the content around individual goal-setting, and training teachers in ‘calming down’ techniques (e.g. stop, think and problem-solve).
<ul style="list-style-type: none"> • Principal support was an important factor in setting school-wide expectations, promoting teachers’ use of the strategies and promoting the programs with parents. 	<ul style="list-style-type: none"> - Facilitator reflections on training /in-class support sessions. - Qualitative interviews with participants and facilitators 	<ul style="list-style-type: none"> • We developed four 90-minute principal-training modules focussing on how to: 1) support teachers, 2) engage parents in the programs, and 3) create an ‘Irie School’.
<ul style="list-style-type: none"> • Teachers needed additional guidelines and support for integrating the strategies into everyday teaching and learning activities 	<ul style="list-style-type: none"> - Facilitator reflections on training /in-class support sessions. - Participant feedback during training/in-class support sessions. 	<ul style="list-style-type: none"> • We prepared structured lesson plans, using content from the Jamaican early childhood curriculum, to guide teachers in how to utilise key strategies during everyday lessons.
<ul style="list-style-type: none"> • Although the ICT led to benefits to the quality of instructional support in early childhood classrooms with an effect size of 0.61SD, scores remained in the low range and the benefits were not sustained at one-year follow-up. 	<ul style="list-style-type: none"> - Quantitative evaluation of the ICT 	<ul style="list-style-type: none"> • We developed an additional module for the ICT to promote teachers’ use of appropriate instructional support strategies. • This included: 1) how to promote children’s critical thinking skills, 2) how to give affirmative and corrective feedback, and 3) language facilitation skills. These skills were introduced through interactive reading activities and then generalised to everyday teaching and learning activities.

