



**Evaluation of the  
‘Stay One Step Ahead’  
home safety programme  
Final Report, May 2022**



## Table of Contents

List of tables .....	5
List of figures.....	6
List of abbreviations.....	7
Executive Summary.....	8
Plain English summary .....	11
Chapter 1 Background .....	12
Rationale for this research.....	13
Aims and objectives .....	14
Patient and public involvement.....	14
Structure of this report .....	14
Chapter 2 The “Stay One Step Ahead” intervention.....	15
Intervention development.....	15
Intervention amendments .....	16
Training .....	19
Aims of the training sessions .....	19
Practicalities of the training .....	19
Content of the training sessions .....	20
Printed resources distributed at the training sessions .....	21
Chapter 3 Study methodology .....	22
Introduction .....	22
Study design.....	22
Setting.....	22
Participants, recruitment, and consent procedures.....	22
Parents.....	22
Service providers.....	23
Primary Care (GP) practices .....	25
Outcome measures.....	25
Primary outcome .....	25
Secondary outcomes.....	26
Training evaluation .....	27
Withdrawals.....	30
Timescale .....	30
Control area selection.....	30
Sample size calculation .....	30

Controlled before-and-after study.....	30
Economic evaluation.....	31
Data analysis .....	31
Controlled before-and-after study.....	31
Interviews and observations.....	32
Intervention delivery data .....	32
Home safety training questionnaires.....	33
Ethics committee approval .....	33
NHS REC .....	33
Faculty of Medicine and Health Sciences .....	33
Management of the study .....	33
Nottingham operational group.....	34
Steering group.....	34
Finance.....	34
Funding source.....	34
Participant stipends and payments .....	34
Modification of the study .....	34
Protocol amendments .....	34
Chapter 4 Effectiveness of the “Stay One Step Ahead” intervention at improving adoption of home safety practices and lowering injury rates.....	36
Results.....	36
Chapter 5 Fidelity of the implementation of the “Stay One Step Ahead” intervention.....	42
Study design recap.....	42
Results.....	43
Adherence to the SOSA intervention: Shared intervention components .....	43
Adherence to the SOSA intervention: Practitioner-specific intervention components .....	45
Chapter 6 Parental perspectives of the barriers and facilitators to child home injury prevention.....	48
Results.....	48
Qualitative analysis of barriers and facilitators to home safety promotion by parents.....	48
Parental knowledge and self-efficacy .....	52
Parental acceptability and satisfaction with home safety promotion.....	53
Chapter 7 Practitioner perspectives of the barriers and facilitators to child home injury prevention	55
Results.....	55
Barriers and facilitators to child home injury prevention.....	55
Acceptability and satisfaction of practitioners to delivering home safety promotion .....	60

Chapter 8 Cost effectiveness of the “Stay One Step Ahead” intervention.....	62
Introduction .....	62
Methods.....	62
Cost of SOSA intervention.....	62
Effectiveness of SOSA intervention.....	63
Cost-effectiveness of the SOSA intervention.....	63
Chapter 9 Training evaluation.....	65
Results.....	65
Staff training numbers .....	65
Knowledge, confidence, and belief scores.....	65
Satisfaction with the training.....	66
Thematic analysis of free text fields relating to training .....	67
Chapter 10 Overall discussion.....	70
What this study shows .....	70
Comparison with other studies.....	71
Home safety practices.....	71
Implementation fidelity .....	71
Parent interviews .....	72
Service provider interviews .....	72
Health economic analysis.....	73
Training evaluation .....	73
Strengths and limitations.....	73
Chapter 11 Conclusions and recommendations.....	76
Recommendations for practice.....	76
Recommendations for future research.....	76
Acknowledgements.....	78
Dissemination .....	79
Peer reviewed papers .....	79
Conference presentations.....	79
Awards .....	79
References .....	80
Appendices.....	86

## List of tables

Table 1: Structure of this report .....	15
Table 2: Summary of elements of training sessions by practitioner groups .....	20
Table 3: Summary of resources provided .....	21
Table 4: Timing of and data collection tools used for measurement of each outcome .....	28
Table 5: Matching criteria for control and intervention wards .....	31
Table 6: Baseline characteristics for families in intervention and control groups .....	36
Table 7: Safety practices at baseline, 12 and 24 months comparing intervention to control groups..	38
Table 8: Parent-reported medically attended injury and injury-associated health service presentation rates (per 100 person years) for intervention and control groups.....	40
Table 9: Parent self-reported receipt of home safety advice from a practitioner source within the previous year at 12 and 24 months from recruitment. ....	44
Table 10: Themes, sub-THEMES, and illustrative quotes .....	49
Table 11 Safety-related developmental milestone knowledge score, and self-efficacy score.....	52
Table 12 Parental acceptability and satisfaction with home safety promotion .....	53
Table 13 Interviews conducted by practitioners according to commencement of Coronavirus public health protection .....	56
Table 14: Barriers and facilitators to home safety promotion by practitioners .....	57
Table 15 Acceptability and satisfaction of providers delivering home safety promotion .....	60
Table 16: Total discounted cost for SOSA intervention by activity (no development costs) .....	63
Table 17: Discounted costs (3.5% per annum) for healthcare by consultation type and ward .....	63
Table 18: Training sessions by participants .....	65
Table 19: Changes in knowledge, belief and confidence scores pre-post training.....	65
Table 20: Satisfaction with and learning from the event .....	66
Table 21: Theme 1 - Impact of home safety training.....	67
Table 22: Theme 2 Potential further training .....	69

## List of figures

Figure 1: Stay One Step Ahead intervention development process .....	17
Figure 2: Logic model .....	18
Figure 3: Inclusion and exclusion criteria.....	24
Figure 4: Overview of Intervention Components .....	42
Figure 5: Electronic medical record data of self-reported SOSA Home Safety Checklist use at child health reviews by Health Visiting Team members .....	45
Figure 6: Cost-effectiveness acceptability curves for the SOSA intervention per additional home with the primary outcome measure and per injury avoided.....	64

## List of abbreviations

<b>Abbreviation</b>	<b>Description</b>
CAPT	Child Accident Prevention Trust
CBA	Controlled Before-and-After
CC	Children's Centre
CI	Confidence Interval
CRN	Clinical Research Network
FM	Family Mentor
FMHS	Faculty of Medicine and Health Sciences
GP	General Practitioner
HV	Health Visitor
HVT	Health Visiting Team
IMD	Index of Multiple Deprivation
IPB	Injury Prevention Briefing
IQR	Interquartile Range
MSM	Monthly Safety Message
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
OR	Odds Ratio
PIS	Participant Information Sheet
QA	Quality Assurance
RoSPA	Royal Society for the Prevention of Accidents
SOP	Standard Operating Procedure
SOSA	Stay One Step Ahead
SSBC	Small Steps Big Changes
SW	Safety Week
UoN	University of Nottingham

## Executive Summary

Unintentional injuries occurring at home are an important cause of death, disability, and health service use in the under 5s in England. Home safety education, home safety checks and the provision and fitting of home safety equipment significantly improve the safety of homes and reduce hospital admissions for injury. These interventions are recommended by NICE but are not systematically implemented within child public health or early year's services.

We co-developed an evidence-based home safety promotion programme - Stay One Step Ahead (SOSA) - with parents, practitioners, and injury prevention experts from Nottingham City, and evaluated its implementation in 4 electoral wards in Nottingham taking part in the Big Lottery funded Small Steps Big Changes (SSBC) programme. These wards have high levels of health, educational and social need. We chose 5 wards who were not taking part in the SSBC programme matched on injury rates, deprivation and minimising overlap of health visiting caseloads to be control wards and these did not receive the SOSA intervention.

The SOSA intervention comprised standardised home safety advice provided through

- a) use of home safety checklists by health visiting teams (HVTs) in child health reviews at 9-12 months and 24-30 months and at post-accident contacts,
- b) monthly safety messages distributed by HVTs, children centres (CCs) and family mentors (FMs),
- c) four safety weeks annually delivered by CCs,
- d) 8 manualised home safety activities delivered by FMs, and
- e) referral to relevant agencies by HVTs, CCs and FMs.

We evaluated implementation of the SOSA intervention using a controlled before-and-after study with an embedded fidelity assessment, qualitative interviews of parents and service providers, economic evaluation, and evaluation of service provider training. The primary outcome for the study was possession of a fitted and working smoke alarm, a safety gate on stairs and storing poisons out of reach. We also measured other home safety practices, injury rates, parental knowledge of injury risk and self-efficacy to prevent injuries. Outcomes were measured using parental completed questionnaires 12 and 24 months after joining the study. Fidelity was assessed by measuring intervention delivery, observations of provider-parent contacts, parent and service provider questionnaires and interviews. The economic evaluation estimated the incremental cost per additional home with the primary outcome and the incremental cost per injury avoided compared to usual care. Service provider training was evaluated by questionnaires.

A total of 762 (361 intervention and 401 control) parents were recruited to the study, 528 (233 (65%) intervention and 295 (74%) control) of whom completed follow-up questionnaires at 24 months.

At 24 months 56% of intervention parents and 49% of control parents reported the primary outcome measure (odds ratio (OR) 1.58 (95%CI 0.98, 2.55)). These findings were statistically significant when missing data was accounted for (OR 1.75 (1.12, 2.73)). A statistically significant higher proportion of intervention parents reported storing poisons out of reach (intervention 73%, control 67%, OR 1.81 (1.06, 3.07)), having a fire escape plan (intervention 77%, control 67%, OR 1.81 (1.06, 3.08)) and having a fireguard (or no fire) (intervention 85%, control 80%, OR 3.17 (1.63, 6.16)). Intervention parents also reported a statistically significant higher number of safety practices than control parents (intervention 25% reported all 9 practices, control 14%; difference between means 0.46 (0.13, 0.79)).

Injury rates were higher in intervention families than control families at the start of the study and lower in intervention than control families at 24 months follow-up, but these differences were not statistically significant.

Intervention parents reported slightly lower knowledge scores and slightly higher self-efficacy scores than control parents at 24 months follow up, but these differences were not statistically significant.

Fidelity of SOSA intervention delivery varied between service providers and across intervention components. Overall FMs delivered the intervention with greater fidelity than other service providers. Intervention components most frequently adapted included the use of home safety checklists by HVTs and the format and frequency of safety weeks delivered by CCs.

A total of 4859 home safety checklists were completed (completed for 86% of reviews) and more than 500 families attended safety weeks (SWs). Monthly safety message (MSM) use varied across providers (FMs (75% used), HVTs (38% used), CC staff (50% used)). More intervention service providers reported signposting/referring to other agencies (Intervention: 90% HVTs, 100% CCs, 86% FMs vs. Control: 19% HVTs, 20% CCs). FMs used home safety activities in their manual in all observed contacts (n=22). Significantly more intervention than control families reported receiving home safety advice (OR 2.59 (1.59, 4.21), advice from  $\geq 2$  practitioners (OR 5.09 (1.34, 19.33), advice from CC staff (OR 3.10 (1.16, 8.27) and home safety leaflets (OR 1.90 (1.11, 3.23)).

Parent interviews illustrated that facilitators to home injury prevention for parents included attitudes to injury severity and the importance of prevention, acquisition of knowledge regarding home safety, information provided by professionals, credibility of information provision, and ease of access to services and support, including free safety equipment. Themes identified were similar for intervention and control parents, except for intervention parents reporting trusting relationships with FMs through sustained and consistent support, which facilitated home safety discussions and changes to the home. Barriers to home injury prevention were similar for intervention and control parents and included perceiving some minor injuries as inevitable, information provision that was too brief or rushed, infrequent health visitor contacts, lack of home safety checks and inconsistent information from different sources. Control parents also reported some difficulties with accessing CCs.

Service provider interviews illustrated that the facilitators for delivering the intervention included having a positive attitude towards the aims of the intervention and the resources provided, a structured intervention enabling some practitioners to find time to deliver the intervention, good relationships with families and using personal experience and learnt techniques (e.g., motivational interviewing). Barriers to intervention delivery included difficulty finding time to deliver the intervention, disruption caused by the Coronavirus pandemic, and forgetting to implement aspects of the intervention, or feeling ill at ease in performing certain tasks.

Parents generally found home safety promotion advice from HVT members and FM acceptable and their preferred source of home safety information, describing them as an authority with the necessary expertise. Parents with other children felt they were less in need of home safety support. Satisfaction with the content and format of the intervention showed wider variability whereby some parents would have preferred to review information in their own time whereas several explained the challenge of engaging with these materials due to time constraints associated with childcare and being 'overwhelmed' with paperwork.

In terms of acceptability of, and satisfaction with, home safety promotion amongst providers, this was influenced by how much they believed the resources were effective. Practitioners who believed

in the efficacy of the intervention and liked the SOSA materials were more likely to prioritize discussions around home safety and deliver resources as intended. By contrast, practitioners were reluctant to use or even omitted resources they found unacceptable because of concern about how such resources would impact on their relationship with parents. Satisfaction with the format of the resources varied, with some appreciative of the novel and interesting format and some concerned that resources like the checklist were just 'tick box exercises'

The cost per additional family having a fitted and working smoke alarm, a safety gate on stairs and storing poisons out of reach was £85.93, and the cost per injury avoided was £11.22. The return on investment for the intervention was £0.96; suggesting the intervention was virtually cost neutral.

The training evaluation showed that overall, the format and content of the training was acceptable and useful, although variable depending on the background of the attendee (CC, FM or HV). Providing practitioners with evidence that they could share with parent, in written and verbal formats, increased their confidence to have conversations about home safety and improved their practice. Based on feedback that the sessions were too long, the duration of the training was reduced from 3 hours to 2 hours. Refresher training and training for new members of staff needs to be considered in the future.

## Plain English summary

Children should be safe in their homes, yet every year in England around 370,000 children under five have an injury that requires a visit to a hospital. Around 40,000 will be admitted into hospital because of this injury and sadly around 50 may die. It is even more distressing that injuries are more likely to occur in families living in the most disadvantaged locations.

But injuries in the home can be prevented. Research has shown that the provision and fitting of home safety equipment, such as stair gates, alongside advice from healthcare professionals, can reduce injuries and improve parent home safety practices. The National Institute of Health and Care Excellence (NICE) recommends that this type of prevention activity is available across England, but this is not yet uniformly available and home safety advice is not provided systematically.

Researchers at the University of Nottingham worked with leaders, professionals, and parents in the Small Steps Big Changes (SSBC) programme to develop a standardised approach to home safety for families with children under three. Together they developed the Stay One Step Ahead (SOSA) home safety programme. This included guides on home safety for use in child health reviews, messages about home safety for parents and activities with families during home visits with Family Mentors (peer mentors available in the four SSBC wards: Arboretum, Aspley, Bulwell, and St Ann's).

Researchers assessed whether SOSA helped to make homes safer in areas where it was used compared to homes in five other areas that were not SSBC wards (Clifton North and South, Bridge, Sherwood and Bestwood). They also looked at parents and professionals views of the programme, how confident parents felt to be able to make their homes safer and if the programme saved the NHS money by preventing hospital attendances and admissions. Professionals were trained to use SOSA consistently and this training was evaluated too.

In total 762 families took part in the research and 361 of these families were in the SSBC areas where SOSA was available. Two years after the start of the programme, 56% of parents in the SSBC areas had safe homes (measured as having a stair gate, fitted, and working smoke alarm and safe storage of poisons) versus 49% of families in the non-SSBC areas. The strongest impact was on the safe storage of poisons whereby families that received SOSA were 81% more likely to store them safely. In addition, families in the SSBC areas reported undertaking a higher number of safety practices, whereby 25% said they implemented all nine practices measured versus 14% in the non-SSBC families. The number of injuries reported did not reduce in the areas with SOSA. This may have been because it was a small research project and not enough had occurred to see a difference.

Some aspects of the programme were delivered as intended, but some were adapted over time. The Coronavirus pandemic had a big impact on how SOSA was delivered. Parents liked the programme and valued the time spent on injury prevention with Family Mentors. The people delivering the programme also valued having a structured approach to home safety though it was difficult to fit it in to already stretched appointments with families.

The SOSA programme cost £43.66 per family and for every £1 spent there was 96 pence returned; making it virtually cost neutral. The training was acceptable and useful to those providing SOSA though areas for improvement were identified.

In conclusion, the Stay One Step Ahead home safety programme, delivered in the Small Steps Big Changes wards, did help to make homes safer for children, improving poison storage, and increasing the total number of home safety practices within families. Overall 95% of costs invested are recovered and valued by families and services that work with families. The researchers recommend that it is continued.

## Chapter 1 Background

Unintentional injuries represent a significant cause of childhood morbidity and mortality. (1, 2) Globally more than 270,000 children under the age of 5 years lose their lives every year to injuries.(3) Importantly, the burden of injury falls unequally whereby children in low-income countries and those from poorer neighbourhoods in high-income countries are the most vulnerable.(4-6)

In England, each year unintentional injuries in children aged under 5 result in an estimated 370,000 visits to emergency departments and approximately 40,000 emergency hospital admissions.(7) The vast majority of these injuries occur in the home(6) and are non-fatal; however they are still responsible for approximately 55 deaths per year.

Injuries have an immediate physical effect on the child and may also result in longer term consequences. For example, injuries like burns and scalds may lead to scarring and deformities and impact on the child's psychological and social wellbeing.(5, 7) A major injury resulting in a disability will also have a large impact on family life and may lead to financial constraints, family tension and effects on mental health.(8, 9)

A number of risk factors play a role in determining unintentional injury rates in children. Children living in more disadvantaged circumstances are at higher risk of injury with a thirteen fold difference in mortality rates being found between children of parents in socio-economic class I (high managerial, administrative and professional occupations) and class 8 (never worked and long-term unemployed).(10) Living in rented accommodation is also associated with higher unintentional injury rates, (11) potentially explained in part by difficulties in accessing, installing and utilising safety equipment.(12, 13) Parental factors associated with higher rates of unintentional injury include young maternal age at the time of delivery, (11, 14) single-parent families, (15-17) and parental mental health problems.(16-18)

In England, the National Institute for Health and Care Excellence (NICE) has published public health guidelines on the prevention of unintentional injuries amongst those less than 15 years of age with specific recommendations being made for child home safety.(19) More recently NICE has endorsed an Injury Prevention Briefing (IPB) for practitioners, linked to the guidelines.(20) The target audiences for the IPB are managers and practitioners of organisations such as family support centres known as children's centres in the UK, public health nursing teams referred to as health visiting teams in the UK, other family support agencies, and fire and rescue services.

Systematic review evidence from the Cochrane Collaboration have found that home safety interventions most commonly delivered to parents in the home, including education and in some cases also including safety equipment provision are successful in improving safety practices in the home and may also help to reduce rates of injuries.(21)

Economic evaluations have been conducted for several types of home safety interventions to prevent child injury, including promotion of smoke alarms(22-26); fire safety education(27); thermostats to reduce tap water scalds(28, 29); education, home safety assessments, or equipment to prevent accidental poisonings(30); home visiting to prevent a range of different types of injury (31); and those offering universal access to parenting support(32) or support to reduce chance of maltreatment in higher risk groups(33-36).

Multiple studies have found evidence for cost-effectiveness of interventions to prevent burns or scalds in the home (22-25, 28, 29). There have been several economic evaluations of smoke alarm promotion interventions, with most(22-25), but not all(26), finding smoke alarm promotion was

cost effective or even cost-saving(23). Provision of fire safety education has also found to be cost effective (27). Evaluations of interventions to reduce tap water scalds have found that legislation(28) or modifications to plumbing in social housing(29) can both be cost saving due to averted scald injuries, which are associated with considerable costs(37).

Evidence also suggests that simpler interventions can be more cost effective than more complex interventions for preventing poisoning,(30) distributing smoke alarms(22, 38), and fire safety education.(27) Targeting injury prevention interventions at higher risk groups can also increase the chances of cost effectiveness; for example, for smoke alarm promotion(25) and poisoning prevention(30).

Home visiting for families of children who have presented to hospital with an injury can also be cost-effective for preventing further injuries(31). Home visiting programmes including laypersons(35) with professional support or paraprofessionals(34) to prevent intentional injuries in children may also be cost saving.

Whilst there are effective and cost-effective home safety interventions, systematic reviews of qualitative research show there are many barriers to implementing home safety interventions. These include a lack of, poorly timed or inadequately tailored information, lack of control over living environment (e.g. rented accommodation), poor quality housing, cost of making safety changes to the home, lack of skills or equipment to fit safety equipment, mistrust of officials and suspicion of strangers coming into the home, difficulties anticipating child development, fatalistic views about injuries, isolation, and language or literacy barriers.(13, 39)

Many facilitators for implementing home safety interventions have also been found. These include training community members to carry out interventions, providing appropriately tailored information, use of focused messages, physical changes requiring simple single actions, provision of free or low-cost equipment appropriate to the family's needs, support with equipment fitting, building trust with service providers, acknowledging parents' efforts in keeping their children safe, and education about child development.(13, 39, 40)

Health and social care practitioners have an important role in promoting child home injury prevention.(41-44) The support provided by practitioners to families can help to reduce the number of hazards present in the home, encourage the use of appropriate safety equipment, and reduce child injuries.(45-49) However, whilst most practitioners hold positive attitudes towards injury prevention(43, 44, 50, 51), they have also raised concerns about their abilities to perform these tasks, a lack of training in injury prevention, lack of home safety resources, difficulties communicating with families about preventing injuries and time and workload constraints.(46-48, 52-59) There are few studies evaluating Injury prevention training for practitioners, but there is some evidence training can improve knowledge and increase safety promotion.(60, 61)

## Rationale for this research

Child injury risk can be reduced through home modifications and undertaking a range of safety practices, and there is good evidence that providing education and supplying and fitting some safety equipment improves home safety.(21) Recent evidence indicates that these interventions also reduce injury-related hospital admissions.(62) Despite this evidence, and recommendations made by NICE regarding the provision of home safety advice by health and care professionals, interventions are still not consistently provided.(43)

## Aims and objectives

The study's primary objective is to determine whether implementing systematic evidence-based home safety promotion (the SOSA intervention) improves key home safety practices: having at least one fitted and working smoke alarm, a safety gate on stairs (where applicable) and poisons stored out of reach. This has been chosen as the primary outcome measure as there is evidence that home safety interventions can improve these safety practices and evidence that these safety practices are associated with reductions in injury risk.(21, 63-66)

The secondary objectives are to evaluate the implementation of systematic evidence-based home safety promotion in terms of:

- a) impact on medically attended child home injury rates
- b) impact on home safety practices other than those included in the primary objective
- c) the extent to which home safety promotion differs between intervention and control wards
- d) impact of home safety promotion on parental knowledge of child development and injury risk
- e) parental self-efficacy to prevent injuries to their children
- f) acceptability of, and satisfaction with, home safety promotion amongst parents
- g) acceptability of, and satisfaction with, home safety promotion amongst providers
- h) barriers and facilitators to changing home safety behaviours amongst parents
- i) barriers and facilitators to implementing home safety promotion amongst providers
- j) cost-effectiveness of home safety promotion in the intervention wards compared to control wards

We also evaluated home safety training that was provided by the University of Nottingham and Child Accident Prevention Trust (CAPT) in terms of changes in knowledge, confidence and beliefs about injury and training satisfaction.

## Patient and public involvement

SSBC has an active patient and public involvement programme and a number of Parent champions. We recruited four parent champions to sit on our project steering group who provided advice on study recruitment, study documentation, recruitment, and retention of parents in the study, changes in protocol due to the Coronavirus pandemic, interpretation of findings and dissemination of study findings to parent participants and the wider community of parents. The SOSA intervention was also co-designed with parents.

## Structure of this report

The remainder of the report comprises a further 10 chapters. Chapter 2 describes the intervention and its development, Chapter 3 describes the study methods, Chapters 4-9 describe the findings grouped into themes (

Table 1 below). Chapter 10 is a discussion of the overall strengths and limitations of the research and Chapter 11 conclusions and recommendation for future research and practice.

**TABLE 1: STRUCTURE OF THIS REPORT**

<b>Chapter</b>	<b>Outcome</b>
<b>Chapter 4</b> Effectiveness of the SOSA intervention at improving adoption of home safety practices and lowering injury rates	Primary outcome - To determine whether implementing systematic evidence-based home safety promotion improves key home safety practices (composite variable) a) Impact on medically attended home injury rates b) Impact on other home safety practices (outside of primary outcome)
<b>Chapter 5</b> Fidelity of the implementation of the SOSA intervention	c) The extent to which home safety promotion differs between SSBC wards and control wards
<b>Chapter 6</b> Parental perspectives of the barriers and facilitators to child home injury prevention	d) impact of home safety promotion on parental knowledge of child development and injury risk e) parental self-efficacy to prevent injuries to their children f) Acceptability of, and satisfaction with, home safety promotion amongst parents h) Barriers and facilitators to changing home safety behaviours amongst parents
<b>Chapter 7</b> Perceptions of factors which impact practitioners' ability to deliver the SOSA intervention	g) Acceptability of, and satisfaction with home safety promotion amongst providers i) Barriers and facilitators to implementing home safety behaviours amongst providers
<b>Chapter 8</b> Cost effectiveness of the SOSA intervention	j) Cost effectiveness of home safety promotion in SSBC wards compared to control wards
<b>Chapter 9</b> Evaluation of the SOSA training	N/A

## Chapter 2 The “Stay One Step Ahead” intervention

### Intervention development

DEVELOPMENT OF THE INTERVENTION PROGRESSED OVER SEVERAL STAGES ILLUSTRATED IN THE FIGURE BELOW, INCLUDING EVIDENCE REVIEW, CO-PRODUCTION OF CONCEPTS AND DEVELOPMENT OF THE INTERVENTION, PILOTING, AND REFINING (

Figure 1).

Co-production was with staff from the Nottingham 0-19 health visiting team, family mentor programme and children’s centres, alongside parents. Two meetings were held with 18 parents of young children living in intervention wards to advise the research team on the importance of research on child home safety and the research questions within this proposal, and to obtain advice about key elements of the research design. In addition, four further meetings were held with SSBC community partnership members (parents, parent champions and service providers) to advise on study recruitment strategies and documentation.

The final SOSA intervention comprised standardised home safety advice provided through:

- a) A home safety checklist used by health visiting teams (HVTs) in child health reviews at 9-12 months and 24-30 months and at post-accident contacts. The home safety checklist incorporates behaviour change principles recommended by NICE to help and support parents make the necessary changes to enhance home safety.(67)

- b) Monthly safety messages distributed by HVTs, children centres (CCs) and family mentors (FMs). These are key messages on posters and flyers, quizzes and related activities, including those from the Injury Prevention Briefing endorsed by NICE.(20)
- c) Four safety weeks annually delivered by CCs which focus on four of the most common causes of injury in young children, namely falls, poisonings, scalds and fires.(68)
- d) 8 manualised home safety activities delivered by FMs and
- e) referral to relevant agencies by HVTs, CCs and FMs.

See Logic Model (Figure 2) below.

### Intervention amendments

During the piloting and refining stage feedback was taken from practitioners using the intervention and from parents and the following changes were made:

- Made the Monthly Safety messages A5 so they could fit into the Red Book – July 2018
- Removal of signatures on parent checklist – November 2018
- Monthly Safety Messages put in SSBC Facebook page – July 2019
- Electronic copies of materials provided following the reduction of face-to-face meetings due to Coronavirus pandemic – March 2020
- Reduction in checklist use during the early stages of the pandemic – March 2020

FIGURE 1: STAY ONE STEP AHEAD INTERVENTION DEVELOPMENT PROCESS

Stay One Step Ahead intervention development process

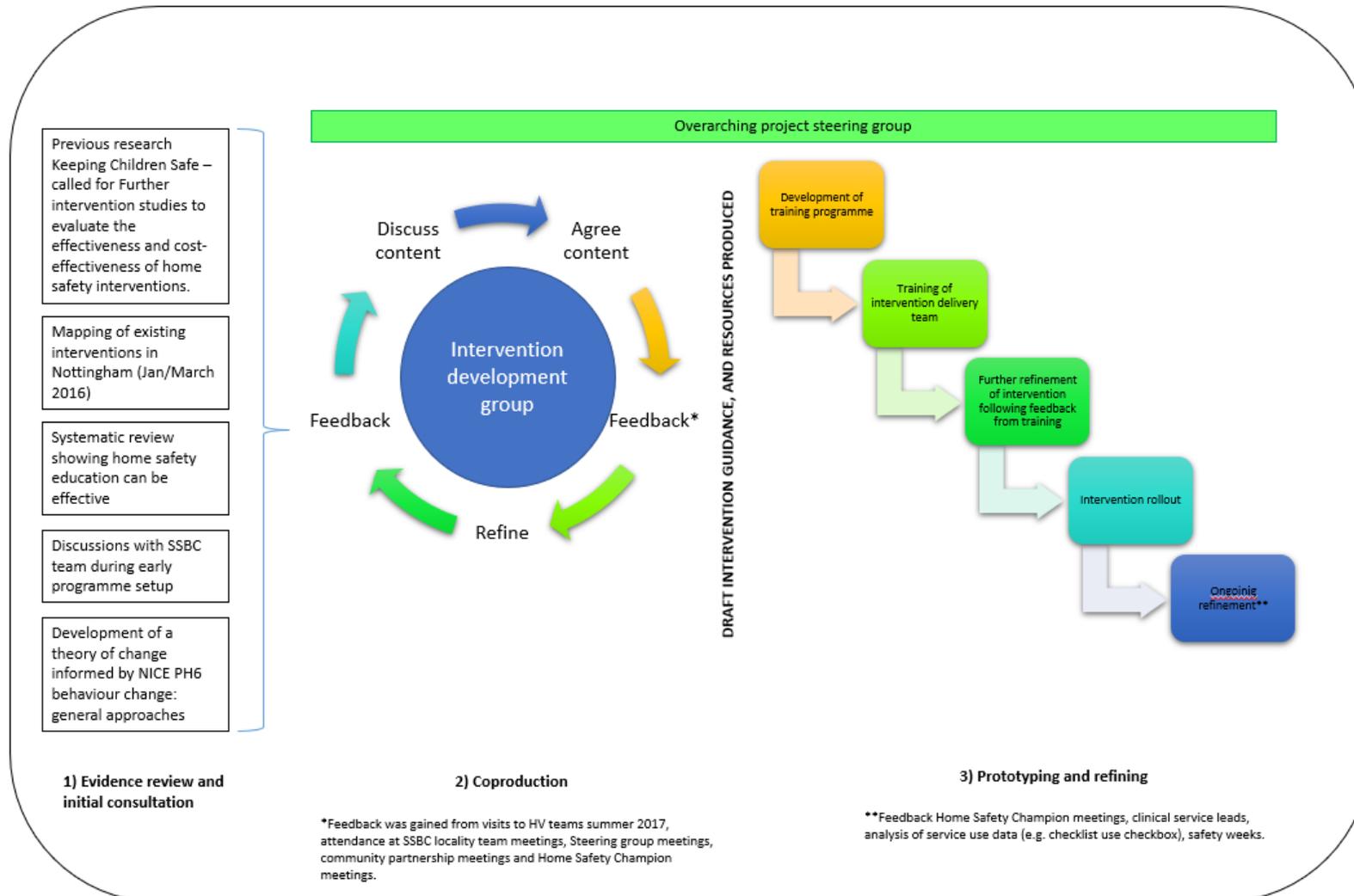
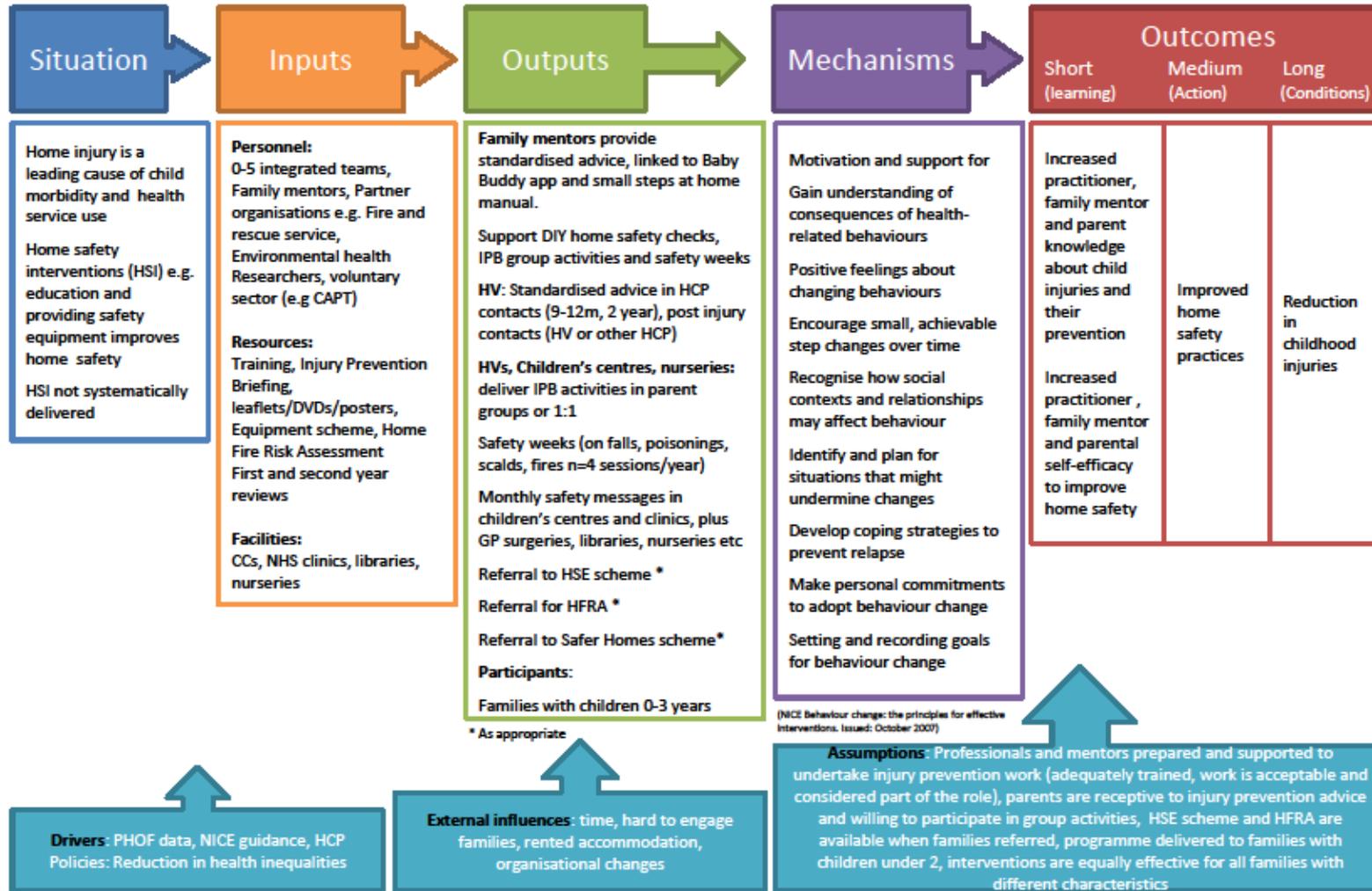


FIGURE 2: LOGIC MODEL

## Home Safety Project Logic Model



## Training

This section describes the training that was carried out with the three practitioner groups involved in delivering the SOSA intervention: members of health visiting teams, staff from children's centre who were to act as leads for delivering the intervention and coordinating the activities of their colleagues, and family mentors. Evaluation of the impact of training can be found in Chapter 9.

Here we present four main topics: a description of the aims of the training sessions; the practicalities of the sessions; an outline of the content of the sessions that were common to all practitioner groups and that were audience-specific; and an overview of the printed resources that were distributed during the sessions.

### Aims of the training sessions

The training had short and medium term aims. In the short term it was intended to provide a learning opportunity, seeking to enhance practitioner and hence parent knowledge about child injuries and their prevention, and increasing practitioner, family mentor and parental self-efficacy to improve home safety. This was intended to result in actions in the medium term, namely improving parents' home safety practices.

In developing the content of and presenting the training sessions we needed to acknowledge and accommodate that:

- audiences might not be homogenous in terms of knowledge and experience, even within practitioner groups.
- the training needed to fit in with what the practitioners had received during their professional education or other training.
- the work of each practitioner group linked with that of the other groups or needed to do so.
- the training needed to make use of the pre-existing knowledge, expertise, and opportunities of each practitioner group.
- each practitioner group had obligations to follow their own protocols, e.g., use of family mentor manual, the healthy child programme, commissioned services, etc.; and
- the sessions could not cover everything because, for example, of time limitations.

### Practicalities of the training

Most of the sessions were carried out at the SSBC training rooms at the Nottingham Community and Voluntary Service offices during September 2017 with further sessions in April and November 2018, September 2019, January, and March 2020. They were usually undertaken by two presenters, sometimes with admin support, one from the Nottingham University research team whose role was primarily to describe the intervention, the roles of the practitioners and the evaluation scheme, and the other from the Child Accident Prevention Trust who was mainly responsible for leading on the characteristics of children's accidents and their prevention. Initially, the sessions were scheduled to run for three hours but for the later sessions the duration was reduced to about two hours as requested by staff being trained due to service delivery pressures.

The training sessions followed similar formats, regardless of the audiences. They were a mix of PowerPoint presentations, exercises, discussion, and small group sessions.

At the end of each session, a questionnaire was distributed with a request that it was completed and returned in a reply-paid envelope. The questionnaire sought views on the impact of the training sessions on knowledge and confidence so that these could be compared with the baseline questionnaire. It also included practical aspects of the sessions (venue, audio-visual systems,

presenters' style, etc.). A second questionnaire from SSBC was handed out for immediate completion for SSBC's own records.

### Content of the training sessions

The training sessions comprised several main elements, some of which were delivered with small variations to all audiences and some to specific groups. Although some elements were common to the three practitioner groups, the detailed ways in which they were presented and the depth in which they were explored differed in some instances.

For all practitioner groups, the following topics were included:

- A description of the SOSA project, including
  - The overall aims of the study,
  - The analytical design of the project and its evaluation (controlled before and after study, the primary and secondary outcome measures, areas of Nottingham included, etc.), and
  - What can improve parental safety practices, and
  - The roles of the different practitioner groups in the study.
- The administration of the baseline questionnaire (see [Chapter 9](#) of this report).
- Discussions of children's accidents – their consequences, nature, trends, role as a child health issue, etc.
- Links between child development and accidents – a series of exercises and discussions
- Roles of and opportunities to support other practitioners
- Home safety opportunities during child health reviews
- Outline of the safety weeks and monthly safety messages – these topics were considered in greater detail during the children's centre staff session
- Working with other agencies, e.g., Nottingham City Council Safer Housing Team, Nottinghamshire Fire and Rescue Service, voluntary sector organisations or charities that provide safety equipment – Gordon Memorial Trust and The Arches – and organisations that provide first aid training and advice – British Red Cross, St John Ambulance
- Safety equipment availability and use – an introduction to the safety equipment handout and discussion of key issues
- Description of the resources for practitioners – the content varied slightly for the different practitioners (see Table 3).

For specific practitioner groups, the topics covered in the training sessions are shown in Table 2. The elements shown in this table were not delivered in the order listed.

**TABLE 2: SUMMARY OF ELEMENTS OF TRAINING SESSIONS BY PRACTITIONER GROUPS**

	Health visiting teams	Children's centre staff	Family mentors
Checklists – development, content, and use	✓		
Behaviour change principles	✓	✓	
Resources to give to parents	✓		
Post-accident contacts	✓		
Quiz on some key accident issues	✓		
Detailed examples of some safety weeks		✓	
Resources for families (see Table 3)	✓	✓	

	Health visiting teams	Children's centre staff	Family mentors
Introduction to the full and short Injury Prevention Briefings and detailed consideration of activities in the short Briefing		✓	
Detailed introduction to safety weeks		✓	
Home safety content of home visiting programme		✓	
Planning home safety discussions			✓
Opportunities for prevention in the family mentor programme - exercises			✓

### Printed resources distributed at the training sessions

Printed resources that were either developed specifically for the project or were available from other agencies were handed out at the end of each session. The list of resources both for the practitioners themselves and for them to pass on to parents is shown in Table 3.

**TABLE 3: SUMMARY OF RESOURCES PROVIDED**

	Health visiting teams	Children's centre staff	Family mentors
<b>In the packs for practitioners</b>			
Guidelines and checklists for discussing home safety during the home visiting programme		✓	
Guidelines and checklists for reviews and post-accident contacts	✓		
Resources to discuss with parents during the home visiting programme or in the children's centre: RoSPA home safety and first aid height chart	✓	✓	✓
Rogue landlord information: e.g., guidance from Shelter about revenge evictions	✓	✓	✓
Important items of safety equipment and when you need them sheet	✓	✓	✓
Activities for use with parents: Short Injury Prevention Briefing Full Injury Prevention Briefing	✓ ✓	✓ ✓	✓
Good practice in injury prevention	✓	✓	✓
Checklists and resources that health visiting teams and children's centre staff will be using with parents: e.g., the home safety checklists used during the 9-12 month and 2-2.5-year review	✓	✓	✓
Home safety advice and support for families Contact details for services and agencies, e.g., the Fire and Rescue Service so parents can arrange a Home Safety Check (involves making a fire escape plan and fitting a smoke alarm)	✓	✓	✓
<b>Resources for practitioners to use and/or give to parents (one pack for each family)</b>			
Child Accident Prevention Trust "One Step Ahead" chart	✓	✓	
RoSPA home safety and first aid chart	✓	✓	
Checklist for the 9–12-month review (infant version) or checklist for the 2-2.5-year review (toddler version)	✓	✓	

	Health visiting teams	Children's centre staff	Family mentors
Monthly safety message leaflets – to be distributed to 10 families per month. Leaflets sent to HV team's home safety champion who was expected to distribute them to HVs	✓		
Monthly safety messages - sent to children's centre home safety leads at the middle of each month		✓	
Monthly safety messages – emailed to family mentors each month for information			✓

## Chapter 3 Study methodology

### Introduction

This chapter describes the overall methodology for the study.

### Study design

This is a non-randomised, controlled before-and-after (CBA) observational study with nested qualitative and economic evaluations.

### Setting

SOSA was set in nine electoral wards in Nottingham City, England.

Intervention wards were the four SSBC wards:

- Arboretum
- Aspley
- Bulwell, and
- St Ann's.

Control wards were five non-SSBC wards:

- Bestwood
- Bridge
- Clifton North
- Clifton South
- Sherwood.

### Participants, recruitment, and consent procedures

#### Parents

Inclusion and exclusion criteria for each part of the study are listed in Figure 3Figure 3.

#### *Parent recruitment to the controlled before-and-after study*

Parents were provided with a participant pack comprising a participant information sheet (PIS), a baseline questionnaire, a gift voucher form containing contact details and a freepost envelope. The PIS described the study and included a telephone number for potential participants to contact the study team to answer any questions or concerns regarding the study and participation. Parents participating in the controlled before and after questionnaire study were not asked to sign a written consent form; the return of the questionnaires by parents was taken as implied consent to take part in this study.

Parents were also asked if they would be interested in taking part in interviews, observations, or the economic evaluation. Those expressing interest were contacted at later time points and invited to participate in interviews, observations of 9-12 month and 2-2.5-year child health reviews or the economic evaluation (see below).

### *Economic evaluation*

All parents from intervention and control wards expressing interest in taking part in the economic evaluation were approached to take part once they had returned their 24-month questionnaire. Parents were approached by letter and sent a PIS, a reply slip and a freepost envelope by post or by email. Those expressing interest were phoned to discuss this aspect of this study and those agreeing were sent a consent form to complete and return to the study team.

### *Interviews*

Parents expressing interest in taking part in semi-structured face-to-face or telephone interviews were sent a PIS, a reply slip and a freepost envelope by post or email. This continued until the required number of interviews (20 parents; 10 from intervention wards and 10 from control wards) had been completed. Prior to invites being sent, Nottingham CityCare checked SystemOne records for vital status of the child, being not at their usual place of residence and changes of address.

Parents expressing interest were sampled to ensure spread across study wards and were phoned by a researcher to explain the interview in more detail and answer any questions. An interview date was arranged. Parents were asked to provide written informed consent and sign a consent form at the interview for face-to-face interviews. For telephone interviews, parents were sent the consent form and asked to complete and return it by post or asked to provide verbal informed consent prior to the interviews. Parents from all three cohorts were approached, with each cohort being separately sampled.

### *Observations*

All parents from intervention and control wards, whose service provider had agreed to have their 9-12 month or 2-2.5 year child health reviews observed, whose child's review was due to take place within the specified time frame for the study (see

Table 4 below for data collection time points) and who expressed interest in taking part in the observations were approached by letter, and sent a PIS, a reply slip and a freepost envelope. Prior to invites being sent Nottingham CityCare checked SystemOne records for vital status of the child, being not at their usual place of residence and changes of address.

All parents who expressed interest and who were on the caseload of service providers agreeing to participate in the observations, were invited to participate. A sampling frame of service provider-parent pairs was drawn up and pairs sampled to provide where possible variation across wards and service provider team members (health visitors, nursery nurses, other staff etc.). Separate sampling frames were drawn up for intervention and control wards. Parents were asked to sign a consent form at the child health review. The aim was for up to 10 service provider-parent pairs to be recruited from intervention wards and up to 10 from control wards for observation of the 9-12 month or 2-2.5-year child health reviews. A £20 gift voucher was given to parents whose child health reviews were observed.

### Service providers

Inclusion and exclusion criteria for each part of the study are listed in Figure 3. Health visiting team members, children's centre staff and family mentors were asked to take part in semi-structured interviews and health visiting team member were asked to take part in observations of home safety promotion during child health reviews. Family mentors (n=23) took part in quality assurance observations conducted by the Small Steps Big Changes programme team and anonymised data on observations was shared with the Stay One Step Ahead study team.

### Interviews

Service providers invited to participate in face to face or telephone interviews were sent a PIS and a reply slip by email. Those expressing interest were phoned by a member of the research team to explain the interview in more detail and answer any questions. An interview date was arranged, and participants asked to complete the consent form at the time of the interview for face-to-face interviews. For telephone interviews, service providers were sent the consent form and asked to complete and return by post or asked to provide verbal informed consent over the telephone prior to the interviews.

A random sample of participants from each ward were sent an invitation to participate in a one-to-one interview. The aim was to recruit a minimum of 14 practitioners (5 health visiting team members, 5 family mentors, 4 Children's centre staff) evenly distributed across the intervention wards and 9 practitioners (5 health visiting team members and 4 Children's centre staff), where possible, evenly distributed across control wards.

### Observations

**Service provider managers were asked to send an invitation pack containing an invite letter, an information sheet, a reply slip, and a freepost reply envelope to all eligible service providers in intervention and control wards. Service providers expressing interest were telephoned by the research team to discuss the observations and answer any questions. They were asked to sign and return a consent form to the research team. Those consenting were sent a list of study participants for the service provider to identify parents on their caseload who were due a child health review and identified parents were invited to take part as described above.**

## FIGURE 3: INCLUSION AND EXCLUSION CRITERIA

## **Parents**

### Inclusion criteria

#### *Controlled before-and-after study*

- Parents of children residing in any of the intervention or control wards
- Parents must be aged 18 years or over
- Children must be 2 to 7 months old when study invites sent
- Children must be living in their usual place of residence (i.e., not in temporary accommodation such as a refuge or foster care)
- Parents must return a completed baseline questionnaire. Completion of questionnaires will be taken as implied consent

#### *Economic evaluation*

- Parents taking part in the controlled before-and-after study
- Able to provide written informed consent to extract data from their child's medical records

#### *Interviews*

- Parents taking part in the controlled before-and-after study
- Able to provide written informed consent or verbal informed consent over the telephone to take part in the interview
- Their child must have had either a 9-12 month or a 2-2.5-year child health review undertaken by health visiting team member.

#### *Observations of home safety promotion*

- Parents taking part in the main (questionnaire) study
- Able to provide written informed consent to have their child's health review by health visiting team member observed by a researcher
- Parents whose child's review is undertaken in English

### Exclusion criteria

- Parents not residing in intervention or control wards
- Parents aged under 18 years
- Children not aged 2-7 months old when study invites sent
- Children not living in their usual place of residence (e.g., in temporary accommodation such as a refuge or foster care)
- Parents not returning completed baseline home safety questionnaire. Parents not providing written informed consent or verbal informed consent over the telephone for interviews, written informed consent for observations of 9-12 month or 2-2.5-year child health reviews or for extraction of data from medical records
- Parents whose child's review is not undertaken in English
- Parents deemed not appropriate to contact by SSBC (e.g., child has died, child taken into foster care)

## **Service providers**

### Inclusion criteria

#### *Interviews*

- Service providers in intervention and control wards who provide written informed consent or verbal informed consent over the telephone for interviews
- For the interviews with providers who conduct 9-12 month or 2-2.5-year child health reviews, the provider must have experience of conducting 9-12 month or 2-2.5-year child health reviews since the start of the SSBC programme

#### *Observations of home safety promotion*

- Service providers (health visiting team staff) in intervention and control wards who provide written informed consent for observations of 9-12 month or 2-2.5-year child health reviews

### Exclusion criteria

- Service provider's not providing written informed consent or verbal informed consent over the telephone for interviews or written informed consent for observations of 9-12 month or 2-2.5-year child health reviews.

## Primary Care (GP) practices

Primary Care (GP) practices of parents wishing to participate in the economic evaluation were recruited to take part in the data extraction from medical records. Extracted data were used to validate parental self-reported medically attended injuries and to collect data on resource use e.g., treatment of injuries.

## Outcome measures

### Primary outcome

1.a Home safety practices including equipment use (having at least one fitted and working smoke alarm, a safety gate on stairs (where applicable) and poisons stored out of reach) at 12- and 24-months post recruitment.

The primary endpoint was chosen as a combination of three key safety practices and equipment use as there is evidence that home safety education and provision of safety equipment can increase these behaviours or equipment use(21) and there is evidence that these behaviours or equipment use are associated with a reduced risk of injury. (63, 65, 66, 69) Injury rates have been chosen as a secondary endpoint as the study is unlikely to be adequately powered to detect anything but a large reduction in injury rates.

### Secondary outcomes

2.a Medically attended injuries:

- Parent-reported medically attended home injury rates at 12- and 24-months post recruitment and by type of medical attendance:
  - Primary care attendances
  - Emergency department attendances
  - Hospital admissions
- Validation of parent reported medically attended injuries using medical record data
- Aggregated data will be collected retrospectively on unintentional injuries to children aged under 5 years attending the Emergency Department at Nottingham University Hospital NHS Trust at electoral ward level for each of the following years September 2016 to August 2017, September 2017 to August 2018, September 2018 to August 2019 and September 2019 to August 2020.

2.b Other home safety practices and equipment use at 12- and 24-months post recruitment (i.e., in addition to those encompassed in the primary outcome measure)

2.c Extent to which home safety promotion differs between SSBC and control wards:

- Observed home safety promotion at 9-12 month and 2-2.5-year child health reviews
- Parent-reported receipt of home safety promotion at 12- and 24-months post recruitment
- Home safety promotion recorded in medical records

2.d Parental knowledge of child development and child injury risk at 12- and 24-months post recruitment

2.e Parental self-efficacy to prevent injuries to their children at 12- and 24-months post recruitment

2.f Acceptability of and satisfaction with home safety promotion amongst parents:

- Acceptability of home safety promotion amongst parents
- Acceptability of the amended 9–12-month child health review amongst SSBC parents. This will only occur if the 9–12-month child health review is amended due to parent feedback
- Acceptability of post-accident contacts amongst parents reporting injuries
- Parental satisfaction with home safety promotion at 12- and 24-months post recruitment

2.g Acceptability of and satisfaction with home safety promotion amongst providers:

- Acceptability of home safety promotion and post-accident contacts amongst providers who conduct 9-12 month or 2-2.5-year child health reviews
- Acceptability of home safety promotion amongst providers who don't conduct 9-12 month or 2-2.5-year child health reviews

2.h Barriers and facilitators to changing home safety behaviours amongst parents

2.i Barriers and facilitators to implementing home safety promotion

- Barriers and facilitators to implementing home safety promotion amongst providers who conduct 9-12 month or 2-2.5-year child health reviews
- Barriers and facilitators to implementing home safety promotion amongst providers who don't conduct 9-12 month or 2-2.5-year child health reviews

2.j Cost-effectiveness:

- Incremental cost per additional family with the three key home safety practices (see primary endpoint) at 24 months post recruitment
- Incremental cost per medically attended injury prevented at 24 months post recruitment

Table 4 details the timing of and data collection tools used for measurement of each outcome. Study questionnaires, interview guides and observation sheets are provided as appendices 1 to 16 in the research tool supplement.

Parent interviews took place between June 2018 and June 2020. Service provider interviews took place between August 2018 and April 2021. Parent interviews lasted between 30 and 60 minutes and service provider interviews between 45 and 60 minutes. Interviews were digitally recorded and transcribed verbatim. Recordings and transcripts were given an interviewee code as the identifier. For each different type of interview, the first three interviews acted as pilot interviews and data from these interviews was included in the analysis as they did not result in substantial amendments to the interview guide. Parents were given a £20 gift voucher to thank them for their time spent participating in interviews.

Observations of child health reviews took place between January-December 2019. Parents were given a £20 gift voucher to thank them for their time spent participating in observations.

### Training evaluation

We also undertook an evaluation of standardised home safety training delivered by the University of Nottingham and Child Accident Prevention Trust. Service providers in SSBC wards were invited to complete questionnaires immediately before and after the training session. Non SSBC ward service providers were invited to complete their questionnaires during the time period that the in-service training takes place for SSBC service providers. Follow up questionnaires were sent to all participants at 3, 12 and 24 months by the evaluation team. Outcomes included changes in knowledge, confidence and belief scores and satisfaction with the training itself. Training evaluation questionnaires are provided as appendices 17 to 32 in the research tool supplement.

**TABLE 4: TIMING OF AND DATA COLLECTION TOOLS USED FOR MEASUREMENT OF EACH OUTCOME**

Outcome measures	Data collection tool														
		0	3	6	6-9	9	12	13	15	18	21	24	26	36	
Outcome 1: At least one fitted and working smoke alarm, a safety gate on stairs and poisons stored out of reach	Parent home safety questionnaire	x					x					x			
Outcome 2a. Parent-reported medically attended home injury rates	Parent home safety questionnaire	x					x					x			
	Parent injury questionnaire		x	x		x			x	x	x				
	Comparison of self-reported injuries and those reported in medical records												x		
Outcome 2a. Injuries attended to in the Emergency Department or admitted to hospital at electoral ward level	Electoral ward level data from Nottingham University Hospitals NHS Trust													x	
Outcome 2b. Other home safety practices	Parent home safety questionnaire	x					x					x			
Outcome 2c. Extent to which home safety promotion differs between SSBC and control wards:	Observations of 9-12 month and 2-2.5-year child health review	x	x	x	x	x	x	x	x	x	x	x	x	x	
	Parent home safety questionnaire	x					x					x			
	Validation of parent reported home safety services from medical records												x		
Outcome 2d. parental knowledge of child development and child injury risk	Parent home safety questionnaire	x					x					x			
Outcome 2e. Parental self-efficacy to prevent injuries to their children	Parent home safety questionnaire	x					x					x			
Outcome 2f. Acceptability of and satisfaction with home	Parent interviews	x	x	x	x	x	x	x	x	x	x	x	x	x	

Outcome measures	Data collection tool	0	3	6	6-9	9	12	13	15	18	21	24	26	36
safety promotion amongst parents	Parent interviews							x	x	x	x	x	x	x
	Parent home safety questionnaire	x					x					x		
Outcome 2g. Acceptability of and satisfaction with home safety promotion amongst providers:	Provider interviews	x	x	x	x	x	x	x	x	x	x	x	x	x
Outcome 2h. Barriers and facilitators to changing home safety behaviours amongst parents	Parent interviews	x	x	x	x	x	x	x	x	x	x	x	x	x
Outcome 2i. Barriers and facilitators to implementing home safety promotion amongst providers	Provider interviews	x	x	x	x	x	x	x	x	x	x	x	x	x
Outcome 2j: Cost-effectiveness:	Parent-reported services received and resource use for injuries measured from parent home safety questionnaire	x					x					x		
	Parent-reported resource use for injuries measured from parent injury questionnaire		x	x		x			x	x	x			
	Comparison of self-reported injuries and those reported in medical records												x	
	Services provided measured from provider activity questionnaire				x							x		

## Withdrawals

Participants could withdraw from the study either at their own request or be withdrawn at the discretion of the Chief Investigator.

## Timescale

Participant recruitment started in September 2017 and was completed in April 2021.

## Control area selection

The four intervention wards were pre-determined by the SSBC programme, chosen to meet criteria for Big Lottery funding. These were that:

- the area for the programme should have a total population of between 30,000 and 70,000 people,
- there should be evidence of deprivation and
- high levels of need amongst children in terms of a range of health, education, and social indicators.

The four intervention wards were chosen because they gave the highest density in terms of child population and provided ethnic and cultural diversity, in addition to meeting the criteria above.

The control wards were matched to intervention wards based on emergency department injury attendance rates for children aged 0-5 (within 15/1000 of the intervention ward injury rate), followed by deprivation (based on Nottingham city wards ranked (1-20) by income deprivation affecting children), then followed by minimising overlap with health visitor caseloads in intervention wards. The intervention wards were larger than control wards, hence five control wards were needed to ensure similar number of children aged 0-5 years in intervention and control wards. The Bridge and Clifton North wards were adjacent to each other, and both were matched to the same intervention ward as they had similar baseline injury rates. The total number of children aged 0-5 years in intervention and control wards were 5118 and 4804 respectively. Baseline injury rates for the combined intervention and control wards were 237 (95%CI 225,250) and 229 (95%CI 217, 241) respectively. Characteristics of intervention and control wards are shown in

### Controlled before-and-after study

### Sample size calculation

Sample size calculations were based on a control group prevalence of the primary outcome measure of 54% having at least one smoke alarm, and a safety gate in the home (if applicable e.g., if stairs present) and storing poisons out of reach. This estimate is from data from a previous study by the investigators.(70) Assuming 80% power, a 2-sided 5% significance level and an absolute difference of 13% points in the prevalence of the primary outcome, 237 families are required in the intervention wards and 237 in control wards. This number (n=237) would provide 90% power (2-sided 5% significance level) to detect an absolute difference of 15% points in the prevalence of the primary outcome measure between SSBC and control wards.

Mid-year population estimates from 2013 indicate there were 1047 children aged under 1 year in intervention wards and 909 in control wards. To allow for losses to follow up the aim was for 400 families to be recruited from intervention and 400 from control wards (minimum follow up rate of 60%)(71). Allocation was at electoral ward level. The intraclass correlation coefficient (ICC) for electoral ward level smoke alarm ownership is <0.00001(72). Hence the design effect is effectively 1, and the sample size adjusting for clustering is the same as that unadjusted for clustering.

## Table 5 Sample size calculation

### Controlled before-and-after study

Sample size calculations were based on a control group prevalence of the primary outcome measure of 54% having at least one smoke alarm, and a safety gate in the home (if applicable e.g., if stairs present) and storing poisons out of reach. This estimate is from data from a previous study by the investigators.(70) Assuming 80% power, a 2-sided 5% significance level and an absolute difference of 13% points in the prevalence of the primary outcome, 237 families are required in the intervention wards and 237 in control wards. This number (n=237) would provide 90% power (2-sided 5% significance level) to detect an absolute difference of 15% points in the prevalence of the primary outcome measure between SSBC and control wards.

Mid-year population estimates from 2013 indicate there were 1047 children aged under 1 year in intervention wards and 909 in control wards. To allow for losses to follow up the aim was for 400 families to be recruited from intervention and 400 from control wards (minimum follow up rate of 60%)(71). Allocation was at electoral ward level. The intraclass correlation coefficient (ICC) for electoral ward level smoke alarm ownership is <0.00001(72). Hence the design effect is effectively 1, and the sample size adjusting for clustering is the same as that unadjusted for clustering.

Table 5.

## Sample size calculation

### Controlled before-and-after study

Sample size calculations were based on a control group prevalence of the primary outcome measure of 54% having at least one smoke alarm, and a safety gate in the home (if applicable e.g., if stairs present) and storing poisons out of reach. This estimate is from data from a previous study by the investigators.(70) Assuming 80% power, a 2-sided 5% significance level and an absolute difference of 13% points in the prevalence of the primary outcome, 237 families are required in the intervention wards and 237 in control wards. This number (n=237) would provide 90% power (2-sided 5% significance level) to detect an absolute difference of 15% points in the prevalence of the primary outcome measure between SSBC and control wards.

Mid-year population estimates from 2013 indicate there were 1047 children aged under 1 year in intervention wards and 909 in control wards. To allow for losses to follow up the aim was for 400 families to be recruited from intervention and 400 from control wards (minimum follow up rate of 60%)(71). Allocation was at electoral ward level. The intraclass correlation coefficient (ICC) for electoral ward level smoke alarm ownership is <0.00001(72). Hence the design effect is effectively 1, and the sample size adjusting for clustering is the same as that unadjusted for clustering.

**TABLE 5: MATCHING CRITERIA FOR CONTROL AND INTERVENTION WARDS**

<b>Intervention ward</b>	<b>2015 injury rate per 1000 children aged 0-5 years</b>	<b>Nottingham city wards ranked by income deprivation affecting children</b>	<b>Control ward</b>	<b>2015 injury rate per 1000 children aged 0-5 years</b>	<b>Nottingham city wards ranked by income deprivation affecting children</b>	<b>Percentage of control ward children receiving health visiting services from health visitors</b>

						<b>in intervention wards</b>
Arboretum	226	3	Bridge	219	4	8%
			Clifton	196	19	1%
			North			
Aspley	294	1	Clifton	309	12	1%
			South			
Bulwell	157	6	Sherwood	163	16	2%
St Ann's	240	2	Bestwood	248	8	2%

## Economic evaluation

We aimed to recruit 100 families to the economic evaluation, 50 from intervention wards and 50 from control wards.

## Data analysis

### Controlled before-and-after study

Continuous data are described with means and standard deviations or medians and interquartile ranges dependent on distributions, categorical data with frequencies and percentages and injury occurrence with rates per 100 person years. Baseline characteristics were compared between groups using Wilcoxon rank sum tests for continuous data and chi-squared tests for categorical data. Primary and secondary outcomes were analysed using multilevel regression with family observations at level one, and wards in which the families lived at level two to control for family-level and area-level covariates(28). Between group comparisons were made using logistic regression for safety practices (including the primary outcome), Poisson regression or negative binomial regression (if likelihood ratio tests indicated overdispersion) for injury and associated health service presentation rates and linear regression for the number of safety practices.

All models included a fixed effect term for ward matching. Where outcomes were measured at baseline (the only secondary outcome this applied to was supervising bathing) models also adjusted for this; for the Poisson models, this was event rate in the 3 months prior to baseline. All models were also adjusted for variables whose prevalence differed significantly at baseline, which significantly predicted the outcome, or which altered the regression coefficient by at least 10% at 12- or 24-month follow up. Where models failed to converge, the matched ward term was removed; if non-convergence continued, a single-level model was used.

In additional analysis, multiple imputation using chained equations was conducted to impute values for missing data at 12 and 24 months in all participants who completed the baseline questionnaire. Fifty datasets were generated and pooled. All analyses were conducted using STATA 17 (Stata Statistical Software, Stata Corporation, TX, USA).

### Interviews and observations

Qualitative data from interviews, observations and meeting minutes were analysed using NVivo 11.(73) Interviews were digitally recorded, transcribed verbatim. Meeting minutes and observation notes were used in the format they were recorded. Interviews, meeting minutes and observations were analysed using thematic analysis.(74) For the analysis of implementation fidelity qualitative

data were coded deductively using the Conceptual Framework for Implementation Fidelity(75), whilst the analysis of barriers and facilitators to home safety for provider and parent interviews were analysed inductively, creating a thematic framework from the data. All transcripts were independently coded by two members of the research team. Emerging themes and discrepancies were discussed in the early stages of analysis. The wider research team then discussed the coding framework, which was revised at regular intervals, and included identifying both confirming and disconfirming cases.(76) Coding disagreements were discussed until a consensus was reached. Reflective field notes were recorded after each interview.

## Intervention delivery data

### *Checklist use*

The proportion of child health reviews where the checklist was discussed was calculated by counting frequency of reporting that it had been used, indicated by the home safety checkbox being checked on SystmOne by the professional undertaking the review (numerator) divided by the mid-quarter caseload number (denominator) per ward. Checkbox frequency and mid-quarter caseload data were reported by SSBC in a quarterly report.

### *Monthly safety message*

The number of monthly safety messages printed and issues to Children's Centre and Health Visiting Teams was recorded monthly. However, Family Mentors received the monthly safety messaged digitally and printed them off when needed. This was not recorded.

### *Signposting to other agencies*

Data on whether professionals signposted to agencies that could support home safety were extracted from provider questionnaires issued at 8- and 24-months following training.

### *Attendance at Safety Weeks*

Anonymised Safety Week attendance data was provided by Children's Centres throughout the study period and described as counts per event.

### *Receipt of home safety advice*

Data from parent questionnaires regarding receipt of home safety advice and resources from intervention practitioners was analysed using multilevel logistic regression models to quantify the reach and dose of the intervention and allow for clustering at ward level. Regression models controlled for baseline receipt of home safety advice and resources, matched wards, deprivation index, number of siblings, maternal age, and whether the family was a single parent household. Practitioner questionnaire responses are reported as descriptive statistics. All quantitative analyses were conducted using Stata 16.(77)

## Home safety training questionnaires

Questionnaires were issued to training course attendees on the day of the training session, prior to commencement of training, and then two weeks following training, returned by post. Questionnaires were completed by Health Visiting team members, Children's Centre staff and Family Mentors.

All questionnaires were entered into an online survey system that allowed the data to be coded for export and analysis in Excel and STATA. Ten percent of each data set was entered again through the same process and comparisons showed error rate between 0% to 0.2%. Any errors were corrected in the final dataset.

### *Knowledge, confidence, and belief measures*

Measures were calculated for the 3 categories of question (knowledge, confidence, belief) in the baseline and post-training period. For each measure, there were between 6 and 15 items. A point was assigned for each correct answer or for agreement on positive statements or disagreement on negative statements. For each participant, and for before and after training, a score was generated for each of the measures.

Median scores and interquartile ranges (IQR) were calculated for each measure, by practitioner group and at each time point. Scores before and after training were compared using Wilcoxon signed rank tests.

### *Satisfaction with the training*

Training attendees were asked 11 questions about the training. A training evaluation score was calculated for each participant and by practitioner type.

A thematic analysis of free text fields was undertaken and combined with themes arising from the qualitative interviews where training was referenced.

## Ethics committee approval

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki, 1996; the principles of Good Clinical Practice, and the Department of Health Research Governance Framework for Health and Social care, 2005.

### NHS REC

Favourable ethical opinion for was obtained from East Midlands - Leicester Central Research Ethics Committee, reference 17/EM/0240.

### Faculty of Medicine and Health Sciences

The training evaluation was approved by the Faculty of Medicine and Health Sciences ethics committee, ethics reference number 46-1706

## Management of the study

The Chief Investigator (Dr Elizabeth Orton) had overall responsibility for delivery of the study, was the data custodian and oversaw all study management.

### Nottingham operational group

The Nottingham research team met monthly to oversee the progression of the study, manage problems arising, agree proposed changes to the protocol and oversee data analysis, interpretation, and dissemination.

### Steering group

A project steering group was established to oversee the study. It met twice per year and ad hoc when necessary. Membership included partners from SSBC, Nottingham CityCare, Nottingham City Council, Nottinghamshire Fire and Rescue Service, the Family Mentor programme, parent champions, and the research team. The group approved protocol amendments, changes in recruitment strategies, contract variations, finances, and dissemination activity.

## Finance

### Funding source

This study is funded by the Big Lottery. The funding is held by Nottingham CityCare Partnership as part of the Small Steps Big Change project.

## Participant stipends and payments

Participants were not paid to participate in the study. To thank them for their time, parents returning completed questionnaires were given a gift voucher for each completed home safety questionnaire (£5 for the baseline questionnaire, £10 for the 12-month questionnaire and £10 for the 24-month questionnaire), a £5 voucher for completing the first three injury questionnaires and a £5 voucher for completing the final three injury questionnaires. Parents agreeing to have their child's 9-12 month and 24-month child health reviews observed and those participating in interviews will be given a £20 gift voucher to thank them for their time.

## Modification of the study

### Protocol amendments

A total of 21 amendments were made to the ethics approvals (NHS and FMHS).

#	Summary	Approval date
1	Changes to administrator information	12/12/17
2	Changes to administrator information	13/12/17
3	Inclusion of face-to-face interviews, changes to inclusion criteria,	24/04/18
4	Changes to service provider questionnaire to shorten	09/08/18
5	Changes to the dates of provider questionnaires	09/08/18
6	Addition of an extra recruitment cohort	19/07/18
7	Addition of newsletter to parents	03/10/18
8	Changes to vouchers for parents	15/11/18
9	Reduction in the number of interviews and observations	29/01/19
10	Changes to service provider questionnaire dates	13/06/19
11	Changes to extraction of data from patient records for economic analysis	21/03/19
12	Change to E Orton as Chief investigator	19/09/19
13	Amendments to protocol	18/02/20
14	Amendment to protocol	21/04/20
15	Change to type of voucher for parents	03/12/20
16	Final reminder questionnaire 24 months to be shortened to primary outcome only	21/10/20
17	Extend participant recruitment until end of December 2020 due to covid	01/11/20
18	Request for GP practice to extract data for health economic analysis	03/12/20
19	Amendment to parent invite letter to health economic analysis to simplify document	11/12/20
20	Extend participant recruitment to health economic analysis to end Feb 2021 due to covid	18/12/20
21	Extend participant recruitment to health economic analysis to end April 2021 due to Covid	05/03/21

## Chapter 4 Effectiveness of the “Stay One Step Ahead” intervention at improving adoption of home safety practices and lowering injury rates

This chapter describes the results relating to home safety practices and injury rates.

### Results

Baseline data were collected from 361 (25% of the 1447 invited) intervention and 401 control families (29% of 1394 invited); 233 (64.5 %) intervention and 298 (74.3%) control families completed the 24-month follow -up questionnaire. Baseline characteristics of study families are shown in Table 6. Intervention group families were significantly larger, had a higher proportion of younger mothers, and were more likely to be single adult households and live in more deprived areas.

**TABLE 6: BASELINE CHARACTERISTICS FOR FAMILIES IN INTERVENTION AND CONTROL GROUPS**

Variable	Control Group (n= 401)		Intervention Group (n= 361)		p
	Median*	Interquartile range (IQR)*	Median*	IQR*	
Child age (months)	4.6 [4]	3.1 to 6.0	4.6 [7]	3.1 to 6.2	0.90
Child gender (% male)	191 (48.2%) [5]		181(50.4%) [2]		0.55
Number of children (under 16) living in household	2 [2]	1 to 2	2 [3]	1 to 3	0.047
Maternal age at birth of first child	27 [34]	21 to 31	25 [19]	20 to 29	0.001
Families with one adult per household	61 (15.3%) [3]	n/a	96 (26.7%) [1]	n/a	< 0.001
Index of multiple deprivation (IMD) 2019	34.3 [6]	24.7 to 40.5	52.69 [9]	45.9 to 57.3	< 0.001
Distance to the nearest emergency department (Kilometres)†	4.86 [2]	3.74 to 5.78	4.24 [6]	3.74 to 6.10	0.074

\*Unless otherwise specified

[ ] Missing values

†Distances from participants’ home postcodes to the nearest emergency department were calculated using <https://www.doogal.co.uk/DrivingDistances.php>

Those who completed a baseline questionnaire but not a 12-month or 24-month questionnaire were more likely than other families to have more children, to include a younger mother, be single-adult, live in areas of higher material deprivation according to the Index of Multiple Deprivation (IMD) scores, and were more likely to live in an intervention ward (Appendix 1).

Table 7 shows safety practices at baseline, 12 and 24 months for intervention and control groups. There was no significant difference between the groups in terms of having a working smoke alarm, a stair gate and storing poisons out of reach at 12 months (Odds ratio (OR) 0.98, 95% confidence interval (CI) 0.61, 1.56) or 24 months (OR 1.58, 95% CI 0.98, 2.55). However, a significantly greater proportion of intervention than control families stored poisons out of reach at 24 months (OR 1.81, 95% CI 1.06, 3.07).

Families in intervention wards were significantly more likely to have a fire escape plan than families living in control wards at both 12 months (OR 1.78, 95% CI 1.08, 2.95) and 24 months (OR 1.81, 95% CI 1.06, 3.08). Families in intervention wards were also significantly more likely to use a fireguard or not have a fire at both 12 months (OR 3.04, 95% CI 1.57, 5.89) and 24 months (OR 3.17, 95% CI 1.63, 6.16). There was no significant difference between intervention and control groups for other individual safety practices, but for most practices, more intervention families reported the safety practice than control families. The total number of home safety practices, including both those comprising the primary outcome and the additional practices, was significantly higher for intervention than control families at both 12 months (difference between means 0.34, 95% CI 0.06, 0.63) and 24 months (difference between means 0.46, 95% CI 0.13, 0.79).

There was no significant difference in medically attended injury rates between the two groups during the first (incidence rate ratio [IRR] 0.89 [95% CI 0.51 to 1.56],  $p = 0.68$ ) or second year (IRR 0.98 [95% CI 0.57 to 1.70],  $p = 0.95$ ), and there was no difference in associated presentations to health services (Table 8).

### **Multiple imputation analysis**

The multiple imputation analysis found intervention families were significantly more likely to report the primary outcome than control families at 24 months (OR 1.75, 95% CI 1.12, 2.73). All significant findings in the complete case analysis remained significant in the multiple imputation analysis.

**TABLE 7: SAFETY PRACTICES AT BASELINE, 12 AND 24 MONTHS COMPARING INTERVENTION TO CONTROL GROUPS**

Measure	Measurement time point	Control group Baseline <i>n</i> = 401 12 months <i>n</i> =298 24 months <i>n</i> =298	Intervention group Baseline <i>n</i> = 361 12 months <i>n</i> = 237 24 months <i>n</i> = 233	Primary analysis		Multiple imputation analysis (Control group <i>n</i> = 401; intervention group <i>n</i> = 361)	
				Adjusted* odds ratio (95% CI) †	<i>p</i>	Adjusted* odds ratio (95% CI) †	<i>p</i>
<b>Primary outcome measure - Having a working smoke alarm, storing poisons out of reach, and having a stairgate or no stairs</b>							
Homes with primary outcome measure	Baseline	117 (29.3%) [2]	112 (31.1%) [1]	1.00 (0.67, 1.51)	0.98	0.96 (0.65, 1.43)	0.85
	12 months	170 (57.1%) [0]	132 (56.4%) [3]	0.98 (0.61, 1.56)	0.92	1.25 (0.79, 1.96)	0.34
	24 months	144 (48.8%) [3]	130 (55.8%) [0]	1.58 (0.98, 2.55)	0.060	1.75 (1.12, 2.73)	0.014
Working smoke alarm	Baseline	375 (94.0%) [2]	329 (91.4%) [1]	0.85 (0.38, 1.88)	0.69	0.83 (0.40, 1.74)	0.63
	12 months	279 (93.6%) [0]	215 (91.9%) [3]	0.67 (0.28, 1.57)	0.35	0.88 (0.36, 2.17)	0.79
	24 months	283 (95.9%) [3]	218 (93.6%) [0]	0.83 (0.28, 2.46)	0.73	1.20 (0.45, 3.18)	0.72
Storing poisons out of reach	Baseline	203 (51.0%) [3]	201 (56.0%) [2]	0.89 (0.60, 1.30)	0.53†	0.86 (0.60, 1.25)	0.44
	12 months	190 (63.8%) [0]	159 (68.0%) [3]	1.13 (0.69, 1.86)	0.63	1.45 (0.88, 2.41)	0.2
	24 months	198 (67.1%) [3]	170 (73.3%) [1]	1.81 (1.06, 3.07)	0.029	1.82 (1.13, 2.93)	0.015
Has a stairgate or no stairs	Baseline	210 (52.9%) [4]	198 (55.0%) [1]	1.37 (0.93, 2.01)	0.11	1.29 (0.90, 1.87)	0.17
	12 months	262 (87.9%) [0]	202 (86.3%) [3]	0.84 (0.40, 1.76)	0.65	1.13 (0.58, 2.20)	0.73
	24 months	222 (75.3%) [3]	177 (77.3%) [4]	1.17 (0.66, 2.11)	0.59	1.38 (0.78, 2.42)	0.26

Measure	Measurement time point	Control group Baseline <i>n</i> = 401 12 months <i>n</i> =298 24 months <i>n</i> =298	Intervention group Baseline <i>n</i> = 361 12 months <i>n</i> = 237 24 months <i>n</i> = 233	Primary analysis		Multiple imputation analysis (Control group <i>n</i> = 401; intervention group <i>n</i> = 361)	
				Adjusted* odds ratio (95% CI) †	<i>p</i>	Adjusted* odds ratio (95% CI) †	<i>p</i>
<b>Secondary outcome measures</b>							
Supervised bathing	Baseline	387 (98.7%) [9]	351 (98.0%) [3]	0.33 (0.06, 2.01)	0.23	0.63 (0.15, 2.70)	0.53
	12 months	278 (93.6%) [1]	223 (94.9%) [2]	1.18 (0.44, 3.13)	0.75	0.94 (0.39, 2.34)	0.91
	24 months	266 (91.1%) [6]	217 (96.0%) [7]	1.85 (0.72, 4.79)	0.20	1.51 (0.66, 3.47)	0.33
Using a fireguard or not having a home fire	12 months	233 (78.5%) [1]	203 (87.1%) [4]	3.04 (1.57, 5.89)	0.001	2.98 (1.61, 5.53)	0.001
	24 months	235 (80.2%) [5]	192 (85.3%) [8]	3.17 (1.63, 6.16)	0.001	3.06 (1.60, 5.85)	0.001
Blind cords out of reach	12 months	244 (82.2%) [1]	202 (86.3%) [3]	1.03 (0.55, 1.92)	0.93	1.06 (0.59, 1.93)	0.84
	24 months	251 (86.0%) [6]	201 (89.0%) [7]	0.72 (0.36, 1.44)	0.35	0.76 (0.40, 1.43)	0.40
Safety catches on any windows	12 months	159 (53.5%) [1]	159 (68.0%) [3]	1.29 (0.80, 2.09)	0.30	1.33 (0.84, 2.13)	0.21
	24 months	174 (59.2%) [4]	148 (65.5%) [7]	0.78 (0.48, 1.27)	0.32	0.76 (0.47, 1.22)	0.25
Fire escape plan	12 months	184 (62.0%) [1]	181 (76.7%) [1]	1.78 (1.08, 2.95)	0.025	1.81 (1.10, 2.94)	0.020
	24 months	196 (67.1%) [6]	174 (77.0%) [7]	1.81 (1.06, 3.08)	0.030	1.72 (1.06, 2.78)	0.029
Outdoor supervision	24 months	203 (73.0%) [20]	169 (79.9%) [21]	1.30 (0.73, 2.31)	0.37	1.28 (0.76, 2.14)	0.35
Post hoc analysis: mean total number of home safety practices adopted and adjusted difference between means							
Total number of home safety	Baseline (max 4)	2.97±0.79 [51]	3.01±0.83 [32]	0.01 (-.14, 0.15)	0.92	0.00 (-0.20, 0.19)	0.97‡
	12 months (max 8)	6.15±1.37 [36]	6.62±1.21 [24]	0.34 (0.06, 0.63)	0.019	0.39 (0.13, 0.65)	0.004

Measure	Measurement time point	Control group Baseline <i>n</i> = 401 12 months <i>n</i> =298 24 months <i>n</i> =298	Intervention group Baseline <i>n</i> = 361 12 months <i>n</i> = 237 24 months <i>n</i> = 233	Primary analysis		Multiple imputation analysis (Control group <i>n</i> = 401; intervention group <i>n</i> = 361)	
				Adjusted* odds ratio (95% CI) †	<i>p</i>	Adjusted* odds ratio (95% CI) †	<i>p</i>
practices adopted	24 months (max 9)	6.92±1.44 [57]	7.37±1.39 [34]	0.46 (0.13, 0.79)	0.006	0.42 (0.12, 0.71)	0.005

[ ] Missing values; \*The model controlled for: number of siblings under the age of 16 years; maternal age at the time of the birth of the first child; the Index of Multiple Deprivation (IMD) of the home postcode, whether the family lived in a single-adult household, the corresponding baseline variable (where collected), and the matched wards factor; †The control group was the reference group; ‡ Model did not converge. 'Matched wards' factor removed, and the model converged

**TABLE 8: PARENT-REPORTED MEDICALLY ATTENDED INJURY AND INJURY-ASSOCIATED HEALTH SERVICE PRESENTATION RATES (PER 100 PERSON YEARS) FOR INTERVENTION AND CONTROL GROUPS**

Measure	Measurement time point	Control group rate Baseline <i>n</i> = 393 12 months <i>n</i> = 349 24 months <i>n</i> = 312	Intervention group rate Baseline <i>n</i> = 354 12 months <i>n</i> = 286 24 months <i>n</i> = 260	Primary analysis		Multiple imputation analysis	
				Adjusted* incidence rate ratio (95% CI)	<i>p</i>	Adjusted* incidence rate ratio (95% CI) ¶	<i>p</i>
Medically attended injury	Baseline**	10.2 (10)	13.6 (12)	1.31 (0.26 to 6.62)	0.74‡	1.14 (0.33 to 3.87)	0.84
	Year 1	23.7 (66)	27.3 (57)	0.89 (0.51 to 1.56)	0.68	1.05 (0.64 to 1.70)	0.86‡
	Year 2	32.0 (84)	31.5 (59)	0.98 (0.57 to 1.70)	0.95	1.02 (0.64 to 1.61)	0.94
Family doctor presentations due to injury	Baseline**	3.1 (3)	9.0 (8)	4.85 (0.46 to 50.79)	0.19	7.70 (0.88 to 676.70)	0.37
	Year 1	5.0 (14)	9.1 (19)	1.13 (0.36 to 3.54)	0.83	1.22 (0.45 to 3.30)	0.70‡
	Year 2	5.7 (15)	5.3 (10)	1.01 (0.31 to 3.25)	0.99	1.13 (0.45 to 2.85)	0.80
Urgent care or walk-in centre presentations due to injury	Baseline**	0.0 (0)	1.1 (1)	<0.001 (not applicable†)	.99‡§	*<0.001 (not applicable†)	0.99§
	Year 1	2.5 (7)	3.8 (8)	1.69 (0.23 to 12.41)	0.61	1.44 (0.35 to 6.02)	0.61
	Year 2	4.6 (12)	3.2 (6)	0.60 (0.19 to 1.96)	0.40§	0.56 (0.20 to 1.55)	0.26§
Emergency department presentations due to injury	Baseline**	9.2 (9)	14.7 (13)	0.63 (0.08 to 5.32)	0.67	0.62 (0.15 to 2.56)	0.51
	Year 1	15.1 (42)	14.4 (30)	0.97 (0.52 to 1.81)	0.94§	1.07 (0.61 to 1.85)	0.82§
	Year 2	22.5 (59)	23.5 (44)	0.97 (0.50 to 1.91)	0.94	0.92 (0.54 to 1.57)	0.77‡

Measure	Measurement time point	Control group rate Baseline <i>n</i> = 393 12 months <i>n</i> = 349 24 months <i>n</i> = 312	Intervention group rate Baseline <i>n</i> = 354 12 months <i>n</i> = 286 24 months <i>n</i> = 260	Primary analysis		Multiple imputation analysis	
				Adjusted* incidence rate ratio (95% CI)	<i>p</i>	Adjusted* incidence rate ratio (95% CI) ¶	<i>p</i>
Hospital admissions due to injury	Baseline**	1.0 (1)	2.3 (2)	0.55 (0.00 to 509.0)	0.87	0.57 (0.00 to 254)	0.86¶
	Year 1	1.4 (4)	0.5 (1)	<.001 (not applicable †)	0.99‡§	0.49 (0.04 to 5.45)	0.56‡¶
	Year 2	2.3 (6)	1.1 (2)	0.01 (0.0001 to 1.06)	0.053§	0.09 (0.01 to 1.43)	0.088§

Completion of each 3-monthly follow-up injury questionnaire represented 0.25 years of data. For Year 1, for example, any participant could contribute 0.25, 0.50, 0.75, or 1.0 year of injury follow-up data.

\*The adjusted model controlled for: number of siblings under the age of 16 years; maternal age at the time of the birth of the first child; the Index of Multiple Deprivation (IMD) of the home postcode, whether the family lived in a single-adult household, the corresponding baseline variable (where collected), and the matched wards factor.

\*\*Baseline rates were based on the number of events that were reported to have occurred in the 3 months prior to the intervention

†The ratio of events is 0:1 and the upper 95% interval cannot be defined

‡The model did not initially converge so the 'Matched wards' factor was removed to enable convergence

§A Poisson model was used

||Model did not converge following removal of matched wards, so a single level model was used to enable convergence

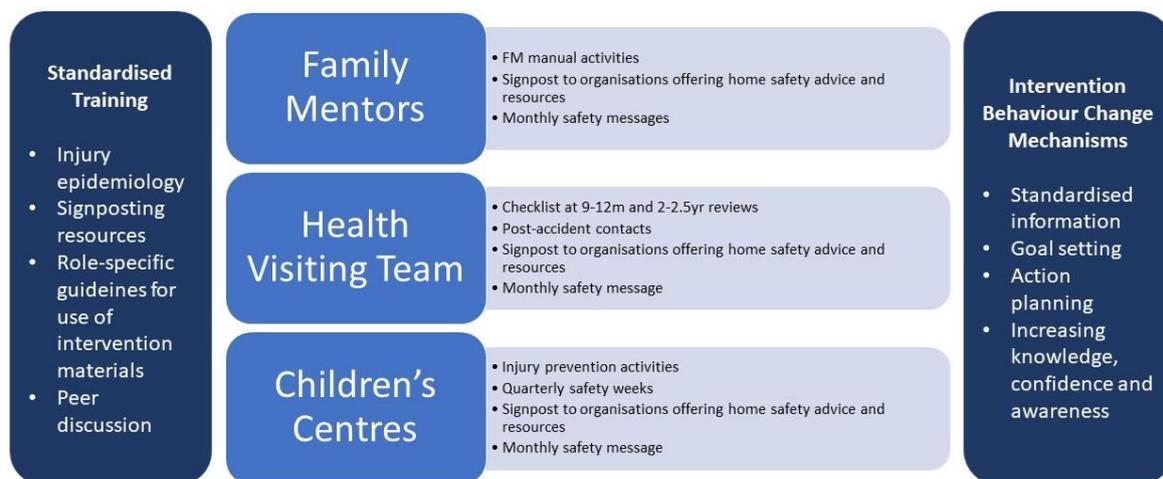
## Chapter 5 Fidelity of the implementation of the “Stay One Step Ahead” intervention

The effectiveness of the SOSA intervention is described in Chapter 4; however, an accurate interpretation of these findings can only be achieved by understanding the process of implementation. Fidelity is a key moderator of how likely an intervention is to achieve intended outcomes(78). By measuring fidelity, this enables a more accurate evaluation of the efficacy of the intervention as the presence or lack of impact of an intervention may result from its design or implementation.(78) Furthermore, fidelity assessments enable intervention replication.(78) Few studies of child injury prevention programmes have conducted an assessment of implementation fidelity (79) with most studies available focusing on injuries within sporting contexts. The SOSA intervention incorporates evidence-based strategies for home injury prevention and therefore it is critical to understand if these can be delivered as designed in real-world contexts, and how fidelity impacts on efficacy. This chapter describes the fidelity of implementation of the SOSA intervention.

A detailed description of the intervention can be found in [Chapter 2](#).

Figure 4 is a summary of the intervention components delivered by different practitioners.

**FIGURE 4: OVERVIEW OF INTERVENTION COMPONENTS**



### Study design recap

Analysis of implementation fidelity involved a mixed-methods approach triangulating data from quantitative and qualitative sources described in the main methods section. These included semi-structured interviews with parents and practitioners, parent attendance records at safety weeks, routine quality assurance visits and observations of home visits conducted by FM and HVT, service evaluation questionnaires completed by practitioners, questionnaires completed by parents, and medical record documentation of home safety checklist use by HVT. Further data sources included

minutes from quarterly meetings which involved study commissioners and stakeholders from the research and intervention teams, and field notes. Further information on the collection of these data sources and analysis can be found in [Chapter 3](#).

Routine Quality Assurance (QA) observations of FM home visits by team managers took place throughout the intervention until March 2020 when home visits stopped due to Covid-19 social restrictions. Team managers used a proforma to assess fidelity to the FM manual activities and use of goal setting techniques.

Practitioners completed service evaluation questionnaires at 8- and 24-months following training. These data were included in the fidelity analysis, in addition to the research data collection methods described in [Chapter 3](#).

## Results

In this analysis a total of 24 parents were interviewed: 12 each from control and intervention wards, and 29 practitioners: 9 FMs, 7 control HVT members, 7 intervention HVT members, and 6 Children's Centre staff who worked in centres across intervention and control wards. A total of 22 Quality Assurance observations of FM home visits and 5 observations of child health reviews took place. Questionnaire responses were received from 537/720 (75%) parents at 12 months from enrolment, and 530/684 (77%) parents at 24 months from enrolment. Questionnaire responses were received from 36/48 (75%) FMs at 8 months, and 51/52 (98%) at 24 months, 29/55 (53%) intervention HVT members at 8 months, and 24/34 (71%) at 24 months, and 4/9 (44%) intervention CC staff at both 8 and 24 months. 16/22 (73%) Control HVT members and 5/11 (45%) Control CC staff responded at 8 months.

### Adherence to the SOSA intervention: Shared intervention components

#### *Provision of evidence-based home safety advice*

**HVT MEMBERS IN CONTROL AND INTERVENTION WARDS REPORTED ALWAYS PROVIDING HOME SAFETY ADVICE TO PARENTS DURING CHILD HEALTH REVIEWS WITH SIMILAR FREQUENCY, 88% (14/16) AND 86% (25/29) RESPECTIVELY. THIS WAS CONSISTENT WITH DATA FROM INTERVENTION AND CONTROL WARD PARENTS WHO REPORTED IN QUESTIONNAIRES A SIMILAR FREQUENCY OF RECEIPT OF HOME SAFETY ADVICE FROM HVT MEMBERS (**

Table 9). At 8-months post training, HVT members from control and intervention wards reported a similar duration of discussing home safety with parents with a mean duration of 9.3 minutes (standard deviation (SD) 3.8), and 9.6 minutes (SD 3.3) respectively during 9–12-month reviews, and 9.3 minutes (SD 3.8), and 10 minutes (SD 3.4) respectively during 2-2.5-year reviews. Time spent on discussing home safety increased at 24-months post training by intervention HVT members with a mean of 12.5 minutes (SD 10.9) during 9–12-month reviews, and 13.1 minutes (SD 11.6) during 2-2.5-year reviews. Control HVT members did not complete questionnaires at this time point.

At 8-months post-training, 31/36 (86%) of FMs reported discussing home safety at every visit dedicated to this topic, with 7 (23%, 7/31), discussing home safety at every visit irrespective of the visit purpose. A total of 73% (73/100) of parents with FMs reported receiving home safety advice from their FM.

**IN THE FIRST YEAR OF THE INTERVENTION, PARENTS LIVING IN INTERVENTION WARDS WERE SIGNIFICANTLY MORE LIKELY TO RECEIVE HOME SAFETY ADVICE FROM THEIR CHILDREN'S CENTRE STAFF THAN THOSE IN CONTROL WARDS (P=0.02) HOWEVER, THIS EFFECT WAS NOT SIGNIFICANT AT 24 MONTHS (**

Table 9).

PARENTS IN INTERVENTION WARDS WERE SIGNIFICANTLY MORE LIKELY TO RECEIVE HOME SAFETY ADVICE FROM ANY PRACTITIONER SOURCE, NAMELY CC STAFF, HVTs OR FMs, AND FROM TWO OR MORE OF THESE SOURCES THAN PARENTS LIVING IN CONTROL WARDS AT BOTH TIME POINTS (

Table 9).

**TABLE 9: PARENT SELF-REPORTED RECEIPT OF HOME SAFETY ADVICE FROM A PRACTITIONER SOURCE WITHIN THE PREVIOUS YEAR AT 12 AND 24 MONTHS FROM RECRUITMENT.**

Advice source	Number of parent responses	Adjusted Odds ratio with 95 % CI	p-value
<b>At 12 months from recruitment</b>	492		
Parents in control wards	270 (54.9%)		
Parents in intervention wards	222 (45.1%)		
Advice from any Practitioner*		2.36 (1.36 - 4.08)	0.002
Health Visiting Team		0.75 (0.46- 1.21)	0.24
Children’s Centre staff		3.10 (1.16 - 8.27)	0.02
Advice from two or more Practitioners		9.63 (3.56- 26.02)	<0.001
<b>At 24 months from recruitment</b>	484		
Parents in control wards	268 (55.4%)		
Parents in intervention wards	216 (44.6%)		
Advice from any Practitioner*		2.59 (1.59 - 4.21)	<0.001
Health Visiting Team		0.98 (0.62 - 1.56)	0.93
Children’s Centre staff		2.35 (0.72 - 7.70)	0.16
Advice from two or more Practitioners		5.09 (1.34- 19.33)	0.02

\*Practitioner includes Health Visiting Team member, Children’s Centre staff or Family Mentor. Family Mentors were only available to parents in intervention wards.

The reference group for receiving advice from any practitioner included those who received advice from family and friends only or did not receive any safety advice.

### Monthly Safety Messages

A higher proportion of FMs used Monthly Safety Messages (MSM) regularly than the HVTs or CC staff. 75% (38/51) of FMs, 50% (2/4) of CC staff and 38% (9/24) of HVT members reported using one or more MSMs. Intervention practitioners most frequently used MSMs to prompt discussion with parents whether in a group or 1:1 setting, with a minority providing the MSM without discussion for parents to review in their own time. In interviews, both approaches were described.

MSMs used to prompt discussion	<p>“On home visits I will say this is the message of this month and we will talk about it and then I will leave them with that leaflet to look at.” FM Interview</p> <p>“When we’re in a session and I literally go around to each individual parent, give them the information, while the children are playing, try and get them to fill [quizzes] in... those who get any wrong I do take to one side and have a proper discussion with them and find out why they have chosen the wrong answer and then tell them which is actually the right answer.” Intervention CC staff interview</p>
MSMs given to parents	<p>“I don’t go through [monthly safety messages] with them, I just leave them for parents with the erm RoSPA growth chart.” Intervention HVT member interview</p>

Parents in intervention wards were no more likely to receive home safety leaflets than parents in control wards in the first year of their enrolment in the SOSA intervention ( $p=0.5$ ) but were more likely to receive them at 2 years ( $p=0.02$ ). In interviews some parents recalled receiving leaflets pertaining to home safety but could not remember specific details to identify whether these were MSMs.

### Signposting

Intervention practitioners were more likely to signpost parents to organisations for home safety advice or resources with 90% (26/29) HVT members, 100% (4/4) CC staff and 86% (31/36) FMs signposting to one or more organisations. By contrast, 19% (3/16) HVT members, and 1/5 (20%) CC staff in control wards reported signposting to an organisation. Of the practitioners interviewed, most had signposted parents although it was not done routinely. This difference in signposting was not reflected in parent questionnaire responses where there was no significant difference reported by parents in intervention and control wards.

## Adherence to the SOSA intervention: Practitioner-specific intervention components

### Health Visiting Teams

HVT members in intervention wards documented high rates of use of the SOSA Home Safety Checklist in electronic child health medical records (used at >80% child health reviews), except during quarters 2 and 3 of 2020 when most home visits were cancelled during the Covid-19 pandemic (Figure 5). In questionnaires at 8 months-post training however, only 62% (18/29) reported using these checklists often or always, and 63% (15/24) at 24-months post-training.

**FIGURE 5: ELECTRONIC MEDICAL RECORD DATA OF SELF-REPORTED SOSA HOME SAFETY CHECKLIST USE AT CHILD HEALTH REVIEWS BY HEALTH VISITING TEAM MEMBERS**



Regarding information provision, a height chart produced by RoSPA (which allows parents to record the height of their child and outlines common hazards in the home and basic first aid strategies), was used most frequently, with 72% using it always or often during child health reviews. A poster developed by CAPT (One Step Ahead Poster linking development with potential hazards) was used

by 60% always or often, and the RoSPA 'Keep Me Safe at Home booklet' (providing advice on safety equipment and common injuries within the home) was used by 25% always or often.

In visit observations and interviews, practitioners' method of using the checklist varied. Some practitioners left the checklist with the parent to review in their own time whereas for others, it formed the basis of a verbal discussion.

Use of the checklist	<p><i>"Yes, we obviously didn't fill [the checklist] in, and I didn't sign it I don't think... but reading through it I do remember reading through it...it was more of a verbal thing like what to look out for and if it was like a plan, I would probably say it was verbal, I didn't write anything down."</i></p> <p>Intervention parent interview</p>
----------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

This finding was supported by data from parent questionnaires which did not find a significant difference between completion of a home safety checklist with an HVT member or CC staff between intervention and control ward parents. Whilst the SOSA home safety checklist was only available in intervention wards, at the time of the SOSA intervention, HVTs were using checklists from other schemes to support child health outcomes. HVTs reported that post-accident contacts were conducted without reference to the standard operating procedure (SOP) developed as part of the intervention protocol or use of intervention resources.

Post-accident contacts	<p><i>"Face to face post-accident contacts using our home safety checklist are very rare. None of the champions have done any, though [name] has a visit next week and [name] has completed a post-accident contact via telephone."</i></p> <p>SOSA Home Safety Champions meeting 11-01-18</p>
------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### Family Mentors

Whilst all parents in intervention wards were offered the support of a Family Mentor, only 45% (100/222) of parents in the study accepted this offer. QA visits undertaken by the FMs' managers found that FMs were familiar with the contents of their manual and used it to guide visits.

Use of the manual to guide visits	<p><i>"FM talked about making a fire escape plan with Mum, and as they pinpointed possible risks together FM wrote on the plan."</i> FM QA observation visit 29</p> <p><i>"[Name] looked at safety checklist and mother ticked what was in place and they discussed measures mother had already taken to minimise risk. [Name] reviewed [the mother's] safety plan from previous visit."</i> FM QA observation visit 22</p>
-----------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

At all 22 QA observations conducted, FMs used the home safety activities from their manual. In interviews, parents recalled regular home safety discussions with FMs and participating in activities pertaining to home safety.

At 8-months post training, 24/36 (67%) FMs reported using at least three quarters of the home safety activities from the manual, rising to 38/51 (75%) at 24-months.

### Children's Centres Staff

Data on parent attendance at Safety Weeks (SW) was often incomplete, but CC staff reported that the weeks often had limited reach, with attendance varying considerably between centres and SWs.

Attendance at safety weeks	<i>“The parents that we really wanted ... to see in [children’s centres] they hardly attended... and a lot of the parents didn’t really go out to the groups...they weren’t able to engage in these erm really good activities about home safety and so like because they did not come.”</i> Intervention CC staff interview
----------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

SWs were consistently delivered but usually took the form of one or two sessions rather than activities throughout the week. In questionnaires, half (2/4) of CC staff reported using IPB activities. In interviews, some staff confused these activities with MSMs, and others were unaware of either resource.

Resources used in safety weeks	<i>“Perhaps sort of an activity to do with it as well...to engage more. Although we do put you know put up the posters...I think actually doing something.”</i> Intervention CC staff interview
--------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

## Chapter 6 Parental perspectives of the barriers and facilitators to child home injury prevention

This chapter describes the results relating to parents' perceptions of barriers and facilitators to child home injury prevention, changes in knowledge and self-efficacy to prevent injuries and acceptability and satisfaction with home safety promotion.

### Results

#### Qualitative analysis of barriers and facilitators to home safety promotion by parents

Participants were predominantly mothers, of white ethnic origin, with an almost even distribution of parents who were first time mothers (11 parents) of the child included in the study versus parents who had older children already. The mean age of parents was 26. Across both intervention and control wards, four themes emerged from the data. These were parents' views about injury prevention, where knowledge comes from, delivery of information and availability of service and support. Themes and sub-themes are shown in Table 10 with illustrative quotes from parents in intervention and control wards.

#### *Theme 1: Parents' views about injury prevention*

Parents across intervention and control groups perceived the importance of preventing injuries and how preventable injuries were differently depending on injury severity. In the case of the minor injuries parents in both groups accepted that such accidents were unavoidable, and this therefore acted as a barrier to improving home safety for some parents. However, some parents also considered minor injuries as learning opportunities to improve home safety.

In cases of more severe injuries in the home (i.e., severe burns and poisoning) parents in both groups felt that these types of injuries were more foreseeable and preventable, which served as a facilitator for making the home safer, and/or changing their own behaviours to improve child safety. This meant that parents were more motivated to take preventative measures to reduce the occurrence of these injuries in the home, including placing items perceived as harmful (i.e., chemicals) out of children's way.

#### *Theme 2: Where knowledge comes from?*

Parents from control and intervention groups frequently referred to informal and formal sources of advice and information. These included friends and family, practitioners, a variety of media sources and workplace courses. Formal advice included verbal advice (in person and by phone) and home safety literature from health visiting staff, community nurses and nursery nurses, as well as family mentors (in intervention wards). Media sources included internet search engines, social media sites (i.e., Facebook, parent forums) and television campaigns or adverts, particularly in relation to fitting smoke and carbon monoxide alarms and keeping laundry liquid capsules/dishwasher tablets out of children's reach.

Some parents referred to experiential knowledge gained from their own upbringing, hearing stories of other children having severe injuries or prior experience of injuries to their older children. Parents in intervention and control groups also referred to having intrinsic knowledge about home safety in the form of 'common sense', which meant that they "intuitively" made their homes safer, particularly as children became more mobile. Some parents felt that they already knew about some of the home safety topics covered in child health reviews and their homes were already safe with respect to those topics.

### *Theme 3: The delivery of information*

Parents from both intervention and control groups discussed adequacy, inadequacy, and consistency of the safety information they received and how this influenced their safety practices. Among parents in both groups, home safety literature from professionals during home visits helped parents make safety changes to their homes. This literature was highly valued and served as a ‘reminder’ on home safety. Verbal advice from health professionals during home visits was also highly valued by intervention and control parents, particularly information about smoke alarms and keeping dangerous items out of children’s reach (e.g., medicines, hot cooking pans, etc.). Among intervention parents, family mentors (which were only present in the intervention wards) were highly regarded, both in terms of the usefulness of the printed resources they used and verbal information that they provided. The regularity of visits and the trusting, personal relationship which ultimately developed with the mentor through their frequent contact was also important.

Conversely, parents in both groups felt that some information provided during home visits from health visitors was too brief or rushed, or that time limitations during home visits led to ‘missing’ or sparse information. In some cases, parents felt it would have been useful to have a physical check of their home during home visits to identify potential safety hazards, including being informed about when safety equipment can be removed (e.g., safety gates). Parents in both groups highlighted the infrequency of health visitors’ visits, with parents complaining about a considerable amount of time between contacts.

Inconsistency of information between various sources and contradictions between sources of home safety advice were highlighted as being confusing. Parents were often unclear about which information they should trust, especially when it came from internet news articles and forums.

### *Theme 4: The availability of services and support*

Among parents in the control group, proximity to children’s centres was highlighted as a barrier to receiving information on home safety. Parents thought that the distance was too great, playgroups that used to be attended had ended, or the children’s centres were closed, which limited their access to information and support.

While less prominent in the intervention group, parents across both groups discussed convenience of services relating to child home safety. Access to free equipment, such as safety gates, cupboard locks and sharp corner guards, were particularly valued by parents and were facilitators to home safety action. The wide variety of products available to buy was also highlighted as, enabling parents to obtain products that suited their needs.

**TABLE 10: THEMES, SUB-THEMES, AND ILLUSTRATIVE QUOTES**

<b>Theme</b>	<b>Sub-theme</b>	<b>Illustrative quotes (Intervention ward – I; Control ward – C)</b>
1. Parents’ views about injury prevention	Minor injuries are inevitable	<p>“...a child can just fall over and, you know, if they have got kind of two left feet, as you say, and you probably couldn’t have done anything to stop that.” (I, Female infant, 2 years 8 months)</p> <p>“I think some of it is you have to learn...I would say like with minor injuries I feel like that is part of learning [for the child].” (C, Male infant, 2 years 8 months)</p> <p>“I think some minor things sometimes having them you know sort of running around and bumping or something, that can be, you know, while they are finding their feet...” (C, Male infant, 2 years 8 months)</p>

Theme	Sub-theme	Illustrative quotes (Intervention ward – I; Control ward – C)
	Some accidents need to be prevented	<p>“...moving things that, so like chemical type things, I think... that is probably because obviously... like toxicity of things I think that because that is obviously really life threatening.” (I, Male infant, 1 year 2 months)</p> <p>“I think with regards to the major, erm, incidents then definitely most of the time they can be avoided if you sort of keep an eye on the home and making sure that you keep certain things away from them and things like that.” (C, Male infant, 2 years 8 months)</p>
2. Where knowledge comes from	Informal sources (friends, family, web).	<p>“...my friends were warning me, when you’re cooking, just make sure [you] start cooking using the back of the stove at the moment, rather than the front to get yourself used to that.” (I, Male infant, 2 years 6 months)</p> <p>“...we all had everything like that, stair gates, fire guards, everything [...] so I feel like a lot of things sort of came through from how I was raised as a child.” (C, Male infant, 2 years 6 months).</p> <p>“I know there is lots of websites that we can go on and visit and just kind of like forums and kind of see what other people are going through and seeing how we can take on board that as well.” AS.C2.0106 (I, Female infant, 2 years 8 months).</p> <p>“I think you get a lot on social media as well, sort of people sharing things like oh just reminder not to leave them in the bath, just a reminder to everyone to put your car seat in safely. I think is where I have picked it up from.” (C, Male infant, 2 years 6 months)</p> <p>“...magazines or internet, Facebook, it is amazing what you do pick up on, on Facebook, on the internet...” (C, Female infant, 2 years 8 months).</p>
	Formal sources (Service providers, workplace (experience and courses)	<p>“...with the job that I do [...] you do get a lot of information anyway [...] we do like booster training and things like that, obviously yearly and what not.” (I, Male infant, 1 year 2 months)</p> <p>“I have done like, first aid at work.” (C, Male infant, 2 years 8 months)</p> <p>“...information about just general things around the home to keep your child safe [child health review] that you might not think about, sort of putting the kettle towards the back and things like that.” (C, Female infant, 2 years 9 months)</p> <p>“I have got my SSBC mentor, she is quite hot on it [...] she will always talk to me about safety measures and stuff like that. Every few months she gives me a new set of sheets, and she goes through the safety...” (I, Female infant, 2 years 4 months)</p>
	Exposure to severe injuries	<p>“... he [nephew] has jumped one time and his head landed on the side of the one of the cabinets [...] we had to rush him to A&amp;E [...] no, I don’t want that [...] I can’t afford to take time off work. So, for that reason I am always making sure, you know, I know where my son is at all times.” (I, Male infant, 2 years 6 months)</p> <p>“...when [name] was a baby he got a partial thickness burn from a hot tea, so we’re a lot more sort of stringent with hot drinks.” (C, Male infant, 1 year, 4 months)</p>
	Having older children	<p>“I think with having two so close together I think I just remembered it all from the first one...” (I, Female infant, 2 years, 5 months)</p>

Theme	Sub-theme	Illustrative quotes (Intervention ward – I; Control ward – C)
		<p>"...obviously over 16 years of myself having children I think it is a lot more accessible, finding out information." (C, Female infant, 2 years, 9 months)</p>
	Common sense (intrinsic knowledge)	<p>"...the basics that they [health visitor] ask you, things that you would expect somebody with a bit of common sense to know anyway." (I, Female infant, 1 year 5 months)</p> <p>"...common sense in we just know that kids shouldn't have access to chemicals, they shouldn't really have access to cupboards with things in that are going to hurt them." (C, Male infant, 1 year 3 months)</p> <p>"...when he started doing his first steps, he started opening all the cupboards and all of the doors everywhere, everything around, so the first thing which I did about it looks like a plastic lockers for all of the cupboards." (I, Female infant, 2 years 3 months)</p>
3. The delivery of information	Adequacy of information	<p>"I think it is really useful [child health review] [...] it keeps it fresh in the mind which again I think is really important when you have got small children." (I, Female infant, 2 years 8 months)</p> <p>"...it was useful [family mentor sessions] and helpful because we were forgetting something or something we didn't know, for example the fire alarm..." (I, Female infant, 2 years 4 months)</p> <p>"... I do find it [child health review] quite helpful because it does make you think oh like make you think in your brain like oh yes, I think back and no this is OK, that is not..." (C, Male infant, 2 years 8 months).</p>
	Inadequacy of information	<p>"...the only thing probably I would say that needs to be discussed a little bit more is maybe things like safety gates, when to actually start removing them, sort of when they come more hazardous than a benefit..." (I, Female infant, 2 years 8 months)</p> <p>"I suppose if someone is coming to your house anyway and they are there, and they maybe know... like it would be helpful if they could say like "oh this looks like a particular hazard" or something." (C, Female infant, 1 year 3 months)</p> <p>"I think like when you're having a first baby, they come out a few times and then after that you're on your own because you never see them ever again. So, I think that is a bit isolating." (C, Male infant, 2 years 8 months)</p>
	Consistency of information	<p>"...internet is not the same [as other sources of support] because you never know if that is completely true..." (I, Female infant, 2 years 4 months).</p> <p>"I mean it depends whether or not it is a trusted site, I mean if it is just someone's opinion on Mumsnet or a Daily Mail article or something like that..." (C, Male infant, 1 year 4 months)</p>
4. The availability of services and support		<p>"There isn't any [children's centres] near us, they have all been closed." (C, Male infant, 2 years 8 months)</p>

## Parental knowledge and self-efficacy

There was no significant effect of the intervention upon safety-related developmental milestone knowledge score at 12 months (Difference between means -0.15 (-0.37 to 0.07),  $p = 0.18$ ) or 24 months (Difference between means: -0.13 [95% CI -0.40 to 0.13],  $p = 0.32$ ) (see Table 11); or in self-efficacy score at 12 months (Difference between means 0.18 [-0.11 to 0.46],  $p = .22$ ) or 24 months (Difference between means 0.16 [95% CI -0.21 to 0.52]  $p = 0.41$ ) (Table 11).

**TABLE 11 SAFETY-RELATED DEVELOPMENTAL MILESTONE KNOWLEDGE SCORE, AND SELF-EFFICACY SCORE**

Measure	Measurement time point	Control group Baseline $n = 401$ 12 months $n = 298$ 24 months $n = 298$	Intervention group Baseline $n = 361$ 12 months $n = 237$ 24 months $n = 233$	Adjusted* difference between the means (95% CI)	$p$
Mean safety-related developmental milestone knowledge score	Baseline (max 8)	2.93±1.11 [19]	2.77±1.14 [14]	-0.21 (-0.42, -0.002)	0.048
	12 months (max 8)	2.86±0.91 [10]	2.65±1.03 [17]	-0.15 (-0.37, 0.07)	0.18
	24 months (max 8)	2.87±1.07 [22]	2.70±1.17 [27]	-0.13 (-0.40, 0.13)	0.32
Mean self-efficacy score	Baseline (max 10)	8.56±1.54 [18]	8.75±1.59 [28]	0.09 (-0.20, 0.37)	0.55
	12 months (max 10)	8.56±1.50 [8]	8.82±1.56 [11]	0.18 (-0.11, 0.46)	0.22
	24 months (max 10)	8.42±1.72 [18]	8.80±1.60 [15]	0.16 (-0.21, 0.52)	0.41

All Intra -class correlation coefficients were less than 0.000001, so were all less than the ICC used in the same size calculation (<0.00001)

\* The model controlled for: number of siblings under the age of 16 years; maternal age at the time of the birth of the first child; the Index of Multiple Deprivation (IMD) of the home postcode, whether the family lived in a single-adult household, the corresponding baseline variable (where collected), and the matched wards factor.

## Parental acceptability and satisfaction with home safety promotion.

Parents generally found home safety promotion advice from HVT members and FM acceptable and their preferred source of home safety information, describing them as an authority with the necessary expertise. Parents with other children felt they were less in need of home safety support. Satisfaction with the content and format of the intervention showed wider variability. For example, some parents appreciated leaflets and handouts to review in their own time whereas several explained the challenge of engaging with these materials due to time constraints associated with childcare and being ‘overwhelmed’ with paperwork. See Table 12 for illustrative quotes.

**TABLE 12 PARENTAL ACCEPTABILITY AND SATISFACTION WITH HOME SAFETY PROMOTION**

Theme	Subtheme	Quote
Acceptability	Advice not needed	<p>INT: “discussion that you had about home safety with your nurse?”            RES: “Yes, yes I mean it just felt like going through the motions really, you know when you just think oh I am not actually sure why, you know, we had to have it but you know it is your third baby...”            SH.C1.0439</p> <p>“..it is useful but it is quite sort of repetitive which I completely understand, it is the same things I think that are given every time you do have a point of contact with the health visitor...” ST.C2.0466</p> <p>“I think for a first-time parent it would probably be quite useful but for somebody that has kind of been there, done it five times it is like well wait a minute...” BE.C2.0052</p>
	Advice is needed and useful	<p>RES: “I think it is good and actually even though I have complained a little bit about [...] the list of dos and don’ts it is probably important because if they just gave you a leaflet then you wouldn’t read it.” CN.C1.028</p> <p>“..when you first have a child there is a lot of information thrown at you, you get sort of a huge book full of information, but you also have a tiny new little person to look after erm and so it goes by the wayside and you don’t manage to you know look through all of that and I think it is really good to have a reminder, especially once they are sort of more mobile, erm and have different needs.”            SH.C1.0386</p>
	Format of information	<p>“...rather than a checklist I think that is a bit intimidating if you know what I mean where someone comes in and goes oh your stairgates are... more of a oh do you know it is best if you... rather than oh this is a tick list, let’s see if you have got ten ticks, that is really intimidating to me. I think to go to a new mum and go right we’re going to look at your house and see if you have got this in the right place... you know at the end if she has only got three ticks she is going to feel rubbish.” BR.C1.0178</p>
Satisfaction	Haven’t got time for home safety promotion	<p>“I am telling you, the pile of paperwork they give you... it is like one of them things you will flick through it, and if it doesn’t catch your eye in the first two seconds, you are not reading it, you haven’t got time.” BE.C2.0052</p>

	Good to be reminded	“I think sometimes with the fire safety in particular you kind of forget erm so it just kind of erm made us just be aware of what we would do in that circumstance.” BU.C2.0309
	Good relationship with practitioners regarding home safety promotion	<p>“Based on the information I have now, I would like it to come from my mentor just because I have a relationship with her because she has been with me since the beginning. She knows my daughter, she has interacted with her, she knows my house, so it is easier to get one on one guidance, you know the health visitor is nice but yes she sees me once a year if that.” BU.C2.0309</p> <p>“... I prefer to hear it from professionals... so to hear it from an official authority so to speak, for me that kind of embeds it a bit more...” ST.C2.0500</p>
	Too basic	“Yes I think for me it just felt sort of very basic, very simple, not that the lady that came out was patronising, but I think the way that it was delivered and obviously I know she sort of is set with how she can deliver it sort of thing but it did feel very basic...” AS.C2.0169
	Important part of the review	<p>“What do you think about the fact that health visitors provide home safety advice as part of their role? As part of their job when they are going...?” RES: “Well I think it is essential and I think it is important because not everybody would have thought to have done certain things, so it is essential to do it.” CN.C1.0250</p> <p>“... I think it shouldn’t ever be removed from the one year review because whilst I thought I know a lot of stuff, I clearly haven’t got everything in there and there will people who probably haven’t even thought of the bigger stuff.” CN.C1.0250</p>

## Chapter 7 Practitioner perspectives of the barriers and facilitators to child home injury prevention

This chapter describes the results relating to service providers' perceptions of factors which impact their ability to deliver the SOSA intervention and the acceptability and satisfaction regarding the delivery of home safety promotion.

### Results

#### Barriers and facilitators to child home injury prevention

A total of 91 practitioners were invited to be interviewed and 21 agreed to participate comprising 9 family mentors, 7 health visiting team staff, and 5 children's centre staff (Table 13).

Three themes emerged from the data as important barriers and facilitators impacting on intervention delivery. These themes were: practitioners' engagement with the intervention, parent engagement with the intervention and communication channels. Sub-themes have been described under each theme. Themes and sub-themes are shown in Table 14 with illustrative quotes from service providers across intervention wards.

#### *Theme 1: Practitioners' engagement with the home safety intervention*

There were several factors that acted as a facilitator to intervention delivery. Practitioners felt more able to engage with the intervention if they believed it was important, felt the resources were helpful and were able to organise their time to include home safety promotion into home visits. Health visiting and family mentor staff felt it was important to build good relationships with families and having good relationships increased practitioner motivation and enthusiasm for promoting home safety. Having a structured home safety intervention built into their role also meant that they were more likely to find the time to discuss it, especially if specific home safety activities were scheduled (for the Family Mentors particularly). Techniques such as simplifying information, motivational interviewing, and providing personal accounts of child accidents were utilised to make information sharing more personal and effective.

There were also factors that acted as barriers to intervention delivery. Practitioners often described feeling that there was little time to fit the intervention into their usual role, particularly if there were competing priorities with a family, such as a specific issue with child development. Children's centre and health visiting staff reported difficulties working across their organisations on issues such as communicating about home safety weeks (which were part of the intervention) and the timing (family mentor) of the support provided to parents. Interviews that were conducted after the commencement of Coronavirus public health protection social restrictions (see **Error! Reference source not found.**) also identified the significant impact that this had on the delivery of the intervention, preventing health visitors from using the home safety checklist in the home (as part of the child health review), preventing the delivery of home safety weeks by Children's Centre staff and home visit activities by Family Mentors.

Family Mentors and Health Visiting staff also admitted to forgetting to discuss home safety or forgetting to record that a discussion had taken place due to heavy workloads, distractions in the home environment and time limitations on the visit. Lack of delivery was also sometimes more conscious. For example, Health Visiting staff didn't feel at ease signing the home safety checklist due to fear of future litigation (if an injury subsequently happened) or asking parents to sign because they felt it was insulting to parents. Beliefs about the best timing and who should provide home safety advice also impacted on intervention delivery. For example, Health Visiting staff who undertook post-accident follow-up contacts with parents felt that this was a role better done by

Accident and Emergency room staff, partly because they were with parents at a time that parents were most likely to listen, but also because revisiting the experience in a post-accident call or visit may be distressing because of re-experiencing the trauma of the accident.

### *Theme 2: Parent engagement with the intervention*

Practitioners reported parent engagement as an important factor in the delivery of the intervention, both as a facilitator, when parents responded well to the intervention, and a barrier when they did not. Engaged parents expressed enthusiasm towards the SOSA resources they received (e.g., home safety quizzes and leaflets), which in turn motivated the practitioners. Across practitioner groups there was also the belief that parents had made changes to their home to make it safer following the advice they had received. These changes included removing safety gates when the child is getting older, and fitting locks to cupboard doors at floor level.

Negative responses to the SOSA resources resulted from parents indicating they felt criticised for poor home safety practices or patronised by obvious or common-sense information, parents not making changes after receiving the information (reported by Health Visiting staff), and parents being too distracted to absorb the information. Health visiting staff reported tailoring their use of the intervention depending on whether parents had older children and therefore knew about home safety. In such instances they reported not going through the checklist in its entirety.

### *Theme 3: Communication channels*

The third theme comprised communication channels which helped or hindered the way that practitioners delivered home safety promotion. Practitioners felt that pictorial presentation of home safety information on posters, leaflets etc., facilitated their use, especially with parents where English was not the first language. The SOSA intervention is a complex intervention delivered across multiple types of practitioner and organisations. Effective teamwork between staff within teams and across different organisations (e.g., the fire service, Family Mentors, Children’s Centres and Health Visiting teams) led to successful implementation through improved referrals, awareness of home safety events and efficient problem solving. This included positive views of the role of the Home Safety Champion, who distributed SOSA resources and home safety checklists to health visiting staff, provided briefings on safety meetings and updates on home safety topics.

Barriers in communication were also highlighted. These included barriers to understanding written messages due to literacy difficulties and barriers among parents whose first language was not English. Additionally, when communication between teams did not work well this led to difficulty understanding what other service providers were responsible for and getting the necessary home safety support delivered to families at a faster pace when safety issues had been identified.

**TABLE 13 INTERVIEWS CONDUCTED BY PRACTITIONERS ACCORDING TO COMMENCEMENT OF CORONAVIRUS PUBLIC HEALTH PROTECTION**

<b>Practitioner job title</b>	<b>Date interview conducted</b>	<b>Pre or post coronavirus public health protection</b>
Family mentor	17/12/2019	Pre
	17/12/2019	Pre
	18/02/2020	Pre
	19/02/2020	Pre
	16/06/2020	Post
	12/08/2020	Post
	12/08/2020	Post
	18/09/2020	Post
	22/09/2020	Post

Practitioner job title	Date interview conducted	Pre or post coronavirus public health protection
Health visitor	24/08/2018	Pre
	30/04/2018	Pre
	18/10/2018	Pre
	06/11/2020	Post
	24/02/2021	Post
	09/12/2020	Post
	19/11/2020	Post
Children's Centre staff	19/10/2020	Post
	16/12/2020	Post
	15/01/2021	Post
	26/01/2021	Post
	29/04/2021	Post

**TABLE 14: BARRIERS AND FACILITATORS TO HOME SAFETY PROMOTION BY PRACTITIONERS**

Theme	Facilitator /Barrier	Sub-theme	Illustrative quotes (Health Visitor – HV; Family Mentor – FM; Children's Centre staff member - CC)
1. Service providers' engagement with the intervention	Facilitator	The intervention itself	<p>"It has made me think differently on how... what topics I need to talk about you know before you could go in, it would be... you would be going through the motions of doing it but now..." (HV)</p> <p>"oh I like the activities... I am enjoying it because it is also good opportunity to praise the parents for things they are already doing and they have got in place." (FM).</p> <p>"... it is all clear so you can understand what it is saying. They are really good posters to tell you the truth they are." (CC)</p>
		The relationship with families	<p>"I think that would be quite rewarding, to know that your contact made a difference." (HV)</p> <p>"Because we are with families, we are there from beginning [...] we have got that relationship with them for that long so I think, you know, we are the best people, yes definitely the best people to deliver it." (FM)</p>
		Finding the time	<p>"I think I probably spend a little bit more time on it and I speak a little bit more about different aspects of safety" (HV)</p> <p>"...if we know that we're going to be discussing something on a particular day then we will erm try and factor in enough time" (FM)</p> <p>"...it is a case of I try and make the time to get it sorted" (CC)</p>
		Using different delivery techniques	<p>"I think is quite important to go in and reassure them [post-accident] erm and get the message across how important it is, home safety is important and how we don't want any more accidents to happen" (HV)</p>

Theme	Facilitator /Barrier	Sub-theme	Illustrative quotes (Health Visitor – HV; Family Mentor – FM; Children’s Centre staff member - CC)
			<p>“I felt like being a mum erm being a parent and all of the things that you go through from when they are born to when they are in school, plays and all of the worries that you have. I just thought if I can share that with someone who is like new to it all, why not?” (FM)</p> <p>“...but it is just down to the mentor of how they deliver it. It is that questioning it is that kind of you know what is it that you do?” (FM)</p>
	Barrier	Finding the time	<p>“I think it is just time, as I say because it is... if you have got a straight forward review then that is fine, you can fit it in, it is if it is problematic and if there is problems with the child then we’re going to be discussing that first.” (HV)</p> <p>“...technically you have only really got an hour there and if you’re not back within a certain time that you said you’ll be back they have got a search party out looking for you.” (FM)</p> <p>“...the health visitors... they still offer to help but then it is finding somebody to actually do it who has got the time to do it. Erm... especially because we have only got set hours with the families in the session. You know... it has even got more awkward now because of Covid-19...” (CC)</p>
		COVID	<p>“I will be honest like I say I haven’t done a review for a fair while now, especially through” (HV)</p> <p>“...it has been like it since March yes, since the first lockdown, nothing has changed. We did start doing a few [safety week] sessions erm beforehand but then when he locked it down again we have had to stop.” (CC)</p>
		Forgetfulness/ dissatisfaction in performing task	<p>“...if I was a parent I wouldn’t have signed it [home safety checklist], I would have found it insulting. I am all for giving information, I am just not sort of what signing does?” (HV)</p> <p>“...when I have done, sometimes it [post-accident contact] can be a bit awkward I would say sometimes, unless it... it is all right if you know the family you know yes you feel a bit awkward. It is not nice, and parents are remorseful as it is” (HV)</p>
2. Parent engagement with the intervention	Facilitators	Positive belief towards the SOSA intervention	<p>“...some of them are like you know some of them they were beneficial because they would go oh I had never even thought about that and that would be a risk” (HV)</p> <p>“I have always found parents to be quite interested in all of it [...] yes you have got their attention and I think that is what it is, when it comes to home safety you need to get their attention...” (FM)</p>

Theme	Facilitator /Barrier	Sub-theme	Illustrative quotes (Health Visitor – HV; Family Mentor – FM; Children’s Centre staff member - CC)
	Barriers	Negative belief towards the SOSA intervention	<p>“...we had a home safety one [safety week session] about stairs, about making sure that the stairs are clear and some of the parents, you could just tell what some of the parents faces that they were like “ooh my stairs have got shoes all up and down it”.” (CC)</p> <p>“...some parents don’t like us to be leaving all of the information in with them, there is a couple of parents who have given us it back and said take it back with you [...] Some of them were saying they feel like they are being patronised, erm that it is basic stuff and they have had five or six children, so they know all of it, erm others are just saying they don’t want it, it is extra pieces of paper that they don’t need.” (HV)</p> <p>“I just think it is a bit repetitive and they just think oh god not this again, do you know what I mean?” (FM)</p> <p>“...one or two would say well you’re not teaching me anything new, I have been there, I have done that, I have heard it all before.” (CC)</p> <p>Post-accident contact:</p> <p>“I think it just depends on the parents, some parents can have their back up because they feel like you’re going around to tell them off” (HV)</p>
3. Communication channels	Facilitators	SOSA intervention (Using visual resources to support language/literacy barriers)	<p>“I would use that (flipchart) if I had got a mum whose second language was English...” (HV)</p> <p>“...maybe [visual resources are helpful to] someone who is not English speaking you know? You know what I mean? But then because you have got the diagram ones, about... that is really helpful (FM)</p> <p>“We found that with the SSBC questions and answers and the visual factors was a lot easier” (CC)</p>
		Teams (internal/ external)	<p>“I think they [home safety champion] get all of the information that they need to, they get all of the checklists that they need to, they get all of the leaflets they need to, I think it works really well.” (HV)</p> <p>“...if we have any issues or problems then I can just ring up [the] health visitor” (FM)</p> <p>“...they [fire service] do engage really, really well with us. (CC)</p>
	Barriers	Language/ literacy barriers	<p>“...on the back it is a lot of reading and our clients don’t read. Can’t read or they look at that and think no.” (HV)</p> <p>“...because I have quite an international case load, just saying you know people need to have stuff erm translated” (FM)</p>

Theme	Facilitator /Barrier	Sub-theme	Illustrative quotes (Health Visitor – HV; Family Mentor – FM; Children’s Centre staff member - CC)
			“A lot of the parents especially with the language barriers around there, we used to struggle trying to get the safety message over.” (CC)
		Teams (internal/ external)	<p>“...people talking to each other? A little bit more? Sharing information erm I think people, projects struggle to share information or let us know when there is different changes” (HV)</p> <p>“...it could be faster [communicating/receipt of services], if there is issues identified and it is about safety of you know whether it be the baby or other family members I think it could be a bit more faster if you like.” (FM)</p>

### Acceptability and satisfaction of practitioners to delivering home safety promotion

The responsiveness of practitioners impacted on the delivery of the intervention. Practitioners who believed in the efficacy of the intervention and liked the SOSA materials were more likely to prioritize discussions around home safety and deliver resources as intended. By contrast, practitioners were reluctant to use or even omitted resources they found unacceptable because of concern about how such resources would impact on their relationship with parents. Satisfaction with the format of the resources varied, with some appreciative of the novel and interesting format and some concerned that resources like the checklist were just ‘tick box exercises’. See Table 15 for illustrative quotes.

**TABLE 15 ACCEPTABILITY AND SATISFACTION OF PROVIDERS DELIVERING HOME SAFETY PROMOTION**

Theme	Quotes
Acceptability	<p>“But I struggle for when they have gone to ED, they have had the information, ED staff tell us that they have discussed the incident, they have talked about home safety, they have told them X, Y and Z and then they want us to just to reiterate it. And that is the bit I struggle on...” STH.0096</p> <p>“Literally it is very bread and butter it is what we talk about anyway and it almost feels like more work to go through the checklist. When it is just a conversation. It makes it too tick boxy I think when actually it just needs to be a conversation.” AS.H.0023</p> <p>“Having all of the materials and the leaflets and things like that, that just supports us even more so erm yes I wouldn’t say it is a challenge no. It fits quite well within our role.” CL.C.0001</p>
Satisfaction	<p>“I think the monthly theme is really good, it just keeps it fresh in your mind because not every visit discusses home safety whereas erm the theme... ensure that you are discussing it all of the time.” BU.F.0003</p> <p>[regarding the CAPT chart]...“Well I was just going to say it is very useful for some families who need that visual cue erm, but they are set at a real sort of basic level. So, they are not great for everyone, but they are useful to hand out if you think they would benefit from it.” BU.F.0003</p> <p>“I like the way it is displayed in the book because the way I deliver the service I am actually asking the parents what they can support and how they can prevent that so</p>

erm and if you look around the house they already are doing it so I like the way it is illustrated so it is more interactive and it is not like oh I am telling you that you have to do that and that and that (goal setting/ behaviour change).” ST.F.0022

[regarding the checklist] “I am going to be honest, number one it is a time issue, number two if they have signed it, what does it mean? To me and what does it mean to them really? They... they sign it and that means that yes I have gone through it with them and we have both agreed that this is what you need but when I have walked out of that house she might think beep to her I am not getting a carbon monoxide...” AS.H.0002

[post-accident contacts] INT: “how do you find doing the post-accident contacts? RES: Erm... the ones I have done, I haven’t done many but the ones I have done I felt quite comfortable doing, erm I think they are important, they need to be done....” ST.H.0054

## Chapter 8 Cost effectiveness of the “Stay One Step Ahead” intervention

### Introduction

The primary aim of this chapter is to determine the cost-effectiveness of the “Stay One Step Ahead” (SOSA) programme, a dedicated home safety intervention, compared with usual care which does not include the Stay One Step Ahead intervention.

### Methods

A micro-costing of the SOSA intervention was performed between October 2017 and September 2020, using an NHS and local health authority perspective. All prices were estimated in 2019-2020 prices. Activity costs were taken either directly from records kept by the research team, or from direct discussion with intervention providers. Intervention expenditure was collected over three years because cohorts of families were recruited over a 12-month period and followed up for 2 years, hence the total period over which the intervention was provided was 3 years.

Healthcare expenditure was estimated from the 596 children who had complete self-reported data on injuries for either the first or second year of follow-up. If data was missing for one year, it was assumed that no injuries occurred in that year. The original plan had been to compare injuries reported by 100 parents on study questionnaires with those recorded in children’s medical records to check the accuracy of parent reported injuries. Recruitment to this part of the study was lower than expected, with only 21 parents consenting to take part whose child’s medical records were also provided by the General Practitioner (GP) practice. The 21 parents reported 29 injuries, and 28 injuries were recorded in the GP records, with close agreement between the site of presentation of injuries. It was therefore concluded that parent reported injuries were likely to be sufficiently accurate to use in the health economic analysis.

The primary outcome was the additional number of homes with the primary outcome measure (having a fitted and working smoke alarm, a safety gate on stairs and poisons stored out of reach), with a secondary outcome being injuries avoided. Incremental healthcare costs, additional homes with the primary outcome, and injuries avoided were estimated using regression analyses taking into account clustering, mother’s age at birth of first child, number of children (aged less than 16 years) at home, single parent family, socio-economic status, and whether the home met the primary outcome at baseline (injury avoided analysis only). Measures of cost-effectiveness were the incremental cost per additional home with the primary outcome measure and per additional injury avoided. Uncertainty was controlled for using a probabilistic sensitivity analysis with 10,000 replications.

### Cost of SOSA intervention

Excluding development costs, the discounted (3.5% per annum) total cost of the SOSA intervention was £216,859.33 over three years. A breakdown of costs by activity can be found in

Table 16. Development costs added an extra £12,275.00, bringing the total cost to £229,134.33. The cost per family for the SOSA intervention was £43.66 (£46.08 with development costs).

**TABLE 16: TOTAL DISCOUNTED COST FOR SOSA INTERVENTION BY ACTIVITY (NO DEVELOPMENT COSTS)**

Financial year	Quarter	Total cost per activity						Total cost (£)
		Training	UoN Admin	Health Visitor	Family Mentor	Children Centre	Interpreters	
2017-2018	3	13,597.43	425.20	961.58	9,004.80	1,026.14	396.89	25,412.04
2017-2018	4	0.00	646.88	2,199.38	8,965.37	4,511.72	394.61	16,717.96
2018-2019	1	1,296.07	765.22	3,015.39	8,925.94	5,481.73	391.60	19,875.95
2018-2019	2	0.00	881.49	3,839.87	8,886.55	6,434.78	391.76	20,434.45
2018-2019	3	707.08	873.94	3,790.08	8,810.45	6,379.68	385.20	20,946.43
2018-2019	4	0.00	745.73	2,943.96	8,698.59	5,342.10	381.89	18,112.26
2019-2020	1	323.94	739.34	2,899.83	8,624.10	5,296.35	374.06	18,257.63
2019-2020	2	265.55	733.01	2,916.91	8,550.25	5,251.00	386.18	18,102.90
2019-2020	3	0.00	726.73	2,866.62	8,477.03	5,206.03	375.97	17,652.39
2019-2020	4	418.86	720.51	2,833.61	8,404.44	5,161.45	369.70	17,908.57
2020-2021	1	0.00	621.45	2,433.32	8,332.46	0.00	363.65	11,750.88
2020-2021	2	0.00	616.13	2,444.20	8,261.11	0.00	366.43	11,687.87
<b>Total cost (£)</b>		<b>16,608.93</b>	<b>8,495.62</b>	<b>33,144.76</b>	<b>103,941.09</b>	<b>50,090.98</b>	<b>4,577.95</b>	<b>216,859.33</b>
<b>Percentage (%) of total cost</b>		<b>7.66%</b>	<b>3.92%</b>	<b>15.28%</b>	<b>47.93%</b>	<b>23.10%</b>	<b>2.11%</b>	

## Effectiveness of SOSA intervention

Discounted total healthcare cost across both SOSA intervention and control wards was £50,021.06 (see Table 17 for a breakdown by type of healthcare and time). Being within an intervention ward was associated with £41.95 reduction in healthcare expenditure per child, an increase of 12 homes with the primary outcome measure (0.0199x596), and a reduction of 91 injuries (0.1524x596).

**TABLE 17: DISCOUNTED COSTS (3.5% PER ANNUM) FOR HEALTHCARE BY CONSULTATION TYPE AND WARD**

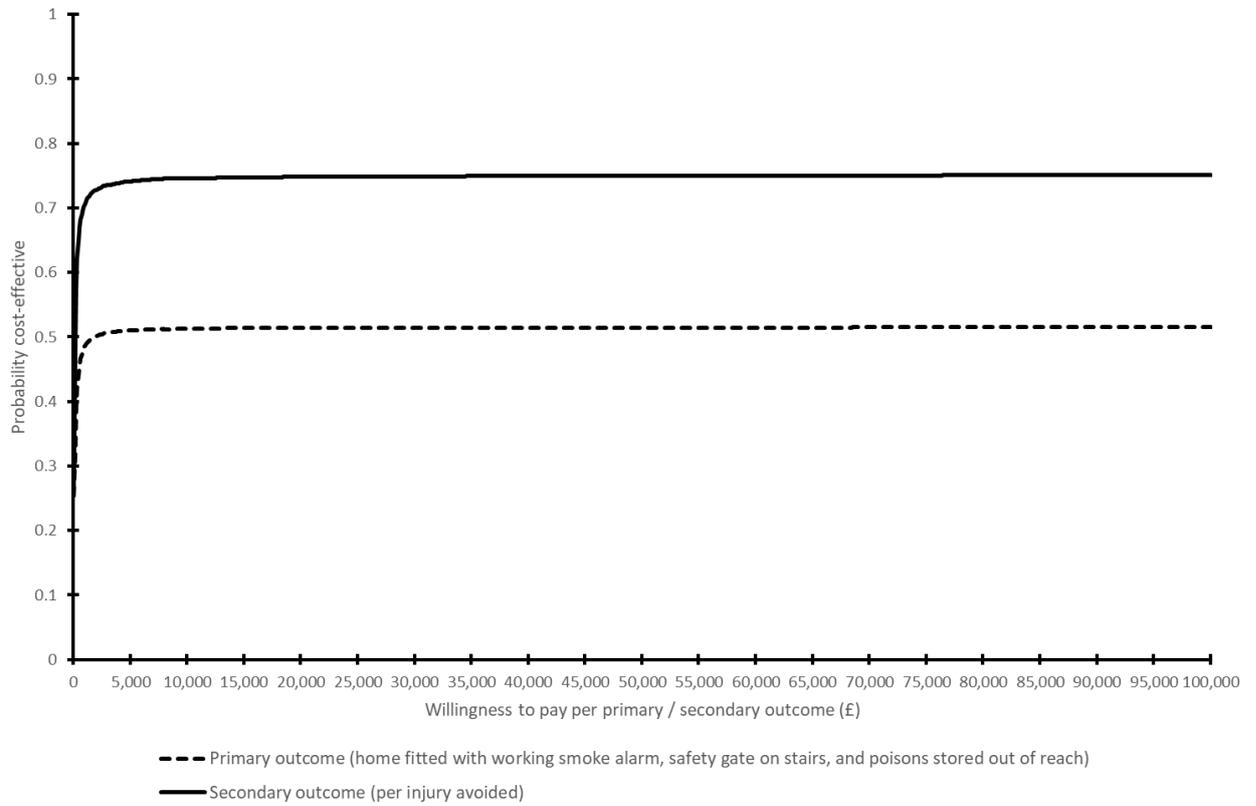
Time	Consultation type	Discounted costs (£)		
		Control wards	Intervention wards	Total
Year 1	GP	527.54	715.94	1,243.48
	Urgent care/ walk-in centre	6,887.19	4,427.48	11,314.67
	Accident & Emergency	334.44	382.22	716.67
	Hospital admission	3,964.48	991.12	4,955.60
	Outpatient	2,129.52	626.33	2,755.85
	<b>Total</b>	<b>13,843.17</b>	<b>7,143.09</b>	<b>20,986.26</b>
Year 2	GP	546.10	364.07	910.17
	Urgent care/ walk-in centre	9,189.26	6,812.72	16,001.98
	Accident & Emergency	553.95	276.97	830.92
	Hospital admission	5,745.63	1,915.21	7,660.84
	Outpatient	1,573.39	2,057.50	3,630.89
	<b>Total</b>	<b>17,608.32</b>	<b>11,426.48</b>	<b>29,034.80</b>
<b>Total across all follow-up</b>		<b>31,451.49</b>	<b>18,569.57</b>	<b>50,021.06</b>

## Cost-effectiveness of the SOSA intervention

The total cost per child (including healthcare costs and intervention costs) was £43.66+(-£41.95)=£1.71, suggesting that return on investment for the intervention was £0.96 i.e. for every pound spent, 96p is recovered, approaching cost neutrality. The incremental cost per additional home with the primary outcome measure was £85.43 and per injury avoided was £11.22. The probabilistic sensitivity analyses suggested that there was a 41% chance that the SOSA intervention would lead to cost-savings (i.e., reductions in healthcare care cost were greater than intervention expenditure per family), but a 25% chance that the SOSA intervention would not lead to cost-

savings. The cost-effectiveness acceptability curves for homes having the primary outcome measure and for injuries avoided can be found in Figure 6.

**FIGURE 6: COST-EFFECTIVENESS ACCEPTABILITY CURVES FOR THE SOSA INTERVENTION PER ADDITIONAL HOME WITH THE PRIMARY OUTCOME MEASURE AND PER INJURY AVOIDED.**



## Chapter 9 Training evaluation

Below is a description of the training evaluation qualitative and quantitative outcomes.

### Results

#### Staff training numbers

A total of 14 training sessions on the SOSA intervention were provided, with 78 health visitors, 77 family mentors, and 7 children centre staff attending training. The numbers of sessions and participants are shown in Table 18. Participants attended one session only.

**TABLE 18: TRAINING SESSIONS BY PARTICIPANTS**

Date of training	Number of health visitors	Number of family mentors	Number of children centre staff	# sessions
06/09/2017	7	6	0	2
07/09/2017	18	27	0	2
13/09/2017	15	0	0	2
20/09/2017	13	10	0	2
27/09/2017	14	0	3	1
25/04/2018	6	0	1	1
07/11/2018	5	0	3	1
24/04/2019	0	13	0	1
26/09/2019	0	10	0	1
08/01/2020	0	11	0	1

#### Knowledge, confidence, and belief scores

A total of 161 pre-training questionnaires and 88 post-training questionnaires were completed by members of Children's Centre (CC, n=11 pre; 5 post), Family Mentor (FM, n=72 pre; 51 post) and Health Visiting (HV, n=78 pre; 32 post) teams. Questions included knowledge of injury epidemiology and home safety, beliefs relating to the importance of home safety in their role and confidence to deliver home safety support. Knowledge scores improved following training for CC and FM staff but not HV (Table 19). Beliefs increased for FM attendees only and confidence to deliver home safety support increased for FM and HV attendees.

**TABLE 19: CHANGES IN KNOWLEDGE, BELIEF AND CONFIDENCE SCORES PRE-POST TRAINING**

		pre	post	Pre-training	Pre-training	Post-training	Max possible score	P-value (Wilcoxon signed rank test)
		n		All	If completed post-training			
				median score (IQR)				
Knowledge	CC	11	5	7 (7-8)	7 (7-8)	9 (8-9)	12	P=0.056
	FM	72	51	6 (5-7)	7 (6-7)**	8 (7-9)**	12	P<0.001
	HV	78	32	6 (6-8)	6 (6-8)	6.5 (5.5-7.5)	12	P=0.080
	All	161	88	6 (6-7)	7 (6-7)**	7 (6-9)**	12	P<0.001
Belief	CC	11	5	4 (4-6)	4 (4-4)	4 (4-6)	6	P=0.16
	FM	72	51	5 (4-5)	4 (4-5)*	5 (4-6)*	6	P=0.02
	HV	78	32	7 (6-8)	7 (6-8)	7.5 (6-8)	10	P=0.52
Confidence	CC	11	5	10 (7-12)	7 (7-11)	10 (8-11)	12	P=0.27
	FM	72	51	11 (8-13)	12 (8-14)	13 (11-13)	14	P=0.06
	HV	78	32	12 (10-13)	12 (8-13)*	13 (11-14)*	15	P = 0.0036

## Satisfaction with the training

Training attendees were asked about their satisfaction with and usefulness of the training immediately after the training (Table 20). A total of 8588 people completed this questionnaire (FM n=4951; CC n=45; HV n=32). The training appeared to be impactful with 44/4951 FMs, 2/45 CC, and 27/32 HVs reporting that they had learned something new from the session. Most felt the session was useful for their work with only 4 people reporting it was not useful and that the facilitators' approach was good (65/885). Overall, 10 people felt the training was too long and 5 people felt the session content was not what they expected.

**TABLE 20: SATISFACTION WITH AND LEARNING FROM THE EVENT**

		<b>Strongly agree</b>	<b>Agree</b>	<b>Neither agree nor disagree</b>	<b>Disagree</b>	<b>Strongly disagree</b>
I learned something new from the session	FM	20 (41%)	24 (49%)	5 (10%)	0 (0%)	0 (0%)
	CC	1 (25%)	1 (25%)	2 (50%)	0 (0%)	0 (0%)
	HV	11 (34%)	16 (50%)	4 (13%)	1 (3%)	0 (0%)
Overall, did you find the session useful for your work?		very useful	useful		not useful	not at all useful
	FM	34 (68%)	14 (28%)		2 (4%)	0 (0%)
	CC	3 (60%)	1 (20%)		1 (20%)	0 (0%)
	HV	9 (28%)	22 (69%)		1 (3%)	0 (0%)
The facilitators' approach was good		<b>Strongly agree</b>	<b>Agree</b>	<b>Neither agree nor disagree</b>	<b>Disagree</b>	<b>Strongly disagree</b>
	FM	16 (32%)	22 (44%)	7 (14%)	3 (6%)	2 (4%)
	CC	0 (0%)	1 (25%)	3 (75%)	0 (0%)	0 (0%)
	HV	8 (25%)	18 (56%)	6 (19%)	0 (0%)	0 (0%)
The mix of training formats was appropriate		<b>Strongly agree</b>	<b>Agree</b>	<b>Neither agree nor disagree</b>	<b>Disagree</b>	<b>Strongly disagree</b>
	FM	14 (28%)	25 (50%)	8 (16%)	3 (6%)	0 (0%)
	CC	0 (0%)	1 (25%)	3 (75%)	0 (0%)	0 (0%)
	HV	5 (16%)	20 (63%)	7 (22%)	0 (0%)	0 (0%)
The training session was too long		<b>Strongly agree</b>	<b>Agree</b>	<b>Neither agree nor disagree</b>	<b>Disagree</b>	<b>Strongly disagree</b>
	FM	1 (2%)	3 (6%)	18 (36%)	19 (38%)	9 (18%)
	CC	0 (0%)	0 (0%)	3 (75%)	1 (25%)	0 (0%)
	HV	3 (9%)	3 (9%)	13 (41%)	12 (38%)	1 (3%)
Was the content of the session what you expected?		<b>Completely</b>	<b>Somewhat</b>		<b>Not really</b>	<b>Not at all</b>
	FM	30 (61%)	16 (33%)		3 (6%)	0 (0%)
	CC	2 (40%)	2 (40%)		1 (20%)	0 (0%)
	HV	17 (55%)	13 (42%)		1 (3%)	0 (0%)

\*Some rows do not add up to the number of service providers completing the questionnaire due to missing data.

## Thematic analysis of free text fields relating to training

Two themes and four subthemes were identified in the analysis of free text fields.

**Theme 1** (Table 21) was impact of home safety training.

**Subtheme 1:** Perceptions of the training sessions - Attendees felt the format was good e.g., multiple presenters and interactive, well-structured, and clear. Attendees thought the training was relevant to their job role and the data from sessions would be helpful to include in discussions with families. Examples of feedback include:

Some attendees thought the content was over simplified or didn't recognise previous training, particularly for the Health Visiting team members

Initially the length of the session was 3 hours, though feedback led to this being reduced to 2 hours to fit with service pressures and time available for training.

**Subtheme A2:** Impact upon knowledge - Attendees who felt they gained new knowledge thought that the training helped them to be more knowledgeable when talking to parents, especially regarding the evidence of injury rates.

**Subtheme A3:** Impact upon attitudes or beliefs - Attendees reporting feeling more confident to talk to parents and as a programme it raised injury prevention as a priority area.

**Subtheme A4:** Impact upon practice - The acquisition of new resources was found to be helpful. For example, having information written down to leave with parents was an improvement. In addition, the resources prompted practitioners to talk about home safety in a consistent way.

**Theme 2** (Table 22): Potential further training - Many attendees referred to the need for more training in the future, but this training needs to include local data to make it more relevant. References to needing more training were also made in control area interviews.

It also came to light that new staff potentially missed training altogether.

**TABLE 21: THEME 1 - IMPACT OF HOME SAFETY TRAINING**

Theme	Subtheme	Quotes
Impact of home safety training	Perceptions of the training sessions	"This session was extremely informative and easy to understand" Evaluation form HV team member
		"Session was broken into small sections, easy to understand" Evaluation form FM team member
		"Very good learning materials, printouts, statistics and evidence-based info" Evaluation form HV team member
		"Enjoyed the visual aids and the opportunity to ask questions. Like the statistical facts as I feel families will respond to this. Love the information packs to, relevant for use in visits" Evaluation form FM team member
		"Good resources to use with families, good trainers with good knowledge" Evaluation form HV team member
		"Due to this training being a small amount of people could ask the questions I needed" Evaluation form CC team member

Theme	Subtheme	Quotes
		<p>"Nothing that I didn't know, we are currently offering this advice routinely at the 1 and 2 year reviews" Evaluation form HV team member</p>
		<p>"I think it was probably a bit too long, I don't think it needed to be as long as what it was..." - Interview SOSA HV AS.H.0024</p>
	Impact upon knowledge	<p>"The statistics discussed during training is significant. My knowledge about the topic is now enhanced and I'm confident in signposting parents to resources and support in local area." Evaluation form HV team member</p> <p>"Learning about home safety and accidents as I didn't know everything but I do now." Evaluation form FM team member</p> <p>"I enjoy it, I enjoy putting it to the parents erm I learnt a lot myself and...yes even the fire escape planning, how they are going to get out of the homes. Erm making sure the cords aren't too low for children, I mean we all use blinds these days and roller blinds." - Interview Children's Centre SOSA and Control AR.C.0012 and SH.C.0013</p>
	Impact upon attitudes or beliefs	<p>"The statistics discussed during training is significant. My knowledge about the topic is now enhanced and I'm confident in signposting parents to resources and support in local area" Evaluation form HV team member</p> <p>"...it was like informative... the blue folder that we got as well I will just have that the back of my car and have that there so before I meet a family I will just recap myself and go over it all.... Just giving me that confidence to go and talk about it more with [parents], whereas if you just said to me right you need to talk about that, I would be like where am I going to get my sources, where am I going to get that from?" - Interview FM AR.F.0130</p> <p>"I can confidently discuss safety with parents and feel able to advise them on safety equipment needed and storage locks for medicines and chemicals." Evaluation form CC team member</p>
	Impact upon practice	<p>"I will still provide the same information, but having a written sheet to leave with the parents in useful." Evaluation form HV team member</p> <p>"I will be able to talk more about prevention and I'm now more knowledgeable with causes of injuries." Evaluation form FM team member</p> <p>"With the questionnaire I will deliver a more detailed advice session." Evaluation form HV team member</p> <p>"Yes it has had a good impact erm it made us even check our own blinds within the centre to make sure they weren't too long, and a child could get tangled up or anything." - Interview Children's Centre SOSA and Control AR.C.0012 and SH.C.0013</p>

**TABLE 22: THEME 2 POTENTIAL FURTHER TRAINING**

<b>Theme</b>	<b>Subtheme</b>	<b>Quotes</b>
Potential further training	n/a	<p>“it could be helpful to know what the accident rate is, the A&amp;E rate due to accidents is, and erm that sort of thing to help us focus on the conversation. We don’t get any of that, I have been here for 12 years we get none of that” Interview Control HV BE.H.0109</p> <p>“It was a little while ago now. Erm but it was useful, in fact I think we could do with a refresher, certainly with regard to figures erm and trends if you like in accidents and stuff like that because I think there are trends erm yes people buying certain equipment” - Interview FM BU.F.0018</p>
		<p>“I didn’t do it because I had only just taken over. Erm last year wasn’t it? When I first came to the meeting, so I didn’t attend any training. Interview Children’s Centre SOSA BU.C.0116</p>

## Chapter 10 Overall discussion

### What this study shows

Significantly more intervention families stored household poisons out of reach at 24 months, had fire escape plans and either used fireguards or did not have fires at 12 and 24 months; but there was no significant difference in the primary outcome (the combination of families having a working smoke alarm, having a stair gate (or no stairs), and storing poisons out of reach). There were also no significant differences in other safety practices or medically attended injury rates. Intervention families undertook significantly more safety practices than control families at 12 and 24 months. Multiple imputation analysis found significantly more intervention families had the primary outcome at 24 months.

Adherence to the use of the SOSA intervention varied with some components being delivered consistently, while others were adapted or used infrequently. The Family Mentor (FM) manual activities and Monthly Safety Messages were delivered with good fidelity, although only 45% of parents in the study had accepted the support of a FM, limiting the reach of these practitioners and the resources they delivered. There was variation in the use of other physical resources, such as the home safety checklist, which was distributed to parents consistently but not always used as intended. Parents in intervention wards were more likely to receive home safety advice from a practitioner source than those living in matched control wards at both 12 and 24 months, though the reach of activities at CCs was limited.

Parent interviews illustrated that facilitators to home injury prevention included attitudes to injury severity and the importance of prevention, acquisition of knowledge regarding home safety, information provided by professionals, credibility of information provision, and ease of access to services and support, including free safety equipment. Themes identified were similar for intervention and control parents, except for intervention parents reporting trusting relationships with FMs through sustained and consistent support, facilitating home safety changes to the home. Barriers to home injury prevention were similar for intervention and control parents and included perceiving some minor injuries as inevitable, information provision that was too brief or rushed, infrequent health visitor contacts, lack of home safety checks and inconsistent information from different sources. Control parents also reported some difficulties with accessing CCs.

Interviews with practitioners showed that they were more equipped to engage with the intervention when they had a positive attitude towards the aims of the intervention, including the effectiveness of the resources they were provided with, and their ability to deliver home safety during the time allocated to family visits. Having a good relationship with families and utilising specific strategies based on personal experience and learnt techniques also benefited practitioners in the delivery of home safety information. Barriers to the delivery of the intervention included the ability for some to find the time to fit home safety promotion into their schedules, disruption caused by the Coronavirus pandemic, and forgetting to implement aspects of the intervention, or feeling ill at ease in performing certain tasks.

The health economic analysis showed that the total spend on the SOSA intervention was £216,859 (excluding development costs), with a cost per family of £43.66. The SOSA intervention was associated with a £41.95 reduction in healthcare costs, an additional 12 homes with the primary outcome measure, and 91 injuries avoided. The SOSA intervention was virtually cost neutral with a return on investment of £0.96 for every £1 spent. The incremental cost per additional home with the primary outcome measure was £85.43 and per injury avoided was £11.22. The intervention appears to offer good value for money with low costs per additional primary outcome and per additional

injury avoided. However, there is some uncertainty within the results and larger studies may provide more precise estimates of cost-effectiveness.

The training evaluation showed that overall, the format and content of the training was acceptable and useful. Training provided evidence that could be shared with parents in written and verbal formats, increased confidence to have conversations about home safety and improved practice.

## Comparison with other studies

### Home safety practices

The finding that the SOSA intervention increased safe storage of poisons, fireguard use, fire escape planning and the total number of safety practices is consistent with previous evaluations of educational interventions.(21, 80-83) The SOSA intervention did not increase the prevalence of working smoke alarms and stairgates. Previous successful interventions to increase these safety practices have predominantly provided or improved access to safety equipment.(84-87) At the time of planning the SOSA intervention, a safety equipment scheme was operating in the study wards, and it was anticipated that the intervention would increase referrals to the scheme. However, funding for the scheme ceased prior to the study starting, terminating this key source of free safety equipment. Baseline smoke alarm prevalence in our study of over 90% gave little room for improvement; this has been encountered in previous research.(88)

It is unsurprising that our controlled before-and-after study did not find a significant effect on injury rates as it was not powered to do so. This is consistent with the findings of previous systematic reviews(21, 88) which highlight the challenges of assessing intervention effectiveness on injury rates because of the large sample sizes required.

### Implementation fidelity

The SOSA intervention was implemented with variable fidelity which is consistent with other multi-component longitudinal community programmes(19), where a wider scope for adaptation resulted in lower fidelity. To the authors' knowledge, there are two studies analysing the fidelity of implementation of child unintentional injury prevention programmes, one pertaining to home safety(89), the other to road safety(79), both of which demonstrated high fidelity. The first study found that 75% (18/24) of Children's Centres implemented Injury Prevention Briefing activities with high fidelity.(89) In the Buckle Up Safely program, all 13 children's centres in the intervention arm delivered a parent education session according to the intervention manual.(79) Similar to the SOSA intervention, attendance varied considerably between sites with 6/13 centres reaching 10 or fewer parents at their session.(79) Heterogeneity in intervention design and complexity may explain the difference in fidelity between these studies and ours. Both studies delivered their interventions within one setting only, involved one set of practitioners and were composed of fewer intervention components than SOSA. The first study was delivered over a 12-month period as compared to 24 months, and some of the Children's Centres who achieved high fidelity received more intensive facilitation than the SOSA intervention. Furthermore, fidelity was assessed using provider activity logs and interviews whereas our study included observations and parent reports of receiving support and resources. In the second study, the intervention was delivered to parents in a single session and although a range of sources were used to assess fidelity, where levels of fidelity were lower with certain intervention components, further detail was omitted to identify whether these were core elements of the intervention. Direct comparison with these studies is challenging due to these differences and a small sample size of data from Children's Centres participating in the SOSA intervention.

## Parent interviews

Findings from parent interviews of fatalistic views about the preventability of minor injuries, and that more serious injuries are perceived as more preventable and more motivating for parents to prevent are consistent with previous research (13, 90, 91). Similar to other studies we found that home safety knowledge from a variety of sources helped parents to make their homes safer.(40, 92) Consistent with other studies we also found that knowledge provided by health professionals was valued, and seen as credible, objective or trustworthy(40, 91). Other studies have found that some parents prefer getting home safety advice from their social networks than from health professionals (91, 93), and advice from friends and family was also valued by parents in our study. Consistent with our findings, previous studies have found parents gained home safety knowledge through having older children and via exposure to previous incidents (94, 95) and that such exposure (including vicarious exposure) prompted parents to make safety changes to their home.(96, 97)

Consistent with other studies we found a range of barriers to improving home safety knowledge including provision of insufficient or inadequately tailored information, insufficient time spent on home safety or infrequent visits by health professionals and inconsistent information from different sources.(40, 43, 92) Our finding that inability to access children's centres was seen as a barrier to obtaining home safety information is consistent with previous research highlighting the important role children's centres play in home safety promotion.(43, 44, 98)

A unique finding in this study was the support provided by family mentors to parents in intervention wards, providing frequent one-to-one support and substantial information on child home safety. Parents particularly appreciated the home safety promotion provided by family mentors, including their manualised programme, regular visits, and the trusting, personal relationships they developed with their mentor. This is consistent with findings from previous studies in which lay community members have delivered home safety promotion.(13, 39, 40) Again, consistent with previous research, we found that building trust with service providers(39) is important for encouraging parents to follow home safety advice.

Our study also found that a previous home safety equipment scheme and the general availability of safety equipment on the market, helped parents to make their homes safer, consistent with previous research.(13, 43)

## Service provider interviews

As shown in previous research(99), a positive attitude towards injury prevention promotion can support practitioners when delivering information to families, including utilising their own experience as parents in terms of the usage of safety equipment(42), and techniques which have been learnt to improve the delivery of information.(100) The limited availability of time and hectic workloads have also been found to hinder the delivery of injury prevention knowledge.(52-59)

Practitioners also described how parents' engagement in the home safety promotion information provided, was significant to supporting the delivery of the intervention. This included the positive reception by parents to the resources provided in the intervention, which translated to essential modifications to reduce the potential for unintentional injuries. Previous research (13, 39) has similarly found that home safety information has encouraged parents to incorporate changes to existing home safety practices. At the same time, limited enthusiasm for home safety resources led practitioners to believe that parents were less engaged with the intervention, which in some cases, resulted in practitioners missing out specific aspects of the intervention during home visits.

The communication channels relied upon to support practitioners' ability to deliver home safety promotion, were another factor which either supported or impaired their ability to remain updated about intervention practices. These included efficient teamwork with internal and external staff members, and the visual presentation of the resources when there were language barriers. Communication was impaired when non-native language and literacy barriers were unsupported by written information, and when communication between teams was delayed and roles were unclear.

### Health economic analysis

Our findings that the SOSA intervention had a low cost for each additional family with the primary outcome measure and per injury avoided and was virtually cost neutral are consistent with previous economic evaluations showing the cost effectiveness of promoting smoke alarms(22-25); fire safety education(27); thermostats to reduce tap water scalds(28, 29); education, home safety assessments, or equipment to prevent accidental poisonings(30); home visiting to prevent a range of different types of injuries(31) or to reduce intentional child injuries.(34, 35)

Previous studies have found that simpler home safety interventions can be more cost effective than more complex interventions, such as those providing home safety assessments, fitting safety equipment, or using specific strategies to facilitate intervention delivery (22, 27, 30, 38). Previous studies have also found that targeting injury prevention interventions at higher risk groups can also increase cost effectiveness (25, 30). Our findings are consistent with these studies, possibly because the SOSA intervention was targeted to higher risk families and was predominantly an educational intervention.

### Training evaluation

Studies in the literature support the need for professionals to be trained in home safety rather than relying on their existing knowledge(53) and that training needs to be taken account of by policy makers.(42) We found improvements in knowledge of injury epidemiology, confidence to deliver home safety and beliefs about the importance of home safety in each attendee's role. However, improvements and changes were not consistent across job families and therefore training should be tailored to the needs of the participants.

Thematic analysis showed that time pressures in the role was a significant barrier to delivery of home safety advice and that there are benefits to collaborative working on home safety across organisations for families. This is consistent with other of health professionals delivering home safety support.(21, 58, 98, 101, 102)

The FM role, which was a new role based on a peer mentor model, has not been previously explored as a vehicle to home safety support for families, although they have been used in a variety of other settings with families, e.g., Bourke-Taylor et al, 2021.(103) We found that the training did offer improvements in knowledge, confidence and beliefs in this group using the training developed as part of SOSA.

### Strengths and limitations

Twenty seven percent of those invited participated in the controlled before-and-after study, which is a reasonable participation rate and retention rates were higher than the 60%(104) predicted, despite some data collection occurring during the Covid-19 pandemic. Study retention may have been facilitated by Parent Champion-informed multiple retention strategies, in addition to Parent Champion involvement in the design of the intervention.(105) A further strength is that the intervention was based on recommended behaviour change principles(67) and was evidence-based.(21, 106)

In terms of limitations, outcomes were parent-reported and therefore potentially open to bias because parents were aware they were or were not receiving the SOSA intervention. Additionally, more parents were lost to follow-up in the intervention than the control group, which was unsurprising given that intervention group families were more materially disadvantaged.(107) Responders and non-responders to the follow-up questionnaires differed on some characteristics (Appendix 1), however the multiple imputation analysis accounted for data missing due to non-response and found similar results to the main analysis. The multiple imputation analysis also found that after taking account of missing data, intervention families were significantly more likely to have a working smoke alarm, have a stair gate (or no stairs) and to store poisons safely. The study sample size was calculated based on the primary outcome and the study may therefore have been too small to detect significant differences in some of the secondary outcomes including injury rates. The Covid-19 pandemic affected intervention delivery as health visiting teams and family mentors stopped most home visits and children's centres stopped delivering safety weeks from March 2020. In addition, follow-up data collection was predominantly collected via email than post during national 'lockdown' periods, which may have affected response rates.(108)

Our study adds to the small body of evidence on implementation fidelity of home injury prevention interventions in 'the real world', providing important information for implementing future programmes. The use of mixed methods and a range of data sources allowed us to undertake a comprehensive triangulation of fidelity, comparing what parents and practitioners recorded and recalled. The assessment of adherence to intervention content through direct observation of child health reviews provided valuable insight into how discussions about home safety took place but was limited to only a small number of observations, curtailed due to the Covid-19 pandemic. Likewise, observations of FM visits through the Quality Assurance process were maintained through much of the intervention period except when also limited by Covid-19 restrictions. Much of the quantitative data we collected was self-reported by practitioners and parents, but there were lower response rates for intervention HVT members and CC staff compared with FMs which limits the generalization of these results. It is possible for example that non-responders undertook activities to a greater or lesser extent than responders. Furthermore, with parent contact opportunities changing during the pandemic, and changes to some of the practitioners' roles, receiving questionnaire responses at this time was challenging. Practitioners and parents were inevitably aware of whether they were in the intervention or control groups, and this knowledge may have influenced their reporting of activities. In addition, reported high turnover of staff meant the number of follow-up questionnaire responses was small for HVTs and CC staff, so caution must be exercised in interpreting their questionnaire responses. Some practitioner interviews occurred at the end of the intervention period and several months after the start of the Covid-19 pandemic. Practitioners' ability to recall their practice was impacted by time elapsing.

Although we have attempted to measure provision and receipt of home safety information, assessing the depth and quality of such information remains a challenge given the limited observation data available except for FM visits. However, parents in the intervention wards exhibited more safety behaviours than parents in control wards suggesting that information delivered by practitioners was effective in achieving such changes.

In terms of parent interviews, our study adds to the limited evidence on UK parents' experiences of receiving home safety interventions. Interviews were conducted with more parents than initially planned, with equal numbers of intervention and control group parents and representation from across study wards. All transcripts were independently coded by two researchers and themes were agreed with the wider study team. However, most parents interviewed were of White British

ethnicity, which is not representative of the ethnically diverse population of Nottingham(109), hence it is possible that different views would have been provided by a more ethnically diverse sample. It is also possible that parents agreeing to be interviewed may have been more confident about home safety behaviours or provided more socially desirable responses than those not agreeing to be interviewed (110-112) However, a range of both positive and negative views were expressed, including parents describing incidents in which their children had been injured, fatalistic attitudes towards some types of injuries, a lack of knowledge or confidence to make their homes safer and negative experiences of home safety promotion.

The exploration of providers' perceptions of factors which impact their ability deliver to deliver a home safety promotion intervention strengthen current knowledge of practitioners' opinions towards implementing home safety knowledge generally, and those aspects which can limit and enhance their practice following training. However, practitioners who volunteered to be interviewed may have been subject to social desirability bias, based on their willingness to discuss the study in comparison to practitioners who refused to take part. In some cases, these findings may show a disproportionate rate of enthusiasm for the project. As the interviews were all audio recorded, there is also the potential that this might have inhibited practitioners from discussing all of their concerns. To minimise these potential limitations, practitioners were advised at the beginning of interviews that they did not have to answer questions they preferred not to, and that they could express withdrawal from the interview and without providing a reason. No practitioners refused to answer questions or withdraw from interviews. In other cases, while 7 interviews were conducted prior to the Covid pandemic, 14 interviews were conducted post pandemic, which meant that most of the practitioners interviewed were operating at a more limited capacity than originally intended according to the requirements of the SOSA intervention training and operating procedures. Therefore, since interviews were conducted pre and post pandemic, a full picture of 'usual' limitations from practitioners' perspectives, could be biased based on them operating at a more limited capacity. However, intervention procedures were modified according to government guidelines (telephone instead of face-to-face visits, resources sent via WhatsApp etc.) and therefore, interruptions to the study were limited where possible.

For the economic analysis micro-costing was limited by some data from wards being unobtainable. It also relied upon self-reported questionnaires for injuries and not medical records as a low number of parents agreed to take part in this component of the analysis. The time horizon of the study was also only 2 years and a longer follow up may have increased the cost-effectiveness, taking into account severe injuries with the ongoing treatment they often require. There was some uncertainty in the estimates of cost-effectiveness, which was likely due to the number of families taking part in the study and the relatively small number of injuries among study participants.

The evaluation of training provided important information on both the quality and outcomes of the training. However, the post-training questionnaire return was relatively low, with only half of participants returning their questionnaire. This is important as changes to knowledge are best evaluated some time after training, after a period of consolidation. In addition, qualitative exploration of training needs and how best to tailor training was not built into this evaluation and the training was not piloted. Piloting might have improved the tailoring of content. Future research is needed on how best to deliver high quality training in services that are under pressure, with limited time and budget allocated to continuous professional development.

## Chapter 11 Conclusions and recommendations

The Stay One Step Ahead (SOSA) intervention is a systematic evidence-based home safety promotion programme for families living in areas with high levels of need. The evaluation conducted here shows that the SOSA intervention is associated with adoption of some safety practices and overall number of safety practices in families with children under five. A health economic analysis has shown that the SOSA intervention offers good value for money.

### Recommendations for practice

This has been a pragmatic study, in 'the real world' and as such, has not been without its challenges. Staff turnover, realignment of clinical services, changes in configuration within Early Help services and a global pandemic have all impacted on delivery. Parent interviews also highlighted the negative impact of the lack of access to Children's Centres following structural changes. Some of these challenges may at least in part explain why the overarching primary outcome, whilst in the direction of improvement in practices, was not statistically significant. What it does highlight however, is:

- a) the importance of ensuring that home safety is prioritised by commissioners and providers, allowing sufficient time in workload for home safety support to be embedded as core activity and facilitated by roles that act as home safety champions.
- b) the importance of embedding monitoring and quality assurance systems within programmes to ensure that they are delivered as intended. Where deviations are found, mitigation and remediation can then be put in place.

The future continuation of SOSA delivery is strongly recommended. It not only standardises home safety advice, and ensures it is evidence-based, but also enshrines child injury prevention in the roles of a wide range of providers. If further changes to services for children occur, it is important that any modification of the SOSA programme, in terms of who delivers it, how and where it is delivered, are piloted, and evaluated. Replication of the outcomes found here may be compromised by using untested models of delivery.

Staff turnover was high, with significant new recruitment, changes in roles and locations covered by providers meant that some staff, who were expected to deliver SOSA, had periods of being untrained. Ongoing training on the delivery of SOSA for new staff, and top up training for existing staff need to be built into future delivery contracts. Lessons learnt from the training evaluation suggest that training should be tailored to the specific needs of different practitioners, acknowledging that some will have received training in professional qualifications (e.g., Health Visitors). The importance of ongoing training should not be overlooked.

NICE recommend that local areas have a Home Safety Co-ordinator who can manage and champion home safety activities within local health and care systems. The research team at the University of Nottingham has performed functions similar to a Home Safety Co-ordinator during the project and so it is recommended that this function be adopted by Nottingham CityCare and/or Nottingham City Council going forward in order that child safety be prioritised. This is important to reduce health inequalities, reduce potential years living with a disability and minimise healthcare costs associated with injury. The role that the emergent Integrated Care Systems will play in children's health should include injury prevention as part of its remit.

### Recommendations for future research

We show that family mentors, which is a novel peer-support role, can be valuable in delivering injury prevention interventions within communities. Parent interviews highlighted that the support and

advice provided by family mentors, with whom families formed trusting relationships, was important for helping families make their homes safer. Further research is required to evaluate their specific effectiveness in terms of home safety and injury outcomes. The wider Family Mentor programme is being evaluated separately.

This study was not designed to demonstrate an impact on medically-attended injury as this would have required a much larger cohort of families. It was included so that the data could be combined with other medically-attended research studies if any future meta-analyses are undertaken. Further large-scale evaluations, and/or meta-analyses, are required to explore the effect of SOSA upon injuries leading to healthcare attendance and to provide more precise estimates of cost-effectiveness.

## Acknowledgements

The research team would like to acknowledge and thank the SSBC team and the SOSA steering group, including the parent champions, for their support and guidance during this study.

Development of the intervention was undertaken with valuable input from: Amanda Abbott, Janine Broomhall, Steph Brannigan, Beverley Coaker, Amanda Doughty, Salma Iqbal, Balwinder Kaur, Nina Kirk, Sarah Kybird, Kirsty Payne, Tracy Rae, Sheryll Shepard, Yvette Stacey and Leah Sweeney.

We would also like to acknowledge the health visiting team members, family mentors and children's centre staff who took part in interviews.

Finally, a huge thank you to all parents that took part in this study. Without them it would not have been possible.

## Dissemination

### Peer reviewed papers

Orton E, Watson MC, Hayes M, Patel T, Jones M, Coupland C, Timblin C, Carpenter H, Kendrick D. Evaluation of the effectiveness, implementation and cost-effectiveness of the Stay One Step Ahead home safety promotion intervention for pre-school children: a study protocol. *Injury Prevention* 2020;**26**:573-580.

### Conference presentations

SSBC Conference. Oral presentation. Promoting Evidence Based Home Safety in the Small Steps Big Changes project. March 2017, Nottingham

RoSPA Home Safety Conference. Oral presentation. Working together to promote home safety: Nottingham's Stay One Step Ahead project. December 2018, Leicester Space Centre

CRN@5. Poster presentation. Stay One Step Ahead (SOSA): Research Study Evaluating the Implementation of Systematic Evidence-Based Child Home Safety Promotion (part of the Small Steps Big Changes Programme). December 2019, Leicester Space Centre

Institute of Health Visiting. Oral presentation. Co-production of a home safety intervention for families with children under 5 to prevent unintentional child injuries. September 2020, Online

Safety 2022. TBC. The "Stay One Step Ahead" Child Home Safety Programme: Effectiveness and Cost-Effectiveness. November 2022, Adelaide Australia

Safety 2022. TBC. Co-production and evaluation of implementation fidelity of the Stay-One-Step-Ahead home safety intervention. November 2022, Adelaide Australia.

### Awards

Children and Young People Now 2021 – award Advice and Guidance category

## References

1. Adeloje D, Bowman K, Chan KY, Patel S, Campbell H, Rudan I. Global and regional child deaths due to injuries: an assessment of the evidence. *J Glob Health*. 2018;8(2):021104.
2. Peden M, McGee KS, Krug E, editors. *Injury: A leading cause of the global burden of disease, 2000*. Geneva: World Health Organisation; 2002.
3. Collaborators GBDCoD. Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2018;392(10159):1736-88.
4. Sethi D, Towner E, Vincenten J, Segui-Gomez M, Racioppi F. *European Report on Child Injury Prevention*. Geneva, Switzerland: World Health Organisation; 2008.
5. Peden M, Oyegbite K, Ozanne-Smith J, Hyder A, Branche C, Rahman A, et al. *World Report on Child Injury Prevention*. World Health Organisation and UNICEF, Geneva; 2008.
6. Sengoelge M, Hasselberg M, Laflamme L. Child home injury mortality in Europe: a 16-country analysis. *Eur J Public Health*. 2011;21(2):166-70.
7. Public Health England CAPT, Royal Society for the Prevention of Accidents,. . Reducing unintentional injuries in and around the home among children under five years. . London: Public Health England; 2018 2018.
8. Cooper NJ, Kendrick D, Timblin C, Hayes M, Majsak-Newman G, Meteyard K, et al. The short-term cost of falls, poisonings and scalds occurring at home in children under 5 years old in England: multicentre longitudinal study. *Inj Prev*. 2016;22(5):334-31.
9. Contact a family for families with disabled children. *Forgotten Families. The impact of isolation on families with disabled children across the UK*. London: Contact a Family; 2011.
10. Edwards P, Roberts I, Green J, Lutchmun S. Deaths from injury in children and employment status in family: analysis of trends in class specific death rates. *BMJ*. 2006;333(7559):119-21.
11. Kendrick D, Mulvaney C, Burton P, Watson M. Relationships between child, family and neighbourhood characteristics and childhood injury: A cohort study. *Soc Sci Med*. 2005;61(9):1905-15.
12. Olsen L, Bottorff JL, Raina P, Frankish CJ. An ethnography of low-income mothers' safeguarding efforts. *J Safety Res*. 2008;39(6):609-16.
13. Smithson J, Garside R, Pearson M. Barriers to, and facilitators of, the prevention of unintentional injury in children in the home: a systematic review and synthesis of qualitative research. *Inj Prev*. 2011;17(2):119-26.
14. Kendrick D, Marsh P. How useful are sociodemographic characteristics in identifying children at risk of unintentional injury? *Public Health*. 2001;115(2):103-7.
15. Shah M, Orton E, Tata LJ, Gomes C, Kendrick D. Risk factors for scald injury in children under 5 years of age: A case-control study using routinely collected data. *Burns*. 2013;39(7):1474-8.
16. Tyrrell EG, Orton E, Tata LJ, Kendrick D. Children at risk of medicinal and non-medicinal poisoning: a population-based case-control study in general practice. *Br J Gen Pract*. 2012;62(605):e827-e33.
17. Orton E, Kendrick D, West J, Tata LJ. Independent risk factors for injury in pre-school children: three population-based nested case-control studies using routine primary care data. *PLoS One*. 2012;7(4):e35193.
18. Towner E. Injury and inequalities: bridging the gap. *Int J Injr Contr Saf Promot*. 2005;12(2):79-84.
19. National Institute for Health and Care Excellence. *Unintentional Injuries in the Home: Interventions for Under 15s (PH30)*. NICE; 2010.
20. Hayes M, Kendrick D, Deave T. *Injury Prevention Briefing. Preventing Unintentional Injuries to the Under Fives: A Guide for Practitioners. Keeping Children Safe At Home*; 2014.
21. Kendrick D, Young B, Mason-Jones AJ, Ilyas N, Achana FA, Cooper NJ, et al. Home safety education and provision of safety equipment for injury prevention. *Cochrane Database of Systematic Reviews*. 2012; Issue 9. Art. No.:CD005014. DOI: 10.1002/14651858.CD005014.pub3.

22. Diamond-Smith N, Bishai D, Perry E, Shields W, Gielen A. Economic evaluation of smoke alarm distribution methods in Baltimore, Maryland. *Inj Prev*. 2014;20(4):251-7.
23. Haddix AC, Mallonee S, Waxweiler R, Douglas M. Cost effectiveness analysis of a smoke alarm giveaway program in Oklahoma City, Oklahoma. *Injury Prevention*. 2001;7(4):276-81.
24. Liu Y, Mack KA, Diekman ST. Smoke alarm giveaway and installation programs: an economic evaluation. *American journal of preventive medicine*. 2012;43(4):385-91.
25. Yellman MA, Peterson C, McCoy MA, Stephens-Stidham S, Caton E, Barnard JJ, et al. Preventing deaths and injuries from house fires: a cost–benefit analysis of a community-based smoke alarm installation programme. *Injury prevention*. 2018;24(1):12-8.
26. Ginnelly L, Sculpher M, Bojke C, Roberts I, Wade A, Diguseppi C. Determining the cost effectiveness of a smoke alarm give-away program using data from a randomized controlled trial. *The European Journal of Public Health*. 2005;15(5):448-53.
27. Deave T, Hawkins A, Kumar A, Hayes M, Cooper N, Watson M, et al. Evaluating implementation of a fire-prevention injury prevention briefing in children's centres: Cluster randomised controlled trial. *PLoS ONE*. 2017;12(3):e0172584.
28. Han RK, Ungar WJ, Macarthur C. Cost-effectiveness analysis of a proposed public health legislative/educational strategy to reduce tap water scald injuries in children. *Injury Prevention*. 2007;13(4):248-53.
29. Phillips CJ, Humphreys I, Kendrick D, Stewart J, Hayes M, Nish L, et al. Preventing bath water scalds: a cost-effectiveness analysis of introducing bath thermostatic mixer valves in social housing. *Inj Prev*. 2011;17(4):238-43.
30. Achana F, Sutton AJ, Kendrick D, Hayes M, Jones DR, Hubbard SJ, et al. A decision analytic model to investigate the cost-effectiveness of poisoning prevention practices in households with young children. *BMC public health*. 2016;16(1):1-17.
31. King WJ, Klassen TP, LeBlanc J, Bernard-Bonnin A-C, Robitaille Y, Pham B, et al. The effectiveness of a home visit to prevent childhood injury. *Pediatrics*. 2001;108(2):382-8.
32. Cattan S, Conti G, Farquharson C, Ginja R, Pecher M. The health effects of universal early childhood interventions: Evidence from Sure Start. IFS Working Paper; 2021.
33. Lane WG, Dubowitz H, Frick KD, Semiatin J, Magder L. Cost effectiveness of SEEK: A primary care-based child maltreatment prevention model. *Child Abuse & Neglect*. 2021;111:104809.
34. Dalziel K, Dawe S, Harnett PH, Segal L. Cost - effectiveness analysis of the Parents under Pressure programme for methadone - maintained parents. *Child abuse review*. 2015;24(5):317-31.
35. Dalziel K, Segal L. Home visiting programmes for the prevention of child maltreatment: cost-effectiveness of 33 programmes. *Archives of disease in childhood*. 2012;97(9):787-98.
36. Barlow J, Davis H, McIntosh E, Jarrett P, Mockford C, Stewart-Brown S. Role of home visiting in improving parenting and health in families at risk of abuse and neglect: results of a multicentre randomised controlled trial and economic evaluation. *Archives of disease in childhood*. 2007;92(3):229-33.
37. Cooper NJ, Kendrick D, Timblin C, Hayes M, Majsak-Newman G, Meteyard K, et al. The short-term cost of falls, poisonings and scalds occurring at home in children under 5 years old in England: multicentre longitudinal study. *Injury prevention*. 2016;22(5):334-41.
38. Saramago P, Cooper NJ, Sutton AJ, Hayes M, Dunn K, Manca A, et al. Cost-effectiveness of interventions for increasing the possession of functioning smoke alarms in households with pre-school children: a modelling study. *BMC public health*. 2014;14(1):1-11.
39. Ingram JC, Deave T, Towner E, Errington G, Kay B, Kendrick D. Identifying facilitators and barriers for home injury prevention interventions for pre-school children: a systematic review of the quantitative literature. *Health Educ Res*. 2012;27 (2):258–68.
40. Khanom A, Hill RA, Brophy S, Morgan K, Rapport F, Lyons R. Mothers' perspectives on the delivery of childhood injury messages: a qualitative study from the growing up in Wales, environments for healthy living study (EHL). *BMC public health*. 2013;13(1):806.

41. Committee on Injury and Poison Prevention. Office-based counseling for injury prevention. *Pediatrics*. 1994;94(4):566-7.
42. Woods AJ. The role of health professionals in childhood injury prevention: A systematic review of the literature. *Patient Educ Couns*. 2006;64(1-3):35-42.
43. Watson MC, Mulvaney C, Timblin C, Stewart J, Coupland CA, Deave T, et al. Missed opportunities to keep children safe? National survey of injury prevention activities of children's centres. *Health Education Journal*. 2016;75(7):833-42.
44. Watson MC, Mulvaney CA, Kendrick D, Stewart J, Coupland C, Hayes M, et al. National survey of the injury prevention activities of children's centres. *Health & Social Care in the Community*. 2014;22(1):40-6.
45. Bass JL, Christoffel KK, Widome M, Boyle W, Scheidt P, Stanwick R, et al. Childhood injury prevention counselling in primary care settings: a critical review of the literature. *Pediatrics*. 1993;92(4):544-50.
46. Towner E, Dowswell T, Jarvis S. Reducing childhood accidents. The effectiveness of health promotion interventions: a literature review. London: Health Education Authority; 1993.
47. King WJ, LeBlanc JC, Barrowman NJ, Klassen TP, Bernard-Bonnin A-C, Robitaille Y, et al. Long term effects of a home visit to prevent childhood injury: three year follow up of a randomized trial. *Inj Prev*. 2005;11(2):106-9.
48. Kendrick D, Young B, Mason-Jones AJ, Ilyas N, Achana FA, Cooper NJ. Home safety education and provision of safety equipment for injury prevention (Review). *Evid Based Child Health*. 2013;8.
49. Kendrick D, Mulvaney CA, Ye L, Stevens T, Mytton JA, Stewart-Brown S. Parenting interventions for the prevention of unintentional injuries in childhood. *Cochrane Database Syst Rev*. 2013;3:CD006020.
50. Marsh P, Kendrick D, Williams EI. Health visitors' knowledge, attitudes and practices in childhood accident prevention. *J Public Health Med*. 1995;17(2):193-9.
51. Rushton R, Bellis M, Haydock D. The role of the HV in accident prevention. *Community Pract*. 2018;91:45-7.
52. Alrimawi I, Hall C, Watson MC. Palestinian Nurses' and Doctors' Perceptions and Practices Regarding the Prevention of Injuries to Children in the Home: An Explorative Qualitative Study. *Compr Child Adolesc Nurs*. 2019;42(3):172-89.
53. Watson M, Kendrick D, Coupland C, Futers D. Childhood injury prevention: The views of health visitors and nursery nurses working in deprived areas. *International Journal of Health Promotion & Education*. 2007;45(1):4-10.
54. Tomlinson R, Sainsbury C. Childhood injury prevention advice: a survey of health professionals responses to common scenarios. *Child Care Health Devl*. 2004;30(4):301-5.
55. Woods AJ, Hapgood R, Collier J, Kendrick D, Illingworth R. Midwives' knowledge of, attitudes to and practice with baby walkers. *Midwifery*. 2003;19(1):63-71.
56. Wilding L, O'Brien JA, Pagliarello G, Friedberg E. Survey of current injury prevention practices by registered nurses in the emergency department. *J Emerg Nurs*. 2008;34(2):106-11.
57. Kendrick D, Marsh P, Williams EI. General practitioners: child accident prevention and 'The Health of the Nation'. *Health Educ Res*. 1995;10(3):345-53.
58. Carter YH, Morgan PS, Lancashire RJ. General practitioners' attitudes to child injury prevention in the UK: a national postal questionnaire. *Inj Prev*. 1995;1(3):164-8.
59. Cohen LR, Runyan CW. Barriers to pediatric injury prevention counseling. *Inj Prev*. 1999;5(1):36-40.
60. Marsh P, Kendrick D. Injury prevention training: Is it effective? *Health Educ Res*. 1998;13(1):47-56.
61. Woods A, Collier J, Kendrick D, Watts K, Dewey M, Illingworth R. Injury prevention training: a cluster randomised controlled trial assessing its effect on the knowledge, attitudes, and practices of midwives and health visitors. *Inj Prev*. 2004;10:83-7.

62. Hill T, Coupland C, Kendrick D, Jones M, Akbari A, Rodgers S, et al. Impact of the national home safety equipment scheme 'Safe At Home' on hospital admissions for unintentional injury in children under 5: a controlled interrupted time series analysis. *J Epidemiol Community Health*. 2021.
63. Runyan CW, Bangdiwala SI, Linzer MA, Sacks JJ, Butts J. Risk factors for fatal residential fires. *N Engl J Med*. 1992;327(12):859-63.
64. Marshall SW, Runyan CW, Bangdiwala SI, Linzer MA, Sacks JJ, Butts JD. Fatal residential fires: Who dies and who survives? *JAMA*. 1998;279(20):1633-7.
65. Kendrick D, Zou K, Ablewhite J, Watson M, Coupland C, Kay B, et al. Risk and protective factors for falls on stairs in young children: multicentre case-control study. *Archives of Disease in Childhood*. 2015; Published Online First: 10 December 2015. doi: 10.1136/archdischild-2015-308486.
66. Kendrick D, Majsak-Newman G, Benford P, Coupland C, Timblin C, Hayes M, et al. Poison prevention practices and medically attended poisoning in young children: multicentre case-control study. *Inj Prev*. 2016; Published Online First: 04 November 2016. doi: 10.1136/injuryprev-2015-041828.
67. National Institute for Health and Care Excellence. Behaviour change: general approaches. Public health guideline [PH6]. Available from <https://www.nice.org.uk/guidance/ph6> [Accessed 13/1/17].
68. Hospital admitted patient care activity 2018/19 [Internet]. 2020 [cited 28/05/20]. Available from: <https://digital.nhs.uk/data-and-information/publications/statistical/hospital-admitted-patient-care-activity/2018-19>.
69. Marshall SW, Runyan CW, Bangdiwala SI, Linzer MA, Sacks JJ, Butts JD. Fatal residential fires - Who dies and who survives? *Jama*. 1998;279(20):1633-7.
70. Kendrick D, Marsh P, Fielding K, Miller P. Preventing injuries in children: cluster randomised controlled trial in primary care. *BMJ*. 1999;318(7189):980-3.
71. Hindmarch P, Hawkins A, McColl E, Hayes M, Majsak-Newman G, Ablewhite J, et al. Recruitment and retention strategies and the examination of attrition bias in a randomised controlled trial in children's centres serving families in disadvantaged areas of England. *Trials*. 2015;16(79).
72. DiGuseppi C, Roberts I, Wade A, Sculpher M, Edwards P, Godward C, et al. Incidence of fires and related injuries after giving out free smoke alarms: cluster randomised controlled trial. *BMJ*. 2002;325:995-8.
73. QSR International Pty Ltd. NVivo (Version 11). 2015.
74. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology*. 2006;3(2):77-101.
75. Carroll C, Patterson M, Wood S, Booth A, Rick J, Balain S. A conceptual framework for implementation fidelity. *Implementation Science*. 2007;2(40):1-9.
76. Murphy E, Dingwall R, Greatbatch D, Parker S, Watson P. Qualitative research methods in health technology assessment: a review of the literature. *Health Technol Assess*. 1998;2(16):iii-ix, 1-274.
77. StataCorp. Stata Statistical Software: Release 16. College Station, TX: StataCorp LLC. 2019.
78. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Science*. 2009;4(1):50.
79. Hunter K, Keay L, Simpson JM, Brown J, Bilston LE, Fegan M, et al. Program fidelity measures associated with an effective child restraint program: Buckle-Up Safely. *Am J Public Health*. 2015;105(3):584-90.
80. Hwang V, Duchossois G, Garcia-Espana J, Durbin D. Impact of a community based fire prevention intervention on fire safety knowledge and behavior in elementary school children. *Inj Prev*. 2006;12(5):344-6.
81. Petridou E, Tolma E, Dessypris N, Trichopoulos D. A controlled evaluation of a community injury prevention project in two Greek islands. *Int J Epidemiol*. 1997;26(1):173-9.

82. Wang Y, Gielen AC, Magder LS, Hager ER, Black MM. A randomised safety promotion intervention trial among low-income families with toddlers. *Inj Prev*. 2017.
83. Achana FA, Sutton AJ, Kendrick D, Wynn P, Young B, Jones DR, et al. The Effectiveness of Different Interventions to Promote Poison Prevention Behaviours in Households with Children: A Network Meta-Analysis. *PLoS ONE*. 2015;10(4):e0121122.
84. Watson M, Kendrick D, Coupland C, Woods A, Futers D, Robinson J. Providing child safety equipment to prevent injuries: randomised controlled trial. *BMJ*. 2005;330(7484):178-81.
85. Hendrickson S. Reaching an underserved population with a randomly assigned home safety intervention. *Inj Prev*. 2005;11(5):313-7.
86. Sangvai S, Cipriani L, Colborn DK, Wald ER. Studying Injury Prevention: Practices, Problems, and Pitfalls in Implementation. *Clin Pediatr (Phila)*. 2007;46(3):228-35.
87. Gielen AC, McKenzie LB, McDonald EM, Shields WC, Wang M-C, Cheng Y-J, et al. Using a Computer Kiosk to Promote Child Safety: Results of a Randomized, Controlled Trial in an Urban Pediatric Emergency Department. *Pediatrics*. 2007;120(2):330-9.
88. Turner S, Arthur G, Lyons RA, Weightman AL, Mann MK, Jones SJ, et al. Modification of the home environment for the reduction of injuries. Issue 2. Art. No.: CD003600. DOI: 10.1002/14651858.CD003600.pub3. *Cochrane Database of Systematic Reviews*. 2011.
89. Beckett K, Goodenough T, Deave T, Jaeckle S, McDaid L, Benford P, et al. Implementing an Injury Prevention Briefing to aid delivery of key fire safety messages in UK children's centres: qualitative study nested within a multi-centre randomised controlled trial. *BMC public health*. 2014;14:1256.
90. Day HR, El-Setouhy M, El-Shinawi M, Assem A, Ismail M, Salem M, et al. Young Egyptians' perceptions, attitudes and knowledge of injuries. *Inj Prev*. 2010;16(5):348-51.
91. Ablewhite J, Peel I, McDaid L, Hawkins A, Goodenough T, Deave T, et al. Parental perceptions of barriers and facilitators to preventing child unintentional injuries within the home: a qualitative study. *BMC public health*. 2015;15:280-9.
92. Barat A, Watson MC, Mulvaney CA. Parents' voices: perceptions of barriers and facilitators to prevent unintentional home injuries among young children. *International Journal of Health Promotion and Education*. 2017;55(5-6):272-83.
93. Ablewhite J, Kendrick D, Watson M, Shaw I. The other side of the story - maternal perceptions of safety advice and information: a qualitative approach. *Child Care Health Dev*. 2015;41(6):1106-13.
94. Simpson JC, McGee R, Fougere G. Using change theory to elucidate complexities in child safety. *Inj Prev*. 2012;18(Suppl 1):A111-A.
95. Ingram J, Emond A. Parents' perceptions of home injury risk and attitudes to supervision of pre-school children: a qualitative study in economically deprived communities. *Primary Health Care Research & Development*. 2009;10(2):98-108.
96. Gibbs L, Waters E, Sherrard J, Ozanne-Smith J, Robinson J, Young S, et al. Understanding parental motivators and barriers to uptake of child poison safety strategies: a qualitative study. *Inj Prev*. 2005;11(6):373-7.
97. Foettinger L, Doerwald F, Bammann K. Understanding parental risk perception regarding unintentional injuries of infants and toddlers within the home: a grounded theory approach. *Journal of Risk Research*. 2021;24(11):1439-49.
98. Goodenough T, Kay B, Deave T, Towner E, Stewart J, Ablewhite J, et al. Barriers and facilitators to delivering injury prevention interventions in English children's centres. *International Journal of Health Promotion and Education*. 2015:1-12.
99. Barat A, Watson MC, Mulvaney CA. Preventing unintentional home injuries among children: exploring the perceptions of Iranian health professionals. *Prim Health Care Res Dev*. 2019;20:e146.
100. Lawrence W, Watson D, Barker H, Vogel C, Rahman E, Barker M. Meeting the UK Government's prevention agenda: primary care practitioners can be trained in skills to prevent disease and support self-management. *Perspectives in Public Health*. 2021:1757913920977030.

101. Alrimawi I, Watson MC, Hall C, Atout M, Al-Yateem N. The Perceptions of Palestinian Health Professionals toward Factors Facilitating or Impeding the Prevention of Home Injuries among Young Children: A Qualitative Study. *Child Care in Practice*. 2021:1-17.
102. Hébert ET, Caughy MO, Shuval K. Primary care providers' perceptions of physical activity counselling in a clinical setting: a systematic review. *Br J Sports Med*. 2012;46(9):625-31.
103. Bourke-Taylor HM, Grzegorzczyn S, Joyce KS. Peer mentor training: Pathway to competency for facilitators of Healthy Mothers Healthy Families workshops. *Child Care Health Devl*. 2021;47(5):575-87.
104. Hindmarch P, Hawkins A, McColl E, Hayes M, Majsak-Newman G, Ablewhite J, et al. Recruitment and retention strategies and the examination of attrition bias in a randomised controlled trial in children's centres serving families in disadvantaged areas of England. *Trials*. 2015;16(1):79.
105. Pizzo E, Doyle C, Matthews R, Barlow J. Patient and public involvement: how much do we spend and what are the benefits? *Health expectations : an international journal of public participation in health care and health policy*. 2015;18(6):1918-26.
106. Swart L, van Niekerk A, Seedat M, Jordaan E. Paraprofessional home visitation program to prevent childhood unintentional injuries in low-income communities: a cluster randomized controlled trial. *Inj Prev*. 2008;14(3):164-9.
107. Bonevski B, Randell M, Paul C, Chapman K, Twyman L, Bryant J, et al. Reaching the hard-to-reach: a systematic review of strategies for improving health and medical research with socially disadvantaged groups. *BMC Me Res Methodol*. 2014;14:42-.
108. Mitchell EJ, Ahmed K, Breeman S, Cotton S, Constable L, Ferry G, et al. It is unprecedented: trial management during the COVID-19 pandemic and beyond. *Trials*. 2020;21(1):784.
109. Nottingham Insight. Demography chapter: the people of Nottingham (2021). 2021.
110. Davis CG, Thake J, Vilhena N. Social desirability biases in self-reported alcohol consumption and harms. *Addict Behav*. 2010;35(4):302-11.
111. Bergen N, Labonté R. "Everything Is Perfect, and We Have No Problems": Detecting and Limiting Social Desirability Bias in Qualitative Research. *Qualitative Health Research*. 2019;30(5):783-92.
112. Gorbach P, Mensch B, Husnik M, Coly A, Mâsse B, Makanani B, et al. Effect of Computer-Assisted Interviewing on Self-Reported Sexual Behavior Data in a Microbicide Clinical Trial. *AIDS and behavior*. 2012;17.

## Appendices

### APPENDIX 1: BASELINE CHARACTERISTICS OF THOSE WHO CONTINUED TO PARTICIPATE AND THOSE WHO DROPPED OUT

Variable	Those who completed baseline questionnaire and did not complete the 12-month or 24-month questionnaire ( <i>n</i> = 169)		Those who completed baseline questionnaire and a 12-month, a 24-month questionnaire, or both ( <i>n</i> = 593)		Statistical test
	Median*	Interquartile range (IQR)*	Median*	IQR*	
Child age (months)	4.5 [4]	3.4 to 6.3	4.7 [7]	3.1 to 6.1	Wilcoxon rank sum: <i>z</i> = 1.05, <i>p</i> = 0.29
Child gender (% male)	46.8% [0]	Not applicable (n/a)	51.9% [7]	n/a	$\chi^2_{(1)} = 1.38$ , <i>p</i> = 0.24
Number of children (under 16) living in household	2 [1]	1 to 3	2 [4]	1 to 2	Wilcoxon rank sum: <i>z</i> = 2.17, <i>p</i> = 0.030
Maternal age at birth of first child	23 [10]	19 to 28	26 [43]	21 to 30	Wilcoxon rank sum: <i>z</i> = -4.37, <i>p</i> < 0.001
Proportion of families with one adult per household	31.4% [0]	n/a	17.7% [4]	n/a	$\chi^2_{(1)} = 15.02$ , <i>p</i> < 0.001
Index of multiple deprivation (IMD) 2019	46.3 [5]	35.8 to 56.9	40.2 [10]	32.6 to 52.8	Wilcoxon rank sum: <i>z</i> = 4.02, <i>p</i> < 0.001
Distance to the nearest emergency department (Kilometres)†	4.55 [2]	3.55 to 6.58	4.60 [6]	3.78 to 5.78	Wilcoxon rank sum: <i>z</i> = 0.53, <i>p</i> = 0.60
Intervention or control (% intervention)	54.4% [0]	n/a	45.4% [0]	n/a	$\chi^2_{(1)} = 4.34$ , <i>p</i> < 0.037