A GUIDE FOR COMMISSIONERS OF CHILD HEALTH SERVICES ON PREVENTING UNINTENTIONAL INJURIES AMONG THE UNDER FIVES

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THE KEEPING CHILDREN SAFE AT HOME STUDY

Keeping Children Safe at Home was a collaboration between the organisations shown below.

It aimed to improve our understanding of children's accidents and make their prevention more effective.

For further information visit www.nottingham.ac.uk/injuryresearch.

Disclaimer

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INTRODUCTION

This guide presents a series of evidence-based statements for commissioners of services that derive from the *Keeping Children Safe at Home* (KCS) project. It is intended to assist commissioners to specify local programmes that are effective in reducing unintentional injuries to pre-school-aged children.

It is particularly relevant to commissioners of health visiting services as it provides guidance on the key safety initiatives that should be delivered, especially as part of advice at the 9 month contact (or earlier) and the 2 – 2.5 year contact as part of the Healthy Child Programme (Department of Health, 2009). It also presents guidance to commissioners of services provided through children's centres and voluntary sector and other organisations that provide early years and family support services.

The KCS project developed evidence only in relation to poisoning, falls, scalds and burn prevention. Commissioners will need to ensure services also address the prevention of other childhood injuries not included in the KCS project but which are included in Public Health England's priorities, namely threats to breathing and drowning. Guidance on these topics can be found in the key sources of advice and policy outlined below.

The recommendations presented in this guide are based on research findings. The absence of guidance relating to specific interventions does not necessarily indicate that they are ineffective; it may mean that no relevant research has been undertaken or reported, or that research has been inconclusive.

The recommendations in this guide arise from systematic reviews, meta-analyses, case-control studies and decision analyses. Summaries of the key results are presented in Appendix A and Appendix B.

A list of the papers that provide the full results from which the recommendations in this guide are derived and that describe the research methods is presented below[1].

KEY SOURCES OF ADVICE AND POLICY

There are several publications that provide related guidance on the prevention of unintentional injuries to pre-school-aged children, support the advice in this document and provide the relevant policy framework.

NICE has published guidance on injury prevention strategies among the under 15s (NICE, 2010a) with an evidence update (NICE, 2013). Linked with the strategic guidance is specific advice on preventing unintentional injuries in the home (NICE, 2010b). The guidance is reinforced by a suite of supporting documents covering costing, self-assessment, and key questions to scrutinise local actions. A NICE endorsed resource linked with the topic is the Injury Prevention Briefing published as part of the

[1] The complete list of papers associated with the Keeping Children Safe at Home project can be found at http://www.miskin-group.org.uk/kcs.htm.

Keeping Children Safe study (Hayes et al, 2014). The NICE guidance publications can be accessed via https://www.nice.org.uk/guidance/ph29 and associated links.

The NICE quality standard, QS107, describes high-priority areas for quality improvement in the prevention of unintentional injury in children and young people under 15 (NICE, 2016). It consists of a prioritised set of specific, concise and measurable statements, drawing on existing guidance, which provides an underpinning, comprehensive set of recommendations, and are designed to support the measurement of improvement. This quality standard is endorsed by the Department of Health as required by the Health and Social Care Act 2012.

Public Health England has published guidance, setting out three action areas for local authorities and their partners that will reduce the numbers of children injured and killed (PHE, 2014). It also describes four steps local partnerships can take to build robust injury prevention strategies.

The policy context for preventing unintentional injuries to children is provided by the Public Health Outcomes Framework, indicator 2.7, seeking a reduction in hospital admissions from unintentional (and deliberate) injuries for children and young people (Department of Health, 2013).

ADAPTING ADVICE TO MEET THE NEEDS OF FAMILIES

As noted above, this guide presents a series of recommendations in Appendix A derived from research. However, it is important to remember that there is a need for flexibility in the prioritisation and delivery of the safety advice presented to individual families as their circumstances and ability to act, and the characteristics of children will vary. The experience and expertise of health visitors and others has an important role to play in ensuring that the guidance is adapted to meet specific needs to enable parents to act on the guidance.

TEACHING SAFETY RULES TO CHILDREN

A number of the statements presented involve teaching safety rules to parents and hence to young children. These should not be the only strategies that parents employ – they still need to anticipate what their children may do, use environmental methods to reduce hazards, supervise the child effectively, etc.

The statements include safety messages for children that can be delivered by health visitors to parents at routine contacts and by others providing child and family support. The advice is likely to need to be reinforced by parents as the child develops as their ability to assimilate and hence act on safety rules will vary from child to child.

For such teaching to be effective, it needs to increase children's understanding of safety issues to reduce the extent to which they interact with hazards. Also, parents need to check their children's understanding of safety rules, not their ability to recite the rules, and be confident that children will consistently comply with rules before relying on this as a preventive strategy.

STAFF TRAINING AND ON-GOING SUPPORT

The strategic guidance published by NICE (NICE, 2010a) and the NICE quality standard, QS107, (NICE, 2016) highlight the need for suitably trained staff and opportunities for initial and ongoing multi-agency training and development. The trial of the injury prevention briefing during the KCS project included the provision of training and on-going support of key staff to ensure consistent delivery and a good understanding of prevention topics. Such training and support are important elements of any services commissioned to prevent childhood injuries.

PREVENTING POISONING

KEY FACTS

- Poisoning is the third most common cause of injury-related hospital admissions among the under 5s in England with about 4,000 admissions a year, 95 percent of them for less than 2 days. About 21,000 under 5s go to emergency departments annually as a result of poisoning incidents.

- While deaths are very rare – just one or two a year nationally – poisonings can be very serious with about 100 children staying in hospital for more than 3 days each year.

KEY FINDINGS FROM THE KEEPING CHILDREN SAFE AT HOME PROJECT

- compared to children without a poisoning, children who attend or are admitted to hospital because of a poisoning are **significantly more likely** to live in families who don't store medicines at or above adult eye height or locked away.

- compared to children without a poisoning, children who attend or are admitted to hospital because of a poisoning are **significantly more likely** to live in families who don't put medicines and household products away immediately after use

- providing families only with education about how to prevent poisoning is **less effective** than providing education along with provision of safety equipment (e.g. cupboard locks) and home safety assessments.

- providing families with education to prevent poisonings was judged to be cost-effective compared to usual care (less than £23,000 per quality adjusted life year (QALY) gained), assuming 1.8 children per family. It was more cost-effective (less than £20,000 per QALY gained) if provided only to families in the most disadvantaged areas. It is important to note that our analyses assessed cost-effectiveness of only poison prevention interventions, not of interventions to prevent multiple types of injuries as would be the case in many home safety assessment and equipment schemes.

COMMISSIONING STATEMENTS RELATED TO PREVENTING POISONING

Commissioners of health visiting services should ensure that poison prevention education and advice is provided to parents as part of the child health programme and at other opportunities appropriate to the age and stage of development of the child.

<u>At the 9 month contact:</u>

- Information/education about the onset of mouthing behaviour and changes in children's gross and fine motor skills that make them more likely to consume medicines and household chemicals.

- Make parents aware that when the child is able to climb and manipulate objects there will be a need for storing medicines and household chemicals out of reach (at or above adult eye height or locked away) and of the importance of returning medicines and household chemicals to their usual storage place immediately after use.

- Deliver the following three key messages:
    - Fit cupboard locks to cupboards where medicines and household chemicals are stored
    - Store medicines and household chemicals in locked cupboards or locked medicines boxes which are at or above adult eye level
    - Always put medicines and household chemicals away straight after using them
- If there is a local scheme to provide a home safety assessment and home safety equipment, put systems in place to ensure that health visitors are aware of such a scheme, understand the referral criteria and know how to refer families.

<u>At the 2 – 2.5 year contact:</u>

- Advice on children's ability to climb on to work surfaces and reach into higher cupboards and to open containers, noting the need for harmful substances to be stored at or above adult eye height or locked away;
- Deliver the following three key messages:
    - Fit cupboard locks to cupboards where medicines and household chemicals are stored
    - Store medicines and household chemicals in locked cupboards or locked medicines boxes which are at or above adult eye level
    - Always put medicines and household chemicals away straight after using them
- If there is a local scheme to provide a home safety assessment and home safety equipment, put systems in place to ensure that health visitors are aware of such a scheme, understand the referral criteria and know how to refer families.

Services commissioned in children's centres should

- Provide Information/education about the onset of mouthing behaviour and changes in children's gross and fine motor skills that make them more likely to consume medicines and household chemicals.
- Make parents aware that when the child is able to climb and manipulate objects there will be a need for storing medicines and household chemicals out of reach (at or above adult eye height or locked away) and of the importance of returning medicines and household chemicals to their usual storage place immediately after use.

- Deliver the following three key messages:
    - Fit cupboard locks to cupboards where medicines and household chemicals are stored
    - Store medicines and household chemicals in locked cupboards or locked medicines boxes which are at or above adult eye level
    - Always put medicines and household chemicals away straight after using them
- If there is a local scheme to provide a home safety assessment and home safety equipment, put systems in place to ensure that health visitors are aware of such a scheme, understand the referral criteria and know how to refer families.

PREVENTING FALLS

KEY FACTS

- Fall injuries are by far the most common cause of injury-related hospital admissions among the under 5s in England with almost 20,000 admissions a year, 90 percent of them for less than two days. An estimated 230,000 under 5s go to emergency departments annually in the UK after falls in the home and garden and a further 75,000 following falls elsewhere.

- Deaths are rare – about five a year nationally – but fall injuries can be very serious with about 700 children staying in hospital for more than three days each year.

- The falls that result in the most serious injuries to children under 5 years and hence the ones towards which most preventive actions should be directed are those from heights, for example down stairs, out of windows, from furniture, off kitchen work surfaces and from highchairs.

KEY FINDINGS FROM THE KEEPING CHILDREN SAFE AT HOME PROJECT

- Compared to children who had not had a fall on stairs, children attending or admitted to hospital because of a fall on stairs were **significantly more likely** to live in families without safety gates on stairs, and **significantly more likely** to live in families who had safety gates but left them open.

- The risk associated with leaving safety gates open was **particularly high** amongst families who also used baby walkers

- Compared to children who had not had a fall on stairs, children attending or admitted to hospital because of a fall on stairs were **significantly more likely** to live in families without carpeted stairs

- Compared to children who had not had a fall from furniture, babies (0-12 months old) attending or admitted to hospital because of a fall from furniture were **significantly more likely** to live in families changing nappies on raised surfaces (e.g. changing tables, beds etc), leaving babies unattended on raised surfaces and putting babies in car/bouncing seats on raised surfaces

- Compared to children who had not had a fall from furniture, children attending or admitted to hospital because of a fall from furniture were **significantly more likely** to live in families without safety gates anywhere in the house

- Compared to children who had not had a fall from furniture, children aged 3-5 years attending or admitted to hospital because of a fall from furniture were **significantly more likely** to climb or play on furniture more frequently.

- Compared to children who had not had a fall from furniture, children aged 3-5 years attending or admitted to hospital because of a fall from furniture were **significantly less likely** to have been taught not to climb on objects in the kitchen

- interventions including a combination of education, provision of low cost or free safety gates, home safety checks and fitting of safety gates were the **most effective** in increasing the possession of a fitted safety gate. Families receiving interventions containing all of these components were **very much more likely to have a fitted safety gate** compared to families who received usual care. Actually fitting safety gates was particularly important as families receiving this part of the intervention were **much more likely to have a fitted safety gate** than those just provided with education or safety gates or home safety checks, or any combination of these.

- none of the interventions (education, home safety assessments, providing and fitting safety equipment) were judged to be cost-effective compared to usual care in preventing stair falls, at a threshold of £30,000 per QALY gained. It is important to note that our analyses assessed cost-effectiveness only of stair falls prevention interventions, not of interventions to prevent multiple types of injuries as would be the case in many home safety assessment and equipment schemes.

COMMISSIONING STATEMENTS RELATED TO PREVENTING FALLS

Commissioners of health visiting services, children's services more generally, for example through children's centres, and **housing maintenance services** (or other services that can fit safety equipment) should ensure that there is coordinated action to provide combined interventions including parental education, the provision and fitting of low cost or free safety gates, and home safety checks to increase the likelihood of families having fitted safety gates.

Commissioners of health visiting services should ensure that fall prevention education and advice is provided to parents as part of the child health programme and at other opportunities appropriate to the age and stage of development of the child:

At the 9 month contact or earlier if possible:

- Deliver the following six key messages:

  - Change nappies on the floor

  - Don't put car seats and bouncing seats on raised surfaces

  - Don't leave babies unattended on a raised surface, e.g. a bed, as they may roll off

  - Use safety gates until your child is 24 months old to prevent falls down stairs and always close them after use

  - Leaving safety gates on stairs open is particularly dangerous if you use a baby walker

  - Cover stairs with carpet to reduce the risk of fall-related injuries

At the 2 – 2.5 year contact

- Deliver the following three key messages;
    - Cover stairs with carpet to reduce the risk of fall-related injuries
    - Teach children rules about not climbing on objects from which they could fall
    - Don't allow children to climb or play on furniture unsupervised

Services commissioned in children's centres should incorporate advice

For parents of babies:

- Deliver the following six key messages:
    - Change nappies on the floor
    - Don't put car seats and bouncing seats on raised surfaces
    - Don't leave babies unattended on a raised surface, e.g. a bed, as they may roll off
    - Use safety gates until your child is 24 months old to prevent falls down stairs and always close them after use
    - Leaving safety gates on stairs open is particularly dangerous if you use a baby walker
    - Cover stairs with carpet to reduce the risk of fall-related injuries

For parents of children who can crawl, walk and climb:

- Deliver the following four key messages:
    - Use safety gates until your child is 24 months old to prevent falls down stairs and always close them after use
    - Cover stairs with carpet to reduce the risk of fall-related injuries
    - Teach children rules about not climbing on objects from which they could fall
    - Don't allow children to climb or play on furniture unsupervised

PREVENTING SCALDS

KEY FACTS

- Scalds are a relatively common injury among babies and young children. They result in about 1,500 hospital admissions among the under 5s in England annually and have some of the longest periods of admission of any injury. Deaths are rare – less than one a year.

- The cause of most scalds is hot drinks, but the most severe scalds are caused by hot bath water.

- Scalds had the highest mean total cost for emergency department attendances and admissions for observation, and the highest mean non-healthcare costs among the injuries studied in the Keeping Children Safe at Home project.

KEY FINDINGS FROM THE KEEPING CHILDREN SAFE AT HOME PROJECT

- compared to children without a scald, children who attend or are admitted to hospital because of a scald were **significantly more likely** to live in families who left hot drinks within reach of a child

- compared to children without a scald, children who attend or are admitted to hospital because of a scald were **significantly less likely** to live in families who taught children what not to do when parents are cooking or using the kettle.

- compared to children without a scald, children who attend or are admitted to hospital because of a scald were **significantly less likely** to live in families who taught children not to climb on things in the kitchen.

- fitting a thermostatic mixing valve (TMV) and providing education is **more effective** in reducing bath water temperature to a level that will not cause serious and rapid injury than education alone or than giving parents thermometers to test their water temperature and lower it if it is too high.

- education, plus providing and fitting a TMV was judged to be cost-effective compared to usual care if fitted in social housing (saved £20,828 per QALY gained. Education alone was judged to be cost-effective compared to usual care (less than £24,000 per QALY gained) if assumed this is provided as part of an existing home safety scheme (and hence no set-up costs of the scheme).

COMMISSIONING STATEMENTS RELATED TO PREVENTING SCALDS

Public health commissioners should work with **social housing providers and landlord organisations** to promote the installation of thermostatic mixing valves (TMVs) to prevent bath water scalds when undertaking major refurbishments. Such installations should be supported by the provision of advice to parents to reduce bath water scalds

Commissioners of health visiting services should ensure that scald prevention education and advice is provided to parents as part of the child health programme and at other opportunities appropriate to the age and stage of development of the child:

At the 9 month contact or earlier if possible:

- Deliver the following six key messages:
  - check the water temperature before placing the baby in the bath
  - never leaving a baby in the bath in the care of a young child who may play with the hot tap. (This is also a drowning prevention issue.)
  - don't place hot drinks within the reach of babies, e.g. within reach when they are in high chairs, or on low tables when babies are crawling.
  - don't handle hot drinks when babies are on laps to prevent babies from knocking or grabbing at the drinks.
  - keep the baby away from cookers, kettles, tea and coffee pots, etc.
  - warn that the risk of scalding will occur when the baby can climb on furniture in the kitchen.

At the 2 – 2.5 year contact

- Deliver the following key messages:
  - teach children safety rules about
    - hot things in the kitchen
    - things not to climb on in the kitchen
    - what to do or not do when parents are cooking
  - keep the toddler away from cookers, kettles, tea and coffee pots, etc.

Commissioners of children's services generally, for example through children's centres, should ensure that scald prevention education and advice is provided to parents at opportunities appropriate to the age and stage of development of the child:

For parents of babies:

- Deliver the following five key messages:
  - check the water temperature before placing the baby in the bath
  - never leave a baby in the bath in the care of a young child who may play with the hot tap. (This is also a drowning prevention issue.)
  - don't place hot drinks within the reach of babies, e.g. within reach when they are in high chairs, or on low tables when babies are crawling.

- don’t handle hot drinks when babies are on laps to prevent babies from knocking or grabbing at the drinks.

- keep the baby away from cookers, kettles, tea and coffee pots etc.

<u>For parents of children who can crawl, walk and climb:</u>

- Deliver the following six key messages:

  - check the water temperature before placing the baby or child in the bath

  - never leave a baby or child in the bath in the care of another young child who may play with the hot tap. (This is also a drowning prevention issue.)

  - don’t place hot drinks within the reach of a baby, e.g. within reach when they are in high chairs, or on low tables when babies are crawling.

  - keep the baby or toddler away from cookers, kettles, tea and coffee pots etc.

  - warn that the risk of scalding will occur when the baby or toddler can climb on furniture in the kitchen.

  - teach toddlers safety rules about

    - hot things in the kitchen

    - things not to climb on in the kitchen

    - what to do or not do when parents are cooking

PREVENTING FIRE-RELATED INJURIES

KEY FACTS

- Children from the families whose parents have never worked or are long-term unemployed have death rates from fires 38 times higher than those for the most affluent families.

- Over half of house fires that the fire and rescue services attend DO NOT have a working smoke alarm, despite the fact that well over 80% of homes have smoke alarms.

- Families with working smoke alarms are less likely to die in a house fire than families without smoke alarms.

- When there is a young child in a family, local fire and rescue service might carry out such fire safety checks when families are referred to them.

KEY FINDINGS FROM THE KEEPING CHILDREN SAFE AT HOME PROJECT

- Families with working smoke alarms are **less likely to die** in a house fire than families without smoke alarms.

- There is **evidence** to suggest that home fire safety fire checks reduce domestic fires and related injuries.

- **The most effective method** for increasing the number of families with a working smoke alarm is to educate families, provide and fit free or low cost alarms and do a home safety check.

- Education and providing free or low cost smoke alarms was judged to be cost-effective compared to usual care (less than £5,000 per QALY gained, assuming 1.8 children per family) or if the probability of families accepting the intervention is 50% (less than £13,000 per QALY gained). It is important to note that our analyses assessed cost-effectiveness only of smoke alarm programmes, not of interventions to prevent multiple types of injuries as would be the case in many home safety assessment and equipment schemes.

- Education is **effective** in increasing the proportion of families with a fire escape plan.

- Most families who had a fire escape plan had not practised it and did not have a backup plan in case they were unable to use their first plan for some reason.

COMMISSIONING STATEMENTS RELATED TO PREVENTING FIRE-RELATED INJURIES

Public health commissioners should commission the local fire and rescue service

- to establish systems to receive and act upon referrals from health visitors, children's centres and other agencies concerning families in need of smoke alarms and fire safety checks.

- to provide and fit smoke alarms, especially in the most disadvantaged households, undertake home safety fire checks and provide supporting advice.

Public health commissioners should work with **social housing providers and landlord organisations** to promote fire safety and ensure that they are aware of the fire prevention services provided by the local fire and rescue service.

Commissioners of health visiting services and **services provided by children's centres** should ensure that

- the following key fire prevention education and advice is provided to parents as soon as possible after the baby's birth and reinforced by health visitors as part of the child health programme at the 9 month contact and at the 2 - 2.5 year contact:

    - the need for having working smoke alarms and a family fire escape plan. This advice should be presented in collaboration with the fire prevention activities of local fire and rescue services.

- as early as possible after the baby's birth, the most disadvantaged families are referred to the local fire and rescue service for the provision and fitting of smoke alarms, fire safety checks and supporting advice.

APPENDIX A – EVIDENCE RELATING TO EFFECTIVENESS OF INTERVENTIONS TO PROMOTE HOME SAFETY BEHAVIOURS, PRACTICES OR SAFETY EQUIPMENT USE AND RISK OF INJURY ASSOCIATED WITH BEHAVIOURS, PRACTICES OR SAFETY EQUIPMENT USE

POISONING PREVENTION	EVIDENCE OF EFFECTIVENESS OF INTERVENTIONS IN INCREASING SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT USE	EVIDENCE THAT SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT IS ASSOCIATED WITH RISK OF INJURY
Safe storage of medicines (at or above adult eye height or locked)	Network meta-analysis demonstrated that education with the provision of low cost or free equipment was the most effective intervention for promoting safe storage of medicines (odds ratio vs. usual care 2.51, 95%CrI 1.01, 6.00, p best=0.39) (Achana et al, 2015; Kendrick et al, 2016a)	Families whose children have had a medically attended poisoning are significantly more likely than families whose children have not had a medically-attended poisoning: ▪ Not to store medicines out of reach (odds ratio 1.59; 95%CI 1.21, 2.09) ▪ Not to store medicines safely (locked or out of reach) (odds ratio 1.83; 95%CI 1.38, 2.42 ▪ Put all medicines away immediately after use (odds ratio 2.11; 95%CI 1.54, 2.90) (Kendrick et al, 2016b) Families of children who attended ED after poisoning were significantly more likely to store medicines in accessible places in bathrooms than families not attending with a poisoning (OR 1.03, 95%CI 1.002, 1.080) (Schmertmann et al, 2013)

POISONING PREVENTION	EVIDENCE OF EFFECTIVENESS OF INTERVENTIONS IN INCREASING SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT USE	EVIDENCE THAT SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT IS ASSOCIATED WITH RISK OF INJURY
Safe storage of household products	Network meta-analysis demonstrated that education plus home safety inspection plus safety equipment was the most effective intervention for promoting safe storage of household products (odds ratio vs. usual care 2.59, 95%CrI 0.59, 15.16, p best=0.37). (Kendrick et al, 2016a)	Families whose children have had a medically attended poisoning are significantly more likely than families whose children have not had a medically-attended poisoning : ▪ Not to put all household products away immediately after use (odds ratio 1.79, 95%CI 1.29, 2.48) (Kendrick et al, 2016b)
Safe storage of medicines or household products		Families of children attending secondary care with a poisoning compared with matched families attending for other reasons were significantly more likely to store poisons unsafely (in boxes/cabinets (OR 3.80, 95%CI 1.15, 12.49) or below 150 cm from the floor (OR 16.59, 95%CI 2.86, 96.20)) (Ramos et al, 2010) Families of poisoned children seeking medical care were significantly more likely than parents of children attending hospital for other reasons to store chemicals and medicines in accessible places (OR 5.6 95%CI 1.9, 16.7) (Ahmed et al, 2011)

FALLS PREVENTION	EVIDENCE OF EFFECTIVENESS OF INTERVENTIONS IN INCREASING SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT USE	EVIDENCE THAT SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT IS ASSOCIATED WITH RISK OF INJURY
Use of safety gates on stairs	Network meta-analysis found that education plus equipment provision plus fitting of safety equipment plus home safety inspection was the most effective intervention in promoting safety gate use (odds ratio vs. usual care 7.80, 95%CrI 3.18, 21.3; p best=0.97). (Hubbard et al, 2014) Meta-analysis found that home safety interventions, with or without the provision and/or fitting of safety gates, were effective in promoting safety gate use (OR 1.61, 95%CI 1.19, 2.17) (Kendrick et al, 2012)	Families whose children have had a medically attended fall on stairs are significantly more likely than families whose children have not had a medically-attended fall on stairs: ▪ Not to use a safety gate on stairs; odds ratio 2.50, 95%CI 1.90, 3.29 (Kendrick et al, 2015) The risk varied by child age and baby walker use: odds ratio for children aged 0-12 months 3.27, 95%CI 1.48, 7.20 odds ratio for children aged 13-36 months 2.33, 95%CI 1.60, 3.39 odds ratio for children aged ≥ 37 months 2.08, 95%CI 1.23, 3.51 See below for baby walker use (Kendrick et al, 2015) ▪ Leave safety gate on stairs open; odds ratio 3.09, 95%CI 2.39, 4.00 (Kendrick et al, 2015) The risk varied by child age and baby walker use: odds ratio in children aged 0-12 months 8.64, 95%CI 3.99, 18.68 odds ratio in children aged 13-36 months 2.64, 95%CI 1.92, 3.64 See below for baby walker use (Kendrick et al, 2015)

FALLS PREVENTION	EVIDENCE OF EFFECTIVENESS OF INTERVENTIONS IN INCREASING SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT USE	EVIDENCE THAT SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT IS ASSOCIATED WITH RISK OF INJURY
Use of safety gates anywhere in the home	Network meta-analysis found that education plus equipment provision plus fitting of safety equipment plus home safety inspection was the most effective intervention in promoting safety gate use (odds ratio vs. usual care 7.80, 95%CrI 3.18, 21.3; p best=0.97). (Hubbard et al, 2014)	Families whose children had a medically attended fall from furniture were significantly more likely than families whose children have not had a medically-attended fall from furniture: ▪ Not to use a safety gate anywhere in the house; odds ratio 1.65, 95%CI 1.29, 2.12 (Kendrick et al, 2014)
Baby walker use	Network meta-analysis demonstrated education were was most effective intervention for reducing baby walker use (odds ratio vs. Usual care for using a walker 0.48, 95%cri 0.31, 0.84). (Hubbard et al, 2014)	Families whose children had a medically attended fall on stairs were significantly more likely than families whose children have not had a medically-attended fall on stairs : ▪ Not to use a safety gate Odds ratio in baby walker users 2.54, 95%CI 1.33, 4.87 Odds ratio in families not using baby walkers 2.42, 95%CI 1.63, 3.59 ▪ Leave safety gate open Odds ratio in baby walker users 7.37, 95%CI 4.36, 12.45 Odds ratio in families not using baby walkers 2.65, 95%CI 1.87,3.76 (Kendrick et al, 2015)

FALLS PREVENTION	EVIDENCE OF EFFECTIVENESS OF INTERVENTIONS IN INCREASING SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT USE	EVIDENCE THAT SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT IS ASSOCIATED WITH RISK OF INJURY
Use of raised surfaces	There is a lack of evidence that interventions are effective in promoting safe use of raised surfaces. Systematic review and meta-analysis found education, with or without home safety equipment provision was not effective in preventing families leaving children alone on high surfaces (odds ratio 0.84, 95%CI 0.58, 1.20). Only 3 studies reported this outcome with total of 661 participants. (Kendrick et al, 2012)	Families whose children have had a medically attended fall from furniture are significantly more likely than families whose children have not had a medically-attended fall from furniture to: ▪ leave children aged 0-12 months on raised surfaces; odds ratio 5.62, 95%CI 3.62, 8.72 ▪ change nappies in children aged 0-12 months on raised surfaces; odds ratio 1.89, 95%CI 1.24, 2.88 ▪ put children aged 0-12 months in car/bouncing seats on raised surfaces; odds ratio 2.05, 95%CI 1.29, 3.27 (Kendrick et al, 2014)
Playing or climbing on furniture	Lack of evidence about effectiveness of interventions to promote safe use of furniture. Systematic review did not find any studies reporting this outcome.	Families of children aged ≥37 months with a medically attended fall from furniture were significantly more likely than families whose children have not had a medically-attended fall from furniture : ▪ to have climbed/played on furniture; odds ratio 9.25, 95%CI 1.22, 70.07 (Kendrick et al, 2014)

FALLS PREVENTION	EVIDENCE OF EFFECTIVENESS OF INTERVENTIONS IN INCREASING SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT USE	EVIDENCE THAT SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT IS ASSOCIATED WITH RISK OF INJURY
Teaching safety rules	Lack of evidence about effectiveness of interventions to promote teaching safety rules. Systematic review did not find any studies reporting this outcome.	Families of children with a medically attended fall from furniture were significantly more likely than families whose children have not had a medically-attended fall from furniture: ▪ not to have taught children rules about climbing on objects in the kitchen; odds ratio 1.58, 95%CI 1.16, 2.15 (Kendrick et al, 2014)
Unsafe stairs		Families of children with a medically attended fall on stairs were significantly more likely than families whose children have not had a medically-attended fall from furniture: ▪ to have no carpet on stairs (AOR 1.51, 95%CI 1.09, 2.10) ▪ to have no landing part way up the staircase (AOR 1.51, 95%CI 1.09, 2.10) ▪ to consider stairs to be unsafe (AOR 1.46, 95%CI 1.07, 1.99) ▪ to consider stairs to be in need of repair (AOR 1.71, 95%CI 1.16, 2.50) (Kendrick et al, 2015)

SCALD PREVENTION	EVIDENCE OF EFFECTIVENESS OF INTERVENTIONS IN INCREASING SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT USE	EVIDENCE THAT SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT IS ASSOCIATED WITH RISK OF INJURY
Safe hot tap water	Network meta-analysis found that education plus free or low cost provision and fitting of thermostatic mixer values was most likely to be effective (OR 38.82, 95%CrI 3.58, 599.10; p best=0.97). This was only the most cost-effective intervention if TMVs were fitted during major refurbishment or new builds to families in social housing in which case money was saved. Pairwise meta-analysis evaluating home safety interventions (education, plus provision of home safety inspections and safety equipment in some studies) showed that intervention group families were more likely to have a safe hot tap water temperature than control group families (OR 1.41, 95% CI 1.07, 1.86). (Kendrick et al, 2016a)	Families of children aged 0-5 years admitted to a burns centre following a burn, predominantly scalds, occurring at home, matched to children admitted to hospital for other reasons, found a one unit increase in a composite burns hazard score increased the odds of a burn by 32% (OR 1.32, 95%CI 1.02, 1.71). (Othman et al, 2013)

SCALD PREVENTION	EVIDENCE OF EFFECTIVENESS OF INTERVENTIONS IN INCREASING SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT USE	EVIDENCE THAT SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT IS ASSOCIATED WITH RISK OF INJURY
Safe handling of food and drinks	There was no consistent evidence that home safety interventions were effective in promoting the safe handling of hot food or drinks.	Families of children with a medically attended scald were more likely to leave hot drinks within children's reach (adjusted odds ratio 2.33, 95%CI 1.63, 3.31) (Kendrick et al. 2016a) Families of children attending an ED following predominantly scalds, matched with non-injured ED attenders, showed that an increase in a composite kitchen safety practices score was associated with a 40% reduction in the odds of a burn (OR 0.6, 95%CI 0.5, 0.8). (Petridou et al, 1998) Families of children aged 0-5 years admitted to a burns centre following a burn, predominantly scalds, occurring at home, matched to children admitted to hospital for other reasons, found a one unit increase in a composite burns hazard score increased the odds of a burn by 32% (OR 1.32, 95%CI 1.02, 1.71). (Othman et al, 2013) Families of children aged 0-4 years attending ED with a burn injury, 62% of which were scalds, matched with controls, found storage of hot drinks in their original containers instead of in vacuum flasks increased the odds of a burn (OR 2.0, 90% CI 1.2,3.1). (Van Rijn et al, 1991)

SCALD PREVENTION	EVIDENCE OF EFFECTIVENESS OF INTERVENTIONS IN INCREASING SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT USE	EVIDENCE THAT SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT IS ASSOCIATED WITH RISK OF INJURY
Safe cooking and other kitchen safety practices	There was no consistent evidence that home safety interventions were effective in promoting safe kitchen and cooking practices.	Families of children with a medically attended scald were less likely **than families of children without a medically attended scald** to teach children ▪ rules about climbing on kitchen objects (adjusted odds ratio 1.66, 95%CI 1.12, 2.47), ▪ safe behaviour when parents are cooking (adjusted odds ratio 1.95, 95%CI 1.33, 2.85) ▪ rules about hot kitchen objects (adjusted odds ratio 1.89, 95%CI 1.30, 2.75). (Kendrick et al. 2016a) Families of children aged 0-12 years admitted to burns units and matched with controls found significantly more cases had cooking equipment within reach of children than controls (P<0.001, OR not reported). (Daisy et al, 2001) Families of children attending an ED following predominantly scalds, matched with non-injured ED attenders, showed that an increase in a composite kitchen safety practices score was associated with a 40% reduction in the odds of a burn (OR 0.6, 95%CI 0.5, 0.8). (Petridou et al, 1998)

PREVENTING FIRE-RELATED INJURIES	EVIDENCE OF EFFECTIVENESS OF INTERVENTIONS IN INCREASING SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT USE	EVIDENCE THAT SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT IS ASSOCIATED WITH RISK OF INJURY
Having a working smoke alarm	Free alarms and installation, home inspection, education, modification, community education compared to usual care. Incidence change in fire related injuries/1000 intervention group (after vs before): 0.5 (0.4, 0.6) Control: 0.8 (0.6, 1.1) (Schwarz et al, 1993) Network meta-analysis showed that education, provision of low cost/free equipment, fitting plus home safety inspection compared to usual care was most effective in increasing working smoke alarm ownership (OR 7.15, 95%CrI 2.40, 22.73) (Cooper et al, 2012; Kendrick et al, 2016a) Meta-analysis showed that home safety interventions increased working smoke alarm ownership (OR 1.81, 95%CI 1.30, 2.52) (Kendrick et al, 2012)	More fatal house fire injury vs. non-fatal house fire injury without an alarm (OR 3.4, 95%CI 2.1, 5.6) (Runyan et al, 1992) When adjusted for confounders, fewer fatal house fire injury vs. non-fatal house fire injury with functioning alarm (OR 0.39, 95%CI 0.18, 0.83) (Marshall et al, 1998)

PREVENTING FIRE-RELATED INJURIES	EVIDENCE OF EFFECTIVENESS OF INTERVENTIONS IN INCREASING SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT USE	EVIDENCE THAT SAFETY BEHAVIOUR/PRACTICE/SAFETY EQUIPMENT IS ASSOCIATED WITH RISK OF INJURY
Having a family fire escape plan	Pairwise meta-analysis of studies reporting having or practising a fire escape plan found home safety interventions increased the proportion of families with a fire escape plan (OR 2.01, 95% CI 1.45, 2.77) (Kendrick et al, 2012) Implementation of the Injury Prevention Briefing in children's centres increased some fire-escape behaviours for IPB only families (AOR 2.56, 95%CI 1.38, 4.76) and IPB + facilitation families (AOR 1.78, 95%CI 1.01, 3.15) (Kendrick et al, 2016a)	
Other fire safety practices	There was some evidence from narrative reviews and pairwise meta-analysis that home safety interventions may be effective in increasing possession of fire guards but network meta-analysis found no significant difference between interventions comprising various combinations of education, home safety inspection, provision and fitting of safety equipment, so the most effective intervention remains unclear. (Kendrick et al, 2016a)	

APPENDIX B – COST-EFFECTIVENESS OF INTERVENTIONS

In the table below, except where stated the sources of the evidence can be found in Kendrick et al, 2016a

INJURY	EVIDENCE OF COST-EFFECTIVENESS
Preventing poisoning	Decision analysis demonstrated education plus providing free or low cost equipment was cost-effective when compared to usual care: Assuming 1.8 children per family: £22,960 per QALY gained If provided to families living in 4th most deprived quintile: £19,315 per QALY gained If provided to families living in most deprived quintile: £18,275 per QALY gained All other interventions were not judged to be cost-effective at a £30,000 per QALY gained threshold. Caution must be used in interpreting these findings as analyses assessed cost-effectiveness only of poison prevention interventions, not of interventions to prevent multiple types of injuries as would be the case in many home safety assessment and equipment schemes.
Preventing stair falls	No interventions were judged to be cost-effective at a £30,000 per QALY gained threshold. Caution must be used in interpreting these findings as analyses assessed cost-effectiveness only of stair falls prevention interventions, not of interventions to prevent multiple types of injuries as would be the case in many home safety assessment and equipment schemes.
Preventing hot tap water scalds	Decision analyses demonstrated providing education, plus a free TMV and fitting the TMV was cost effective compared to usual care if provided to families living in social housing, with £20,828 saved per QALY gained. Education alone was cost-effective compared to usual care if assumed this was provided as part of an existing home safety scheme (and hence no set-up costs of the scheme), with a cost per QALY gained of £23,975. All other interventions were not judged to be cost-effective at a £30,000 per QALY gained threshold.

INJURY	EVIDENCE OF COST-EFFECTIVENESS
Preventing fire-related injuries	Decision analysis demonstrated that education plus providing smoke alarms was cost-effective compared to usual care if the number of children per family was assumed to be at least 1.8, with a cost per QALY gained of £4,456, or if the probability of families accepting the intervention was 50%, where the cost per QALY gained was £12,701 (Saramago et al, 2014) All other interventions were not judged to be cost-effective at a £30,000 per QALY gained threshold. Caution must be used in interpreting these findings as analyses assessed cost-effectiveness only of smoke alarm programmes, not of interventions to prevent multiple types of injuries as would be the case in many home safety assessment and equipment schemes. (Saramago et al, 2014)

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