

Preventing Hot Beverage Scald Injuries  
to Young Children

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**David A Swain  
University of Waikato  
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## **1.0 Introduction**

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The focus of the research proposal was two-fold: to analyse the emphasis placed on hot beverage scald injuries to under five year olds in current public education material for parents and caregivers; and to make practical recommendations in regard to more effective educational messages and preventative behaviour. We anticipated that there would be a lack of emphasis on hot beverage scald prevention in public education material when compared to the emphasis placed on preventing other scald hazards.

Among children under five years, falls, poisoning, cuts, burns, smoke inhalation, drowning, suffocation, and choking cause at least two-thirds of all unintentional injuries. Many of these injuries occur in the home, where young children spend most of their time (DiGuseppi, 2000). In Aotearoa/New Zealand thousands of children suffer burn-related injuries each year, and on average nine children are admitted to hospital every week as the result of a hot water scald. One-quarter of scald injuries to children under three years old are, however, caused by hot beverages, with this age group being the most likely to receive treatment.

### **1.1 Necessity of Research**

Every year over 10,000 Aotearoa/New Zealand children are injured to the point where they require hospitalisation. Aotearoa/New Zealand's rate of child death due to unintentional injury is one of the highest for developed countries. Our children are twice as likely to die from injury as children who live in Australia, and three times as

likely as children from England and Wales. Many of these injuries are preventable (ACC, 2000: 1)

The New Zealand Injury Prevention Strategy focuses on injury prevention, which involves using preventive measures to reduce the number of new cases of injury, and reduce the severity of those injuries that do occur (<http://www.nzips.govt.nz/>). Public education materials such as booklets, fact sheets, videos, and posters are part of current injury prevention strategies. Given the importance of increasing safety practices to prevent scalds in under-fives, it is necessary to review present public education material, to assess the information available on hot beverage scald prevention for children under five. This assessment of selected public education materials will take place through content analysis.

Burns from hot drinks, food, steam or other hot liquids are a common cause of serious injury to young children. According to the booklet, *A Child Safe Home for Under Fives: preventing injuries to young children* (Accident Compensation Corporation, 2001) children, especially under-fives are naturally curious and are often attracted by the steam from hot water or drinks. They may not recognise the danger of getting burnt until it is too late.

## 2.0 Literature Review

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A literature review was undertaken to determine the extent of the information within the topic area. Materials from a broad range of Aotearoa/New Zealand and overseas sources, including academic books and articles, internet websites, and public education materials, in the form of booklets, videos and posters, were reviewed.

Most scalds occur in kitchens when fluids spill from stoves or microwaves, as well as on or around tables, counters, and sinks. Every single scald injury is preventable, and ‘the most effective way to prevent scalds in the kitchen or bathroom is through adequate and continuous supervision’. Practices which keep hot fluids away from children are: supervision, keeping children away from risk areas, avoiding the use of tablecloths and place mats, putting hot items on the table only when adults are ready to be seated, testing all foods before feeding a baby, and cooking on the rear of the stove (Health & Medicine Week, 2002).

The New South Wales Health Department *Hot Water Burns Like Fire: The NSW Scalds Prevention Campaign* (1998), despite its title, examines only hot tap water scalds, which it claims are the ‘most serious scalds because of the large body surface area involved’. This is based on a study of hospital admissions of children under 15 with scald injuries. The age distribution showed that around 75% of scald injury admissions were under five years. Tap water scalds to under-fives accounted for 143 admissions to hospital. While the severity of large-scale tap water scalds should not be downplayed, it is clearly not the most common cause of scald injury. What the report does acknowledge is that roughly half of scald injury admissions are from hot beverages that ‘are generally a result of a child pulling the hot tea or coffee over him or her [self]’.

## 2.1 Scald Evaluation: Hot Liquids Burn Like Fire

Injuries from burns have long been recognised as among the most painful and devastating injuries a person can sustain and survive. These often require long periods of rehabilitation, multiple skin grafts, and painful physical therapy. Often victims are left with lifelong physical and psychological trauma (Kemp & Sibert, 1995).

A substantial proportion of child hospital visits are attributable to injuries, many of which are unintentional. According to Erdman et al (1991) scalds are the leading cause of hospitalisations for burns among children under five years of age. Eight or nine children on average are admitted to Aotearoa/New Zealand hospitals each week with hot water scalds. Fortunately deaths from scald injuries are relatively rare, with only four occurring over the five-year period 1993 to 1997. Most scalds are from hot water especially from hot beverages and hot tap water, but they can also be caused by steam. For children under five years, scalds from hot drinks and beverages are the leading cause of injury (33%). Other significant causes of young children being scalded are hot tap water (18%) and jugs/kettles (16%) (Safekids, 2002a).

One of the groups most at risk from scald injury in the home are children under five years (M2 Presswire, 1998). A recent media report stated that 640 children are hospitalised for burns and scalds each year in Aotearoa/New Zealand, 80 percent of whom were 'under five-years old' (stuff 2002). In the *New Zealand Herald*, a plastic surgeon claimed that 'the equivalents of 20 classrooms of children' were admitted to hospitals annually due to burns, which 'were most often scalds' (Mold, 2002).

A study in the Eastern Bay of Plenty of child injuries (1992-95) found that most burns to children occur in the home environment. Two-thirds of child thermal injury hospitalisations were the result of contact with hot liquids. Hot beverages accounted for 32 percent of these burns compared with 19 percent from hot tap water (Ministry of Health, 1998). An Auckland study found that burn and scald injuries between 1995 and 1998 in the Auckland region hospitalised 639 children. These burns were serious



and the children were, on average, hospitalised for one week. It was discovered that hot liquids and substances, such as hot water from beverages, kettles, taps and baths, caused three-quarters of child thermal injuries. Toddlers were most at risk from burns and scalds with over one-third of all injuries involving one year olds. The vast majority (78%) of those burned and scalded were pre-schoolers (Safekids, 2002c)

## **2.2 Hot Beverage Scald Prevention: A Challenge**

As has been highlighted earlier, scalds in children from hot liquids are mainly a problem for under five year olds. Although the most common scalds are those from the hot content of cups, there is a paucity of literature addressing prevention strategies for hot beverage scalds in under-fives. The literature acknowledges that preventing scalds in children remains a challenge and that scalds from cups present particular difficulties in prevention. As Kemp and Sibert (1995) have pointed out, it is difficult to see how an environmental solution such as specially designed cups would be practical or acceptable.

Eadie and colleagues at the Welsh Centre for Burn and Plastic Surgery found that the numbers of scalds between 1956 and 1991 had not fallen, although the pattern of these injuries had changed. Hot water from teapots caused one-fifth of the injuries in 1956. In 1991 hot liquid from cups caused almost half the scald injuries compared with less than one in 10 cases 35 years ago. This reflects current fashion for making hot drinks with instant coffee and tea bags in cups rather than in pots (Eadie et al, 1995).

Under the article title 'Preventing childhood burns' the American *Parents* magazine reported Dr. P Simon's recommendation stating, 'Don't let your child sit on your lap when you're holding a mug containing a hot beverage such as coffee or tea; it might grab it. Whenever a child is nearby, place your hot beverages in the centre of the table, where it is out of reach' (Parents, 1994). In Aotearoa/New Zealand a study investigating the circumstances of 64 scald injuries to children under five found that in almost all cases an adult was supervising the child and in 59 percent of cases the

supervising adult saw the injury event. The authors commented on the general lack of awareness of the hazards of hot liquids, such as tea and coffee and stressed the need to promote public and parental awareness of the hazards of hot liquids (Langley et al., 1981).

In addition to ‘spill scalds’, which account for most of the burn injuries in the paediatric population, the risks of microwave heating of food and infant formula are not trivial. There is no good reason to heat infant formula. Formula and other foods may be served at room temperature. Infant formula and microwave ovens should be appropriately labelled and more attention should be given to flyers and anticipatory guidance regarding this problem. Convincing people to limit the use of microwaves is difficult. Therefore, it must be emphasized repeatedly that, whereas the *bottle* may feel warm, but the *formula* may be hot. All food or liquid heated in the microwave should be tested by the caregiver, prior to presentation to the child (Hibbard & Blevins, 1988).

Many researchers agree with Kemp and Sibert (1995) and Hibbard and Blevins (1988) on the difficulty developing injury prevention recommendations for hot liquid scalds. A representative of the Child Accident Prevention Foundation also remained pessimistic about the ability of safety education to modify behaviour. Noting that for safety public communication campaigns to be effective they must be simple and continuous, and directed at the “right” people. Public Health Nurses also argued that posters and pamphlets targeted for parents as a part of public communication campaigns were the most effective strategy (Podmore & Lealand, 1990:77-78).

The British book *Safety in the Home* by Baldwin and Lister (1986: 18) claimed that ‘[m]ore than half of all scalds happen because hot liquids are passed over children’s heads’. This is not mentioned in any Aotearoa/New Zealand preventative literature and may be the result of different housing design and living conditions between the two countries. However, if such actions are major factors in hot beverage scalds, then the Aotearoa/New Zealand literature fails to note this entirely, instead focusing on the

holding of children (or not holding children as is the desired case) while drinking hot beverages.

### **2.3 Making Prevention Happen**

Modern approaches to injury prevention are grounded in a public health framework that considers an injury to be the product of the interaction between an individual, the agent or object that causes injury, and the physical and social environment. For decades, most efforts to prevent injuries among children have focused on public education strategies that require individuals to take active steps to change their behaviour. These strategies are based on the premise that when parents and children learn how to prevent injuries, they will alter their behaviour to do so.

An Internet search revealed that most organisations continue to base strategies upon this premise. For example, the American Burn Association recommended the following tips to prevent scalds from food and beverages. Never drink or carry hot liquids while holding or carrying a child. Quick motions (reaching or grabbing) may cause the hot liquid to spill, burning the child or adult. Do not make hot coffee, tea or hot chocolate in a mug the child normally uses. Consider using mugs with tight-fitting lids, like those used for travel, when children are present. Do not place hot liquids on low coffee or end-tables that a young child can reach. Never heat baby bottles of formula or milk in the microwave, especially those with plastic bottle liners. When the bottle is inverted, plastic liners can burst, pouring scalding liquids onto the baby. Always mix the formula well and test on the back of a hand or inner wrist before feeding (Storknet, 2002). Although all the safety tips outlined above are valid, they solely depend on individual behaviour modification.

However, many of the most notable advances in injury prevention have occurred through changes in the environment rather than changes in individual behaviour. For example environment or product modification increased safety by altering childrens' physical surroundings and changing the design of toys and other consumer products

that children use, such as cribs and high chairs. In general, passive environmental strategies, including product modification by manufacturers, are the most effective as they provide automatic protection to large groups of people, including those least likely to undertake 'active' measures (Karlson, 1992).

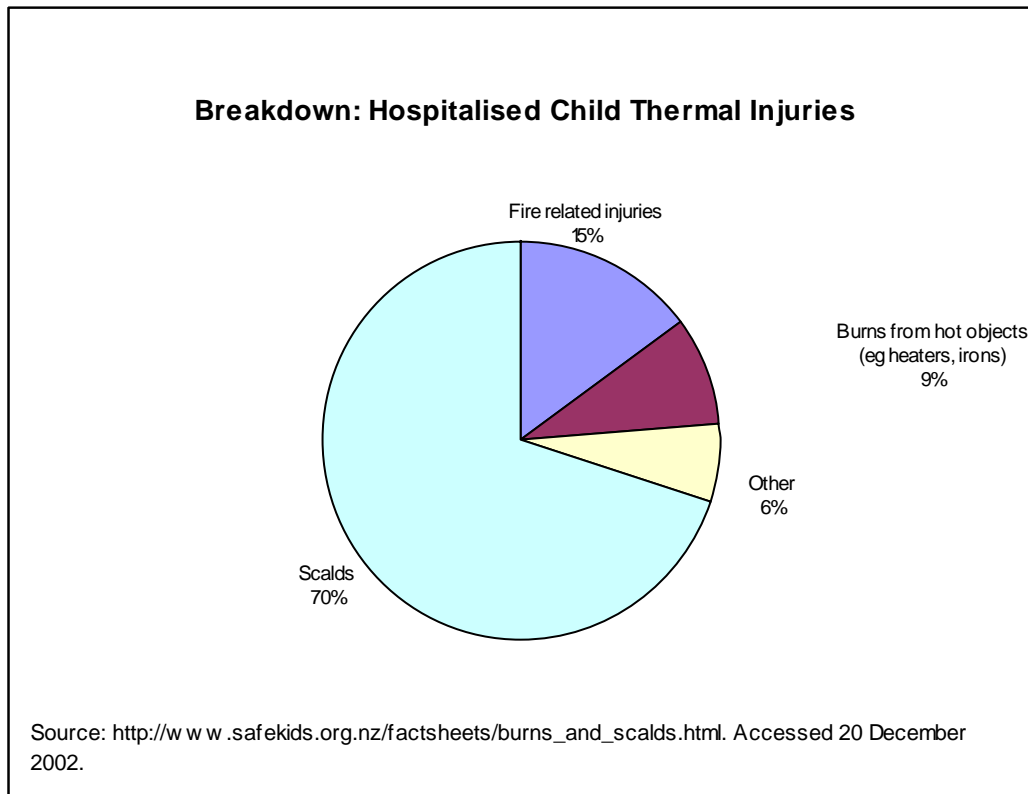
Severe burns to children from scalding tap water have been reduced using passive environmental strategies such as legislation requiring hot water cylinder temperature not to exceed 55° Celsius. There is tremendous potential to further reduce childhood injuries by more widely implementing strategies to make children's physical environments safer.

## **2.4 Aotearoa/New Zealand Literature**

In Aotearoa/New Zealand the Accident Compensation Corporation (ACC), the Royal New Zealand Plunket Society, Safekids, the Ministry of Health, and other organisations actively promote child accident prevention. The *Safekids* New Zealand website shows that scalds are *the* major cause of hospitalisation of children from thermal injuries, as graphically illustrated on the following page;

The 'burns and scalds fact sheet' explains that '[n]early half of all scald hospitalisations (where the source of hot water is specified) are from hot beverages', of which 80 percent will be 'under the age of five' (Safekids, 2002b). In contrast to the incidence of hot beverage scalds, Safekids report that only one quarter of scald hospitalisations arise from hot tap water temperature. Being mindful of this comparison, selected public education material are reviewed later in this research to determine whether the preventative emphasis reflects the incidence of children hospitalised because of hot beverage scalds.

**Figure 2.1: Breakdown of Hospitalised Child Thermal Injuries**



The Safekids organisation is a division of Auckland’s Starship children hospital. Their mission ‘is to reduce the incidence and severity of unintentional injury to children in New Zealand’ (Safekids, 2002d). Safekids’ philosophy for action is detailed in *Keeping Kids Safe, in the home, on the roads, at play: A five year strategic plan to reduce our children’s risk of unintentional injury* which spells out the four basic tenets of the Ottawa Charter<sup>1</sup>. The first is that injuries do not happen by accident, because they are predictable and therefore preventable. Also, the safety of children depends largely on the safety of their environments – both at home and in the community. Children are to a large degree dependent on adults to create these safe environments. Finally, parents and caregivers cannot do this alone, keeping kids safe is a community responsibility.

<sup>1</sup> The Ottawa Charter was a change of focus from a curative to a more preventative health care approach. For more information see the World Health Organisation website: [http://www.who.dk/AboutWHO/Policy/20010827\\_2](http://www.who.dk/AboutWHO/Policy/20010827_2)

Providing information is not enough. Effective prevention must address the practical barriers families and communities face in keeping children safe and creating safer environments (McCracken & Kokotailo, 1995: 64)

The Safekids strategic plan also discusses the incidence, severity and prevention of scalds. Hot beverages scalds are identified as the 'key issue' to be addressed ahead of other burn and scald interventions. A change is called for within traditional and accepted family practices and there are suggested activities that advocate a cyclical 'hot water burns like fire' advertising campaign. Also suggested are the development and delivery of effective public education materials, the design of child resistant cups or mugs, or a reduction in hot beverage temperatures by adding more milk or cold water or the development of an early cut-off kettle (McCracken & Kokotailo, 43-44).

The Ministry of Health (MOH) published a kit *Nga Kupu Oranga Healthy messages: a health safety resource for early childhood services* (1997) for health safety in early childhood care. This offers a four-step program for child accident prevention: constantly check the child's environment for hazards; recognise the risk to different children; identify ways to remove or control the hazard and take action so that this becomes part of daily practice. On hot beverage scalds they specifically offer the advice that '[b]abies who are not yet mobile are often scalded while they are carried and held. Their arms move quickly and knock things that are held. Burns from hot drinks happen easily at this stage' (MOH, 1997). This advises caregivers about the risks so that the hazard is at least recognized, without offering any non-behavioural solutions. In regard to controlling or removing hazards the MOH suggests that children are kept out of kitchen areas when hot food or beverages are prepared, and that staff consume hot drinks away from children. They also recommend that the temperature of hot food and drinks be tested before being given to children.

The Child Safety Foundation of New Zealand offers similar advice about scald hazards to children (<http://www.childsafety.co.nz>). Among the scalds/burns

information the following points are raised in direct relation to hot beverage scalds, most of which require a behavioural change: 'teach children about what 'hot' means', 'keep hot drinks and food away from edge of tables', 'use table mats instead of table cloths', 'it is dangerous to carry your child and hot liquid or food at the same time', 'ensure food and liquids are cooled down before being given to a child'. The Child Safety Foundation also encourages early childhood centres to join the Kea Kaha safety club, which is committed to teaching 3-4 years old a wide range safe behaviour. The Child Safety Foundation are due to release a kit on scald prevention in May 2003.

The Accident Compensation Corporation report *Hazardous Environments: A New Zealand Study of Early Childhood Injury Prevention* (Podmore & Lealand, 1990) surveyed parents and early childhood centre staff, reporting a much greater awareness of hot tap water and stove top scalds than of hot beverage scalds. Of the parents 94% responded that they were aware of preventative strategies in regard to 'jugs, kettles, and stoves', compared to only 33% responding that they were aware of preventative measures to do with hot beverages. The early childhood centre staff showed a greater awareness (48%) of hot beverage scald prevention (Podmore and Lealand, 1990: 91). Awareness of hot tap scald injury prevention among parents is greater than knowledge about hot beverage scald prevention. The report goes on to recommend a 'publicity campaign' to 'improve public awareness of the need for caution with hot beverages including tea, coffee, hot chocolate, and soup, to reduce thermal injuries to infants and young children'. The authors suggest a 'co-ordinated implementation approach' from major agencies and institutions, such as ACC, the Ministry of Health, and other relevant 'health and education groups' (1990: 107).

David Geddis (1985) in *Let's Play it Safe* highlights the terrible consequences of burns and scalds to children. He notes that water from the tap is not the only hot liquid to be a problem to young children. Very young infants reach out for everything and having a baby on your knee while you enjoy that cup of tea or coffee is running the real risk of having that baby end up in hospital. No matter how careful you are *most of the time* it only takes your attention to be distracted for a split second during which time the

baby could easily pull the contents of the cup all over herself. However, there are no passive measures recommended to reduce the incidence of hot beverage scalds unlike other scald hazard passive preventative measures, such as stove guards, shortened jug cords, and reduced hot water cylinder temperatures.



### 3.0 Hot Beverage Temperatures

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The hot beverage scald hazard may well be increased with the greater use of instant tea and coffee as the use of percolators and teapots has diminished. Eadie and colleagues (1995, see section 2.2) state that the pattern of these injuries has changed because of the current fashion for making hot drinks with instant coffee and tea bags in cups rather than in pots.

The researchers thus performed some tests to determine the differences in hot beverage temperatures between percolated coffee, and instant coffee; and between tea made in a pot and with tea-bags in a cup. It was found that in these tests with the water boiling for 15 seconds before being poured, that the temperature of instant coffee was 84°C eight seconds after being removed from the element. Four seconds later 30mls of milk from the fridge was poured, bringing the temperature down to 69°C. After four minutes of standing at room temperature (25°C) the instant coffee dropped further to 62°C. The same process as used for instant coffee was adopted for tea-bags, where the initial temperature at pouring was 83°C, which declined to 73°C after adding milk. For percolated coffee a full pot of 10 cups was made with one cup being poured as soon as it had percolated. This was 15 seconds after it stopped percolating. The initial temperature was 73°C, which dropped to 62°C after adding milk, and after four minutes it declined to 59°C. A teapot was used with two tea bags and a litre of water, which boiled for 15 seconds. The teapot was then left to sit for 3 minutes and 15 seconds with the tea having an initial temperature of 79°C. After adding 30mls of milk the temperature fell to 68°C.

One researcher and an assistant then tested the temperature for palatability. The researcher found that 65°C was a comfortable temperature to begin consuming the hot

beverage with it becoming unpalatable at 52°C. The above tests illustrate that although the temperatures were different, all of the recorded temperatures are an extreme danger for scald injuries. This statement is based upon information received from the Waikato Burns Support Trust, and the Injury Prevention Unit (IPRU, 1997), Dunedin School of Medicine, both of which report 60°C as the lower threshold of the high danger zone where scalds can occur in a matter of seconds. What must be noted is that extra caution is still needed because scalds still occur below this temperature, where beverages were within the comfortable drinking range (between 52°C – 65°C). The above temperature range for scalding does not account for children's skin being more sensitive and therefore more susceptible to higher degree burns over shorter time periods.

## 4.0 Methodology

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This research involves a selective, rather than a comprehensive content analysis of ‘child safety in the home’<sup>2</sup> public education material and exploratory interviews with expert key informants. Recent Aotearoa/New Zealand public education materials were selected for evaluation based on the criteria that the material was recent, widely available and accessible to the general public, and part of a public communication campaign aimed at child accident prevention. The results of the content analysis were then used to format the expert informant interview schedule and focussing the primary research questions. Reflecting the research proposal’s goal, the passive and active measures for hot beverage scald prevention were compared to the passive and active measures for other scald hazards, to see whether hot beverage scald prevention was equally identified in the material. To achieve this, an examination of the public education material using content analysis, was undertaken.

Four expert informants were selected from key agencies within the injury prevention field for interview. The informant’s employment position and their organisation are listed here: Health Promotion Specialist from the Injury Prevention Research Unit, Dunedin School of Medicine, Otago University; National Child Safety Advisor, Royal New Zealand Plunket Society; Field Officer, Waikato Burns Support Trust; and Programme Manager, Injury prevention and Client Services (primary responsibility is for child safety), Accident Compensation Corporation.

## **4.1 Methods**

### **4.1.1 Primary Research Questions**

Initially the two primary research questions were developed in relation to the content analysis, these were:

- What passive and active measures are suggested to reduce hot beverage scalds to under five year olds in public education material?
- How is information presented in the area of hot beverage scald prevention in public education materials for ‘child safety in the home’?

Two additional primary research questions were designed for the development the expert interview schedule, these were:

- How do individuals knowledgeable on the topic of burn injury prevention view existing public education materials regarding hot beverage scald prevention?
- What are the challenges and barriers to effective hot beverage scald prevention in under-fives?

## **4.2 Content Analysis**

Content analysis as a technique enabled data to be gathered about the passive and active measures contained within public education materials. The materials reviewed included booklets, posters, and videos. The goal was to identify the information available in relation to the passive and active preventative measures for hot beverage scalds in comparison to other scald injuries.

The preliminary search was undertaken in three stages. Firstly a broad range of safety/accident materials was collected. Secondly, the material was examined for suitability for this research. Thirdly, the criteria for material selection were established. These criteria outlined that the material had to contain information about burns/scalds in the home related to children, and had to be available to the general public in Aotearoa/New Zealand. In addition the material needed to be part of a public communication campaign, directed towards child accident prevention.

By using the above mentioned criteria, nine materials were selected for content analysis. The selection comprised five booklets, two posters, and two videos. A summary presentation of these materials is provided in Appendix One (see pages 32-35).

The content analysis of the selected public education material was undertaken on the premise that hazards need to be identified, eliminated if possible, or isolated if they were unable to be eliminated. The first criterion, was the identification of the hot beverage scald hazard and other scald hazards in the material. Once these had been identified the material was examined to determine whether measures had been suggested that eliminated the hazard(s). For those hazards that could not be eliminated we then considered hazard isolation measures.

The isolation of the hazard was examined using an approach where isolation measures were deemed to be either passive or active. Passive measures are those that require little or no behavioural adjustment, as a permanent intervention can be applied to isolate the hazard. Active measures, on the other-hand, are those that require ongoing active behavioural adjustment.

We compared hot beverage scald information in the material with other scald information, using the questions outlined below, that were reduced to a 'Yes' or 'No' response. A copy of the content analysis form is included in Appendix Two (see pages 36-37)

- 1) Was the hot beverage scald hazard identified? Yes / No
  
- 2) Were other scald hazards identified? Yes / No
  
- 3) Have preventative measures been suggested to eliminate the hazards? Yes / No
  - For hot beverage scald and other scald hazards
  
- 4) Are measures suggested to isolate the hazards? Yes / No
  - For hot beverage scald and other scald hazards
  
- 5) What active measures have been suggested to isolate the hazards? Yes / No
  - For hot beverage scald and other scald hazards, measures were compiled from the material and then listed with a yes / no response
  
- 5) What passive measures have been suggested to isolate the hazard?
  - For hot beverage scald and other scald hazards, measures were compiled from the material and then listed with a yes / no response

To develop categories applicable to all the materials the researchers identified expressions that conveyed the same information. For example the message '[k]eep hot drinks out of children's reach and make sure any visitors do the same' was aggregated with the message '[p]ut hot drinks well out of reach of grabbing hands' into the category 'keep hot drinks out of children's reach'. In other cases message appeared similar but actually conveyed different information. Examples of these messages are 'avoid holding hot drinks while holding baby' and 'keep hot drinks away from baby'.

Here the former refers to a specific and present risk while the latter warning refers more generally to the risks of having hot beverages around babies, not *just* while they are being held. Due to this, the researchers decided to retain separate categories in this and other cases, which have been presented in the tables on the following pages.

**Table 4.1: Hot Beverage Scald Content Analysis**



**Table 4.2: Other Scald Hazards Content Analysis**

#### 4.2.1 Content Analysis Results

Of the eight materials surveyed, seven distinctly identified the hot beverage scald hazard. Measures to eliminate the hazard were not found in any of the materials. A combined total of 14 active isolation measures were found in the eight materials however all materials suggested at least one active isolation measure.

For hot beverage scald prevention (see Table 4.1) eight active isolation measures were identified compared to a single passive isolation measure. In regard to the educational material, one item listed four active measures, two of the materials listed three, one item listed two and four items featured only one active isolation measure. The eight active measures suggested were 'keep hot drinks out of children's reach' (4/8), 'keep hot drinks away from baby' (3/8), 'avoid holding baby while holding a hot drink' (2/8), 'test the temperature of hot food and drinks' (2/8), 'Use place-mats instead of table cloths' (2/8), 'take care with microwave heating' (1/8), and 'ensure visitors are aware of the hazard' (1/8). One of the materials suggested the single passive measure which was 'put tablecloths away, they can be pulled'.

Other scald hazards were identified in all of the materials (see table 4.2). Seven out of eight identified at least three other hazards in common, these were 'hot water temperature', 'kettles and jugs' and 'stove-tops'. One of these seven also identified 'microwave ovens' as an 'other' scald hazard. The remaining piece of material identified only one 'other' hazard, which was hot water temperature. None of the materials suggested any measures to eliminate the hazards. In regard to isolation, they all recommended isolation measures. There were active isolation measures suggested in six of the eight materials. These are expressed as above out of the total of eight, 'Supervision' (4/8), 'Turn pot handles to rear' (4/8), 'Use back element' (3/8), 'Use cold water first, in baths' (3/8), 'Keep hot things out of reach' (2/8), 'Refill kettle with cold water after use' (2/8).

All of the materials suggested passive measures to isolate ‘other’ scald hazards. These measures were, ‘Keep hot water below 55°C’ (7/8); ‘Use short/curly cords’ (7/8); ‘Use stove-guards’ (6/8); ‘Use child resistant tap surrounds’ (1/8); ‘Jug holders/wide base jugs’ (1/8); ‘Bench top guards- to stop jug being pulled’ (1/8). Of these measures, three were commonly suggested in six of the materials, these were ‘keep hot water below 55°C’, ‘use short or curly cords’ ‘use stove-guards’.

The three most common passive isolation measures are suggested for the three most common ‘other’ scald hazards. That is, hot water temperature can be reduced to below 55°C, electric jugs and kettles can have their cords shortened and stove-tops can have guards installed to stop pots being pulled or knocked onto children. The number of passive measures that could be deployed to isolate the ‘other’ hazards is a considerable contrast to those suggested to isolate the hot beverage hazard.

### **4.3 Expert Informant Interviews**

Open-ended questions were used to conduct the interviews in a semi-structured manner with the interviewer probing for more detail to elicit additional information. Questions one and six were general questions, while two to five were specific and related to the findings from the content analysis of the public education material. The full interview schedule is provided in Appendix Three (see page 38).

#### **4.3.1 Interview Analysis**

*How to reduce hot beverage scalds to children aged 0-5 years.*

The research participants agreed that the hazard cannot be entirely eliminated and that there are difficulties in isolating the child from the hazard. Continuing parental vigilance (not children’s education) is required to isolate the hazard. Raising awareness of the hazard and the severity of its impact upon scald victims was seen as the way to reduce the incidence. However, there was no consensus over how this

could be achieved. The preferred method of delivering the preventative message was varied amongst the interviewees. One respondent felt that child health professionals, who interface directly with parents and caregivers, were in a good position to assist preventative education. Another felt that ‘people need to *see* what a hot beverage can do to a child’ through the use of photographs.

*Why there are few passive measures to isolate the hazard*

All participants acknowledged that there were no passive measures that are effectively deployed to isolate the hazard. There was recognition that the drinking of hot beverages is an embedded socio-cultural practice, which is a part of people’s everyday lives. One respondent commented that ‘there was nothing you could do about it because it was the people’. Some suggested permanent measures such as child-safe cups were deemed as socially unacceptable, with a suggestion that further research might indicate why people are resistant to using such devices. In this respect, one respondent advised that parents with children who socialised with other parents, would be more likely to be aware of the hazard, and perhaps use those devices, than those who socialised with adults without young children. Also, parents who had some type of scald experience were more likely to be receptive to the use of such passive devices. However, the hazard was not widespread enough for all parents to be able to apply personal or closely related experiences. Another barrier to the use of any passive device is the cost, which may exclude some socio-economic groups. Aside from the issue related to cost, there are difficulties in developing passive measures to isolate this hazard, because of its nature.

*The effectiveness of preventative messages that require behavioural change.*

Active messages that require behavioural adjustment by parents and caregivers were seen as only partially effective by three of the respondents and ineffective by one respondent. The latter respondent felt the messages were ineffective and needed to be more ‘hard-hitting’, because people thought that a hot beverage scald is ‘never going to happen to them’. Another respondent questioned the use of ‘shock tactics’ because it may ‘turn a whole lot of people off’. The incidence of harm occurring due to hot

beverage scalds is relatively low across the total population, which also may undermine the message's effect. There is a hierarchy of messages, which means that those messages conveying information about low-incidence events may not be taken notice of over messages pertaining to more regular and prevalent incidents. Messages also had to be reinforced socially, commented one respondent, which may not be as 'easy as it used to' and depended upon 'social climate', 'extended family' or 'peers'. This acknowledges that there is a spectrum of parental vigilance which is not only dependent upon parents and caregivers, but also dependent upon the wider social context of each and every family. One respondent also recognised that the delivery of the messages needed to be in a realistic not idealistic context, particularly when considering some messages are more practical to implement than others. The Accident Compensation Program Manager commented that they had done research that showed ACC was perhaps not the best organisation to deliver the message because some New Zealanders viewed it as 'big-brotherish'.

*Any other permanent interventions?*

Besides drinking from a specially designed cup with a safety lid, the respondents did not suggest any practical passive measures that could isolate the hazard. There were suggestions about furniture design and the creation of safe areas where children may not tread. However these suggestions were dismissed as needing active monitoring, and also relied upon an idealised situation. In regard to a child-safe cup, besides the previously mentioned social unacceptability, there was a concern expressed by one respondent that the hazard could then be shifted from the child to the adult. This was due to lidded cups keeping the beverage much hotter than those usually consumed from an uncovered cup (this needs further investigating).

*Are there any semi-passive measures that may warn of the danger?*

Heat sensitive warning devices, such as a sticker, label or transfer that indicated a beverage was too hot to drink, were seen as problematic. One respondent referred to 'thermamatic cards' that were distributed by ACC some years ago to test the temperature of hot beverages. Another respondent felt that because of the difference

in thickness of skin between adults and children and even amongst children of different ages, indicating a temperature would be a ‘contentious issue’. This would require a level of knowledge that not all parents/caregivers possess. Also, a safe temperature would be below that which could be comfortably consumed, a hot beverage would thus become ‘unpalatable’ if left too long. There was concern about the reliability and accuracy of the technology used in such heat sensitive warning devices, particularly over time. The ACC representative had investigated similar devices for use in baths. In this instance the manufacturer could not guarantee reliability over one year, which would initially ‘increase awareness and decrease the risk’ which could then give a false sense of security ‘after the first year’, in turn increasing the possible risk. Another respondent felt that for hot beverage scald prevention that passive measures should be out of our ‘range of thinking’ because if they are not ‘fool-proof’ then there is always the possibility that ‘we program the vigilance out of people’.

*Any other knowledge or advice?*

All respondents indicated that hot beverage scald prevention could *only* be effective through active measures that require ongoing awareness and behavioural adjustments. Media exposure was seen to have a definite affect upon raising consciousness, through advertising such as the ACC campaign ‘Hot water burns like fire’ but also through incidents reported in the news. From another perspective, health-care workers, such as Plunket and Karitane nurses were in a position to directly influence parents/caregivers of young children, with a suggestion that a reminder sticker is put in the *Well Child Health Book* to be used as a prompt a particular intervals. One respondent also raised the question of whether behavioural change had been sustained over longer periods of time, which would require some ‘long-term evaluation’.

### **4.3.2 Interview Analysis Results**

Throughout the interviews it became apparent that an awareness of the hazard and its impact combined with continuing parental vigilance was required to reduce the incidence of hot beverage scalds to children. It also appears that passive or permanent measures cannot be relied upon because of the effect they could have in undermining parental vigilance, the unreliability of some measures and also the inaccuracy of some 'warning' technologies. Therefore passive measures should be ruled out of consideration for prevention of this hazard. In regard to active measures there was no consensus on how these should most effectively be deployed. A synthesis of the various positions would be required, perhaps beginning with a co-ordinated approach amongst agencies who would need to deliver the message in a multi-dimensional manner, such as: publicity campaigns delivered by the most appropriate agencies, probably from the health sector; and ongoing reminders to parents and caregivers of young children are also required but the wider social cohort needs to be aware that this is not just a parent/caregiver responsibility.

## 5.0 Discussion

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In Aotearoa/New Zealand one-quarter of scald injuries to under-three year olds are caused by hot beverages. The importance of improving safety practices in order to reduce scald injuries to under five year olds, was highlighted in the literature. The results from both the content analysis and the expert informant interviews support the researchers' informal hypothesis that there would be limited suggestions provided regarding hot beverage scald prevention. The content analysis indicated a dearth of passive measures that could permanently and effectively isolate the hot beverage scald hazard, especially when compared to the passive measures suggested that permanently isolate other scald hazards. The sole passive measure suggested for hot beverage scald reduction was to 'put tablecloths away' whereas the other scald hazards had a total of eight passive measures suggested, proposing permanent solutions ranging from turning hot water temperature down to the use of stove-guards.

Information from the expert informant interviews highlighted that passive measures in the instance of hot beverage scalds, should be ruled out of consideration. This includes the use of heat sensitive devices, which may become unreliable over time, or which may undermine parental vigilance. From the results of this research it can be argued that there are no passive measures that either effectively eliminate or isolate the hot beverage scald hazard to under five year olds. This lack of passive measures only leaves active measures which require behavioural adjustments. The interviews also advised that some active measures suggested in the public education material were unrealistic and relied upon ideal situations. For example, a suggestion such as 'keeping hot drinks out of children's reach' needs to be in a realistic not idealistic context. It is not always possible to separate children from the physical location where hot beverages are consumed. It is unreasonable to expect that hot drinks could be separated from everyday life because of the embeddedness of consuming hot



beverages as an important socio-cultural practice. When designing public communication campaigns and educational materials, these points need to be considered.

Public communication campaigns are an attempt to shape behaviour toward desirable social outcomes (Weiss & Tschirhart, 1994). The outcomes of those behaviours may include healthier individuals, families, and communities. Communication designers have begun to diversify their strategies and abandon the notion that information alone is the cure-all for society's behavioural ills. Therefore, campaigns should no longer be based on the flawed notion that people would improve if they just knew better. Campaigns must give attention to context and linking traditional media and behaviour change strategies with on-the-ground community action to make the social environment more supportive of the desired campaign results. Dungan-Seaver (1999) has shown that public communication campaigns feature not only communications through media channels. They coordinate media efforts with a diverse mix of other media types, some interpersonal and others community-based in order to extend the reach and frequency of the campaign's messages increasing the probability that messages will successfully result in a change.

Therefore, it is not enough to convey knowledge through public communication strategies that require individuals to take active steps to make individual behavioural adjustment. Continual reinforcement of messages needs to occur to facilitate this ongoing individual change. Regular and repetitive media and educational campaigns impressing the need for vigilance from all adults with hot beverages may be strengthened by the use of warning labels. Research into the effectiveness of product warning labels has shown that they may assist in reinforcing public education messages, providing information to people who may not access public education materials, while encouraging health professionals to remind clients. In addition, warning labels inform the public of the dangers of drinking hot beverages and raise the visibility and subsequently awareness of the hot beverage scald hazard (Polowchena, 2002).

## 6.0 Conclusion

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Hot beverage scald hazards cannot be eliminated as the practice of drinking hot beverages is an embedded socio-cultural practice, which the researchers believe that few if any parents or caregivers would be willing to renounce. This contrasts with other scald hazards, some of which can be isolated through permanent passive interventions. In regard to hot beverages there are no passive measures that effectively eliminate or isolate the hazard, leaving the preventative advice reliant upon behavioural adjustment messages. Active measures need to create awareness of the hazard and its severity, and also need to reinforce the need for continuous parental/caregiver supervision and vigilance. One way to address this would be through regular repetitive media and educational campaigns focusing upon the need for vigilance of all adults consuming hot beverages in an environment where children are present. This message could be strengthened when combined with the use of warning labels that highlight the hot beverage scald hazard in various locations, such as on percolators, teapots, kettles, product packaging, cups, fridges and so forth. Following the tests of hot beverage temperatures and keeping in mind the changing pattern of consumption from traditionally prepared to instant hot beverages, the need for a practical solution is ever more pressing.

## Appendices

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### Appendix One: Summary Presentation of Material Selected for Content Analysis

This section provides a brief review of the public education materials selected for content analysis. Each source is headed by its bibliographic details, followed by a descriptive review of the scald prevention content.

- Accident Compensation Corporation NZ (2000) *Making your home child safe*. Wellington: Accident Compensation Corporation.

The ACC booklet *Making Your Home Child Safe* (2000) recommends that hazards are identified, removed or negated if possible. In regard to parental supervision, ACC states that it is not only a matter of ‘being there and being aware’ but also of ‘being a good role model’. There is a section on hot water, food and steam scalds, here active and passive measures are suggested for avoiding hot beverage spillage’s. These are, ‘[a]void drinking hot drinks while you’re holding a baby’, [h]ot drinks should only be warm’ and passive measures such as the use of place mats over tablecloths to avoid children pulling ‘hot food or drinks down on top of them’ (ACC, 2000: 8).

- Accident Compensation Corporation (2001). *A Child Safe Home for Under Fives: preventing injuries to young children*. Wellington: Accident Compensation Corporation.

*A Child Safe Home for Under Fives: preventing injuries to young children* offers similar advice to the above pamphlet with some additional advice that hot drinks are kept ‘out of children’s reach’ ensuring that visitors are aware of the hazard. In regard to passive measures there is a section on ‘things you can

do right now’, and a ‘shopping list’, neither of which include any hot beverage scald interventions.

- The Royal New Zealand Plunket Society. (1989). *Confident Caring for Kids* (Video). New Zealand: Royal New Zealand Plunket Society.

*Confident Caring for Kids* (1989) states that ‘most childhood injuries happen in the home’ and that ‘as a caregiver you can make the difference if you can concentrate on the simple things’. Regarding hot beverage scalds, a man is shown picking up a child and placing it beside a safely guarded fire, then showing the child crawling across the floor to a coffee table and pulling a hot jug over itself. A written message at the end of the scene states that ‘[m]ost non-fatal burns in children under 5 years occur in the home. Most of these are caused by contact with hot objects or liquids. Hot tap water and baths are a frequent cause of burns in young children’ (Plunket, 1989).

- The Royal New Zealand Plunket Society. (1993). *Your guide to preventing children’s accidents*. New Zealand: Royal New Zealand Plunket Society.

The booklet *Your Guide to Preventing Children’s Accidents* outlines a three-step method for dealing with accident prevention;

1. Spot the dangers
2. Decide how to deal with the danger
3. Make the changes

More specifically, regarding scald prevention the booklet details different preventative measures depending on the age of the child. For baby safety, Plunket recommends that hot drinks are kept ‘well out of reach of grabbing hands’ and that tablecloths are ‘put away [because] they can be pulled’. While for toddlers and pre-schoolers there are no suggested interventions to reduce

hot beverage scalds, although it did recommend the use of short or curly cords for jugs, keeping kettles out of reach and using the back stove top elements or a stove guard.

- The Royal New Zealand Plunket Society. (1993). *Kid's Safe [poster]*. New Zealand: Royal New Zealand Plunket Society.

This poster illustrates a cross-section of a house demonstrating various household hazards. A picture of a woman holding a baby and a crossed out hot beverage is accompanied by the message '[k]eep hot drinks away from baby'. Other scald prevention advice is illustrated with messages such as; 'use short or curly cords', use the back element. Fit a stove guard', keep hot water below 55°C.

- The Royal New Zealand Plunket Society. (1993). *Keep kids safe = Pupuri tia nga tamariki mo te ora.*(video). New Zealand: Royal New Zealand Plunket Society.

The *Keep kids safe* (1993) video shows 'simple steps' to prevent unintentional injury to children in the home. Demonstrated in this are passive measures, such as a jug cord being hooked up and pot handles being turned away from the front of the stove. The scene then shifts to the parent placing a hot beverage on the floor (where a child is sitting), the parents attention is distracted by the doorbell which allows the child to burn itself. The written message following this scene iterates that parents should 'Keep hot things away from children, use a fire guard, hook cords out of reach and turn pot handles away, hot water temperature [from the tap] 55°Celsius', and that it takes 'seconds to burn [and] 10 minutes to cool (Plunket, 1993).

- Ministry of Health (2002). *Well child, Tamariki Ora, health book*. Wellington: Ministry of Health.

This child health booklet contains a safety section where advice is provided on burns, fires and scalds. This first point is in regard to baby's food and drink' temperature, warning new parents to 'take care with microwave heating as food can heat unevenly'. It also advises parents to keep 'all hot things out of reach' but does not specify the hot beverage hazard. The remaining scald prevention points are non-hot beverage scalds related, noting jug cords stove guards and pot handles, and hot water cylinder temperature being under 50°C (pp.42-3). Illustrated in the section 'Family Relationships', are three adults and three children in a social setting, with each adult having what appears to be a hot beverage. One of the adults is in a precarious position sitting on the floor, where the drink could easily be spilled by the child playing immediately in front of her (p. 25). This type of message contradicts the creation of a safe environment for children.

- Ministry of Health (2002). *Protect us from hot water* (poster). Wellington: Ministry of Health.

The title of this poster is its only text, which is then illustrated with various pictures of 'safe' behaviour around hot water hazards. Regarding hot beverages there is a scene with a woman seated at a kitchen table holding a hot drink with a young child seated at a high chair. The table has a steaming teapot and two cups placed near its centre. Another child is at the side of the table, but is out of view of the adult because she has her back turned from the child. Also illustrated are, hot running bath with a child under direct supervision; a child standing beside a stove which has its handles turned towards the rear (but missing a stove guard); and of a child standing beside a kitchen bench on which stands a boiling kettle which has its cord hooked up out of the child's reach.

## Appendix Two: Content Analysis Schedule

<u>Child Accident Prevention Foundation New Zealand</u> <u>Hot Beverage Scald Burns and other Scald Burn Content Analysis</u>				
Material id:	_____			
Title:	_____			
Material type	_____			
Organisation:	_____			
<ul style="list-style-type: none"><li>Who is targeted by the communication? (please circle)</li></ul>				
Parents	Caregivers	Educators	Children	Other _____

### Hot Beverage Scalds

<b>Criteria one: Hazard identification</b> <ul style="list-style-type: none"><li>Has the hot beverage scald hazard been identified? Yes / No</li></ul>
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<b>Criteria two: Hazard elimination</b> <ul style="list-style-type: none"><li>Have preventative strategies been suggested that eliminate the hazard? Yes / No</li><li>If so, what are these measures (please list) _____ _____</li></ul>
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<b>Criteria three: Hazard Isolation</b> <ul style="list-style-type: none"><li>Have prevention strategies been presented that isolate the hazard? Yes / No</li><li>What active measures been suggested to isolate the hazard (please list) _____ _____ _____ _____</li><li>What passive measures been suggested to isolate the hazard (please list) _____ _____</li></ul>
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**Other Scald Hazards**

**Criteria one: Hazard identification**

- What other scald hazards have been identified (please list)?

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**Criteria two: Hazard elimination**

- Have measures been suggested that eliminate the hazard? Yes / No
- If so, please list \_\_\_\_\_

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**Criteria three: Hazard Isolation**

Have prevention strategies been presented that isolate other scald hazards? Yes / No

- What active measures been suggested to isolate the hazard (please list)

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- What passive measures been suggested to isolate the hazard (please list)

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### **Appendix Three: Expert interview schedule**

In your professional experience, what can be done to reduce hot beverage scalds to children aged 0-5?

Our research has shown that only a few permanent measures are suggested to isolate the hot beverage hazard. In your opinion, what are some possible explanations for this?

Our research found that for hot beverage scald prevention, the most common intervention type, suggested on-going behavioural adjustment(s), such as ‘do not hold baby while holding a hot drink’ or ‘keep hot drinks away from children’. In your opinion how effective are these suggestions in reducing hot beverage scalds?

Can you suggest any other permanent interventions could be considered to reduce hot beverage scalds (0-5 years).

Can you make any suggestions which would identify the hot beverage scald hazard without actually isolating it, such as heat sensitive baby-bottles?

Do you have any other knowledge or suggestions relating to our research topic of hot beverage scald prevention, for children aged 0-5?

Appendix Four: Hot Beverage Scald Warning Label – Sample



**Kia Tupato !  
He morea weratanga**



**Warning!  
Scald Hazard**

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