POPULATIONS AT RISK ACROSS THE LIFESPAN: POPULATION STUDIES

Barriers and Enablers to the Use of Measures to Prevent Pediatric Scalding in Cape Town, South Africa

Ashley Van Niekerk, Ewa Menckel, and Lucie Laflamme

ABSTRACT   *Objective:*   Little attention has been paid to the prevention of pediatric scalding injuries in low-income settings, especially from the standpoint of local stakeholders. This study investigates stakeholder understandings of potential measures to prevent childhood scalding and the related hinders and enablers to such measures. *Design and Sample:*   The study utilized an exploratory qualitative design. Content analysis was applied to the transcriptions of interviews with 13 caregivers and 8 burn prevention research, policy, and practitioner professionals. *Measures:*   The study used semistructured interviews using illustrations to generate data. The 21 individual interviews were audio-recorded, transcribed verbatim, and analyzed using content analytic steps. Interviews focused on 2 illustrations that depict circumstances that surround the occurrence of pediatric scalding typical for Cape Town. *Results:*   3 categories of prevention measures were identified: enhancements to the safety of the home environment, changes to practice, and improvements to individual competence. The barriers identified were spatial constraints in homes, hazardous home facilities, and multiple family demands. *Conclusions:*   Caregivers and professionals report a similar range of measures to prevent pediatric scalding. Many of these might not be readily implementable in low-income settings with key barriers that would need to be addressed by policymakers and prevention practitioners.

Key words: barrier, enabler, low-income setting, pediatric scalding, prevention measure.

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Pediatric burn prevention programs have been implemented in communities in America, Australasia, and Europe (Towner, Dowswell, & Jarvis, 2001; Warda, Tenenbeim, & Moffat, 1999). These interventions have focused on the reduction of individual vulnerabilities, environmental change, or combinations of these. Evaluations indicate that a number of these interventions have demonstrated some success in the form of moderate increases in caregiver safety knowledge, improvement in some child and caregiver behavior/ practice, or occasional reductions in child burn morbidity (Warda et al., 1999). These few evaluations have been conducted on interventions directed at the prevention of fire and to a more limited extent scalding injuries, and include smoke detector promotion programs, tap water temperature reduction, and parent and child education (DiGuiseppi & Higgins, 2000; Harvey et al., 2004; Kendrick et al., 2007; Towner et al., 2001; Warda et al., 1999). Burn prevention has predominantly been documented in high-resource countries, with its specific contextual and risk factors and typically high levels of medical care. This is in contrast to many of the settings where the burn injury

burden is greatest, in South-East Asia and Africa, where there is also more limited burn prevention research (Forjuoh & Gielen, 2008; World Health Organization [WHO], 2002).

The implementation of burn and other childhood injury prevention interventions continues in general to be hindered by a range of barriers and challenges. These include the roles of service affordability, awareness, cultural values and the attitudes of providers, and the restricted use of child safety resources by impoverished communities (Barss, Smith, Baker, & Mohan, 1998; Brannan, 1992; Kendrick & Marsh, 1999; Peterson & Saldana, 1996; Saluja et al., 2004; Thompson et al., 1998). Although some studies indicate that poor knowledge and safety practice may be problematic (e.g., Lerner et al., 2001; Leveque, Humblet, & Lagasse, 2004; Mock et al., 2002; Shinar, Schechtman, & Compton, 2001), there is a distinct body of knowledge on childhood injuries, mainly focused in the home, that suggests that the problems faced by people from impoverished groups may not be primarily attributable to deficiencies in knowledge and practice (e.g., DiGuiseppi et al., 2002; Evans & Kohli, 1997; Jan, Hasanain, & Al-Dabbagh, 2000; Ribas, Tymchuk, & Ribas, 2006).

The recently released *World Report on Child Unintentional Injury Prevention* offers some recognition of the environmental and technological barriers that limit burn and scalding prevention strategies, but little on factors that may enable the implementation of prevention measures, especially in low-income settings (Forjuoh & Gielen, 2008). In South Africa, scalding injuries are a serious health threat to children, especially for those aged up to 4 years (Van Niekerk, Rode, & Laflamme, 2004). This study aims to identify views on the barriers and enablers to scalding prevention from the experiences of the caregivers of young children and of local burn prevention practitioners and researchers. The clarification of these perspectives is of importance for pediatric burn reduction, particularly in contexts where the conditions that affect the implementation of current prevention measures remain poorly documented. The study therefore has the following research questions:

1. What are the measures proposed by caregivers and professional stakeholders for the prevention of scalding of children in the home?
2. What factors hinder implementation of the identified measures?
3. What factors enable implementation of the identified measures?

Methods

Design and Sample

This study followed an exploratory qualitative design (Berelson, 1952; Burnard, 1991). Individual semi-structured interviews were conducted; these focused on two depictions of the circumstances surrounding the occurrence of pediatric scalding injuries typical for Cape Town (Van Niekerk et al., 2004; Van Niekerk, Seedat, Menckel, & Laflamme, 2007). Synopses of these common sets of situations guided an artist's development of two sketches that focused on the preceding circumstances rather than on the injury event itself. The illustrations depict particular child and caregiver activities, and environmental hazards associated with the occurrence of childhood scalding (see Fig. 1). Each sketch was accompanied by a limited text description. This use of pictures and illustrations as a way of collecting data is consistent with elements of

Figure 1. Scenarios Depicting the Circumstances of Scalding Injuries in Cape Town
From *Paediatric Burn Injuries in Cape Town, South Africa. Context, Circumstances, and Prevention Barriers*, by A. Van Niekerk, 2007, Stockholm: Karolinska Institutet. Copyright 2007 by the Van Niekerk. Adapted with permission of the author.

social science research that have used images or pictures to elicit respondent perspectives on issues; for example in the 1970s, such research reported on teenagers' views on dating, sexual behavior, and unwanted pregnancy (Cogswell & Shoultz, 1970). The study received ethics approval from the South African Medical Research Council on the August 22, 2005. Ethics approval was granted subject to the informed and voluntary participation of all study participants, signed consent for interviews and audio recordings, the confidentiality of all interviews, and the exclusive utilization of material for research purposes.

The study took place in Cape Town, which has about 3 million residents, with just over 48.1% "colored" (referring to mixed heritage), 31.7% Black, and 18.8% White individuals. In South Africa, these terms were created through apartheid laws to refer to various population groups. These are still used as they have social significance as a consequence of the profound impact of the earlier legislation. In South Africa as a whole, Black Africans constitute 79% of the population, while Whites makeup 9.6%, colored 8.9%, and Indians/Asians 2.5% (Statistics South Africa, 2003). Although racial legislation defining access to education, living areas, occupations, and other resources ended in 1994, racial and socioeconomic differences among communities in Cape Town—as in the rest of South Africa—remain marked. Nearly 20% of the city's homes comprise informal shacks, with predominantly Black and colored residents occupying these, and other marginally more developed, but still impoverished and poorly resourced areas. These areas have a high population and child density, low aggregate income, and comprise household structures that are compact, with minimal facilities and temporary physical separations between rooms, including the kitchen. These areas have been identified as the ones at the highest risk for childhood burn injury in the city (Van Niekerk, Reimers, & Laflamme, 2006).

The study informants included both caregivers and burn prevention professionals. Suitable caregivers were those caring for children aged 6 years and younger and resident in a neighborhood in Cape Town identified as a high burn risk area (Van Niekerk et al., 2006). The Provincial Department of Health assisted in identifying prospective caregiver informants from a number of its projects in these areas. These referrals were personally contacted and interviewed in sequence until saturation was reached (Miller & Brewer, 2003). At this point, 13 caregivers had been inter-

viewed, just over 70% of all caregivers approached. The caregivers were all mothers, except for 1 grandmother, and on average cared for two or three children. The first languages of the caregivers were Afrikaans (6), Xhosa (6), and English (1); because of the spoken languages of the interviewer, all were interviewed in either Afrikaans or English. The burn prevention professionals were approached after a contact list had been compiled from sources located at key health and safety agencies in Cape Town. Eight stakeholders from a number of professions were approached, with all interviewed. Interviews were all conducted in English. These stakeholders included medical practitioners, social workers, and psychologists, most with significant experience, but ranging from 2 to 27 years in the burn prevention sector.

Measures

The lead researcher interviewed informants from August to October 2006, with interviews lasting between 25 and 50 min. All informants were briefed about the research objectives and the interview process; they were interviewed as soon as they agreed to participate in the study. The researcher emphasized that the interview was solely for the purposes of research, with all interview transcriptions and notes anonymous. Informants were interviewed either at their place of work, their home, or at other convenient and appropriate venues. After an introduction to the study, the respondent could choose which sketch to respond to first. Thereafter, the study questions were presented in the following order: (1) the interviewee's ideas about prevention measures or actions specific to the two scenarios, and their identification of (2) barriers and (3) enablers to these measures. In addition, the interviewer probed the contributions of: (1) home design and layout, (2) home equipment and appliances, and (3) the use of this equipment in hindering or alternately enabling measures to prevent the two scenarios. Minor adjustments to accommodate the appropriateness of the questions to the different informant groups were ensured.

Analytic strategy

The 21 interviews were audio-recorded, transcribed verbatim, and analyzed using core content analytic steps (Berelson, 1952; Burnard, 1991). Scenario 1 was the starting point for all respondents, except for one caregiver. In most cases and for both scenarios, respondents reported that they could relate to the sce-

nario portrayed, and in many cases, especially for caregivers, had actual experience or direct observations of the depicted circumstances. Within this structure, information on measures that prevent scalding and thereafter on hinders and enablers to the identified measures was inductively generated.

Respondents typically identified prevention measures directed at the more obvious physical elements represented in the figure, with some more comprehensive in their approach than others. In most instances, respondents would thereafter elaborate more specific elements. Most informants would reflect on the barriers to the measures they had identified by indicating, elaborating on, and illustrating a single barrier, and thereafter identifying others. A small number of others would start by listing a range of barriers and thereafter systematically explaining each. The identification of enablers was more limited, with many informants questioning the usefulness of the concept. The transcripts were independently examined by the three researchers. We looked at the first scenario and then assessed whether this would hold for the second scenario, which it did. The data were analyzed in the same form of content analysis for all three study questions. The interview texts were read a number of times to identify the prevention measures, related barriers, and facilitators to the measures proposed for burn scalding scenarios 1 and 2, respectively. The researchers identified relevant keywords or phrases, emerging types, and finally categorized these types according to the domains of prevention measure, barrier, or enabler. All points of convergence and divergence were discussed, with the latter discussed further and adjustments made on agreement that the type or category in question was a distinct and relevant description or domain of prevention measure, barrier, or enabler, respectively. The labeling of domains was informed by the researchers' collective experience in injury studies in public health.

Results

Prevention measures

Three categories of prevention measures were identified for both scalding scenarios, and depicted in proportion to the emphasis accorded. These were labeled: safety enhancements to the home environment (when the proposed measure targeted an aspect of the physical environment, including the home equipment available); changes in practice (i.e., when informants

suggested doing things represented in the picture in a different manner); and improvements of individual competence (i.e., when the proposed measures implied an enhancement or acquisition of individual ability or skill). Figure 2 presents these three prevention measures (categories) together with the strategies (types) related to each, and in turn, the specific actions (codes) proposed with each strategy.

The prevention measures each comprise three or four strategies. Whereas measures were accorded a similar importance in the scenarios, different emphases were accorded to the strategies and actions. Table 1 lists the strategies proposed for scalding scenarios 1 and 2, with descriptions of related actions. The descriptions are of phrases or key words, and organized from the most to the least commonly cited action, according to each strategy. Prevention measures and strategies are sequenced in order of emphasis, based on the aggregated number of informants who identified each.

Safety enhancements to the home environment. This class of prevention measure was a focus for the majority of informants, and emphasized the
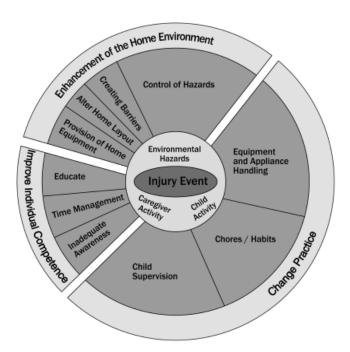

Figure 2. Three Prevention Measures for Common Scalding Scenarios, Comprising 10 Actions
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TABLE 1. *Caregiver and Stakeholder Measures to Prevent Scalding Scenarios 1 and 2*

Caregivers (13)[a]	Stakeholders (8)	Prevention strategy
Safety enhancements of the home		
Home equipment	*Home equipment*	Control of hazards
Scenario 1—Remove tablecloths; hot things out of reach of child; tack kettle and other cords against walls; locks for cupboards (12)	Scenario 1—Hang cords on wall; put hot substances at the back of tables (5)	
Scenario 2—Put hot liquids out of reach; place stove and kettle out of child's reach (12)	Scenario 2—Raise cooking area and pots; put hot substances out of reach of child; put stove in a position inaccessible to child (7)	
Play area		
Scenario 1—Move play area for child: not in kitchen; in other room (bedroom or sitting room) when cooking; make safe play area (5)		
Scenario 2—Remove child from cooking area; cook in different room to child (5)		
Stove	*Stove*	Creation of barriers
Scenario 1—Use table; furniture as barrier (2)	Scenario 1—Stove guards; cardboard box for child while cooking (2)	
Furniture	*Furniture*	
Scenario 2—Lock cupboards to prevent child climbing on these to stoves (2)	Scenario 2—Use chair or table to block off risk area (2)	
Child space	*Child space*	Alter the home layout
Scenario 1—Housing with higher plugs (1)	Scenario 1—Housing with power points out of child's reach; provide stimulating space for exploration and growth (2)	
	Surface for appliances	
	Scenario 2—Use bricks for a stable surface; government must provide corner work surfaces (3)	
Kettles	*Kettles*	Provision of home equipment
Scenario 1—Limit cord lengths (2)	Scenario 1—Limit cord length; coiled flex cords (2)	
Stove	*Stove*	
Scenario 2—Build into working surfaces (1)	Scenario 1—Heavy base (1)	
Pan handles	*Cooking utensils*	
Scenario 1—Shorten (1)	Scenario 1—Short handles (1)	
Appliances	*Pots*	
Scenario 2—Use electrical appliances (1)	Scenario 2—Provide safer types (1)	
Changes in practice		
Caregiver	*Caregiver*	Child supervision
Scenario 1—Must get help for chores or child care from others; cautious in small environments; place child in crèche (7)	Scenario 1—Parents must supervise; share supervision with other caregivers (7)	

TABLE 1. *Continued*

Caregivers (13)[a]	Stakeholders (8)	Prevention strategy
Scenario 2—Sit between stove and child when cooking; gets others to supervise child when cooking (8)	Scenario 2—Get assistance with children; get assistance from siblings; share supervision with other caregivers (6)	
Child	*Child*	
Scenario 1—Preempt from grabbing table cloth; place in chair to feed; child be supervised by someone while busy with hot things (11)	Scenario 1—Separate from dangerous environments; keep in a safer place while meals made (6)	
Scenario 2—Watch at all times; keep away from stoves; watch if busy with hot stuff (7)	Scenario 2—Keep in safe corner if busy with chores; remove from cooking area (6)	
Hot stuff/liquids	*Hot stuff/liquids*	Chores/habits
Scenario 1—Heat water while child asleep; caregiver always present at cooking area when cooking (7)	Scenario 1—Leave hot stuff at higher level to child; keep hot stuff away from table edges (3)	
Scenario 2—Never leave hot liquids on floor; add cold water to hot (8)	Scenario 2—Do not cook on floor; remove hot liquids from reach of child; pour cold water before hot (6)	
Tablecloths	*Tablecloths*	
Scenario 1—Remove; shorten; use table mats (7)	Scenario 1—Remove; use small cloths or placemats (5)	
Scenario 2—Do chores/cook while child asleep or outside (3)		
Child	*Child*	
Scenario 1—Don't cook with child around; should not play in kitchen with toys; sit between child and hot things (8)	Scenario 1—Do not sit down with child and hot substances; eat outside in garden where space for child (2)	
	Scenario 2—Remove from cooking area; do not leave alone when busy with bath (5)	
Caregiver	*Caregiver*	
Scenario 2—Remove toys from stove area; get help with chores (5)	Scenario 2—Get assistance from adults and older children (2)	
Stove	*Stove*	Equipment and appliance handling
Scenario 1—Use back plates; place out of child's reach (8)	Scenario 2—Place elsewhere; put on firm surface (6)	
Scenario 2—Put on high stand; put against wall (11)		
Kettle	*Kettle*	
Scenario 1—Use short cord; place out of child's reach (9)	Scenario 1—Use nontilting kettle with heavy base; use cordless kettles (3)	
Appliances	*Appliances*	
Scenario 2—Keep out of child's reach (2)	Scenario 2—Check (2)	
	Cooking utensils	
	Scenario 1—Turn frying pan and pot handles inwards; use utensils with short handles (4)	

		Educate
Children Scenario 1—Show with actions to get used to feeding in certain way; teach older children to help (3) Scenario 2—Explain dangers to child (1) Parent Scenario 1—Teach parents so that they can teach their children; teaching by someone with experience of burns (2)	Children Scenario 1—Explain dangers; create situations to learn safe behavior (2) Parent Scenario 1—Education about risk situations; assist to interpret safety messages to own contexts (2) Scenario 2—Assist persons to interpret safety messages (2)	
Parent Scenario 1—Time roster: Use to organize child care and home tasks; do chores while child sleeps (3) Scenario 2—Make time for everything; if no time take care of child first; do chores when child sleeps or is away (4)	Parent Scenario 1—Provide with time plans; organize play time for children (1) Scenario 2—Make play time for children; make time for children before washing dishes (2)	Time management
Parent Scenario 2—Tell about child injuries (2) Teachers Scenario 2—Tell about ways of getting burnt (1)	Parent Scenario 1—Awareness of dangers: Raise caregiver awareness; distribute pamphlets with dangerous scenarios depicting limited home space (3) Scenario 2—Show safety videos showing what can happen; warn about dangers of kerosene stoves (3) Child Scenario 2—Warn of dangers; warn siblings of dangers (2) Authorities Scenario 1—Educate government (1)	Increase awareness

Note. [a]The numbers in parentheses indicate the number of respondents who identified the particular measure.

control of hazards in the home (especially in the cooking area), and focused on the management of hazardous home equipment or its removal from the reach of children. In scenario 1, this involved the removal of kettles and pots with hot substances, and the control of lengthy kettle cords, and in scenario 2, the removal or elevation of portable stoves and pots of hot foods or liquids. Caregivers stressed the importance of creating or ensuring a play area outside of the cooking area as a hazard control measure for both scenarios. Other home safety enhancements include the creation of physical barriers, alterations to the layout of the home, and the provision of safer home equipment, examples of which are listed in Table 1.

Changes in practice. Informants proposed measures directed at changing various home chores, child supervision activities, and the handling of home equipment. In both scenarios, changes to child supervision emphasized separating the child from cooking and eating environments, and greater support for the caregiver with child supervision and chores. The proposed changes to household habits focused in the first scenario on the removal or replacement of tablecloths, while in the second scenario, this involved the removal of hot liquids and foodstuff from the reach of children, by for example not cooking on the floor. Changes to the handling of equipment and appliances emphasized the use of kettles with shortened cords, the use of the back heating elements of stoves, or the removal of the portable electrical or kerosene stove out of the reach of children, the latter specific to scenario 2.

Improvements to individual competencies. These included measures to promote time management, education, and increasing awareness. Only a small proportion of informants advocated for the use of time plans or rosters or suggested education measures for both parents and children. The former measures included organizing and sequencing child activities and home chores, while the latter involved the provision of information about risk situations that for example highlights the dangers of kerosene stoves, as in scenario 2. Informants suggested increased parental awareness, with stakeholders offering more detailed suggestions for both scenarios.

Barriers

All informants, except for one caregiver, identified barriers to the prevention measures they had pro-

posed. Four categories of barrier were identified and labeled: limitations in the physical environment (i.e., the physical or spatial arrangements and characteristics of the home environment that impair human activity); executive problems and hinders (hinders of various kinds impeding one's capacity to perform an activity in a safe manner); instrumental limitations (particular to appliances and physical equipment or facilities that impair scalding prevention measures); and hardship (general, and more widespread material and human impoverishments). Each of the barriers comprises two to three specific types. Table 2 lists the barriers and barrier types for scenarios 1 and 2, respectively. Barrier and barrier types are sequenced in order of emphasis, based on the aggregated number of informants who identified each. The informant descriptions are of key factors (codes) attributed to each barrier type.

The *limitations in the physical environment* comprise spatial congestion and restriction (the arrangements and concentration of furniture and equipment in the home and the extent to which space can be used for daily human activities), and of a child-unfriendly environment (home design and spatial features that may be functional for adults but constitute a risk to children). The *instrumental limitations* category includes the unaffordability of home facilities, equipment, and products, and insufficient electricity infrastructure. The *executive problems and hinders* include competing activities and demands (activities, events, or issues that may exert a horizontal or a vertical influence, be anticipated or unplanned, and compete for the caregiver's attention); risk appraisal capacity (the cognitive, emotional, and physical attributes of either the caregiver or the child that affects their capacity to recognize and appraise danger); and habits (entrenched practices that are less amenable to change). The fourth category, *hardship*, includes social prejudice (social values and norms that disadvantage children or families from specific social groupings); poverty (i.e., material deprivation); and the inadequacy of available safety interventions (factors that impede the translation of interventions and information into practice).

Limitations in the physical environment. These barriers related, in both scenarios, to space restriction and congestion, and to a lesser extent, a child-unfriendly environment. Most informants commented on spatial arrangements that limited the

TABLE 2.   *Caregiver and Stakeholder Barriers to Prevention Measures for Scenarios 1 and 2*

Caregiver examples (12)	Stakeholder examples (8)	Barrier subtypes
Limitations in the physical environment		
No space for daily activities	*No space for daily activities*	Space restriction and congestion
Scenario 1—Small kitchen; no space to move around in (7)	Scenario 1—Smaller houses; one-bedroom house more difficult (6)	
Scenario 2—House is one room, so everything happens in this space; the kitchen and the sitting room are in the same room (5)	Scenario 2—Can only work on the limited work surface available; lack of space in kitchen/home (6)	
Appliance and furniture	*Appliances and furniture*	
Scenario 1—No place for big stove in small kitchen; no space for own bed, store furniture in passage (2)	Scenario 1—Limited space for appliances; no demarcated kitchen area because of size (4)	
Scenario 2—No space for essential appliances; no place in kitchen for proper stove/furniture (3)	Scenario 2—No space to keep working appliances in right place; lot of clutter (2)	
Family size	*Family size*	
Scenario 2—Space is limited for families with a number of young children (1)	Scenario 1—More people in small house the worse (1)	
Equipment	*Equipment*	Child-unfriendly environment
Scenario 1—Knobs of stove are close and visible to the child (1)	Scenario 1—Child has access to stove knobs; appliance handles in reach of child (3)	
Scenario 2—Stove is where children play; child can reach all hot equipment (4)	Scenario 2—Children being urbanized and encountering unfamiliar environments and appliances; toys near stove (3)	
Space arrangements	*Space arrangements*	
Scenario 1—Layout of home cramped—hot things near to child; space only for certain kinds of play (4)	Scenario 1—Not enough space between child and equipment; clutter on floor from child's play (2)	
Scenario 2—All the things are in one place and they are near the children (2)	Scenario 2—Lack of safe area for child (1)	
Instrumental limitations		
No access to electricity	*No access to electricity*	Insufficient electricity infrastructure
Scenario 1—Only one plug per room; not enough power points in houses (3)	Scenario 1—Only one plug per room; not enough power points in houses (4)	
Scenario 2—Lack of electricity; not enough plug-points (5)	Scenario 2—No access to electricity in house (3)	
Limited basic facilities/equipment	*Limited basic facilities/equipment*	
Scenario 1—No alternative to kitchen set-up; portable stove not safe (2)	Scenario 1—Use of kettle to warm up water as opposed to taps; portable stoves not safe (2)	
	Scenario 2—When no taps then moving hot water to different places dangerous (3)	
Kerosene stoves	*Kerosene stoves*	
Scenario 2—No choice but to use kerosene stove which can explode (3)	Scenario 2—Kerosene stoves are cheap but unstable (2)	
	Proper equipment	

TABLE 2. *Continued*

Caregiver examples (12)	Stakeholder examples (8)	Barrier subtypes
Proper equipment Scenario 1—Can only afford portable stoves; no money to buy table mats (3) Scenario 2—Proper equipment not affordable (3)	*Proper equipment* Scenario 1—Cordless kettle expensive; people can't afford to buy a stove guard (2) Scenario 2—People do not have modern kitchens where there is the proper placement of appliances/hobs (2)	Unaffordability of facilities and equipment
Storage and working spaces Scenario 1—Don't have enough cupboards; no cupboards to place kettles and pots out of reach (2) Scenario 2—No money to buy cupboards; no money to do everything so that the house can be safe (2)	*Storage and working spaces* Scenario 2—Use of open cupboards (cheaper) which are easier for child to climb; people can't afford to buy wood to make a working platform (2)	
Executive problems and hinders *Horizontal* Scenario 1—When others leave something dangerous close to the child; very busy, can't always be there for the child (6) Scenario 2—Have to cook, clean and work; must make food, bath, and watch children (4)	*Horizontal* Scenario 1—Haste with too many chores after work; domestic violence or conflict (5) Scenario 2—People stressed (by work, relationships, etc.) no time to think about hazards; parent may struggle to respond to the unexpected (6)	Competing activities
Vertical Scenario 1—Main priority is not to let the child go hungry (1) Scenario 2—No income, then first priority to feed children (1)	*Vertical* Scenario 1—Child safety can be secondary to other issues (2) Scenario 2—Safety is sometimes less a priority than other issues (1)	
Caregiver Scenario 1—Frustrations; everyday problems on mind; in thought (5) Scenario 2—Lack of experience; frustration (6)	*Caregiver* Scenario 1—Lack of experience; preoccupations and distractions (5) Scenario 2—Lack of foresight; influence of alcohol and stress (6)	Risk appraisal
Child Scenario 1—Child curiosity; child has ability to access dangers (2) Scenario 2—Wants to do things for itself (1)	*Child* Scenario 1—Children always want to know what is on top of tables; ability and curiosity of child (3) Scenario 2—Hunger—provides motivation to explore contents of hot pot (1)	
Cooking Scenario 1—Use of stove in certain way; use of pots with long handles (2)	*Cooking* Scenario 1—Pots have to be accessible for parent; grew up not knowing that pot handles must be turned inwards (1)	Habits

Scenario 2—Parents prefer to use stove in certain way; used to putting stove on floor while knowing it is not safe (2)	Scenario 2—Practice of kerosene on low surfaces; children encouraged from young to help with cooking (2)	
Hardship		Poverty
Material deprivation	*Material deprivation*	
Scenario 1—Very poor (1)	Scenario 1—Poverty is a barrier to safety choices; lack of resources (4)	
Scenario 2—People live in poverty; no basic facilities; unemployment (2)	Scenario 2—Poverty; poor housing conditions (4)	
Financial constraints	*Financial constraints*	
Scenario 1—No money (1)	Scenario 1—Lack of financial resources; no money for changes (1)	
	Scenario 2—Limited finances (1)	
Information utility	*Information utility*	Inadequacy of available safety interventions
Scenario 1—Lack of interest in safety; some people do not like to be taught (2)	Scenario 1—Not acting on safety knowledge; negative attitude toward safety (2)	
Information quality and dissemination	Scenario 2—Not all safety messages may be used easily, depends on situation and design of individual homes (1)	
Scenario 1—No education on electricity use (1)	*Information quality and dissemination*	
Scenario 2—Cannot go to parents houses to teach, it will be difficult (1)	Scenario 1—Some prevention strategies not practical (1)	
	Scenario 2—Uncertainty about safety information; inappropriate means used to create awareness; safety messages not always practical (3)	
	Poverty related	Social prejudice
	Scenario 2—Poor people do not have political or financial clout to force access to good-quality geysers and other equipment (1)	
	Age related	
	Scenario 2—Children live in shack land not precious enough (1)	

space for daily living activities, starting with the restricted home and especially kitchen spaces typical of low-income homes. To a lesser extent, informants reported on the hindering role of furniture and appliance congestion, noting the size of appliances, the limited working spaces offered by furniture, and the lack of permanent demarcations separating the cooking area from the rest of the home. Child-unfriendly dimensions to the home focused on specific equipment and spatial hindrances, in particular, the hazardous effect of this limited space on particular kinds of activity and play and the increased proximity to hazardous equipment.

Instrumental limitations. These related to insufficient electricity infrastructure and the prohibitive cost of home facilities and equipment. Insufficient electricity infrastructure involved limited access to electricity and the limited basic (electrical and other) facilities and equipment required for cooking (physically stable electrical stoves) but also for heating water (geysers). In homes with an electricity supply, many informants highlighted the difficulties around electricity usage as a result of limited plug points. Many families also have no access to basic home equipment such as table cloths, working spaces, and cupboards with closing and lockable doors.

Executive problems and hinders. These comprised competing activities, impaired risk appraisal, and to a lesser extent habits. Informants indicated a multitude of horizontally competing demands on the caregiver such as domestic chores, work, unexpected demands, conflict and child care, and to a lesser extent vertically competing activities, that is priorities other than safety promotion taking precedence for a family's meager resources. In addition, a range of factors that could impair the caregiver's capacity to recognize and appraise scalding hazards to the child included preoccupations with everyday problems, frustrations, and lack of experience—especially for first-time and young parents. A number of informants drew attention to limitations in the child's ability to appraise danger, such as its growing curiosity and increasing physical ability to grasp and climb.

Hardship. This involved barriers imposed by poverty, the inadequacy of current safety interventions, and social prejudice. Barriers related to poverty incorporated dimensions into general material deprivation (impoverished living conditions, unemploy-

ment), and to a lesser extent financial constraints. A small minority of informants also commented on the inadequacies of the available safety interventions, reporting difficulties imposed by information quality and dissemination problems and barriers related to information utility. Social prejudice entailed barriers related to prejudice against poor people (specifically their restricted political and financial power to access safer services and products) and age-related prejudice, specifically directed at children in informal settings.

Enablers
All stakeholders identified enablers to either or at least one of the scenarios as did 10 caregivers, although in less detail than that for the prevention measures and barriers. Three enabler categories were identified: *enhanced individual responsibility* (i.e., caregivers' acknowledged roll in creating, maintaining, or promoting safe living conditions in the home, e.g., around the child); *built-in safety of equipment and structures* (i.e., of the household design, structure, and equipment, including spatial attributes); and *supportive state policy* (i.e., of state policy and responsibilities for promoting safety). There were far fewer descriptions of enablers of prevention measures from both caregiver and stakeholder groups. Table 3 presents categories, each with two to three types, and all sequenced in order of emphasis. The descriptions are illustrations of each of the enabler types.

Enhanced individual responsibility. This enabler category was especially highlighted for caregivers. Informants indicated that the caregiver (and to a lesser extent, other family members or neighbors) could take greater responsibility for managing the child's activities and for dealing with dangerous equipment and activities in the home, by for example, ensuring that cooking equipment and utensils are out of reach.

Built-in safety of equipment and structures. These were highlighted especially by stakeholders, who emphasized the existing safety features of appliances and home equipment (even of kerosene and portable electric stoves and kettles—that they can be secured); the attributes of home structures and spaces (especially regarding the more effective use of space as in modern kitchen designs); and the portability of equipment (which allows for the movement of

TABLE 3. *Caregiver and Stakeholder Enablers to Prevention Measures*

Caregivers (10)	Stakeholders (8)
Enhanced individual responsibility	
Caregiver: Take responsibility for dangerous activities; can do range of things to make inside of home safe (6)	*Caregiver:* Can rearrange child's activities; possible to manage utensils (4)
Others: Family members can help (2)	*Others:* Support from family/neighbors (1)
Built-in safety of equipment and structures	
Safety features of appliances and equipment: Electricity supply can be switched off when appliances not in use at night; cupboards are lockable (3)	*Safety features for appliances and equipment:* Provision of whistles on all kettles; appliances can be secured and tethered (5)
Home structure and space: Space can be made—remove everything else from top of cupboard when cooking (1)	*Home structure and space:* Safer design of living areas; availability or provision of modern kitchens (5)
Portability of appliances: Stove can be placed at back of a room; can use available furniture as a barrier (1)	*Portability of appliances:* Locations of appliances can be changed; availability of chairs or tables to block off risk areas (3)
Supportive state policy and structures	
State policy and interventions: Government replacement of stoves with gas stoves; home visitation and support for poor families; money to buy safer equipment/stoves (4)	*State policy and interventions:* Government promotion and supply of gas stoves; provision of education (4)
Poverty alleviation: Take people out of poverty (3)	*Poverty alleviation:* Finances to purchase bigger homes (2)
Access/control of equipment/appliances: Pots with short hands supplied to people; removal of kerosene stoves from market (1)	*Access/control of equipment/appliances:* Provision of proper electrical connections; access to electricity and electrical appliances such as geysers (2)

hazardous appliances to facilitate the safer use of the limited home space).

State policy and structures. These include government efforts to promote and fund the use of safe energy sources (such as the provision or the subsidization of gas or electricity as an alternative to kerosene appliances in high-risk neighborhoods); the state's national drive to alleviate poverty via the subsidization of larger and better constructed homes and the financial and social support of low-income families; and a greater government role in control of the public's access to hazardous home facilities.

Discussion

More consensus than divergence between caregivers and stakeholders

The study highlights context-relevant pediatric scalding prevention measures to contribute to a platform for prevention in impoverished South African communities. A first observation is that caregiver and stakeholder understandings of these are quite similar, and display important consensuses as regards key prevention measures, barriers, and enablers. The caregiver recommendations of prevention measures demonstrate an awareness of strategies that may prevent scalding, and include those prioritized by current public health practice and research (Forjuoh & Gielen, 2008; Towner et al., 2001; Warda et al., 1999). Secondly, caregiver awareness of burn prevention measures highlights the contribution of poor material, technological, and social resources in hindering the implementation of scalding, or more broadly, injury prevention as indicated elsewhere (Laflamme, 1998).

Despite the similarities of the key proposals, there are differences especially in the weighting accorded to the strategies and individual actions specific to each prevention measure, and barrier categories and types, some of which are illustrated by the examples in the tables. In one example, a number of caregivers, but no professionals, proposed enhancements to the child's play area as an important aspect of the home environment, foregrounding the normal developmental needs of children as an important consideration in planning for scalding prevention. In another example, professionals highlighted material deprivation as a barrier to scalding prevention measures, as opposed to a few caregivers, a possible reflection of the differential impact that circumstances have on perceptions on what constitutes a challenge or an accepted aspect of daily life.

While effective measures exist (Towner et al., 2001; Warda et al., 1999) and have been promoted by the WHO and UNICEF in their recent *World Report on Child Unintentional Injury Prevention* (see Forjuoh & Gielen, 2008), this study highlighted the barriers that may affect implementation. The study identified a range of barriers to these measures, most of which are not easily modifiable. These include home spatial constraints; hazardous home facilities and appliances; the multiple and often complex daily demands on families; and the oppressing contribution of material and social hardship. The identification in this study of enablers was more limited, but strongly emphasized enhanced individual responsibility, consistent with the persisting prescriptions to parents by many in the health sector (Saluja et al., 2004) and the considerable social pressure on caregivers for the guardianship of their children (Sidebotham & ALSPAC Study Team, 2001).

Safety in a limited living space

A central barrier to burn safety efforts is the impact of the small home and especially the constrained cooking space, identified by both caregivers and local experts familiar with local contexts. Within a limited physical space, it is very difficult to manage essential daily activities, create barriers to prevent injuries, or compensate for human shortcomings. In impoverished communities, this is exacerbated by limited access to safe home facilities and appliances such as built-in working spaces and electrical stoves (Van Niekerk et al., 2007). Under these circumstances, the state policy and interventions proposed by informants especially poverty alleviation and access of the poor to safety technology may be a most welcome response to the spatial limitations imposed by low-income homes. Since 1994, over 2 million housing subsidies have been allocated to South Africa's poor (Department of Housing, Republic of South Africa, 2007). Many of these were, however, poorly built and tiny, although recent legislation has emphasized minimum standards for entry-level housing (Harsch, 2001).

Built in hazards and safety of appliances

The effects of home cooking and heating appliances and related working and storage spaces were identified as important issues for prevention. An inadequate electricity supply was highlighted, the latter com-

pounded by the nonaffordability of home equipment, such as cordless kettles, installed electrical stoves, plug points, stable working surfaces, and table mats. Cheaper but unstable kerosene stoves were emphasized as an alternative, despite concerns about its hazardous nature (Forjuoh, 2006). Its use constitutes a considerable hinder to the control or the prevention of scalding, especially to efforts to change cooking habits. Despite the unfavorable descriptions of kerosene and portable electrical appliances, stakeholders and some caregivers emphasized the inbuilt safety features of this equipment. The very portability of these electrical and kerosene stoves and kettles also allowed for greater flexibility and control over their location, to an extent demanded by the fluid conditions prompted by the internal spatial and functional arrangements in small homes. The extension of the state subsidy for entry-level housing to include cooking appliances would be consistent with the recent legislation on minimum housing standards (Harsch, 2001), and could include redesigned kerosene stoves with the safety features promoted by, for example, the Sri Lankan Safe Bottle Lamp Program. The latter has demonstrated effectiveness in preventing kerosene spills when stoves tip over (Forjuoh & Gielen, 2008).

Human capacities, responsibilities, and priorities

The numerous household chores, care of often multiple children, and competing activities, including work, everyday tensions, and distractions, are central concerns expressed by the interviewees. Within the context of the spatial and equipment limitations mentioned above, it is obvious that the demands placed on individual competencies are high, probably exceeding sustainable human prevention capacity and efforts. There are considerable social pressures on parents to still succeed in these contexts, with some informants calling for even greater individual responsibilities for child safety. These interviewees indicated that families under impoverished circumstances may consider safety a secondary priority after other concerns about shelter, food stability, or clothing needs. Caregivers who succumb to these adverse and pressured environments are often stigmatized by their communities (Sidebotham & ALSPAC Study Team, 2001). Within this climate, the enhancements of home infrastructure and the provision of greater home safety technology would support greater caregiver management of home demands (Forjuoh & Gielen,

2008). In addition, homes under high-risk circumstances could receive specific social and health support via, for example, home visitation programs, an intervention that has demonstrated positive safety and health outcomes among families marginalized from health care systems (Swart, Van Niekerk, Seedat, & Jordaan, 2008).

Social context and plausible structural interventions

Poor families confront the barriers of poverty due to physical and financial deprivation, impaired access to safety technology, and persisting social prejudice (Evans, 2004). While informants recognized the deleterious effects of these barriers, few highlighted the limitations imposed by hardship on the measures they had proposed. Poor communities were proposed as the target for current and further state policy interventions, especially those directed at poverty alleviation, the promotion and dissemination of safety technology, and the installation of safe infrastructure. In recent years, South Africa has made considerable, but uneven progress in meeting social reconstruction and development objectives, with social inequality as directly manifest by income differentials and indirectly by the access to safer infrastructure, facilities, and appliances, remaining among the highest in the world (Day & Gray, 2003).

This study thus supports the ongoing formulation of state policy and interventions focused on poverty alleviation, the promotion of access of the poor to cooking appliances and safety technology, the enforcement and further formulation of minimum standards for entry-level housing, and the provision of specific social and health support to families in marginalized settings.

Implications for research and practice

The current study has emphasized the following:

- Three categories of scalding prevention measures: enhancements to the safety of the home environment, changes to practice, and improvements to individual competence.
- Barriers to these prevention measures, identified as spatial constraints in homes, hazardous home facilities and technology, competing activities and demands on caregivers, and hardship.
- Enablers to prevention measures, that is greater individual responsibility, the built-in safety of equip-

ment and structures, and supportive state policy and efforts.

- Consensus between caregivers and professionals on many key prevention measures.
- Caregiver awareness of the barriers to these measures, a number of which are not easily modifiable.

This study provides a basis for the development of measures to prevent pediatric scalding in the home in low-income settings in Cape Town, and possibly further afield. Many of these measures were promoted by the majority of stakeholders and find support in the injury control and prevention literature. The study furthermore highlights barriers to the application of these measures, several of which are typical of poor living conditions and not easily modifiable. Perhaps because of this, those enablers identified by the respondents tend to place important responsibilities on already burdened caregivers. In the absence of context-relevant prevention measures and without strategies to combat the barriers identified, children from low-income settings remain at an excess risk to injury, with their caregivers confronted with managing the additional burden. Under such circumstances, child safety is compromised, with the possibility of blame for "poor supervision" being leveled at caregivers. Evidence-based action plans are required that combat those barriers that impair the implementation of burn prevention in settings where burns are most prevalent.

The study contributes to a limited evidence base for scalding prevention. Most prevention measures have been developed in high-income settings, making it difficult to see how immediately applicable—and relevant—these measures can be. The current study used a qualitative approach and attempted to identify from the perspectives of local stakeholders the preventive measures needed in such contexts, and the difficulties that would be faced in its implementation. The study demonstrates stakeholder awareness and consensus on key context-specific prevention measures, barriers, and enablers. However, the study does not indicate the relative importance of each of these, which will in any event vary among individuals, families, and communities. This study also does not clarify which or the extent to which these measures and factors will be present in the contexts not covered by the current study. The study does, in the provision of a detailed description of its research process, analytic framework and methods, and the research context

and situation, enable a foundation for the transferability of findings to other settings (Smaling, 1992).

Acknowledgments

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