



American Burn Association SCALD INJURY PREVENTION Educator's Guide

A Community Fire and Burn Prevention Program Supported by the
United States Fire Administration Federal Emergency Management Agency

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GENERAL BACKGROUND INFORMATION ON SCALD BURNS

Although scald burns can happen to anyone, young children, older adults and people with disabilities are the most likely to incur such injuries. Most scald burn injuries happen in the home, in connection with the preparation or serving of hot food or beverages, or from exposure to hot tap water in bathtubs or showers. Severe scalds also occur in the workplace, typically when pipes or valves fail while carrying or regulating the flow of steam. Both behavioral and environmental measures may be needed to protect those vulnerable to scalds because of age or disability, or because they do not have control of the hot water temperature in multi-unit residential buildings.

The severity of a scald injury depends on the temperature to which the skin is exposed and how long it is exposed. The most common regulatory standard for the maximum temperature of water delivered by residential water heaters to the tap is 120 degrees Fahrenheit/48 degrees Celsius. At this temperature, the skin of adults requires an average of five minutes of exposure for a full thickness burn to occur. When the temperature of a hot liquid is increased to 140° F/60° C it takes only five seconds or less for a serious burn to occur¹. Coffee, tea, hot chocolate and other hot beverages are usually served at 160 to 180° F /71-82° C, resulting in almost instantaneous burns that will require surgery. Since immediate removal of the hot liquid from the skin may lessen severity, splash and spill burns may not be as deep as burns suffered in a bathtub.

High risk groups

➤ *Young Children*

Young children have thinner skin resulting in deeper burns than adults for the same temperature and exposure time to a scalding substance. The proportion of a child's body that is exposed to any given amount of a scalding substance is also greater: the same cup of spilled coffee will burn a much larger percent of a small child's body. Small children also have little control of their environment, less perception of danger and less ability to escape a burning situation on their own. Children grow fast and can reach new, dangerous things every day. They do not realize that hot liquids burn like fire.

➤ *Older Adults*

Older adults, like young children, have thinner skin so hot liquids cause deeper burns with even brief exposure. Their ability to feel heat may be decreased due to certain medical conditions or medications so they may not realize water is too hot until injury has occurred. Because they have poor microcirculation, heat is removed from burned tissue rather slowly compared to younger adults.² Older adults may also have conditions that make them more prone to falls in the bathtub or shower or while carrying hot liquids.

¹ Moritz, AR, Hennessey, FC Jr. Studies of thermal injuries: II The relative importance of time and surface temperature in the causation of cutaneous burns. Am J Pathol 1947; 23:695-720.

²Stone, M, Ahmed J, Evans J. The continuing risk of domestic hot water scalds to the elderly. Burns 2000; 26:347-350.



➤ **People With Disabilities or Special Needs**

Individuals who may have physical, mental or emotional challenges or require some type of assistance from caregivers are at high risk for all types of burn injuries including scalds. The disability may be permanent or temporary due to illness or injury and vary in severity from minor to total dependency on others.

Mobility impairments, slow or awkward movements, muscle weakness or fatigue, or slower reflexes increase the risk of spills while moving hot liquids. Burns to the lap are common when a person attempts to carry hot liquids or food while seated in a wheelchair. Moving hot liquids can be extremely difficult for someone who uses a cane or walker. Sensory impairments can result in decreased sensation, especially to the hands and feet, so the person may not realize if something is “too hot.” Changes in a person’s intellect, perception, memory, judgment or awareness may hinder the person’s ability to recognize a dangerous situation (such as a tub filled with scalding water) or respond appropriately to remove themselves from danger.

➤ **Other risk factors**

Studies have shown that children who live in crowded housing and in families with low socioeconomic status are at higher risk for scald burns. Other related risk factors may include a lack of safe play environments, single and/or young mothers, and poor maternal education.³

While the basic principles of scald prevention apply to the general population the additional concerns affecting these high risk groups must be addressed. Scald injuries result in considerable pain, prolonged treatment, possible lifelong scarring, and even death. Prevention of scald injuries is always preferable to treatment and can be largely accomplished through simple changes in behavior and in the home environment.

Time and Temperature Relationship to Severe Burns⁴

Water temperature		Time for a third degree burn to occur
155° F	68° C	1 second
148° F	64° C	2 seconds
140° F	60° C	5 seconds
133° F	56° C	15 seconds
127° F	52° C	1 minute
124° F	51° C	3 minutes
120° F	48° C	5 minutes
100° F	37° C	safe temperature for bathing

3. Delgado J, Ramirez-Cardich ME, Gilman RH, et al. Risk factors for burns in children: crowding, poverty and poor maternal education. *Inj Prev* 2002;8:38-41

4 Moritz, A.R., Herriques, F.C. Jr., *ibid.*



Selected Burn and Scald Injury Statistics for Children⁵

Total burns

- In 2003, an estimated 83,300 children ages 14 and under were treated in hospital emergency rooms for burn-related injuries.
- 15,000 children are hospitalized annually with burn injuries.
- 1,100 children die each year from fire and burns.

Scald burns

- Approximately 21,000 children were treated for scald burns.
- Among children ages 4 and under hospitalized for burn-related injuries, an estimated 65% are treated for scald burns.
- The total annual cost of scald burn-related deaths and injuries among children ages 14 and under is \$44 million. Children 4 and under account for more than 90 percent of these costs.

⁵ National Safe Kids Campaign. Facts About Childhood Burns. 2006



SCALD PREVENTION FACT SHEETS FOR *COMMUNITY DISTRIBUTION*

- Hot food and beverage scalds
- Microwave scald prevention
- Tap water scald prevention
- Water heater thermostat settings and scald prevention
- Other causes of scald burns



HOT FOOD AND BEVERAGE SCALDS

Cooking-related scalds are common in all age groups, but are especially serious for young children, older adults and people with disabilities. Children get burned when they upset cups of coffee, hot tea, hot chocolate or other hot beverages, grab dangling appliance cords or pot handles, or pull on hanging tablecloths. Adults receive cooking related scalds from hot liquid spills or when attempting to move containers of hot liquids.

Although cooking-related scalds may cover a smaller surface area than tap water scalds, they are often deeper because of higher temperatures and, in the case of many foods, a thicker texture, which may stick to the skin longer. When these scalding foods and liquids come into contact with the thinner skin of a small child or older adult, they may cause a full-thickness burn which will require skin grafting surgery.

Steps you can take to make your home safer from food and beverage scalds include:

In the Cooking Area:

- ✓ Establish a safe area, out of the traffic path between the stove and sink, where children can safely play but still be supervised.
- ✓ Place young children in high chairs or playpens a safe distance from counter or stove tops, hot liquids, hot surfaces or other cooking hazards while preparing or serving food.
- ✓ Child walkers are extremely dangerous and should never be allowed in kitchens or bathrooms.
- ✓ Infants in child walkers have increased mobility and height and can more easily come in contact with dangling cords and pot handles.
- ✓ Provide safe toys for children, not pots, pans and cooking utensils, to occupy a child's attention. Young children are unable to distinguish between a "safe" or "play" pan that they perceive as a toy and one used for cooking, which they may reach for on the stove.
- ✓ Cook on back burners when young children are present.
- ✓ Keep all pot handles turned back, away from the stove edge. All appliance cords need to be kept coiled and away from counter edges. Curious children may reach up and grab handles or cords. Cords may also become caught in cabinet doors causing hot food and liquids to spill onto you or others. The grease in deep fat fryers and cookers can reach temperatures higher than 400 degrees and cause serious burns in less than 1 second.
- ✓ When removing lids from hot foods, remember that steam may have accumulated. Lift the cover or lid away from your face and arm.



- ✓ If young children want to help with meal preparation, give them something cool to mix in a location away from the cooking. Do not allow a child to stand on a chair or sit on the counter next to the stove.
- ✓ Children should not be allowed to use cooking appliances until they are tall enough to reach cooking surfaces safely. As children get older and taller and assume more cooking responsibilities, teach them safe cooking practices.
- ✓ Check all handles on appliances and cooking utensils to guarantee they are secure.
- ✓ Consider the weight of pots and pans. Lift only those items you can easily handle.
- ✓ Wear short sleeves or tight-fitting clothing while cooking.
- ✓ Always use oven mitts or potholders when moving pots of hot liquid or food.
- ✓ If area rugs are used in cooking areas, make sure they have non-slip

In the Dining Area:

- ✓ During meal time, place hot items in the center of the table, at least 10 inches from the edge.
- ✓ Use non-slip placemats instead of tablecloths if toddlers are present - young children may use the table cloth to pull themselves up causing hot food to spill down on them. Tablecloths can also become tangled in crutches, walkers or wheelchairs, causing hot liquids to spill.

Hot 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.
- ✓ Do not make hot coffee, tea or hot chocolate in a mug that a 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.

Special Considerations for People With Mobility Impairments:

- ✓ If it is necessary to move hot liquids while using a wheelchair, place a large, sturdy tray with a solid lip in your lap to decrease the risk of lap burns.
- ✓ A tray in the lap may also prevent burns from hot foods or beverages if someone is unsteady or shaky.
- ✓ Use a serving cart to transfer food from the stove to the table top instead of carrying it.



MICROWAVE SCALD PREVENTION

Microwave ovens are thought by many families to be “safer” than conventional ovens and stoves. In these families, young children may be permitted to use the microwave but not other heating appliances. However, they heat foods and liquids to very high temperatures, resulting in burns from spills, splashes and release of steam. The face and upper body are the most common areas burned on children. Hands, arms, abdomens and legs are more frequently injured with adults. In addition to reading and following manufacturer’s instructions, other microwave safety pointers include:

- ✓ Place microwaves at a safe height, within easy reach, for all users to avoid spills. The face of the person using the microwave should always be higher than the front of the door. All users should be tall enough to reach the microwave oven door, easily view the cooking area, and handle the food safely. Microwaves installed above counters or stoves can be a scald hazard for anyone.
- ✓ Children under age 7 should not operate the microwave unless they are closely supervised.
- ✓ 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.
- ✓ Steam, reaching temperatures greater than 200 degrees, builds rapidly in covered containers and can burn the face, arms and hands. Puncture plastic wrap or use vented containers to allow steam to escape while cooking. Or, wait at least one minute before removing the cover. When removing covers, lift the corner farthest from you and away from your face or arm.
- ✓ Steam in microwave popcorn bags is hotter than 180 degrees. Follow package directions, allow to stand one minute before opening, and open bag away from the face.
- ✓ Foods heat unevenly in microwaves. Jelly and cream fillings in pastries may be extremely hot, even though outer parts feel only warm.
- ✓ Microwaved foods and liquids may reach temperatures greater than boiling without the appearance of bubbling. Stir and test food thoroughly before serving or eating.



TAP WATER SCALD PREVENTION

Tap water scalds are almost completely preventable, through a combination of behavioral and environmental changes. Tap water scalds, common among young children, older adults and people with disabilities, are often more severe than cooking related scalds. For these high risk groups, hospitalization is longer and recovery more difficult.

Tap water scalds to children usually occur when a child is left unattended in the bathroom for even a brief time. This may happen when he or she is placed in water that is too hot, being bathed by an inexperienced caregiver (baby-sitter or older sibling), are in the tub when another child turns on the hot water, or when the child falls into the tub.

Tap water scalds to older adults or someone with a disability usually happen when they slip or fall in the tub or shower, when a caregiver fails to recognize that the water is too hot, when water temperature fluctuates due to running water in other parts of the home, or when a faucet or plumbing fixture malfunctions and the person is unable to escape a sudden burst of scalding water.

The safest temperature for bathing is about 100 degrees Fahrenheit / 37° C.

- ✓ **Adequate and constant supervision is the single most important factor in preventing tap water scalds.** Provide constant adult supervision of young children, anyone who may experience difficulty removing themselves from hot water on their own, or people who may not recognize the danger associated with turning on the hot water. If you must leave the bathroom when bathing a child, take them with you.
- ✓ Fill tub to desired level and turn water off before getting in. Run cool water first, then add hot. Turn hot water off first. This can prevent scalding in the event someone should fall in while the tub is filling. Mix the water thoroughly and check the temperature by moving your elbow, wrist or fingers with spread fingers through the water before allowing someone to get in. The water should feel warm, hot to touch.
- ✓ Do not leave the bathroom unattended while the tub is filling.
- ✓ Turn the faucet to the “COLD” position when not in use if the tub has a single faucet handle.
- ✓ Clearly mark the “HOT” water position on faucets.
- ✓ Do not allow young children or a person with a mental disability to adjust the water temperature.
- ✓ When bathing young children, seat the child facing away from faucets and so he or she can not reach the faucet. Turn the faucet to the “COLD” position.



- ✓ Set water heater thermostats to deliver water at a temperature no higher than 120° F/ 48° C. An easy method to test this is to allow hot water to run for three to five minutes, then test with a candy, meat or water thermometer. Adjust the water heater and wait a full day to allow the temperature to change. Re-test and readjust as needed.
- ✓ Install grab bars and non-slip flooring or mats in tubs or showers if someone is unsteady or frail. Use a shower chair or stool when bathing or showering if standing unassisted is a problem. Provide a way to call for help (bell or whistle) for people who may need assistance or may be unable to remove themselves from the tub or shower in case of emergency.
- ✓ Avoid flushing toilets, running water, or using the dish- or clothes-washer while anyone is showering to avoid sudden fluctuations in water temperature.
- ✓ Consider keeping the bathroom door closed when not in use.
- ✓ Reinforce these recommendations with baby-sitters and other care providers.
- ✓ Install anti-scald* devices. Thousands of people suffer scald injuries every year due to sudden surges of hot water. Anti-scald devices, anti-scald aerators, and scald guards are heat-sensitive devices that stop or interrupt the flow of water when the temperature reaches a pre-determined temperature (generally 110 to 114 degrees, but before it reaches 120°F / 48° C.) and prevent hot water from coming out of the tap before scalding occurs. These devices will not allow the faucet to become fully operational until the water temperature is reduced to a safe level. Some devices allow the resident to preset a comfortable maximum temperature to eliminate the risk of scalding. Whole house anti-scald mixing valves installed in a hot water line are also available.

*Anti-scald devices can simply and inexpensively be installed on most existing taps in showers, bathtubs and sinks. These are especially beneficial for people living in multi-family or apartment buildings when the family is unable to lower the temperature of the water heater. Anti-scald devices are available at some local hardware, plumbing and baby stores.

Caution: Each residence (house, apartment, mobile home, RV) has special plumbing needs. It is important to evaluate which type of device is best suited for your own home to protect your family from tap water scalds. It is also important to test the temperature with your hand or elbow.



WATER HEATER THERMOSTAT SETTINGS AND SCALD PREVENTION

Several points need to be emphasized to correct common misconceptions about water heaters and dangerous tap water temperatures. Please take a moment to review the information below.

1) 120 degrees Fahrenheit is an upper limit to safety, not a target to be aimed at.

Numerous safety brochures and public service announcements urge consumers to “set your water heater at 120 degrees”. This is a brief and misleading reference to the manufacturing standard established by the U.S. Consumer Product Safety Commission (CPSC). In fact, the Commission merely requires that the thermostats of residential hot water heaters be set at the factory to deliver hot water to the tap at a temperature that does not exceed 120° F/48°C. Many consumers will find it both effective and cheaper to set their thermostats to deliver hot water at a temperature below 120 degrees.

2) The research regarding time of exposure and temperature relationships used in setting scald safety standards was based on a normal adult model.

Standards based on this research have never been adjusted to account for the thinner skin in general of small children and older adults. Persons with altered peripheral circulation such as diabetics are also at increased risk for scald injuries and complications if a burn injury occurs. Such safety standards, which are set to provide guidelines for the overall well-being of a general population, also cannot be customized to account for the wide variation in thickness of skin on different body areas of any single person.

3) While the 120 degree temperature is considered “safe”, it is still higher than the comfortable bathing temperature for most people and potentially dangerous to many.

Water not hot enough to burn on a brief exposure may be hot enough to cause someone to fall while attempting to adjust the temperature or escape discomfort in the tub or shower, and not be able to get back up. They may also slip or suffer a fainting spell. In any of these cases, they may suffer a scald injury from a continuing exposure to water that would not cause an injury in a brief exposure.

4) Water heater thermostats do not have numerical settings.

Unlike the temperature of household air, which can be maintained by thermostats within a range of a few degrees, the actual temperature of hot water may vary greatly, depending on the distance from the heater to a particular tap, which may vary widely in a multi-unit building, and recent hot water use for bathing or cleaning. We normally adjust water temperature by mixing cold water with hot, rather than constantly resetting the water heater thermostat.



OTHER COMMON CAUSES OF SCALD BURNS

Potpourri pots, especially those filled with oil, reach very high temperatures.

- ✓ Locate potpourri pots where they can not be tipped and out of the reach of children.

Hot Steam Vaporizers, especially: older models which often work at very high temperatures.

- ✓ Replace hot steam vaporizers with a cool mist humidifier or vaporizer.

If you must use a steam vaporizer:

- ✓ Place on a level surface to prevent tipping.
- ✓ Keep out of the reach of children.
- ✓ Allow the water to cool before emptying the vaporizer.

Home Radiators

- ✓ Do not remove or release pressure valves.
- ✓ Repairs should be performed by a professional.

Car Radiators. Car radiator scalds primarily affect adult males.

- ✓ Radiator caps are clearly marked “DO NOT REMOVE CAP WHEN ENGINE IS HOT” or with a similar warning for a good reason
- ✓ When the car is running and the radiator working properly, the temperature of the fluid is normally between 195 and 220° degrees - hot enough to cause serious burns in less than one second. When the radiator overheats, the temperature increases drastically and pressure builds. When the cap is removed, the liquid boils or even explodes out, causing serious injuries. Faces, hands, arms and chests are the most common areas burned. In addition to scalds, radiator fluid contains antifreeze which may cause chemical burns.
- ✓ **Prevention is simple - do not remove the cap until the engine has cooled.**



GETTING THE MESSAGE TO THE MEDIA

- Sample press releases
- Sample Public Service Announcements



Sample Press Release #1

For Immediate Release

Contact: Local person and title
Local phone number
or American Burn Association 312-642-9260

Scalds - A Burning Issue

(Dateline: City and Date)

Scald injuries affect all ages. Young children and the elderly are most vulnerable. This is why the American Burn Association wants to provide you with information on scald injury prevention.

Annually in the United States and Canada, over 500,000 people receive medical treatment for burn injuries. Roughly half of these injuries are scalds. *(Insert statistics from regional burn center if available)*. Most burns occur in the home, usually in the kitchen or bathroom.

Scalds can be prevented through increased awareness of scald hazards and by making simple environmental or behavioral changes. These include providing a “kid-safe” zone while preparing and serving hot foods and beverages, and lowering the water heater thermostat to deliver water at a temperature not to exceed 120 degrees.

For more information about preventing scalds, contact *(local organization)* at *(phone number)*.



Sample Press Release #2

For Immediate Release

Contact: Local person and title
Local phone number
or American Burn Association 312-642-9260

Scalds - A Burning Issue

(Dateline: City and Date)

Scald injuries are painful and require prolonged treatment. They may result in lifelong scarring and even death. Prevention of scalds is always preferable to treatment and can be accomplished through simple changes in behavior and the home environment.

In conjunction with Burn Awareness Week, *(date)* the American Burn Association *(and local organization)* is providing information relating to scald burns for use in your own communities.

“Although anyone can sustain a scald burn, certain people are more likely to be scalded --- infants, young children, older adults and people with disabilities. These high risk groups are also more likely to require hospitalization, suffer complications and experience a difficult recovery” says *(local fire department, burn center or support organization representative)*
“Most burn injuries occur in the person’s own home and the vast majority of these injuries could have easily been prevented.”

Tap water scalds are often more severe than cooking-related scalds. The American Burn Association recommends the following simple safety tips to decrease the risk to yourself and those you love from tap water scalds.

- Set home water heater thermostats to deliver water at a temperature no higher than 120 degrees Fahrenheit / 48 degree Celsius. An easy method to test this is to allow hot water to run for three to five minutes, then test with a candy, meat or water thermometer.



Community Fire & Burn Prevention Programs
Scald Injury Prevention Campaign

Adjust the water heater and wait a day to let the temperature drop. Re-test and re-adjust as necessary.

- Provide constant adult supervision of young children or anyone who may experience difficulty removing themselves from hot water on their own. Gather all necessary supplies before placing a child in the tub, and keep them within easy reach.
- Fill tub to desired level before getting in. Run cold water first, then add hot. Turn off the hot water first. This can prevent scalding in case someone should fall in while the tub is filling. Mix the water thoroughly and check the temperature by moving your elbow, wrist or hand with spread fingers through the water before allowing someone to get in.
- Install grab bars, shower seats or non-slip flooring in tubs or showers if the person is unsteady or weak.
- Avoid flushing toilets, running water or using the dish- or clothes washer while anyone is showering.
- Install anti-scald or tempering devices. These heat sensitive instruments stop or interrupt the flow of water when the temperature reaches a pre-determined level and prevent hot water that is too hot from coming out of the tap.

Cooking-related scalds are also easy to prevent. Some things you can do to make your home safer from cooking-related burns include:

- Establish a “kid zone” out of the traffic path between the stove and sink where children can safely play and still be supervised. Keep young children in high chairs or play yards, a safe distance from counter- or stovetops, hot liquids, hot surfaces or other cooking hazards.
- Cook on back burners when young children are present. Keep all pot handles turned back, away from the stove edge. All appliance cords should be coiled and away from the counter edge. During mealtime, place hot items in the center of the table, at least 10 inches from the table edge. Use non-slip placemats instead of tablecloths if toddlers are present. Never drink or carry hot liquids while carrying or holding a child. Quick motions may cause spilling of the liquid onto the child.

For more information about preventing scald burns, contact the American Burn Association at 312-642-9260 or www.ameriburn.org. *(Local information for contacts can be inserted here instead.)*



Community Fire & Burn Prevention Programs
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Sample Public Service Announcements

SUBJECT

HOT LIQUIDS
SCALD PREVENTION

CONTACT

Name: _____
Organization: _____
Telephone: _____

Start use: Immediately
Stop use: Indefinitely

READING TIME: 10 SECONDS

Hot liquids burn like fire and can injure the people you love. Call the (insert local identification) for scald prevention tips at (phone number).

READING TIME: 20 SECONDS

Scalds are the number one cause of burn injuries to small children. The (insert local identification) reminds you to supervise young children near stoves and cooking appliances

For more burn safety tips, call (insert local identification) at (phone number).

READING TIME: 30 SECONDS

“Hot liquids burn like fire!” That is just one of the messages the (insert local identification) wants you to remember this week. Scalds are the number one cause of burn injuries to children under four. Remember to supervise children when you are cooking or drinking hot liquids and to turn water heaters down to deliver hot water at less than 120 degrees Fahrenheit. For more burn safety tips, call (insert local identification) at (phone number).



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Community Fire & Burn Prevention Programs
Scald Injury Prevention Campaign

EVALUATION FORM

SCALD INJURY PREVENTION

We appreciate any suggestions and recommendations for future improvements in the community fire and burn prevention education programs. Please take a moment to print and complete this form; return it to the American Burn Association, 625 N. Michigan Ave., Suite 2550, Chicago, IL 60611 (Fax - 312-642-9130). Thank you.

Name (optional) _____ Date: _____

Affiliation: Hospital _____ Fire Service ____ Burn Support Organization _____
Other (describe) _____

1. Did the content covered in the campaign kit meet your learning needs?
Yes No

2. If you answered no, please tell us what we should add, or subtract?

3. Did the length of the topic coverage provide what you needed?
Yes No

4. Were the fact sheets helpful?
Yes No

5. What did you like most about this campaign?

6. What did you like least about this campaign?

7. What pieces of this campaign did you use? Please check all that apply.

___ Statistics

___ PSAs

___ Fact Sheets

___ PowerPoint Presentation

___ Press release

