



BURNS

A burn is an injury to tissue resulting from heat, chemicals, electricity, or radiation.



1st degree burn

Although the skin is usually the part of the body that is most susceptible to burns, the underlying tissues are also vulnerable to injury, and internal organs can be burned even when the skin is not. For example, drinking a very hot liquid or caustic substance such as acid can burn the *esophagus* (the tube leading from the throat to the stomach) and stomach. Smoke and hot air from a fire can easily burn the *trachea* (the airway passage from the throat to the lungs), and lungs. When tissues are damaged by burn injuries, they lose their ability to perform normal barrier functions. When this happens, fluid leaks from blood vessels into the surrounding area, causing overall swelling. If the burn is extensive, a large amount of fluid may escape from abnormally leaky blood vessels causing *shock*, a life-threatening condition in which blood pressure is too low to deliver adequate amounts of blood to vital organs.

TYPES OF BURNS

THERMAL BURNS

Thermal burns occur when an external heat source raises the temperature of skin and deeper tissues to a level that causes cell death. The most common causes of thermal burns are flame, scalding liquids, and hot objects or gases contacting the skin. Sunburns also fall into this category.

ELECTRICAL BURNS

Electric currents passing from the electrical source to the body generate electrical burns. This type of burn often completely destroys and chars the skin at the point where the current enters the body. Because the *resistance* (the body's ability to slow the current's flow) is highest where the skin touches the current's source, much of the electrical energy is converted to heat there, burning the surface. The effective heat transferred to the skin reaches 9,000 degrees Fahrenheit. Most electrical burns also severely damage the tissues underneath the skin causing tissue death to areas much larger than suggested by surface findings. Large electrical shocks can paralyze breathing and cause dangerous disturbances in the heart's rhythm.

CHEMICAL BURNS

Many corrosive substances and poisons have the capacity to cause serious injury to the skin and penetrate into the deeper tissues. Chemical burns may cause tissue death that spreads for hours after the burn.

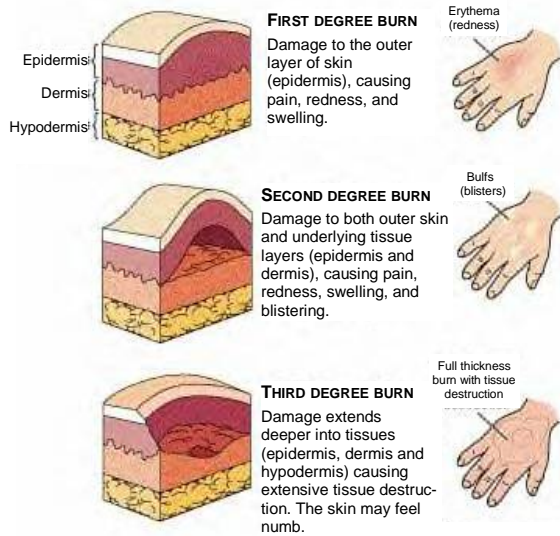
RADIATION BURNS

Prolonged exposure to the sun's ultraviolet radiation causes burning to the skin's delicate surface, usually called *sunburn*. Prolonged or intense exposure to other sources of ultraviolet radiation (eg. tanning beds or x-rays), may also burn the skin.

SYMPTOMS

The severity of a burn depends on the amount of tissue affected and the depth of the injury. Burns are usually classified as first, second, or third degree burns based on the deepest layer of skin involvement.

THE THREE DIFFERENT DEGREES OF BURNS



First-degree burns are the least severe. The burned skin becomes red, painful, sensitive to touch, and moist or swollen. The burned area whitens (blanches) when lightly touched, but no blisters develop (see below).

Second-degree burns damage deeper layers of skin causing blisters. The bases of the blisters are usually red or whitish and may be filled with a clear, thick fluid. The burn is painfully sensitive to the touch and may *blanch* when touched (see below).

Third-degree burns cause damage to every layer of the skin producing a *full thickness* burn. The surface of the injured area may be white and soft, or it may be black, charred, and leathery. While the skin may be pale, and mistaken for normal, it can be differentiated by the fact that it does not *blanch* when touched. Damaged red blood cells in the injured area may cause the burn to appear

bright red. Hairs in the burned area may be easily pulled from their roots, and rarely blisters may develop. Generally, third-degree burns are not painful, because the nerve endings in the skin have been destroyed. As a result, the patient has no feeling in the area of the burn. Distinguishing between deep second-degree burns and third-degree burns is difficult until days after the injury.

COMPLICATIONS

Victims under the age of 4 or over the age of 60 have a higher incidence of complications and, consequently, a higher death rate. Burns on the face, hands, feet, and genitalia are most serious, because of possible loss of function. Complications such as shock, respiratory track injury, and infection are more life threatening than local effects.

Fluid escape from damaged vessels leads to *shock*. In this situation, the leaky blood vessels can not keep enough fluid inside to maintain adequate pressure to get blood to the vital organs. Without blood and the oxygen it carries, the organs quickly fail and die.

Inhalation of toxic substances often present in structural fires may result in injury to the entire upper airway, and may severely inhibit the body's ability to transport oxygen. Chemical injury to the small structures of the lower airway may cause progressive respiratory failure. Thermal, or *heat induced*, injury can cause swelling of the respiratory structures obstructing the airway. If a person is experiencing a decreased level of consciousness, the lower respiratory tract might also be injured by the inhalation of hot gases.

Infection, even in small burns, is an extremely important barrier to recovery. The conditions established by even a minor burn provide an optimal setting for bacterial growth. Infection has the potential to cause life-threatening complications, and is a major source of scarring and disfigurement following a burn.

TREATMENT

About 85 percent of burns are minor and can be treated effectively and safely at home, in a doctor's office, or in an emergency room. Removing all clothing helps stop the burning and prevents further injury. Chemicals should be washed off the skin as soon as possible with large amounts of water. Make sure the victim is up-to-date on tetanus immunization.

Hospitalization is more likely to be needed in the following situations:

- The face, hands, genitals, or feet are burned
- The person would have difficulty caring for the wound adequately at home
- The person is under 2 or over 70 years old
- Internal organs are burned

CONSIDERATIONS

Before giving first aid, consider how extensively the victim is burned, try to assess the depth of the most serious aspect of the burn and attend to the entire burn according to the most severe section. Knowing how the burn occurred is helpful, since different sources cause different types of burns.

Giving immediate first aid before professional medical help on the scene may lessen the severity of the burn, helping to prevent scarring, disability, and deformity.

WHAT TO IN AN EMERGENCY:

- Remove the victim from the source of the burns.
- If the person's clothing is on fire, lay him or her on the ground so the burning clothing is on top.
- Smother the flames with a blanket or coat, or tell the person to roll over slowly to smother flames
- **Call 911 or go to an emergency facility immediately if:**
 - The burns cover more than a small area.
 - The burns involve the face, hands, feet, or genital area.
 - The burns appear to be third-degree.
 - There is a chemical or electrical burn, or there is uncertainty about the severity of the burn.
 - The victim shows signs of shock.
 - The victim has an airway burn.
- **If the person appears to be unconscious, check his or her ABC's:**
 - Lift the chin to open the **A**irways.
 - Check the **B**reathing.
 - Check for **C**irculation or a pulse.
- If the person is not breathing, begin CPR.
- Remove any clothing from or jewelry from the burned area, as long as it is not stuck to the burned skin.
- Elevate a burned arm or leg so that it's above heart level to reduce swelling.

- Take steps to prevent shock:
 - Lay the victim flat, elevate the feet about 12 inches, and cover the victim with a coat or blanket.
 - Do not place the victim in the shock position if a head, neck, back, or leg injury is suspected or if it makes the victim uncomfortable.
- Continue to monitor the victim's vital signs (pulse, rate of breath, blood pressure or strength of pulse) until medical help arrives.
- If the victim is conscious and still breathing, you may give small sips of water.
- **Things to avoid**
 - DO NOT apply ointment, butter, ice, medications, fluffy cotton dressing, adhesive bandages, cream, oil spray, or any household remedy to a burn. This can interfere with proper healing.
 - DO NOT allow the burn to become contaminated.
 - Avoid breathing or coughing on the burn.
 - DO NOT disturb blistered or dead skin.
 - DO NOT give the victim anything by mouth if there is a severe burn.
 - DO NOT apply cold compresses or immerse a severe burn in cold water as this can cause shock.
 - DO NOT place a pillow under the victim's head if there is an airway burn and he or she is lying down. This can close the airway.

SYMPTOMS OF SHOCK	
Anxiety, nervousness	Numbness
Bluish lips and fingernails	Paleness
Chest pain	Profuse sweating, moist skin
Cool, clammy skin	Rapid pulse
Decreased or no urine output	Shallow breathing
Dizziness	Excessive thirst
Faintness	Unconsciousness
Nausea and vomiting	Weakness
Confusion	

SYMPTOMS OF AN AIRWAY BURN	
Charred mouth; burned lips	Coughing
Burns on the head; face or neck	Singed nose hairs or eyebrows
Difficulty breathing	

FIRST AID FOR MINOR BURNS

- If the skin is unbroken, and the injury did NOT occur in a cold environment, run cool water over the burn, or soak it in cool water.
- Do not use ice or ice water. Keep the area submerged for at least 5 minutes. A clean, cold, wet towel may also help reduce pain.

- Calm and reassure the victim. Burns tend to be extremely painful.
- After rinsing or soaking for several minutes, cover the burn with a sterile bandage or clean cloth.
- Protect the burn from pressure and friction.
- Over-the-counter pain medication may be used to help relieve the pain; they may also help reduce inflammation and swelling.
- Minor burns will usually heal without further treatment. However, if a second-degree burn covers an area more than 2 to 3 inches in diameter, or if it occurred on the hands, feet, face, groin, buttocks, or a major joint, then treat the burn as a major burn (see below).

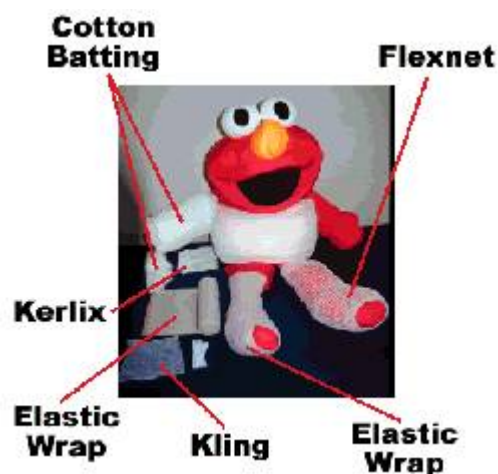
If the burn does not heal normally, get medical advice. For extensive but superficial burns, keep dressings clean and dry and change them often. If signs of infection develop (see below), get medical help immediately.

SIGNS OF INFECTION	
Increased pain	Drainage from the burn
Redness	Swollen lymph nodes
Swelling	Red streaks spreading from the burn toward the heart
Warmth around the area of the burn	

MEDICAL TREATMENT

At a doctor's office or emergency department, a burn will be cleaned carefully with soap and water to remove all debris. If dirt is deeply embedded, the doctor may anesthetize the area and scrub it with a brush or remove pieces of debris or dead skin with special instruments. Broken blisters and ones that appear extremely fragile are usually removed. Once the area is clean, the doctor or his/her assistant will usually apply an antibiotic cream such as *Silvidine*. Over the cream, the medical practitioner will dress the burn with a bandage to protect the burned area from contaminants in the environment, and from further injury. There are a number of different dressings available, and the doctor will make a choice based on the characteristics of the burn and the special needs of the patient.

It is extremely important to keep the area clean because once the top layer of skin (*epidermis*) is damaged, infections can start and spread easily. Occasionally the doctor will prescribe an antibiotic to prevent infection, but usually adequate care is all that is necessary. The patient will receive a tetanus booster if it has been less than 5-10 years since his/her last one.



A burned arm or leg is usually placed higher than the level of the heart to reduce swelling. Maintaining this position may be possible only in the hospital, where part of the bed can be raised or traction can be used. If the burn affects a joint and is of second or third degree, the joint may have to be immobilized with a splint because movement may worsen the injury. The doctor will provide an analgesic, often a narcotic, for at least a few days to control the pain.

SEVERE BURNS

More severe burns require immediate care, preferably at a hospital specially equipped to treat burns. Rescue or ambulance personnel usually place an oxygen mask over the burn victim's face to help overcome the effects of carbon monoxide, a poisonous gas often formed in fires. In the emergency department, doctors and nurses check the patient's airway to, examine for other injuries, start an IV to replace fluids, and begin antibiotic treatment. Hyperbaric oxygen therapy, in which the patient is placed in a special chamber with oxygen at increased pressure, is occasionally used to treat severe burns, however, it must be started within 24 hours of the burn and is not widely available.

If the airways and lungs have been injured in a fire, a tube may be inserted through the mouth into the chest to assist breathing. The decision to insert the tube (*intubate*) depends on such factors as the rate of breathing. Breathing either too rapidly or too slowly keeps the lungs from filling with enough air and impairs transport of oxygen to the blood. A tube may be needed when the face is directly injured or swelling in the throat threatens breathing. If breathing is normal, the oxygen given through a facemask may be all that's needed.

After the doctor cleans the burned area, an antibiotic cream or ointment is often applied, and the area is covered with sterile bandages. The bandages are usually changed two or three times a day. Because extensive burns are extremely susceptible to severe infections, antibiotics may be given intravenously. A tetanus booster may also be given if the patient's immunizations are not up to date.

Burned skin develops a thick, crusty surface called *eschar*, which can become taut and restrict blood flow to the area. Restricted blood flow can be dangerous if the burn completely surrounds an arm or a leg. A doctor may need to cut through the *eschar* (*escharotomy*) to relieve the tension on the healthy tissue under it. Even a deep burn can heal itself if the area is small (no larger than a 50-cent piece) and is kept meticulously clean. However, if the underlying *dermis* is damaged extensively, a skin graft may be needed to cover the burned area. A skin graft is a piece of healthy skin taken from unburned areas of the burn victim's body (*autografts*), from another living or dead person (*allografts*), or from another species (*xenografts*)—usually pigs because their skin is most similar to human skin. Autografts are permanent, but skin grafts from other people or animals are temporary, protecting the area while the body heals itself. The body rejects the allograft or xenograft 10 to 14 days later.

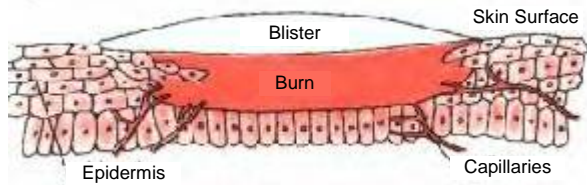


Immature donor site (left) is red and may be painful and itch. A mature donor site (right) is less red, does not itch and is no longer painful.

Grafted areas are immobilized or splinted until adequate healing has taken place. Adequate nutrition is vitally important in burn healing and the patient must consume an adequate amount of calories for healing to occur. Those who can't eat enough may drink nutritional supplements or receive them by way of a tube inserted through the nose into the stomach (a *nasogastric tube*). If the intestines aren't functioning because of an injury or repeated operations, nutrients can be given intravenously.

Because severe burns take a long time to heal, sometimes years, a burn victim can become severely depressed. Most burn centers provide psychologic support for their patients through social workers, psychiatrists, and others.

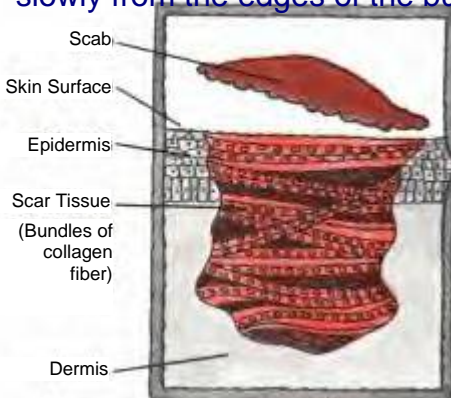
PROGNOSIS



Time and extent of the healing process depends on both the depth and the location of the burn. In superficial burns (first-degree and superficial second-degree burns), the dead layers of skin slough off, and the top layer of skin (*epidermis*) re-grows to cover the layers below. A new layer of epidermis usually grows quickly with little or no scarring. The deeper layer of skin

(*dermis*), which can't regenerate, is not destroyed in first degree and superficial second degree burns.

Deeper burns reach the *dermis* and cause more significant injury. A new layer of epidermis grows slowly from the edges of the burned area and from any remnants of the epidermis in the burned



area. Consequently, healing is very slow and scarring is considerable. The burned area also tends to contract, distorting the skin and interfering with its functioning.

Mild burns of the esophagus, stomach, and lungs generally heal without problems. More severe burns, however, can lead to scarring and narrowing, called *contractures*. If the scarring is extensive, the doctor may suggest surgery for either cosmetic or functional reasons. In the esophagus, scarring has the potential to block the passage of food. Scarring in the lungs can prevent the normal transfer of oxygen from inhaled air to blood in the lungs.

FIRE

In 1999, more than 2,900 people were killed and another 16,425 were injured in home fires in the United States. Older adults, children younger than five years old, and people in substandard housing or mobile homes are at the highest risk for fire-related deaths. Each year, more than 600 children ages 14 and under die, and nearly 47,000 are injured, in fires. Kids are at grave risk of injury and death from residential fires because they have less control of their environment than adults and limited ability to react appropriately. More than 40 percent of residential fire-related deaths among children ages 9 and under occur when the child is attempting to escape, is unable to act or is acting irrationally. Older kids are often at risk due to their own curiosity. Studies indicate that an estimated 38 percent of children ages 6 to 14 have played with fire at least once. Child-play home fires tend to begin in a bedroom where children are left alone. Children playing with matches or lighters start nearly 80 percent of these fires. Boys are nearly twice as likely as girls to play with fire. More than half of the children under age 6 who die are asleep at the time of the fire, and another one-third of them are too young to react appropriately. Although an escape plan may help to reduce these deaths, only 26 percent of households have developed and practiced a plan.

OTHER RISK FACTORS:

- Children in homes without working smoke alarms are at the greatest risk. Households without working smoke alarms are approximately two and a half times more likely to have a fire in their homes.
- Home cooking equipment is the leading cause of residential fires and fire-related injuries. Heating appliances, including portable space heaters, can ignite furniture and other com-

bustibles left too close to the heater However, residential fires caused by smoking materials (i.e. cigarettes) are the leading cause of fire-related death, accounting for nearly 23 percent of all fatalities. Alcohol use and fires are also a deadly mix. One study found that intoxication contributed to 40% of deaths due to home fires

- Home fires and fire-related deaths are more likely to occur during the cold weather months, December through February, when there is a significant rise in the use of portable or area heating equipment such as fireplaces, space heaters and wood stoves.
- Children living in rural areas have a dramatically higher risk of dying in a residential fire. Death rates in rural communities are more than two times higher than in large cities, and more than three times higher than in large towns and small cities.

PREVENTION

One of the most important fire safety devices for the home is one that provides a warning before the area becomes filled with toxic gases- the smoke alarm. Most victims of fires die from smoke or toxic gases rather than from burns. Poisonous gases from fire can spread quickly and far from the fire itself to claim victims who are asleep and not aware of the fire. Even if people awaken, the effects of exposure to these gases can cloud their thinking and slow their reactions so that they cannot escape. That is why it is so important for people to have early warning so they can escape before their ability to think and move is impaired.

Studies have shown that in a fire, smoke alarms cut the chances of dying in half. As many as 93% of U.S. homes have at least one smoke alarm, but one in four homes with smoke detectors have non-working alarms. People with non-working smoke alarms most often report that they disconnected or removed the battery to stop nuisance alarms, or they forgot to replace the old battery.

AVOID HOME FIRES

- Smoking materials, such as cigarettes, are the leading cause of fire deaths.
 - If you are a smoker, do not smoke in bed; never leave burning cigarettes unattended; do not empty smoldering ashes in a trash can; and keep ashtrays away from upholstered furniture and curtains.
- The most common causes of residential fires are cooking and heating equipment. The leading cause of cooking fires is unattended cooking, and most heating related fires involve space heaters.
 - When cooking, never leave food on a stove or in an oven unattended. Keep cooking areas free of flammable objects such as potholders and towels. Avoid wearing clothes with long, loose-fitting sleeves while cooking.
 - Portable space heaters should not be placed near flammable materials, like drapes. Space heaters should be turned off every time you leave the room or go to sleep.
- Residential fire injuries most often result from cooking fires or fires set by children playing with matches.
 - Keep matches and lighters away from children's reach
- Other residential fire prevention safety tips:
 - Safely store flammable substances used around the home (for example, gasoline or paint thinner).
 - Never leave burning candles unattended.



FIRE SAFETY

Residential fires can be dangerous and destructive, but you can reduce your risk for fire-related injuries if you follow a few simple tips.

- **Install smoke alarms outside each separate sleeping area and on every floor of your home, including the basement.**
 - CDC suggests using smoke alarms with lithium-powered batteries and a "hush button." A lithium-powered battery lasts up to 10 years, and a hush button allows you to quickly stop nuisance alarms that are caused by such things as steam or oven smoke.
 - If 10-year, long-life smoke alarms are not available, install smoke alarms that use a regular 9-volt battery, but be sure to replace the battery every year. (A useful tip to help you remember: when you change your clocks to standard time in the fall, change the battery. Or pick a fall holiday like Halloween or Thanksgiving to change the battery.)
 - Smoke alarms have a useful life of about 10 years. At that age the entire alarm should be replaced, even if it seems to be working.
 - Test smoke alarms every month to make sure they work properly. This can be done by pushing the test button. If the smoke alarm is out-of-reach, you can push the test button with a broom handle or yard stick
- **Make a family fire escape plan and practice it every 6 months.**

In a typical home fire, people have only about 2 minutes to get outside. It's easy for anyone to panic and be confused during that short time, especially children. During a fire, children often try to hide in a closet or under beds where they feel safe rather than going outside. That's why it's so important to make a fire escape plan for everyone in the family and practice it at least twice a year. However, in a national survey, only 53% of respondents said they had a plan to follow if there were a fire in their home, and of these, only 3 of 10 had ever practiced the plan.

In the plan, discuss at least two different ways to get out of every room and choose a safe place **in front of the house or apartment building** for family members to meet after escaping a fire. Having a meeting place will let you know that everyone has gotten out safely, and no one will get hurt looking for someone who is already safe.

- **Talk with your family about what to do in the event of a fire:**
 - Get out as fast as possible and go to your family's designated meeting place.
 - Do not stop to grab photographs or other belongings.
 - Do not go back into a burning house or apartment building.
 - Call the fire or rescue department from a neighbor's house.
 - If there is smoke in the room, stay low or crawl to your exit.
 - If you cannot escape, put wet towels or fabric around doors to block off smoke, crawl to a window, and open it. Yell out the window for help and wave a sheet or cloth for attention. If there is a phone in the room, call for help.
- **Teach children to stop, drop, and roll.**

Clothing fires are a major cause of burn injuries to children. Children can set their clothes on fire by playing with matches or getting too close to open fires or stoves. If this happens, children's natural reaction is to run, which will make the situation worse. Parents should teach their children the "stop, drop, and roll" maneuver to smother the flames. This has saved many lives, and parents should practice the maneuver with their children. The moment clothes start to burn:

 - **stop** where you are,
 - **drop** to the ground,
 - and **roll** over and over with your hands covering your face.

SCALDING INJURIES

Open flames and hot objects are not the only avenues for burn injuries. Even more common are serious scalding burns from liquids, such as coffee, tea, soup and even hot bath water. Scalds are the number one cause of burn injury to children under age four. Many scalding injuries can be avoided by taking some simple precautions.

HOME SAFETY

In the kitchen

- Never leave cooking unattended.
- Cook on the back burners whenever possible and turn pot handles toward the rear of the stove, out of the reach of young hands.
- Keep young children out of the kitchen when you are handling hot liquids.
- If possible, occupy toddlers in a playpen or a highchair, where they can be easily supervised and restrained.
- Do not drink hot liquids while holding your child.
- Remember that children move fast and can easily bump your cup or bowl, spilling hot liquid onto themselves or you.
- Keep the cords short on appliances such as electric teapots and deep-fat fryers -- long cords can be tripped over or pulled.
- Do not use a tablecloth around young children; they may pull on it and bring hot food down on themselves.
- Do not let the microwave mislead you. It may not get hot to the touch, but the foods and liquids we cook in it can cause serious burns. So when you use your microwave, remember:
 - Follow the printed instructions when microwaving packaged foods.
 - If the instructions say not to microwave the food, take the extra few minutes to warm it conventionally.
 - Remove the lid carefully when taking a dish out of the microwave -- the steam that has built up inside the dish can cause a nasty burn.
 - Do not let children use the microwave until they are old enough to follow directions and handle hot foods carefully.
 - Even then, it is best to supervise them.
 - Before serving microwaved food, stir and test it to eliminate the hot spots often caused by microwaving. This is especially important with baby food.
 - Do not use the microwave to warm a baby's bottle. The hot spots could scald a tender young mouth.

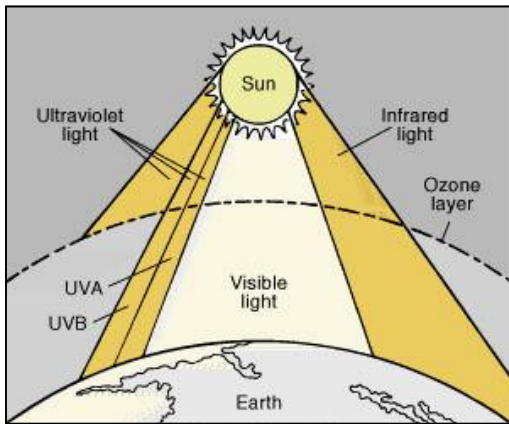
In the bathroom

- Your water heater should be turned down as low as possible -- it should never be above 120 degrees Fahrenheit. (If you have a dishwasher, consult the operators manual for the lowest effective water temperature setting.) Water at 133 degrees Fahrenheit can cause third-degree burns in just 15 seconds.
- Never put a baby or child in a bathtub before testing the water yourself. Test the water with your elbow or the back of your wrist -- not your hand. Water temperature should be 100 degrees Fahrenheit or lower. Never leave children unattended in the bath. Aside from the danger of drowning, your child could receive a life-threatening scald in just a few seconds if he or she manages to turn on the hot water.

If a scalding burn occurs, examine it to see what type of burn it is. Your child may need to see a doctor immediately. Check the burn to see if the skin is intact and whether the burned area hurts when touched.

The most serious burns are deeper ones with loss of both skin and tactile sensation. Seek emergency treatment if you notice discoloration under extensive areas of peeling skin. Second- and third-degree burns leave skin blistered and charred. These burns require immediate medical attention. A first-degree burn leaves skin red and slightly swollen. If a burn covers a large part of the body, you need to see a doctor immediately. Otherwise, you can treat a first-degree burn at home by immersing it in cold water and then covering it with burn ointment, petroleum jelly or a thin layer of baking soda. Do not put butter, margarine or a greasy substance on the burn. Loosely bandage the area, allowing exposure to air.

SUNBURNS



Although a suntan is often considered an emblem of good health and an active, athletic life, tanning for its own sake is actually a health hazard. Any exposure to UVA or UVB light can alter or damage the skin. Long-term exposure to natural sunlight or the artificial sunlight in tanning parlors may cause long-term skin damage. Quite simply, there's no "safe tan."

The sun radiates energy of different wavelengths; for example, yellow light has a longer wavelength than blue light. Ultraviolet (UV) wavelengths are shorter than wavelengths of visible light and can damage living tissue. Fortunately, the ozone layer of the earth's upper atmosphere filters out the most damaging UV wavelengths, but some UV light, chiefly in the A (UVA) and B

(UVB) wavelength bands, penetrates to the earth and can cause skin damage.

The character and amount of UV light varies according to season, weather, and geographic location. Because of the way light slants through the atmosphere at different times of the day in temperate zones, skin exposure is less hazardous before 10 A.M. and after 3 P.M. The potential for damage is greater at higher altitudes where the protective atmosphere is thinner.

The amount of UV light reaching the earth's surface is increasing, especially in the northern latitudes. That's because chemical reactions between ozone and *chlorofluorocarbons* (chemicals in refrigerants and spray can propellants) are depleting the protective ozone layer, creating a thinner atmosphere with some holes.

Skin, especially in the desert climates, is constantly exposed to the danger of sunburn. Reflective glare of sun on water increases the risk of sunburn dramatically. Children, especially very young children, are particularly vulnerable.

Young children have very thin skin compared to older children and adolescents. Excess exposure to the sun's rays can cause a blistering sunburn (a *second-degree burn*) in less than an hour. Children who have experienced blistering sunburns have a significantly higher risk of developing a severe form of skin cancer, *malignant melanoma*, later in life.



PROTECTION

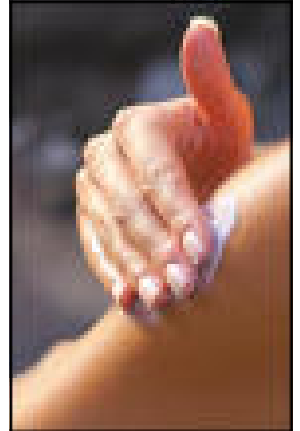
The best way to protect children from damaging ultraviolet (*UV*) rays of the sun is to shade them or to cover the skin with clothing.

Infants

- Infants should wear a hat with a wide brim or edge whenever they are outdoors.
- They should travel in a shaded stroller or carriage.
- If infants must be at the beach or at poolside, they should be under an umbrella and away from direct sunlight at all times.

Older Children

- Older children should wear shirts or cover-ups when possible.
- A hat with a brim is a great way to shade the face.
- Sunglasses are recommended to protect their eyes from the development of cataracts later in life.
- Sunscreens with *PABA*, or other UV blocking components should be worn on exposed areas at all times.
- Sunscreens are rated according to the amount of sun protection factor (SPF) that they contain: *A sunscreen with SPF 15, for example, means that a child can be in the sun safely 15 times longer than if the child didn't use any sunscreen at all.*
- In general, children should use a sunscreen with SPF 15, and some very fair children can use SPF 30. It should be reapplied several times during the day because it is removed by swimming, towel drying or sweating. SPF 45 is rarely necessary.
- Zinc oxide ointment will totally prevent sun exposure on the nose, tops of the ears and tops of the shoulders.
- Limit sun exposure when possible. Cover up with towels and beach blankets when not swimming, and picnic in the shade.
- Provide a good example for your children by applying sunscreen to your skin and by not "sunbathing" to get a tan.
- Plan not to spend the entire day at the beach or pool, and avoid the brightest sun at mid-day.



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