

## **H. SKIN, BURNS, HEAT EXHAUSTION, FEVER AND HYPOTHERMIA**

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In this chapter you will learn about:

- The skin.
- Burn wounds.
- Dry burns and scalds (burns from fire, heat and steam).
- Electrical burns.
- Chemical burns.
- Sun burns, heat exhaustion and heatstroke.
- Frost bites (cold burns).
- Prevention of burns.
- Fever.
- Hypothermia.

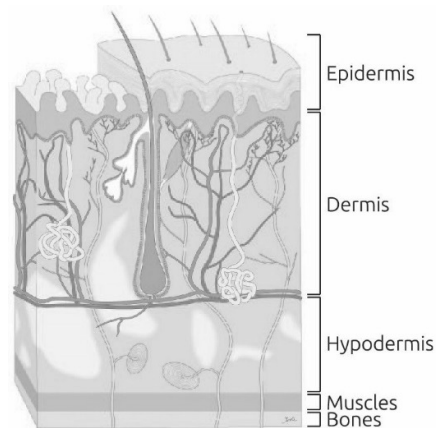
## H.1 THE SKIN

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Skin is the largest organ on our body, made up of several different components including water, protein, lipids and different minerals and chemicals.

Throughout life the skin changes and regenerates itself approximately every 27 days.

Proper care and treatment is essential for maintaining the health and vitality of this crucial protection.



The skin consists of three layers: *epidermis*, *dermis* and *hypodermis*.

### H.1.1 THE OUTER LAYER: EPIDERMIS

It's the thinnest layer, but it's responsible for protecting you from the harsh environment, with five layers of its own: *stratum germinativum*, *stratum spinosum*, *stratum granulosum*, *stratum lucidum*, and *stratum corneum*.

The epidermis also hosts different types of cells: *keratinocytes*, *melanocytes* and *Langerhans cells*. Keratinocytes produce the protein known as keratin, the main component of the epidermis. Melanocytes produce the skin pigment, known as melanin. Langerhans cells prevent things from getting into the skin.

### H.1.2 THE MIDDLE LAYER: DERMIS

The dermis is a complex combination of blood vessels, hair follicles, and *sebaceous* (oil) glands. Here, you'll find *collagen* and *elastin*, two proteins offering the skin's support and elasticity. *Fibroblasts* are the cells that synthesize collagen and elastin.

This layer also contains pain and touch receptors.

It is this layer that is responsible for wrinkles.

### H.1.3 THE FATTY LAYER: HYPODERMIS

This layer is also known as the *subcutis*.

It hosts sweat glands, and fat and collagen cells, and is responsible for conserving your body's heat and protecting your vital inner organs.

## **H.2 SKIN FUNCTIONS**

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The main functions of the skin are protection, sensation, temperature regulation, immunity, allowing movement and growth, excretion and synthesis of vitamins.

### **H.2.1 PROTECTION**

The skin is a natural barrier between the inside of the body and its surrounding environment. The skin protects against dehydration, UV light, microorganisms and physical trauma.

### **H.2.2 SENSATION**

The pain and touch receptors in the dermis allow us to feel touch, pressure, heat, cold and pain.

### **H.2.3 TEMPERATURE REGULATION**

The optimal temperature for the human body is 36 to 37 degrees Celsius (or 97 to 99 degrees Fahrenheit). A section of the brain called the *hypothalamus* controls the body's thermoregulation. It issues instructions to muscles, organs, glands, and nervous system when it senses the core internal temperature is becoming too low or too high.

One of the major functions of the skin is to help to maintain the body temperature.

#### **H.2.3.1.1 HOW THE SKIN HELPS TO KEEP THE BODY WARM?**

When the body becomes too cold, blood vessels at the body's skin surface narrow (*constrict*) to keep the warm blood in the core of the body. The activity of the sweat glands in the skin is reduced and the hairs stand on end to keep warm air close to the skin. Shivering is a method to generate heat by involuntary muscle activity.

#### **H.2.3.1.2 HOW THE SKIN HELPS TO KEEP THE BODY COLD?**

When the body becomes too hot, blood vessels at the body's skin surface widen (*dilate*) to loose heat by the increased blood flow. The activity of the sweat glands in the skin is turned up to create more sweat, which cools down the skin as it evaporates.

### **H.2.4 IMMUNITY**

Several types of skin cells (e.g. *Langerhans cells*, *phagocytic cells*, *epidermal dendritic cells*) are responsible for the destruction of microorganisms or are involved in the interaction of the skin with the body's immune system.

### **H.2.5 ALLOWS GROWTH AND MOVEMENT**

The elasticity of the skin allows growth, movement and adaptation of the contours of the body during movement.

### **H.2.6 EXCRETION**

The body releases waste products from the body via the surface of the skin, regulated by the volume and composition of sweat (e.g. excretion of water, urea, ammonia and uric acid).

### **H.2.7 SYNTHESIS OF VITAMINS**

The skin plays an important role in the synthesis of vitamin D.

## H.3 BURN WOUNDS

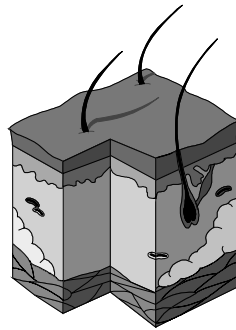
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Burns are injuries to the skin and underlying tissue that result from the sun, heat sources, fire, hot items, boiling liquids, chemicals, irradiation, etc. However, cold can also create burn wounds!

### H.3.1 FIRST, SECOND AND THIRD DEGREE BURNS

Burns are classified by the degree of skin and underlying tissues that are damaged. You will observe different signs and symptoms according to the severity of the burn wound.

#### H.3.1.1 FIRST DEGREE BURNS

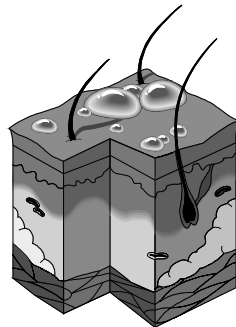


Superficial first degree burns show following signs and symptoms:

- red or darker than usual skin;
- slightly swollen skin;
- painful, but mostly bearable.

These burns usually extend only into the epidermis.

#### H.3.1.2 SECOND DEGREE BURNS

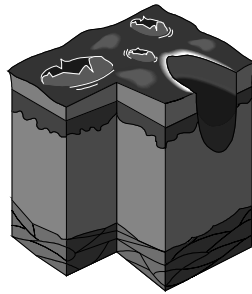


Intermediate second degree burns show following signs and symptoms:

- blistering,
- swelling,
- very painful.

These burns usually involve the epidermis and the dermis.

### **H.3.1.3 THIRD DEGREE BURNS**



Deep third degree burns show following signs and symptoms

- black, parchment-like or white-looking burn wound;
- mostly dry;
- no pain inside the third degree area, but very painful in the surrounding second and first degree burned parts of the skin.

### **H.3.2 TYPE OF BURNS BY ORIGIN**

Burns can be differentiated by their origin:

#### **H.3.2.1 DRY BURNS**

Dry burns are burns from flames, contacts with hot objects (e.g. hot cigarettes, hot domestic appliances) or friction (e.g. rope burns).

#### **H.3.2.2 SCALDS**

Scalds are burns by steam or hot liquids (e.g. tea, coffee, hot fat).

#### **H.3.2.3 ELECTRICAL BURNS**

Electrical burns are burns caused by electrical current. These burns can result from low voltage current (e.g. home appliances) or high voltage current (e.g. transformers) or by lightning strikes.

#### **H.3.2.4 CHEMICAL BURNS**

Exposure to chemical substances like industrial chemicals, corrosive gases or inhaled chemical fumes can cause chemical burns. Also, the exposure to domestic chemicals and agents as paint stripper, caustic soda, weed killers, bleach, oven cleaners or strong acids or alkali can cause burns.

#### **H.3.2.5 RADIATION BURNS**

Exposure to radioactive sources, e.g. X-rays or radiotherapy-rays, can result in radiation burns.

#### **H.3.2.6 FROST BITES (COLD BURNS)**

Cold burns like frost bites originate from exposure to cold wind, cold temperature or contact with cold freezing materials (e.g. cold metal), or can happen from contact with freezing vapours (e.g. liquid oxygen or liquid nitrogen).

### **H.3.2.7 SUN BURNS**

Intensive exposure to sunlight, an over-exposure to ultraviolet light (UV) from a sunlamp or the sun result in sun burns.

Long exposure to heat or hot weather can also lead to heat exhaustion and heat stroke.

### **H.3.3 DANGER OF BURNS**

Severe or large burn injuries can pose serious problems. However, any burn injury can lead to complications.

The danger from burns usually depends more on the area of the burns rather than the degree. Superficial burns over a large area of the body are more dangerous than the complete charring of a part of the limb. It must be noted that a burn is mostly a mixture itself of different degrees of burns, and that in the same person different degrees of burns may show on different parts of the body.

The most important dangers are:

- Infection

Burn injuries leave the skin open and susceptible to infection. Burn injuries also increase your risk of sepsis, which is a life- threatening infection that rapidly travels through the bloodstream. Sepsis can cause shock and organ failure.

- Low blood volume

Burn injuries damage the skin and the blood vessels, causing fluids to escape the body. This can result in low blood volume, known as hypovolemia. A severe loss of fluid and blood can prevent the heart from pumping enough blood through the body (resulting in shock).

- Low body temperature

The skin helps to control the body's temperature. When a large portion of the skin is injured, the body loses heat. This increases the risk of hypothermia — i.e. when the body loses heat faster than it can produce – resulting in a dangerously low body temperature.

- Breathing difficulties

One of the most common dangers that accompany burn injuries is the inhalation of smoke or hot air. This can burn the airways, making it difficult to breathe. Smoke can permanently damage the lungs and lead to respiratory failure.

- Pain

Burn wounds are very painful.

- Disability

Burn injuries form scar tissue once healed. When the skin is burned, the surrounding skin starts to pull together resulting in a post-burn contracture that prevents movement. Deeper burns can limit movement of the bones or joints when skin, muscles or tendons shorten and tighten, permanently pulling joints out of position.

### **H.3.4 DRY BURNS AND SCALDS (BURNS FROM FLAMES, HOT SURFACES, STEAM, ...)**

#### **H.3.4.1 WHAT DO I SEE AND ENQUIRE?**

Following signs and symptoms may be observed:

- The casualty has first, second and/or third degree burn wounds.
- In case of burns to the face or inhalation of hot air or smoke, you may also observe:
  - soot around the mouth or nose, or
  - scorched eyebrows, eyelashes, moustache, beard or hair

#### **H.3.4.2 WHAT DO I DO?**

##### **H.3.4.2.1 SAFETY FIRST AND SEEK HELP**

1. Make sure the situation is safe for yourself and (if possible) for the victim.
2. Shout or call for help if you are alone but do not leave the person unattended. Ask a bystander to seek help or to arrange urgent transport to the nearest healthcare facility or hospital. Tell him to come back to you to confirm if help has been secured.

##### **H.3.4.2.2 RESCUING A PERSON FROM A FIRE:**

The fire brigade is equipped and trained to rescue people from fires. It is their duty and is not the primary duty of a first aider. However, in the exceptional case you need to rescue a person from a fire yourself, follow these guidelines:

3. Make sure you have already called for help prior entering the location.



4. Have a wet handkerchief/cloth around your face. Crawl along the floor to reach and pull out the casualty as most clean air will be at lower level.
5. Act swiftly and quickly because there might be some amount of carbon monoxide also in the room. A wet handkerchief and crawling on the floor will not protect you from it.
6. Do not open other doors or windows when there is fire in the room. The rush of air will increase the fire.

#### H.3.4.2.3 PROVIDE FIRST AID

7. If the person's cloths are on fire:



a. stop him from running around;



b. douse the fire with water;



c. approach the person whilst holding a rug, heavy blanket, coat or cotton table cover in front of you and wrap him in it to smother the flames, or



d. make the person roll on the ground to smother the flames.





8. Cooling with water will prevent the burn from going deeper and will reduce the pain.

Pour water on the burn for 10-15 minutes or until the burn stops hurting.

Do not use very cold water for cooling the burns. Burn victims can easily become hypothermic.



9. Protect the burn victim by wrapping him in clean blankets.

10. If possible, wash your hands before taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

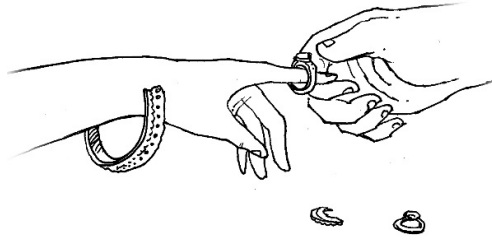
11. Put on gloves if available. You can also use a clean plastic bag.

Try not to touch the person's wounds.



12. Cover burn wounds with a clean cotton cloth.

13. Do not open blisters – leave them intact.



14. Remove any clothing or jewellery that is not stuck to the burned skin.

Do not remove parts of clothing or jewellery that are attached to the burn wounds.

15. If possible, remove the person's belt, shoes or boots as the limb might swell.

16. Keep the casualty warm, but do not overheat him.



17. If possible, keep burned hands, legs or feet in an elevated position.

18. Do not leave the casualty alone, and keep observing him.

19. Observe the casualty's breathing, especially when the person is burned in the face and exposed to heat or has breathed in a lot of smoke or hot air.

20. In case of severe burns, transport the casualty as quickly as possible to the nearby healthcare facility or hospital.

#### H.3.4.2.3.1 WHAT DO I DO IF THE PERSON IS UNCONSCIOUS, BUT IS STILL BREATHING?

- a. Put the person in the recovery position, if possible.
- b. Continue to observe the victim and check his breathing

#### H.3.4.2.3.2 WHAT DO I DO WHEN THE PERSON STOPPED BREATHING?

Perform CPR.

Do not interrupt the resuscitation until:

- the person starts to wake up, moves, opens his eyes and breathes normally;
- help (trained in CPR) arrives and takes over;
- you become too exhausted to continue; or
- the scene becomes unsafe for you to continue.

#### **H.3.4.2.4    HYGIENE**

Wash your hands after taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

#### **H.3.4.3    WHEN TO REFER A BURN VICTIM TO A HEALTHCARE FACILITY OR HOSPITAL?**



Always arrange urgent transport to the nearest healthcare facility and seek medical help straight away in a healthcare facility or hospital if:

- the injured person is under five years old or over 65 years old;
- the burn is on the face, eyes, ears, hands, feet, the sexual organs or joints;
- the burn circles the entire limb, body or neck;
- the burn is equal or larger than the injured person's hand size;
- the burn looks black, white, papery, hard and dry;
- the injured person has a decreased or no sense of feeling in or around the wound;
- the burns were caused by electricity, chemicals or high pressure steam;
- the injured person has inhaled flames or hot air, or breathed in a lot of smoke;
- clothing or jewellery is stuck to the skin;
- the victim suffers any other serious trauma due to the accident;
- the victim suffers from a medical condition, like diabetes; or
- the person's condition is getting worse.

### **H.3.5 CARE OF MINOR BURNS (SMALL FIRST AND SECOND DEGREE BURNS)**

For minor burns (small first and second degree burns) you can use fresh aloe vera or honey if available to cover the burn wound. This will help the wound to heal faster.

#### **H.3.5.1 HYGIENE**

1. Wash your hands before taking care of the sick person. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

Use gloves to protect yourself. If no gloves are available, you can use a clean plastic bag. Try not to come in contact with the person's vomit, stools or fluids.

#### **H.3.5.2 PROVIDE FIRST AID**

After cooling down the burn wound (see above on how to approach the casualty):



2. Dress the wound with a clean cotton cloth.



3. Do not apply any medicine to the burns.

Do not apply cotton wool to cover the burns.

Do not use Vaseline to cover the burns.

Do not apply any pastes or creams to the burns.



4. Make sure the burned casualty has sufficient fluids to drink.
5. Refer the victim to a healthcare facility for further management.

### **H.3.5.3 WHEN TO REFER A BURN VICTIM TO A HEALTHCARE FACILITY OR HOSPITAL?**

 Always refer the victim to a healthcare facility for further management.

Advise the injured person to seek medical care if in the days after:

- the burn smells bad,
- there is any discharge from the wound or the wound is soaked with pus,
- the pain remains or increases,
- there is swelling, or
- if he gets fever.

## **H.3.6 SPECIFIC BURN LOCATIONS**

### **H.3.6.1 BURNS TO THE FACE**

The casualty having burned in the face or breathed in hot air or smoke, may experience difficulty in breathing:

- Approach the casualty as described for burns and scalds.
- Allow the casualty to take a position that allows him to breathe best and is most comfortable.
- Loosen clothing that might hinder easy breathing.
- Especially observe the casualty's breathing and start CPR, if required.
- Always transport these burn victims urgently to a healthcare facility or hospital.

### **H.3.6.2 BURNS TO THE EYE**

Flames or hot substances may have burned the eye(s).

Following signs and symptoms may be observed:

- scorched eyebrows, eyelashes;
- burn wounds around the eye; or
- red eyes with burning and itching sensation.

In case of burns to the eye:

1. Shout or call for help if you are alone but do not leave the person unattended. Ask a bystander to seek help or to arrange urgent transport to the nearest healthcare facility or hospital. Tell him to come back to you to confirm if help has been secured.



2. Rinse the eye immediately with plenty of water for 10-15 minutes, preferably from the nose outwards.

Use clean water or water that has been boiled and cooled. Be careful: Room temperature water is more comfortable than cold water. Very warm water might burn the eye.

Make sure no liquid or rinsing water runs into the other eye.

3. If the person wears contact lenses, ask the person to take them out and keep them in a safe place.
4. Arrange transport to the nearest healthcare facility or hospital.

5. Do not put medication into the eye.
6. Eye injuries have to be managed always with great care. Always refer these victims to the nearest healthcare facility or hospital.

### **H.3.7 ELECTRICAL BURNS AND ELECTROCUTION BY ELECTRICITY OR LIGHTNING**

Electrical burns are caused when electricity passes through the body.

The electricity source may be e.g. lightning or contact with household current, high voltage cables or transformers, or low voltage - high ampere electricity from a car, truck or tractor battery. Do not touch the casualty till the power switch has been turned off.

The electricity enters the body at the point of contact, goes through the body and exits at the point where the body touches the ground or at earth point. Often burn wounds may be observed at these entry and exit points. But inside the body the electricity can cause damage on its track that remains hidden.

Exposure to electricity can also cause cardiac arrest.

#### **H.3.7.1 WHAT DO I SEE AND ENQUIRE?**

Following signs and symptoms might be observed:

- Based on the situation you may be able to detect there has been an electrocution accident (e.g. you notice an electrical appliance connected to the electrical net next to the casualty, a high voltage wire might be next to the casualty, thunderstorm, ...).
- The casualty may:
  - be unconscious,
  - have difficulty in breathing or have stopped breathing,
  - be in cardiac arrest (no beating heart) or have an irregular pulse,
  - have burn wounds, or
  - have muscle spasms.

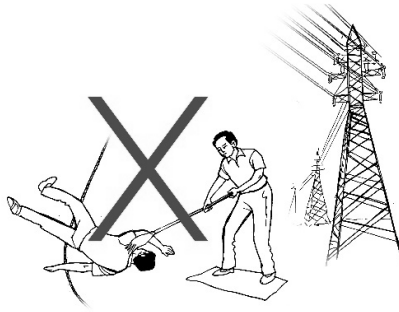
#### **H.3.7.2 WHAT DO I DO?**

##### **H.3.7.2.1 SAFETY FIRST AND CALL FOR HELP**

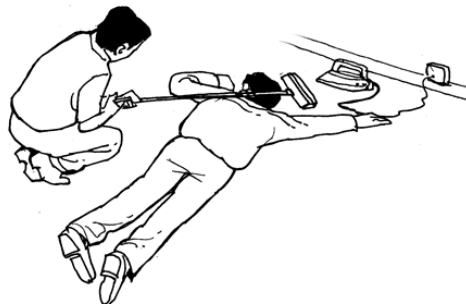
1. Never touch a casualty that still is connected to an electrical source!



2. Turn off the source of electricity.



- a. In case of high voltage currents, never try to move the wire or source of electricity away from the victim. High voltage current (+ 1000 Volt) can jump and kill up to 18 metres. Wait till the high voltage source has been turned off prior approaching the victim.



- b. In case of electrocution by home electricity (220V) and if you cannot switch off the electric source, you may try move the source away from both you and the injured person using a dry, non-conducting object made of cardboard, plastic or wood.

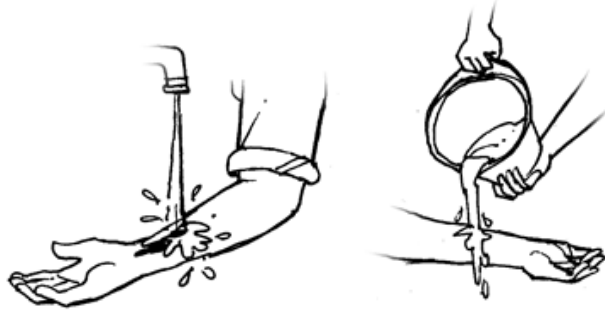


- c. In case of strike of lightning, make sure you and the victim stay safe. If you are at risk from ongoing lightning, wait until danger has passed. If possible stay inside a house or in a car.
3. Shout or call for help if you are alone but do not leave the person unattended. Ask a bystander to seek help or to arrange urgent transport to the nearest healthcare facility or hospital. Tell him to come back to you to confirm if help has been secured.

#### **H.3.7.2.2 PROVIDE FIRST AID**

4. Try not to move the casualty, except if he is in immediate danger.





5. Cool down the burn wounds. Use clean water. If there is no clean water available, use the available water.

Only do this, if there is no danger of further electrocution: make sure the current has been switched off.

- a. Pour water on the burn for 10-15 minutes or until the burn stops hurting.
- b. Do not use very cold water for cooling the burns. Burn victims can easily become hypothermic.

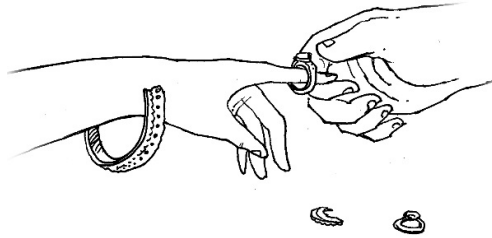


6. Protect the burn victim by wrapping him in a clean sheet of cloth or blankets.
7. If possible, wash your hands before taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.
8. Put on gloves if available. You can also use a clean plastic bag. Try not to touch the person's wounds.



9. Cover burn wounds with a clean cotton cloth.

10. Do not open blisters – leave them intact.



11. Remove any clothing or jewellery that is not stuck to the burned skin.

Do not remove parts of clothing or jewellery that are attached to the burn wounds.

12. If possible, remove the person's belt, shoes or boots as the limb might swell.

13. Keep the casualty warm, but do not overheat him.



14. If possible, keep burned hands, legs or feet in an elevated position.

15. Do not leave the casualty alone, and keep observing him.

16. Transport the casualty as quickly as possible to the nearby healthcare facility or hospital.

#### H.3.7.2.2.1 WHAT DO I DO IF THE PERSON IS UNCONSCIOUS, BUT IS STILL BREATHING?

- a. Put the person in the recovery position.
- b. Continue to observe the victim and check his breathing

#### H.3.7.2.2.2 WHAT DO I DO WHEN THE PERSON STOPPED BREATHING?

Perform CPR.

Do not interrupt the resuscitation until:

- the person starts to wake up, moves, opens his eyes and breathes normally;
- help (trained in CPR) arrives and takes over;
- you become too exhausted to continue; or
- the scene becomes unsafe for you to continue.

#### **H.3.7.2.3    HYGIENE**

Wash your hands after taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

#### **H.3.7.3    WHEN TO REFER THE VICTIM TO A HEALTHCARE FACILITY?**



Always seek medical help straight away in a healthcare facility or hospital if:

- the person got electrocuted by a high voltage source or got struck by lightning;
- the injured person is under five years old or over 65 years old;
- the burn is on the face, eyes, ears, hands, feet, the sexual organs or joints;
- the burn circles the entire limb, body or neck;
- the burn is equal or larger than the injured person's hand size;
- the burn looks black, white, papery, hard and dry;
- the injured person has a decreased or no sense of feeling in or around the wound;
- clothing or jewellery is stuck to the skin;
- the victim suffers from any other serious trauma due to the accident;
- the victim suffers from a medical condition, like diabetes; or
- the person's condition is getting worse.

## **H.3.8 CHEMICAL BURNS**

Some chemicals may irritate, burn or penetrate the skin and cause damage, sometimes even death. Unlike burns by heat or electrocution, these burns may develop slowly.

Chemical burns are always to be considered serious and always require medical follow up.

### **H.3.8.1 WHAT DO I SEE AND ENQUIRE?**

Following signs and symptoms may be observed:

- There may be evidence of chemicals in the vicinity of the casualty.
- The victim may complain of intense stinging pain.
- At the body parts that came into contact with the chemical:
  - The skin may be irritated or burned.
  - The skin may be discoloured.
  - The skin may be swollen.
  - The skin may show blisters.
  - The skin may peel off.
  - There may be signs of poisoning (see chapter on Poisoning).

### **H.3.8.2 WHAT DO I DO IF THE VICTIM'S SKIN IS BURNED BY A CHEMICAL?**

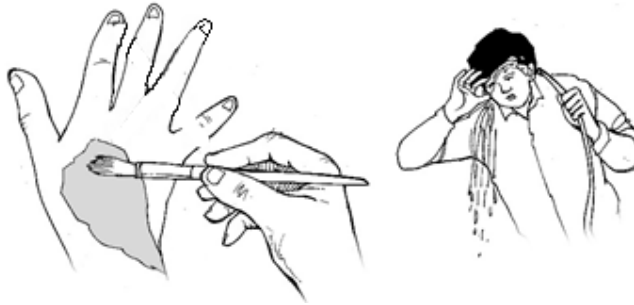
#### **H.3.8.2.1 SAFETY FIRST AND CALL FOR HELP**



1. Make sure the area is safe for you and the victim and make sure you do not come into contact with the chemical yourself unprotected.
2. Shout or call for help if you are alone but do not leave the person alone. Ask a bystander to seek help or to arrange urgent transport to the nearest healthcare facility or hospital. Tell him to come back to you to confirm if help has been secured.

#### **H.3.8.2.2 PROVIDE FIRST AID**

3. Wear gloves to protect yourself. If no gloves are available, use a plastic bag to cover your hands.



4. Remove the cause of the burn by first brushing off any remaining dry chemical and then rinsing the chemical off the skin surface with cool, gently running water for 10 to 15 minutes.



5. Remove clothing or jewellery that has been contaminated by the chemical.



6. Wrap the burned area loosely with a clean cloth.
7. Rewash the burned area for several more minutes if the person experiences increased burning after the initial washing.
8. Arrange transport to the nearest healthcare facility.

H.3.8.2.2.1 WHAT DO I DO WHEN THE CHEMICAL HAS BEEN SWALLOWED OR BREATHED IN?

Approach the casualty as described in the chapter 'Poisoning'.

H.3.8.2.2.2 WHAT DO I DO WHEN HARMFUL LIQUIDS WERE SPILLED IN THE EYE?

Approach the casualty as described in the chapter 'Burns to the eye'.

H.3.8.2.2.3 WHAT DO I DO IF THE PERSON IS UNCONSCIOUS, BUT IS STILL BREATHING?

- a. Put the person in the recovery position.
- b. Continue to observe the victim and check his breathing.

#### H.3.8.2.2.4 WHAT DO I DO WHEN THE PERSON STOPPED BREATHING?

Perform CPR.

Do not interrupt the resuscitation until:

- the person starts to wake up, moves, opens his eyes and breathes normally ;
- help (trained in CPR) arrives and takes over;
- you become too exhausted to continue; or
- the scene becomes unsafe for you to continue.

#### H.3.8.2.3 HYGIENE

Wash your hands after taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available, but may not remove the chemicals from your hands completely.

#### H.3.8.3 WHEN TO REFER TO A HEALTHCARE FACILITY?



Always transport the victim of chemical burns urgently to the nearest healthcare facility or hospital.

## **H.3.9 SUNBURNS, SNOW/WELDERS EYES, HEAT EXHAUSTION AND HEAT STROKE**

### **H.3.9.1 SUNBURNS**

Direct exposure to sunlight can have ill effects on the skin and eyes.

The injury to the skin is known as "sunburn". It is caused by the exposure to ultraviolet rays from the sun. When UV B rays penetrate the deeper skin layers damage to the cells occurs. The skin becomes red and painful. In some cases the damage to the cells is so severe resulting in skin peeling and blistering.

Strong or cool wind or a body covered by water or sweat might give the sunbathing person a falsely reassuring effect of not being sunburned. As clouds have less limiting effect on UV radiation than they do on temperature, sunburns still can happen on cloudy days. White surfaces such as snow or sand reflect UV radiation and so increase the risk of sunburn. Rippling water and rough sea reflect more UV radiation than calm open water. Sunlight has a shorter distance to travel in order to reach the earth's surface in areas closer to the tropics; UV radiation levels will therefore, be higher in these areas because there is less dissipation of the rays as they travel to earth. The level of UV radiation also increases with altitude as the atmosphere becomes thinner and there is less absorption of the radiation.

#### **H.3.9.1.1 WHAT DO I SEE AND ENQUIRE?**

Following signs and symptoms may be observed when a person suffers a sunburn:

- reddened skin,
- warm skin, and
- pain of varying degrees.

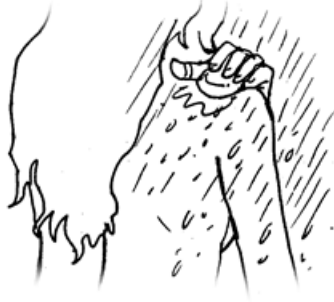
In more severe cases:

- swelling,
- blistering, and
- weeping skin.

#### **H.3.9.1.2 WHAT DO I DO?**



1. Bring the casualty to a shaded cool place. If this is not possible, cover the skin with light clothing or a towel.



2. Cool down the skin by sponging or by slowly showering for about 10-15 minutes. Be careful not to overcool the casualty: do not use too cold water.



3. Encourage the casualty to have frequent sips of cool water (this is an exception to the standard first aid guideline of not giving a casualty to drink or to eat).
4. For severe burns, refer the casualty to the nearest healthcare facility.  
For minor burns, an after-sun cream may be applied.
5. Wash your hands after taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

#### **H.3.9.1.3 WHEN TO REFER TO A HEALTHCARE FACILITY?**



Always refer the casualty to the nearest healthcare facility if:

- The burns cover a large body surface.
- There are blisters.
- The casualty is a child or an elderly person.
- When you notice signs of a heat stroke (see chapter on Heat stroke).



### **H.3.9.2 SUNBURN OF THE EYE AND SNOW OR WELDERS BLINDNESS**

Snow blindness or sunburn of the eye (also known as *photokeratitis* or *ultraviolet keratitis*) is a painful eye condition caused by exposure of insufficiently protected eyes to the ultraviolet rays. Common causes are looking into welding light without eye protection; exposure to sunlight reflected from snow and ice without wearing sun glasses, or looking directly into sunlight (e.g. looking at a solar eclipse) without using the appropriate protection.

#### **H.3.9.2.1 WHAT DO I SEE AND ENQUIRE?**

Following signs and symptoms may be observed when a person suffers a sunburn of the eye(s) or suffers snow or welders blindness:

- The casualty complains of intense pain in the affected eye(s).
- The eye(s) is (are) red.
- The eye(s) have tears.
- The casualty may be sensitive to light.
- The casualty may report having stared directly into the sun or into strong light (like welding light or fireworks)

#### **H.3.9.2.2 WHAT DO I DO?**

1. Reassure the casualty.
2. If the person wears contact lenses, ask the person to take them out and keep them in a safe place.



Ask the casualty to protect his eye(s) by holding a non-fluffy pad to each injured eye. Eventually, the eye pads may have been wetted with clean water. If no eye pad is available, ask him to keep the eyes closed or use sunglasses.

Put no pressure on the eyes.

3. Arrange transport to the nearest healthcare facility or hospital.
4. Do not put medication into the eye.
5. Refer the casualty to a healthcare facility.
6. Wash your hands after taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

#### **H.3.9.2.3 WHEN TO REFER TO A HEALTHCARE FACILITY?**



Eye injuries have to be managed always with great care. Always refer these victims to the nearest healthcare facility.

## **H.4      HEAT EXHAUSTION**

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Heat exhaustion is a milder form of heat-related illness that can develop after prolonged exposure to high temperatures and inadequate or imbalanced replacement of fluids. Those most prone to heat exhaustion are elderly people, people with high blood pressure, and people working or exercising in a hot environment.

### **H.4.1      WHAT DO I SEE AND ENQUIRE?**

Following signs and symptoms may be observed:

- heavy sweating;
- paleness;
- the casualty complains of muscle cramps;
- the casualty complains of headache, dizziness or tiredness;
- the casualty may act confused;
- rapid, weakening pulse; and
- fast, shallow breathing.

### **H.4.2      WHAT DO I DO?**

#### **H.4.2.1      PROVIDE FIRST AID**



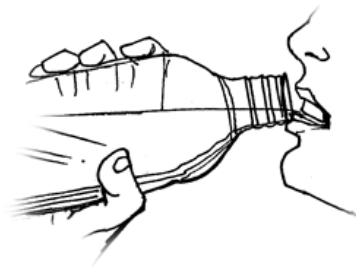
1. Help the casualty move to a cool place.



2. Help the casualty to lie down with the legs slightly raised.
3. Cool the casualty by sponging him or having him to take a cool shower.



4. Ask the casualty to rest.



5. Ask the casualty to drink plenty of water (this is an exception to the standard first aid guideline of not giving to drink or to eat to a casualty).
6. Keep observing the casualty's breathing and consciousness.
7. Refer the casualty to a healthcare facility.

#### **H.4.2.1.1 WHAT DO I DO IF THE PERSON IS UNCONSCIOUS, BUT IS STILL BREATHING?**

- a. Put the person in the recovery position.
- b. Continue to observe the victim and check his breathing

#### **H.4.2.1.2 WHAT DO I DO WHEN THE PERSON STOPPED BREATHING?**

Perform CPR.

Do not interrupt the resuscitation until:

- the person starts to wake up, moves, opens his eyes and breathes normally;
- help (trained in CPR) arrives and takes over;
- you become too exhausted to continue; or
- the scene becomes unsafe for you to continue.

#### **H.4.2.2 HYGIENE**

Wash your hands after taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

#### **H.4.3 WHEN TO REFER TO A HEALTHCARE FACILITY?**



Always refer the casualty to a healthcare facility for further medical follow up.

## **H.5      HEATSTROKE**

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Normally the body dissipate the heat with the help of sweat glands.

In some cases the body may not be able to dissipate the heat by sweating and the body temperature rises, sometimes up to 41.1 C (106 F) or higher. Or a dehydrated person may not be able to sweat fast enough to dissipate heat, which causes the body temperature to rise. Heat regulation mechanism fails during heatstroke.

Heatstroke is a form of hyperthermia, an abnormally elevated body temperature with accompanying physical and neurological symptoms. Heatstroke is a true medical emergency that can be fatal if not properly and promptly treated. Most susceptible to heat strokes are infants and the elderly.

### **H.5.1      WHAT DO I SEE AND ENQUIRE?**

Following signs and symptoms may be observed:

- a hot flushed, red dry skin;
- the casualty complains of headache, dizziness or discomfort;
- the casualty may act confused or is restless;
- a full bounding pulse; and
- a body temperature above 40 degrees Celsius (>104 F).

### **H.5.2      WHAT DO I DO?**

#### **H.5.2.1      PROVIDE FIRST AID**

1. Help the casualty move to a cool place.
2. Check the casualty's breathing and consciousness.
3. Help the casualty to lie down with the legs slightly raised.



4. Cool the casualty by sponging him or showering him with cool water.



5. Make the casualty to rest.



6. If the casualty is conscious, ask the casualty to drink water (this is an exception to the standard first aid guideline of not giving to drink or to eat to a casualty).
7. Keep observing the casualty's breathing and consciousness.
8. Transport the casualty to the nearest healthcare facility or hospital.

#### **H.5.2.1.1 WHAT DO I DO IF THE PERSON IS UNCONSCIOUS, BUT IS STILL BREATHING?**

- a. Put the person in the recovery position.
- b. Continue to observe the victim and check his breathing

#### **H.5.2.1.2 WHAT DO I DO WHEN THE PERSON STOPPED BREATHING?**

Perform CPR.

Do not interrupt the resuscitation until:

- the person starts to wake up, moves, opens his eyes and breathes normally;
- help (trained in CPR) arrives and takes over;
- you become too exhausted to continue, or
- the scene becomes unsafe for you to continue.

#### **H.5.2.2 HYGIENE**

Wash your hands after taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

### H.5.3 WHEN TO REFER TO A HEALTHCARE FACILITY?



Always transport the casualty suffering a heatstroke to a healthcare facility for further medical treatment and follow up.

## H.6 FROSTBITES

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Frostbite is damage to skin and tissues caused by exposure to freezing temperatures – typically any temperature below minus 0.55°C (31°F).

An inadequate blood circulation when the ambient temperature is low leads to frostbites. Causes can be exposure to extreme cold weather, wearing inadequate or wet clothing, or wind chill. The poor blood circulation caused by too tight clothing or boots, staying in a cramped position, fatigue, certain medications, smoking, alcohol use, or diseases that affect the blood vessels, such as diabetes may enhance the process.

Frostbites can affect any part of your body. However, the extremities, such as the hands, feet, ears, nose and lips, are most likely to be affected as the body is constricting circulation to extremities on its own to preserve core temperature and fight hypothermia.

The symptoms of frostbite usually begin with the affected parts feeling cold and painful. If exposure to the cold continues, the person may feel pins and needles before the area becomes numb as the tissues freeze.

People with a history of severe frostbite often report after effects of frostbite. These can include:

- increased sensitivity to cold;
- numbness in the affected body parts, most commonly the fingers;
- reduced sense of touch in the affected body parts; and
- persistent pain in the affected body parts.

### H.6.1 WHAT DO I SEE AND ENQUIRE?

You may observe following signs and symptoms:

- The person complains of feeling pins and needles, throbbing or aching in the affected area.
- The skin feels cold, numb and white.
- The person may feel a tingling sensation.

If the frostbite is more advanced:

- the affected area may feel hard and frozen;
- when the person is out of the cold:
  - the tissue is thawed out (defrosted and becomes soft);
  - the skin will turn red and blister, which can be painful;
  - there may also be swelling and itching.

If the exposure to the cold continues and the frostbite develops further:

- the skin becomes white, blue or blotchy, and
- the tissue underneath feels hard and cold to touch.

When the person is out of the cold and the skin thaws (defrosts):

- blood-filled blisters form and turn into thick black scabs. At this stage, it is likely that some tissue has died. This is known as tissue necrosis, and the tissue may have to be removed to prevent infection.

## **H.6.2 WHAT DO I DO?**

### **H.6.2.1 SAFETY FIRST**

1. Make sure you are protected sufficiently against the cold, prior helping the other person

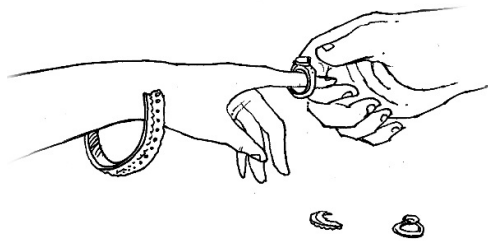
### **H.6.2.2 PROVIDE FIRST AID**



2. If possible, move the victim to a warmer place.
3. It is best that the person avoids to walk on frostbitten toes and feet as this can cause further damage, although in emergency situations this may not always be possible.



4. Replace wet clothing with soft, dry clothing to stop further heat loss.





5. Gently remove gloves, rings, and other constrictions, such as boots.

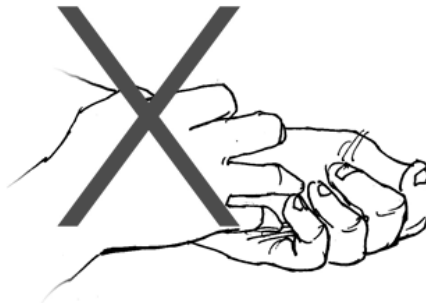


6. The affected areas need to be re-warmed.

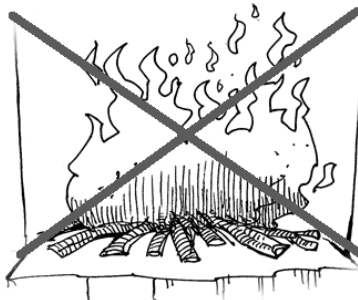
Do not try to do this until you are out of the cold. If the warming process is started and the frozen parts are re-exposed to the cold, it can cause further irreversible damage.



You can warm the affected part with your hands, in your lap, or in the person's armpits.



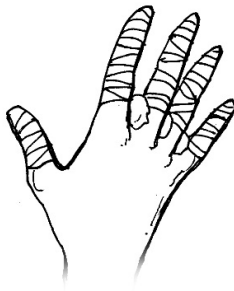
7. Do not rub the affected area as this can damage the skin and other tissues and do more harm than benefit.



8. Do not apply direct heat (such as from a fire or heater) as this can cause further injury.
9. Re-warming should last at least 30 minutes and should only be stopped once the affected body part has a red-purple colour and can be easily moved.



10. Do not allow the person to smoke as this can affect blood circulation.



11. After the frostbitten area has been thawed, it should be wrapped very gently in clean bandages, with the fingers and toes separated. It is very important to keep the skin clean to avoid infection. Wash your hands prior bandaging the frostbites.
12. Too much movement should be avoided, and the limbs should be elevated if possible. Ask the person not to walk on affected parts that have been re-warmed as the tissues will be very delicate.
13. Refer the person with frostbites to a healthcare facility.

Transport the person to the nearest healthcare facility or hospital in case of advanced frostbites.

### **H.6.2.3    HYGIENE**

Wash your hands after taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

### **H.6.3    WHEN TO REFER TO A HEALTHCARE FACILITY?**



Always urgently transport the person suffering severe frostbites to the nearest healthcare facility.



A person with minor frostbites should also always be referred to a healthcare facility.

## H.7 PREVENTION OF BURNS

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Burn injuries can be caused by cooking accidents, house fires, electrical faults, candles, incense, or children accessing fire or heat sources.

Burn wounds cause a lot of pain, scars, deformities and even death. Burn injuries can easily be prevented by simply following simple precautions:

Teach and protect the children:

- Teach children about household objects that can burn them, could cause fire and explain the danger of fire to them.
- Do not leave children alone near heat sources, hot water, or open fires.
- Install fences around open fires to discourage children from standing too close.
- Hot drinks and liquids should be kept out of reach of young children.
- Cover the electric points properly.

Cooking & heating:

- Ensure that gas cylinders do not leak.
- Switch off the gas supply after the work is over.
- Designate a specific cooking area, for example by making a raised stove with a mud barrier when you cook outside.
- The safest cooking height is when the cooking area is raised to a height that allows cooking whilst standing.
- Keep children out of cooking areas.
- Never leave food unattended on a stove.
- Turn the pot and pan handles towards the back of the stove when cooking, so that children can't accidentally knock them over.
- Do not leave spoons or utensils in pots when cooking.
- Only handle pots and pans with the insulated handles, or use cloth or other protective material before touching the handle.
- Avoid wearing clothing that could easily catch fire whilst cooking. Avoid wearing loose clothing when cooking or handling a fire. Do not hang clothes near an open fire.
- Do not keep flammable objects like towels, potholders near to the fire.
- Do not overheat oil when cooking.
- Never use water to extinguish burning oil
- Be careful when handling kerosene stoves and lamps as they can easily be knocked over and ignite.
- Have something handy to extinguish a fire (wet towel or cloth, water, sand bucket, fire extinguisher).

#### Electricity:

- Remove electrical cords from floors and keep them out of reach.
- Do not overload the electricity sockets.
- Use correct wiring.
- Do not use electrical appliances near water.
- Use plug protectors to make sure children can't stick something in the electrical outlets and get electrocuted.

#### Candles and lights:

- Do not leave burning candles unattended.
- Ensure they are in a sturdy metal, glass or ceramic holder. Place them where they cannot be knocked down,
- Do not burn candles near flammable materials (like curtains).
- Never sleep with a kerosene lamp near the bed.

#### Smoking:

- Never smoke in bed.
- Do not leave cigarettes burning unattended.
- Do not empty smouldering ashes into a trash can. Keep ashtrays away from clothes.

#### Bathing:

- To prepare water at the right bathing or washing temperature, use cold water first and mix this with hot water (do not pour the hot water first and cool it down afterwards with cold water).
- Make sure bathwater is not too hot. Test the temperature of the water before putting children in the bath tub. Your water geysers should be set at 49-54 °C (120-130 °F).

#### Chemical and inflammable products

- Never store flammable products in the proximity of a heat source.
- Store chemical, flammable or corrosive products safely out of the reach of children.
- Store chemical products at the eye level of an adult person; higher placed items are more difficult to reach and might spill over you when reaching for them.
- Be careful when handling chemical products – they can create burn wounds when spilled on the skin, face or eyes.
- Use the right containers to store chemicals in and label them.
- Do not reuse old bottles of drinks for storage of chemicals.

#### Heat:

- Do not stay too long in direct sunlight.
- Drink water and liquids frequently, especially in hot weather.

Cold:

- Protect head, face, hands and feet when in cold weather or cold wind.
- Do not consume alcohol when going out into the cold.

Exits:

- Make an escape plan.
- Do not block (fire) exits.

## H.8 FEVER

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A fever is a temporary increase in the body temperature. Fever can be a sign of serious illness. Any person with fever needs medical attention to determine the cause. Fever caused by malaria, typhoid, pneumonia (lung infection) etc., can be very dangerous if they are left untreated and can lead to death.

The normal body temperature is around 37 °C (98.6 °F). Fever is generally agreed to be present if the temperature is above 37.7 °C (100 °F).

Following set points are used to identify fever:

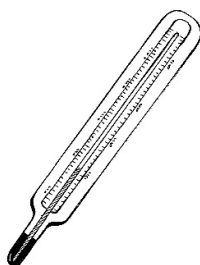
- If the temperature in the anus (*anal/rectal*) is at or over 38.0 °C (100.4 °F).
- If the temperature in the mouth (*oral*) is at or over 37.7 °C (100 °F).
- If the temperature under the arm (*axillary*) or in the ear (*otic*) is at or over 37.2 °C (99.0 °F).

### H.8.1 HOW TO MEASURE THE BODY TEMPERATURE?

The body's temperature can be measured by a thermometer you place in the armpit, mouth, rectum, ear or on the forehead.

#### H.8.1.1 TYPES OF THERMOMETERS

##### H.8.1.1.1 MERCURY TEMPERATURE THERMOMETERS



In a mercury thermometer, a glass tube is filled with mercury and a standard temperature scale is marked on the tube. A mercury thermometer can be easily identified by the presence of a silver bulb. Do not use mercury thermometers to measure the body temperature via the mouth or rectum.

If the bulb is red, blue, purple, green or any other colour, it is not a mercury thermometer, but contains another non-poisonous fluid. It works on the same principle as a mercury thermometer. These type of glass thermometers also can be used to measure the body temperature via the mouth or rectum.

Shake down the fluid in the glass thermometer before starting a new temperature measurement. Do this by holding the thermometer firmly and flicking the wrist until the fluid reads at or below the lowest number.

With changes in temperature, the fluid expands and contracts in a consistent fashion and the temperature can be read from the scale.

#### **H.8.1.1.2 ELECTRONIC BODY TEMPERATURE THERMOMETERS**



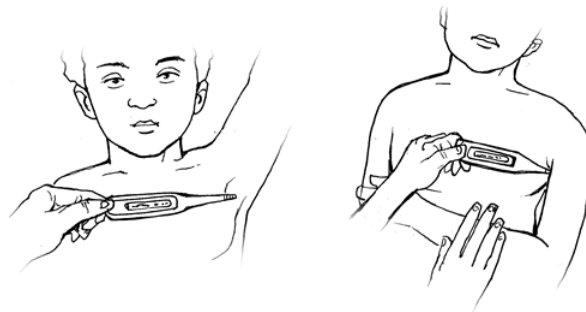
Electronic thermometers exist in different formats and types. These mostly work on battery power, some use sunlight as power source. They have a display where you can read the measurement (in Celsius or Fahrenheit corresponding to the device settings). Most electronic thermometers will beep when the measurement is complete and the body temperature can be read of the display.

Special electronic thermometers exist to measure the temperature via the ear or via scanning the forehead.

#### **H.8.1.2 MEASURING THE BODY TEMPERATURE**

##### **H.8.1.2.1 MEASURING THE BODY TEMPERATURE IN THE ARMPIT**

1. Clean the thermometer using water and soap or rubbing alcohol.
2. Place the thermometer in the armpit.



3. Wait for five minutes or until the electronic thermometer beeps.
4. Read the temperature.
5. Clean the thermometer using water and soap or rubbing alcohol.
6. Wash your hands after taking care of the person. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

##### **H.8.1.2.2 MEASURING THE BODY TEMPERATURE IN THE MOUTH**

1. Clean the thermometer using water and soap or rubbing alcohol.
2. Place the thermometer in the mouth, under the tongue.



3. Ask the person to close the mouth and fix the thermometer via the lips, but not to bite on the thermometer. The person can breathe through the nose.
4. Wait for three minutes or until the electronic thermometer beeps.
5. Read the temperature.
6. Clean the thermometer using water and soap or rubbing alcohol.
7. Wash your hands after taking care of the person. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

#### **H.8.1.2.3 MEASURING THE BODY TEMPERATURE IN THE RECTUM**

1. This method is used for small children.
2. Clean the thermometer using water and soap or rubbing alcohol.
3. Put petroleum jelly (Vaseline) on the bulb of the thermometer.
4. Place the child face down on a flat surface or knees.
5. Spread the buttocks and insert the bulb end about 1 to 2 cm (1/2 to 1 inch) into the anal canal. Be careful not to insert it too far. Struggling can push the thermometer in further.

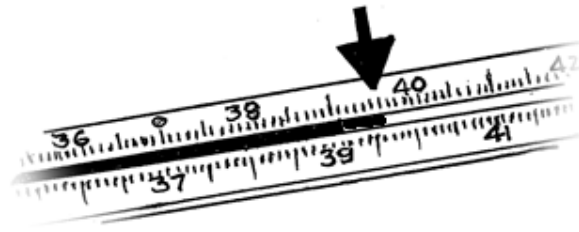


6. Wait for three minutes or until the electronic thermometer beeps.
7. Read the temperature.
8. Clean the thermometer using water and soap or rubbing alcohol.
9. Wash your hands after taking care of the person. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.



### H.8.1.3 READ THE RESULT

Read the temperature of the glass fluid or electronic thermometer immediately after taking the temperature.



The temperature is read to the closest line of the fluid in glass fluid thermometers, or from the electronic display in electronic thermometers.

A person has fever if his temperature is higher than  $37.7^{\circ}$  ( $>100^{\circ}\text{F}$ ) in the mouth.

If you have no thermometer you can feel with the back of the hand on the abdomen

If the skin feels hot, the person has probably fever.

### H.8.2 WHAT DO I SEE AND ENQUIRE WHEN A PERSON HAS FEVER?

Following signs and symptoms may be observed:

- The person has a raised temperature.
- The person complains of feeling cold, but his skin feels hot.
- He may shiver and have chattering teeth.
- Later the person may show a hot, flushed skin and is sweating.
- The person may complain of headache, malaise (feeling sick) and muscle pain.



- Children under five year of age may show convulsions (aka fits) and shake fast and uncontrollably when their body temperature rises quickly. Seizures can occur even if the child has a mild fever. Alternatively, they can occur when a child's temperature drops fast from a high level.

During simple febrile seizures:

- the child's body will become stiff and their arms and legs will begin to twitch,
- they'll lose consciousness and they may wet or soil themselves,
- they may also vomit and foam at the mouth and their eyes may roll back,

- the seizure usually lasts for less than five minutes,
- following the seizure, the child may be sleepy for up to an hour afterwards.

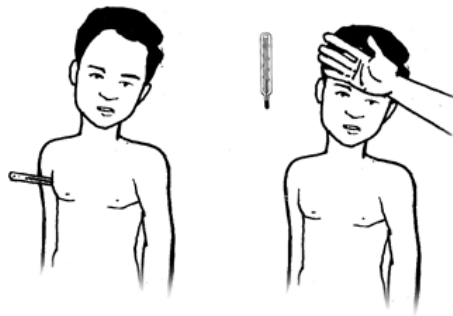
Look also for signs of dehydration, especially when the sick person has diarrhoea or vomiting, the sickness lasts over a longer period, or it is a sick child or elderly person.

### **H.8.3 WHAT DO I DO?**

#### **H.8.3.1 HYGIENE**

1. Wash your hands before and after taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

#### **H.8.3.2 SUPPORT THE SICK PERSON**



2. Find out how high the temperature of the person is (see "How to measure the body temperature?").
3. Ask the person to rest.
4. Keep the person in a cool environment.



5. Give the person lots of water to drink to prevent dehydration. Check if the urine darkens or there is less urine.

Breast-fed babies should be breast-fed more frequently than usual.

Bottle-fed babies should be bottle-fed normally and should be given extra rehydration drinks as a supplement.

6. Contact the local healthcare worker as soon as possible so the cause of the fever can be investigated.
7. Evaluate how the person is dressed.

Too much clothing can increase the fever; too little can cause shivering which will deplete the energy of the sick person.



8. Use water at room temperature to sponge the sick person unless he does not like it and starts shivering. Do not use cold water.

If the person with fever is suffering he may benefit from paracetamol. Give the person the appropriate dose of anti-fever medication. These medications might bring temporary relief, but do not treat the cause of the illness.

9. If the sick person has convulsions (aka fits) (the person suddenly shakes fast and uncontrollably): treat for fits (see chapter 'Fits – convulsions – seizures').
10. Keep checking on the sick person. There may be need to get up in night to check the temperature.



11. If medication has been prescribed to treat the person, advise the person to finish the whole course of medicine. If he does not finish the whole course, the disease might come back.

Advise the person to make sure the correct dose and amount of medicine is taken at the prescribed time intervals. Advise the parents when giving medication to a child to make sure that the child is not crying. When a child is crying, the medication will not be swallowed.

If the sick person vomits less than 30 minutes after taking the medicine, the medicine can be given again.

12. Advise not to use, buy or give medication that has:
  - passed the expiry date, or
  - has been exposed to direct sunlight, or
  - has been wet.
13. Bring the person to a nearby healthcare facility if the fever remains or the patient's condition worsens.

### **H.8.3.3    HYGIENE**

Wash your hands after taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

### **H.8.4    WHEN TO REFER TO A HEALTHCARE FACILITY?**

Fever can be a sign of a serious illness. Any person with fever needs medical attention to determine the cause. It is always advised to undergo a blood test for malaria in malaria prone regions.

Medical attention is especially important for babies, children, pregnant women and the elderly.



Arrange transport for the person to a nearby healthcare facility if:

- The person cannot take his medication.
- The person has convulsions (fits).
- The person is very sleepy, difficult to wake up or is confused.
- The person complains of headache.
- The person keeps vomiting.
- The person cannot drink.
- The person urinates less and the colour of the urine darkens.
- The person has sunken eyes.
- The sick child continues to cry without tears.
- The person's mouth is dry.
- The person cannot sit up or stand up.
- If sick baby is less than three months old, or the baby is too weak.
- The person has fast breathing:
  - Children up to 12 months: more than 50 breaths/minute.
  - Children more than 12 months: more than 40 breaths/ minute.
- The person has difficulty in breathing, for example chest heaving, nostrils flaring or chest indrawing.
- The person lets out a whistling noise when breathing.
- The person starts bleeding spontaneously.

When transporting the person to a healthcare facility or hospital, provide him with something to drink.

## **H.9      HYPOTHERMIA**

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Hypothermia occurs when a person's body temperature drops below 35 °C (95 °F) (the normal body temperature is around 37 °C (98.6 °F)).

Hypothermia can quickly become life threatening and should be treated as a medical emergency.

It's usually caused by being in a cold environment and can be triggered by a combination of factors, such as being outdoors in cold conditions for a long time, living in a poorly heated house or falling into cold water.

### **H.9.1      WHAT DO I SEE AND ENQUIRE?**

You may observe following signs and symptoms:

- shivering, though this may stop as body temperature drops;
- slurred speech or mumbling;
- slow, shallow breathing;
- weak pulse;
- clumsiness or lack of coordination;
- drowsiness or very low energy;
- confusion or memory loss;
- loss of consciousness; or
- bright red, cold skin (in infants).

### **H.9.2      WHAT DO I DO?**

#### **H.9.2.1      SAFETY FIRST**

1. Make sure you are protected sufficiently against the cold, prior helping the other person

#### **H.9.2.2      PROVIDE FIRST AID**

2. Gently move the person out of the cold.

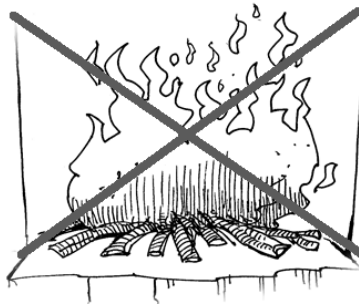
If going indoors isn't possible, protect the person from the wind, especially around the neck and head and insulate the individual from the cold ground.



3. Gently remove wet clothing. Replace wet things with warm, dry coats or blankets.
4. If further warming is needed, do so gradually. For example, apply warm, dry compresses to the center of the body — neck, chest and groin.



5. Offer the person warm, sweet, non-alcoholic drinks slowly in sips. This is another important exception to general principles of first aid (not giving casualty to eat or drink).



6. Do not apply direct heat. Do not rewarm the person too quickly, such as with a heating lamp or hot bath.



7. Don't attempt to warm the arms and legs. Heating or massaging the limbs of someone in this condition can stress the heart and lungs.



Do not eat, drink, or smoke.

8. Don't give the person alcohol or cigarettes. Alcohol hinders the rewarming process, and tobacco products interfere with circulation that is needed for rewarming.
9. Urgently transport the person to the nearest healthcare facility or hospital.

#### **H.9.2.2.1 WHAT DO I DO IF THE PERSON IS UNCONSCIOUS, BUT IS STILL BREATHING?**

- a. Put the person in the recovery position.
- b. Continue to observe the victim and check his breathing

#### **H.9.2.2.2 WHAT DO I DO WHEN THE PERSON STOPPED BREATHING?**

Perform CPR.

Do not interrupt the resuscitation until:

- help arrives and takes over;
- the person starts to wake up, moves, opens his eyes and breathes normally;
- you become too exhausted to continue, or
- the scene becomes unsafe for you to continue.

#### **H.9.2.3 HYGIENE**

Wash your hands after taking care of the patient. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

#### **H.9.3 WHEN TO REFER TO A HEALTHCARE FACILITY?**



Always urgently transport the hypothermic person to the nearest healthcare facility.