FIRE SAFETY and FIRST AID

METHODOLOGY BOOK

2022

PARTNERS

LATVIJAS UGUNSDROŠĪBAS ASOCIĀCIJA

National Fire Officers Alliance
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Learnkey

Contents:

WHAT IS AN EXPLOSION?

EXPLOSION is a phenomenon associated with a sudden change in the state of a substance, accompanied by strong sound and rapid energy release, which allow the explosion products and the environment to warm up, move and contract. When the pressure in the explosion area increases, a shock wave is formed in the environment, which has a strong destructive effect.

An explosion can be caused by:

- chemical reaction,
- electrical discharge,
- laser spark,
- fission and fusion reactions,
- meteorites,
- volcanic eruptions.

Often explosions are accompanied by loud noise and fire. An explosion is very dangerous to human health and life. Some explosions are so powerful that they can destroy houses.

Explosives are marked with the following mark:

Premises in which an explosive atmosphere may occur are marked with the following mark:

The explosion risk and fire categories of buildings and premises are determined on the basis of the properties of the substances present or used in the production process, such as highly flammable, non-combustible gases, liquids, solids, their flash point and quantity.

Buildings and premises are categorized into A_{sg}, B_{sg}, C_g, D_g, E_g categories according to the risk of explosion and fire. These categories do not apply to the manufacture and storage of explosives.

What Kind of Explosions There Are and How Do They Occur?

In the event of an explosion, the initial potential energy of a substance is usually converted into the energy of compressed heated gas, and as it expands, it is converted into the environmental motion, compression, and heating energy. Some of the energy remains internal (thermal) energy of the expanded gas.

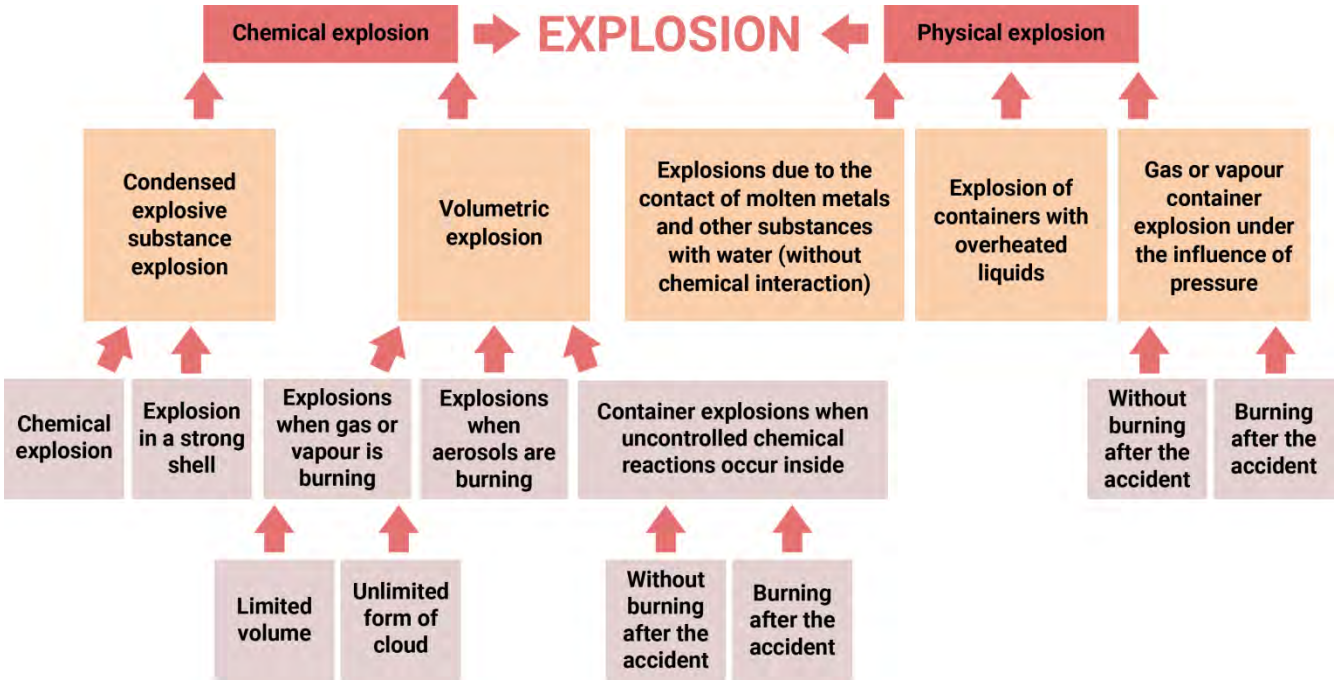
The amount of energy released during an explosion determines the total amount of destruction (volume, width). The energy concentration (energy per unit volume) determines the intensity of destruction in the source of the explosion. These properties depend on the rate at which the explosive system releases energy and which results in the formation of a destructive or disruptive shock wave.

In other words, an explosion occurs when a very sudden, high-velocity, normal-temperature gas greatly increases in volume. This is due to the heating of the gas. A lot of gas is released, which is hot and of a very large volume. Therefore, the walls of vessels or other containers cannot withstand it and all the substances inside are released outside together with a large amount of energy.

Substances that can explode due to external influences are called **explosives**. There are several different reasons for the sudden expansion of gas or vapour. A distinction is made between **physical, chemical, and nuclear explosions**.

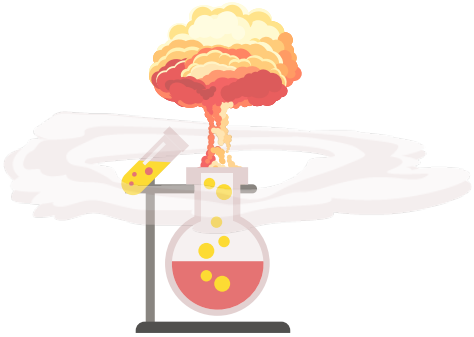
If only physical changes in a substance take place during an explosion, such explosions are called **PHYSICAL EXPLOSIONS**

Some examples are an explosion of a container with compressed gas (a gas cylinder kept at home for food production), a blasting with the help of liquid carbon dioxide and compressed air, an explosion of steam boilers, liquefied gas cylinders. As the gas expands, the walls of the vessel rupture. The evading gas disrupts the vessel and provides the debris with a high acceleration and therefore destroys or damages the surrounding objects.



Explosions that occur due to a rapid chemical reaction are called

CHEMICAL EXPLOSIONS



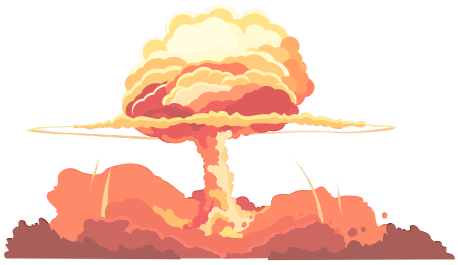
Chemical properties describe the ability of a substance to combine with other substances or to transform into another product. It is a way of describing what a substance can react to or which one can transform itself. When a chemical reaction takes place, matter changes into a completely different kind of matter.

For example, sodium can react to air vapour and result in a strong explosion; iron and oxygen combine with rust, so iron has the chemical ability to form rust; gasoline has the property of burning (it is flammable).

A chemical property is any property that can only be determined by changing the chemical identity of a substance. Simply touching or observing a substance will not prove its chemical properties. The substance or the structure of substance must be changed in order to see its chemical property.

Explosions caused by nuclear reactions are called

NUCLEAR EXPLOSIONS



A nuclear explosion can occur in the air (stratosphere), on the surface of land or water, underground, or underwater. During the explosion, a chain reaction takes place, during which a cloud of hot air, soil, water vapour and nuclear explosion products is formed. The temperature at the epicentre of the explosion reaches millions of degrees, creating a ball of fire that is a source of light radiation. When a nuclear charge explodes, a dazzling ball of fire is first seen, which rapidly increases and rises to the top. A pit appears at the site of the explosion, and a cloud of radioactive dust is formed, which rises to the top and merges with the cooled radiant area to form a fungal-like radioactive cloud. This cloud reaches its maximum height within 10-15 minutes after the explosion, that is, 5-20 km, and then gradually loses its characteristic shape and dissipates downwind, spreading radioactive contamination. Nuclear explosions are the strongest explosions currently known to mankind.

The potential for explosions exists in a variety of industries:

CHEMICAL INDUSTRY	In the chemical industry, highly flammable gases, liquids, and solids are recycled and processed in a variety of processes. Explosive mixtures may be formed during these processes.
LANDFILLS OF WASTE AND CIVIL ENGINEERING	Landfills of waste can generate flammable gases. Complex technical measures are needed to prevent uncontrolled emissions and possible ignition of gases. Flammable gases from various sources can accumulate in poorly ventilated tunnels, basements and elsewhere.
ENERGY COMPANIES	Solid carbon, which is not explosive in reaction with air, can be transformed into carbon dust during transport, milling and drying processes, and can generate explosive gas-air mixtures.
WASTE RECYCLING COMPANIES	When treating wastewater in treatment plants, the released gases can generate explosive gas-air mixtures.

GAS PROVIDERS	Emissions of, for example, natural gas may result in the formation of explosive gas-air mixtures.
WOOD PROCESSING INDUSTRY	Wood dust is generated during wood processing. They can form explosive dust-air mixtures, such as in filters or tower storage.
SPRAY PAINTING	Too much spray paint accumulated in the painting room and solvent vapours released when mixed with air create an explosive atmosphere.
FARMING	Some farms use biogas plants. Explosive mixtures of biogas and air are formed if the gas is released into the environment, e. g. due to a leakage.

Explosions in the World

Exceptional examples

Explosion in Lebanon

On 4th August 2020 the Lebanese capital was shaken by a powerful explosion, razing to the ground almost the entire port and destroying many buildings. More than 100 people were killed in the blast, another 4,000 or more were injured, and an unclear number of people were buried under the rubble. The explosion was caused by about 3,000 tons of ammonium nitrate stored unsafe in the port for 6 years.

Ammonium nitrate is a granular nitrogen fertilizer used for pre-sowing fertilization or additional fertilization during vegetation. The mixing of ammonium nitrate and furnace fuel produces a highly explosive mixture that is widely used in the construction industry. In this case, experts working at the scene found that initially a fire occurred in one of the adjacent hangars. Later, the uncontrolled flames also covered premises with almost 3,000 tons of ammonium nitrate. The disaster struck when it detonated.

Explosion of Fukushima Nuclear Power Plant

On 11th March 2011 a powerful 9-magnitude earthquake in the Pacific Ocean off the east coast of Japan shook the earth along the coast of Fukushima Prefecture. The earthquake automatically shut down three reactors at the Fukushima nuclear power plant, and the other three reactors were shut down for a scheduled inspection at the time. The earthquake cut off external power supplies and the nuclear power plant's diesel power generators were flooded by a tsunami. Cooling failures resulted in a partial meltdown of nuclear fuel in reactors 1, 2 and 3, with explosions on 12th, 13th and 15th of March that resulted in the release of large amounts of radioactive substances into the atmosphere and the Pacific Ocean.

The Fukushima accident caused by a serious natural disaster is unprecedented so far – it was a triple disaster as the accident occurred in as many as 3 nuclear reactors at the same time. The earthquake and tsunami killed about 20,000 people, more than 150 thousand buildings were destroyed, 4.4 million of households were left without electricity and 1.5 million – without drinking water.

Terror Attacks

Explosives produced by terrorist groups can be very dangerous. The activities of such groups are usually directed at the civilian population in order to do as much damage as possible and sow fear among the population.

Pre-planned terrorist attacks with bombings

On 15th April 2013 two homemade bombs were detonated near the finish line of the Boston Marathon. Three people were killed, and another 264 people were injured. Two bombs that triggered the tragedy exploded 12 seconds apart near the finish line in the Boylston Street.

On 11th April 2011 an explosion of a powerful homemade device took place at the Minsk metro station Oktiabrskaya. 15 people were killed and more than 200 people were injured.

On 24th January 2011 an explosion struck Moscow's Domodedovo airport. 35 people were killed and about 170 people were injured.

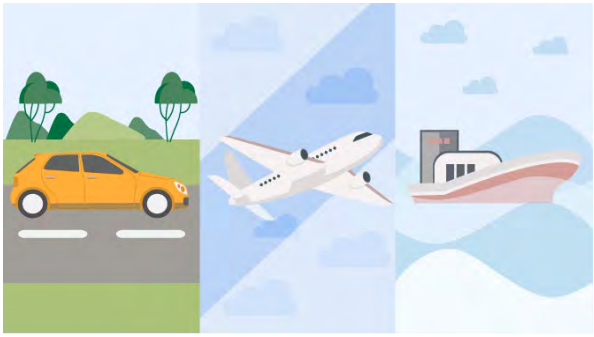
On 13th and 14th November 2014 terrorist attacks occurred in various parts of Paris. According to various figures, at least 129 people were killed, about 352 people were injured, of whom about 99 were seriously injured. Eight attackers were killed and seven of them blew themselves.
On 22nd March 2016 two explosions were carried out at Brussels Zaventem airport, killing 10 people, and injuring more than 30 people. According to preliminary data, explosions took place at the airline's check-in counter. The airport was closed. Trains between Brussels and the airport were also stopped, and a state of emergency was declared by the regional services.

Explosions in the Household

Gas explosions are a common phenomenon. The most common cause of fire that result in an explosion is gas leakage. This is why it is recommended to use electrical appliances and a gas stove properly. Natural gas has no odour. Therefore, odorants are added to household cylinders in order to detect leaks. This can help protect not only from possible domestic gas poisoning, but also from other unpleasant consequences such as gas explosions and even death. In order to prevent an explosion in the household, it is necessary to follow the requirements of simple rules for the use of appliances. This will protect the home from disasters.

Explosions During Traffic Accidents

Transport is a vital branch of the economy. The main modes of transport are road, rail, air, inland waterway transport and sea shipping, seaports. Traffic accidents can be fatal, disrupt traffic, pollute the environment and disrupt normal living conditions for a long time, i.e., cause an emergency situation.



Road Transport

Road transport is the most appropriate and flexible means of delivering goods. One of the areas that can pose a risk to traffic, adversely affect the environment, human health and safety and cause emergency situations is the transport of dangerous goods. Vehicles carrying dangerous goods can be involved in accidents: collide with another vehicle, hit an obstacle, fall off the road, and so on. Dangerous substances can be spilled on the road and endanger traffic, be released into the environment, and affect human lives and health.

On 10th December 2016 a train, which carried more than 20 tanks of liquefied propane and butane and propylene gas, derailed at the railway station in the town of Chitrin, about 100 kilometres from Varna, Bulgaria's main Black Sea port. The last two tanks hit a power line and exploded; another seven propylene-filled tanks fell off the rails. Five people were killed and another 27 people were injured in the accident.

The magnitude and impact areas of the explosions are predictable. In the developed countries of the world, a lot of attention is paid to prevent them from happening. This is called preventive action. Various services work in preparation for action in the event of explosions, these are so-called preparedness and response actions.
Preventive action is taken by the services that supervise the operation of facilities, issue permits for construction and industrial activities. These include environmental services, civil protection, fire and rescue services and people working in municipalities. For computation, modelling, and forecasting, the modern world has developed many computer programmes that allow us to predict possible substance and facility explosions, prepare for them, and take measures to protect the population. The most commonly used forecasting programs are SPHEARE, RISKCURVES, EFFECTS.

You can check how the forecasts are made here https://www.gexcon.com/products-services/effects/

What Are the Risks and Threats Posed by an Explosion?

In the event of an explosion, the persons closest to the epicentre of the explosion are the ones who suffer the most, are injured by shattering fragments and hit other structures as they are blown away by a strong energy. The fragments damage human external and internal organs. Internal organs are damaged, causing internal bleeding or injuries to the legs, arms, and head. The force released during high-energy radiation causes thermal burns.

The effects of building fires are greater than the ones of other threats because of the long-term damage to residents. When large buildings burn or collapse, there is a high probability of an emergency situation. Many natural and human created factors, such as building design, geographical location, climate, seismic processes, building materials, building maintenance, and security standards, affect the magnitude of the consequences of this threat.

Terror Acts

Forms of terrorist activity can be different, i.e., may include these actions:

- Organization, planning, preparation and execution of a terror act.
- Formation of a terrorist group or membership of a terrorist group.
- Incitement to commit terrorist activities – recruitment, training and use of persons in the commission of a terror act.
- Financing of a terrorist group and its activities or other support provided to persons involved in terror acts.

Hazardous Facilities

In industrial facilities, where chemicals are used, there is a risk of an accident during transport that can lead to an emergency situation. These are disturbances of various technological processes, which cause fires, explosions, release of chemicals (pollutants) into the environment, transport accidents during transportation of dangerous chemicals, accidents in energy facilities, main pipelines. Accidents

in industrial facilities have a significant impact on human health and pollute the environment. Such industrial facilities are called hazardous facilities and can lead to major industrial accidents.

How to Avoid the Risk of Explosions?

Pressure vessels can explode in the household and living spaces:

When purchasing a cylinder, it is necessary to assess whether the date of the performed and future inspection are indicated on it – the technical inspection of the cylinder is performed at least every 10 years, and such a cylinder must be marked with the logo of the company that performed the inspection. There have been a number of cases when gas has leaked into the environment during the replacement of a liquefied petroleum gas cylinder. Later, just a spark in the premises is enough for the gas-air mixture to explode.

In the event of a gas leak, a specific, unpleasant odour is emitted. It is an odorant that is injected into the odourless gas so that we can smell it. If you smell it indoors, it is very important to react quickly and properly – close the valve of the gas cylinder, and if it does not close, the cylinder should be taken out as carefully as possible. It is also necessary to ventilate the premises, not to light matches, not to smoke, not to switch on electrical appliances and switches. If the cylinder remains indoors and there is a gas odour, leave the room immediately and call for help. The telephone number of the gas emergency service must

be indicated both on the label of the gas cylinder and in the leaflet of the operation of the cylinder.

Suspicious article of unknown origin – an unexpected, unanticipated shipment, package, envelope, container that is received or found and is suspected of endangering human life and health or polluting the environment due to an explosion, ionizing radiation, chemical contaminants or biological hazards. In most cases, such articles are used to endanger a particular person or institution or to confuse the public.

How to Deal with an Explosion?

Information on the accident at the hazardous facility and the necessary precautionary measures shall be communicated through the media. Depending on the circumstances of the accident, residents may need to evacuate a potentially contaminated area or hide from pollution in sealed buildings. People living close to hazardous facilities should research which dangerous substances these facilities use, what the dangers are in the event of an accident, and what to do when they receive information about an accident.

Dangerous facilities must inform the public (especially people living nearby) about:

- The activity or type of activity carried out in the hazardous facility.
- The dangerous substances used that could cause an accident, their main hazardous properties.
- The nature of the potential risk of accidents and their possible consequences for people and the environment.
- Ways to warn and inform the population about the accident.
- Necessary actions in case of an accident.

What you need to know in the event of a nuclear or radiological accident?

- Large amounts of radioactive substances may be released into the environment.
- The more radioactive substances are released into the environment, the greater the risk of ionizing radiation.

- Radioactive substances released into the environment are spread by the wind.
- These substances eventually settle on the surfaces of earth and water.
- Radioactive substances irradiate humans and animals from the outside.
- These substances can damage the internal organs if they get into the body.
- Radioactive dust is relatively easily removed from the body surface by washing it with running warm or room temperature water with soap (thus removing up to 95% of radioactive substances).
- Agree on a place where you can meet your family members during an emergency situation.
- In case of evacuation, bring essentials, identity documents, drinking water and some food, suitable clothing, mobile phone.
- Always know where the emergency exits from the premises are located. Never use an elevator if there is an explosion, fire, or damage to the building structure.
- The family is advised to have an emergency plan. Every member of the family must know the telephone numbers of special and rescue services. Know how to disconnect water, gas, and electricity at home.

If you think you have been contaminated with radioactive substances:

- When you return home, carefully take off your outerwear, do not shake it nor clean it, and try to touch the surface of the clothes as little as possible. Put them in a plastic bag and keep away from people and animals.
- Wash yourself under running warm soapy water. Do not rub the skin too intensely, just wash it well. Wash your hair only with shampoo, do not use conditioner. While washing, care must be taken to prevent contaminated water from entering the eyes, mouth, nose, wounds.
- Change into clean clothes.
- When the collection point for radioactively contaminated items is announced, take the clothes you have taken off there. Leaving areas contaminated with radioactive substances is possible only through exposure control and sanitation points.

Exposure control point means a special or adapted room for the assessment of radioactive contamination of human beings. Sanitation point is a special place where decontamination of affected people takes place.

How to behave during a terrorist attack?

- In the event of a terrorist attack, if you or others need help, call 112 immediately.
- Follow the instructions provided by special and rescue services.
- If possible, leave the danger area and warn others of the danger.
- Try to stay calm, do not panic, act thoughtfully.
- If you are injured, take care of yourself first, then assess whether you can help others.

How to deal with an explosion?

- When you see or hear an explosion nearby, fall to the ground and cover your head with your hands. If possible, be sure to use any shelter – it can be a building, a ditch, a ravine, a tree or even a sidewalk. Inside the room you can use a closet, a table, or a wall.
- Do not rush to leave the shelter after the explosion, as some fragments boomerang and fall around the explosion site after turning around.
- If you are not injured and the fragments no longer fall, leave the explosion site. Be aware that an explosion can happen again – such a tactic is used very often in terrorist activities: after a relatively small explosion, they wait until special services arrive, and then carry out the actual terror act, thus disrupting the work of special services.
- If the explosion occurred inside a building, use emergency exits when exiting. The use of elevators and other electrical equipment is strictly prohibited.
- If there are injured people, help them to evacuate to a safe place and give first aid. When choosing a safe location, avoid collapsed buildings as they or parts of them may collapse completely.
- Report the incident to the general emergency number 112.

When you find an item similar to a standard explosive, do not touch it nor disassemble it in any way.

The main steps to follow are the following:

- Do not touch the explosive.
- Warn those around you.
- Mark the place.
- Report the article to the general emergency number 112.
- Be sure to wait for deminers and provide them with information.
- When leaving for a safe place, be sure to follow the same path you came from.

STINGS AND BITES

What is a sting and what is a bite?

BITES AND STINGS of various animals and insects are skin lesions that can cause severe pain and/or swelling, infection, allergies, or even anaphylactic shock. Without proper assistance in a timely manner, the victim can become seriously ill or even die.

Snake bites

Only 27 countries in the world report no deaths from snake bites, and in 138 countries snake bites can be fatal. Snake bites are more often recorded at the start of the mushroom and berry season, but early spring bites can cause more severe poisoning because the snake produces a lot of highly concentrated poison during the winter.
The prognosis is worsened by older or very young age of the victim and failure to provide first aid in a timely manner.

How does snake venom work?

Snake venom is an altered saliva that consists of 26 types of enzymes of protein origin. These enzymes determine the venomousness of the snake and the nature of the venom effects: some poisons have a damaging effect on the blood and blood vessels (hemotoxins), others have a nerve paralyzing effect (neurotoxins).

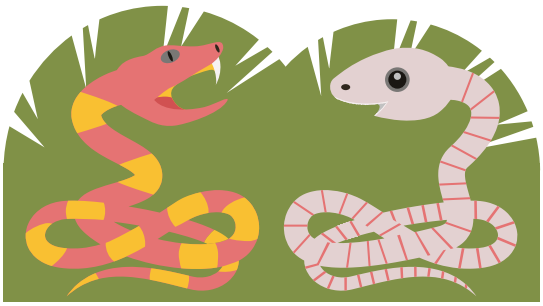
- **Hematoxins** destroy erythrocytes (cause rupture of red blood cells), blood coagulation, i.e., the ability to clot.
- **Neurotoxins** can suddenly paralyze the propagation of nerve impulses in muscles and, in critical cases, can paralyze the muscles involved in the process of breathing and swallowing.
- **Cardiotoxins** directly affect the heart and can cause circulatory failure.

The severity of the condition is determined by:

- Snake species and size.
- Amount of poison injected.
- Number of bites.
- Bite site (bites in the head are especially dangerous).
- Age and weight of the victim.
- General health of the victim.
- Individual sensitivity to poisons.

Snake species

There are about 3,000 species of snakes living on earth. Bites of as many as 600 snake species are dangerous to humans. How to distinguish a poisonous snake from a non-poisonous one? The heads of non-venomous snakes are oval in shape and with round eyes. Unlike poisonous snakes, non-poisonous snakes do not have a stinger to inject poison. The most common in Europe are snakes of the viper family: adder, common adder, horned viper, aspic viper. In Lithuania, it is the common European adder - Vipera berus.



Snake bite:

- Tooth marks appear at the bite site – **two** small wounds next to each other;
- Sometimes, when a bite occurs on a toe or finger where there is not enough space for two stings, or when a snake has one tooth broken, it can leave a bite mark of only **one** tooth.

Signs of a bite:

- **Severe, burning pain** at the site of the bite.
- **Common reactions** – fear, headache, weakness, nausea, vomiting, abdominal pain (should go away by itself in thirty minutes or an hour).
- The bite site gradually begins to **swell**, the skin **colour changes** – into red or blue.

First aid for snake bites:

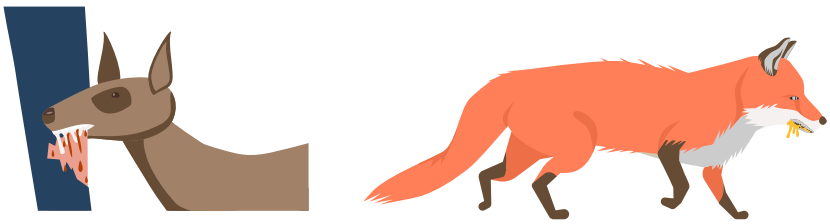
1. **Protect** the victim and prevent the rescuer from being bitten repeatedly – move or take the victim away from the snake and call for help.
2. **Lay down** the victim and reassure him, communicate with him, explain what happened to him, what help will be given to him, ask not to move.
3. **Do not remove clothing**.
4. **Remove the rings** off the damaged limb, take off the watches or other jewelry.
5. Apply **a wide pressure bandage** over the bite site (1-2 fingers should easily fit under the bandage).
6. Important: **The bandage cannot interfere with blood flow in the arteries and deep veins, but should only impede lymph and blood flow in the superficial veins. This slows down the spread of the poison.**
7. The bandage should not be left unattended, as swelling of the limb can suppress blood circulation and cause a risk of blood clots. **Do not remove the bandage until a specific poison antidote has been administered**.
8. **Immobilize** the limb including the nearest joints.
9. **Cool** the affected area (cold object through the cloth).
10. **Do not give anything to eat or drink** but a few sips of water.
11. **Passive transport** of the victim to the hospital – carry the victim, do not let him walk.
12. **Do not cut the bite or suck poison**, as this can be very dangerous to the life of the rescuer.
13. **Do not place a turnstile** on the damaged limb .
14. **Do not give coffee or alcohol**.
15. **If the person is unconscious**, assess breathing and pulse, if he is not breathing, take initial steps in resuscitation.

Human or animal bites

A human bite can be very dangerous for a victim - even more dangerous than that of a dog. Dangerous diseases such as AIDS, hepatitis B and C can be transmitted through human bites. All human bites should be treated by medical personnel. When an animal bites, a person can become infected with rabies, tetanus, and many forms of fever can develop.

Rabies

Rabies is an acute viral disease caused by a virus that is fatal when it reaches the symptomatic stage of the disease. Rabies viruses are highly vulnerable to the external environment, so infection occurs only when the saliva of an animal with rabies enters a wound through damaged skin or mucous membranes. The rabies virus is very sensitive to dehydration, disinfectants, for this reason the spread of the virus through objects in the external environment is almost impossible.



The incubation period (from infection to onset of disease symptoms) lasts from 12 days to several months. The duration of the incubation period depends on the site of infection (the closer to the head, the shorter the incubation), the amount of infection entering the wound, the peculiarities of the bite site, the immune system of the bite victim. The first symptoms of rabies are similar to the flu: fever, headache, severe weakness. This period can take about a week. Other symptoms occur as the disease progresses.

There are two typical forms of rabies:

- **Encephalitis** with agitation is a classic form of rabies, manifested by fear of water, fear of air movement, and spasms of the throat.

- **The paralytic form** of rabies manifests itself in progressive muscle weakness without signs of brain damage. The period of neurological symptoms can last about a week, then turn into a coma and end in death.

Symptoms of rabies:

1. **Pain and swelling** at the site of the bite
2. **The stage of excitement and fear of water**, which manifests itself in:
   - restlessness, distraction;
   - painful swallowing muscle spasms;
   - uneven breathing;
   - salivation;
   - high temperature;
   - aggression;
   - hiccups, inability to swallow saliva, hallucinations.
3. Later, **a paralytic stage** develops:
   - the patient calms down
   - increased salivation and convulsions
   - paralyzed legs
   - death occurs due to paralysis of the respiratory centre

First aid

- Wash the wound thoroughly and, if possible, disinfect it with suitable means (these measures do not protect against infection).
- The only way to protect life is to get **vaccinated with a rabies vaccine.**

Insect stings

In the summer, insects become especially active, and the number of cases when their stings cause allergic reactions in humans increases. The stings of some insects do not cause much discomfort, while others can do a lot of damage to the body, and worse, they can be life-threatening.

Naturally, the bodies of people react differently to insect bites. These reactions are divided into several types:

- **Normal** – redness, pain, swelling of the skin.
- **Local** – reddening of a larger area of skin.
- **Allergic** – difficulty breathing, itchy rash, swelling of the face, mouth, throat, increased heart rate, nausea, vomiting, low blood pressure.

It is very important to know that an allergic reaction can occur **just a few minutes after the sting**, and if aid is not given in time, a person can die.

Signs of a bee sting:

- There is a stinger left at the bite site.
- Pain.
- Swelling and discolouration of the skin (red, blue, white, gray) at the bite site.

After the bee sting, the first aid is to **remove the stinger**. The stinger should be removed as soon as possible, as the poison is pumped into the wound from the moment of stinging. The method of removal is not important, you can either scratch it out with a knife blade, nail or the edge of a credit card, or pull it out with tweezers, fingers or nails.

First aid in case of a bee sting:

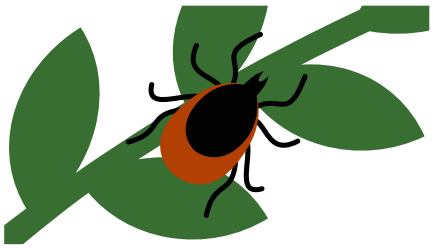
1. **Protect** the victim from repeated stinging.
2. **Calm down** the victim.
3. **Remove the jewelry** off the bitten limb.
4. **Get out the sting**.
5. **Ask the victim if he is sensitive** to bee stings, monitor him.
6. Apply a **cold compress** at the sting site.
7. In the event of **anaphylactic shock** – the first aid as in any other anaphylactic shock.
8. **Transport** the victim to a medical facility as soon as possible.

Tick sting (attachment)

Stages of tick development: larvae, nymphs, adult tick. The tick feeds on blood. The period of tick activity lasts from March to November. Ticks transmit pathogens of dangerous diseases (Lyme disease, tick-borne encephalitis), so its sting can be dangerous. The tick-borne encephalitis virus is present in the saliva itself, so it a tick sting is enough to transmit the virus.

Tick bite, signs:

- Itching at the sting site.
- Attached tick visible (not always).
- Attachment site reddened, slight swelling.



LYME DISEASE – the most common symptom is migratory erythema - redness occurs at the site of tick after 1-4 weeks. The spot usually expands. After a few more days, joint pain, fever, and general weakness may occur. If you experience such symptoms, you should consult a doctor.

TICK-BORNE ENCEPHALITIS – fever, headache, nausea, vomiting, general weakness, muscle aches. May occur 2 to 3 weeks after tick attachment.

First aid:

1. **Remove the tick** (do not twist the tick left or right when pulling it out, try to grab the tick as close to the skin as possible with tweezers and remove it by pulling back).
2. **Disinfect** the wound with available means.
3. After removing the tick, the bite site and your general health should be **monitored for ≈1 month**.
4. **Do not pour any viscous liquids** on the tick.

Prevention:

- **VACCINATION** is the only and reliable remedy for tick-borne encephalitis.
- When going into the forest, cover the open areas of the body well, especially protecting the wrist and neck areas.
- Use special **tick repellents**.
- When you return from the forest, **inspect your entire body and clothing** immediately.

Prevention of insect bites:

- Use **repellents** every two hours and each time you cross a water obstacle.
- Apply to uncovered skin: wrists, neck, calves at the top of shoes, do not apply to skin around eyes.

ALLERGIC REACTIONS

What is allergy?

ALLERGY is an abnormal response of the body to an antigen, i.e. an allergen that has entered the body or its surface (pollen, dust, food, chemicals, etc.). An allergic reaction usually develops after repeated exposure to the antigen, when the body is already sensitized to the antigen after the initial exposure.

To kill allergens that have entered the body (Antigen (Ag)), the immune system produces antibodies (also called immune complexes, or protective proteins produced by the body in response to Ag) which die after their job is done (that is, having destroyed the allergen Ak, they bind to Ag, neutralising and removing Ag from the body). Dead antibodies must be neutralized or eliminated from the body. If a lot of these antibodies are produced at a high rate, the body is not able to eliminate them all, and they may accumulate in various organs - they deposit on the walls of arteries, brain, liver, kidneys, joints. It is estimated that 90% of kidney diseases are due to immune reactions and deposited antibodies. Besides, excessive production of antibodies (due to constantly entering allergens) narrows blood vessels and damages joints (rheumatoid arthritis). Moreover, during an allergic reaction (response), a chemical called histamine is produced, which is toxic to the body and causes skin rashes and itching.

Common allergens:

- Drugs.
- Animal bites and stings.
- Animals.
- Food.
- Plants.
- Domestic and other dust.
- Cold, heat.

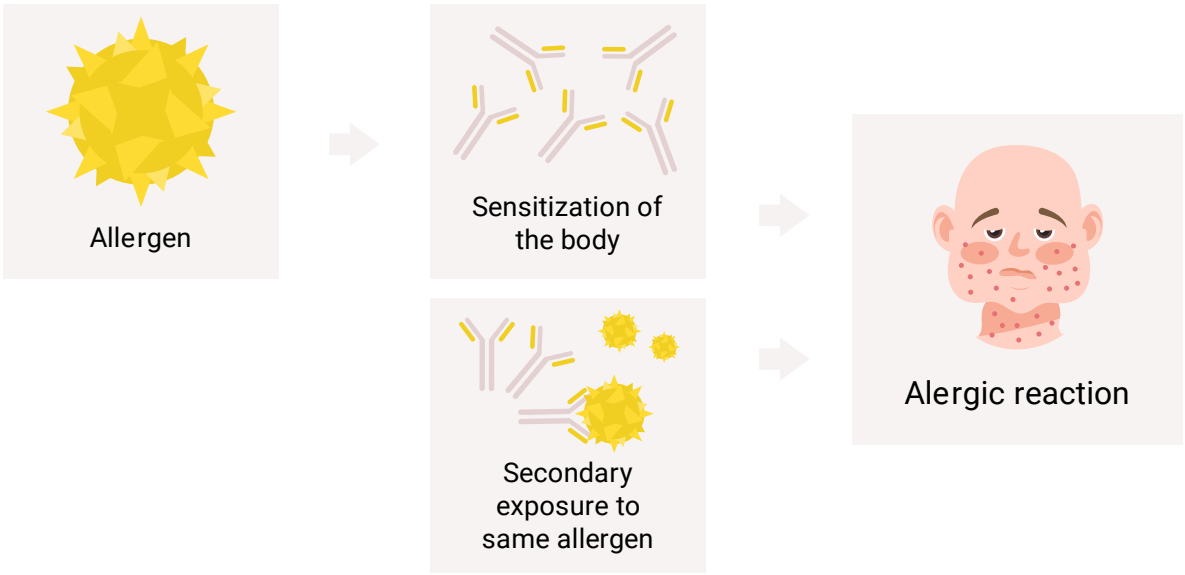
Due to the production of immune complexes and histamine, tissues and organs may swell and the cell experiences oxygen depletion, its pH decreases and the cell cannot function normally.

Why is an allergic reaction dangerous?

Allergic reactions weaken the immune system and thus distract from its main function - the body's defence. Besides, an allergic reaction depletes the body's energy. Therefore, people frequently suffering from allergies are more prone to various diseases and infections and often feel tired.

- Chronic non-healing wounds may occur at the site of allergen exposure.
- Swelling or spasm of the upper respiratory tract can cause a suffocation death.
- Shock occurs when blood pressure drops.
- Impaired functioning of important body systems can lead to death.

Mechanism of allergic reaction



Most allergies arise due to a person's weakened immune system and body contamination, because not everyone has an allergic reaction to a particular allergen. It is estimated that 50-80% of the immune system relies on a good balance of intestinal bacteria. When bad bacteria predominate in the gut, the intestinal walls thin out, and undigested or under-digested proteins and other under-digested foods enter the bloodstream. The immune system does not recognize them, considers them intruders

and attacks them, thus developing allergies to various foods, especially proteins, because proteins are most likely to be under-digested; therefore food allergies are most common to protein-rich foods - dairy products, nuts, eggs, soy, many people are allergic or do not tolerate wheat due to its gluten protein. Today, wheat varieties are modified to contain as much gluten as possible (better pastries and thus more beneficial for traders), the body is ill-adapted to processing high levels of gluten, and this alone has led to a significant increase in wheat gluten allergies in the last 10-20 years (gluten is found in many products; other grains also contain gluten, but less, so it usually does not cause problems).

Allergies are either seasonal and permanent, depending on the time of onset:

- Seasonal allergies occur in a certain season, such as spring, caused by pollen from blooming trees, grasses, weeds.
- Permanent allergies **occur constantly.**

The following types of allergies are distinguished in terms of the cause:

1. **Inhalant allergies.** This is a type of allergy where an allergic reaction (allergic rhinitis, tearing, allergic asthma) occurs after inhaling certain allergic substances.
2. **Food allergy**. It is a type of allergy where the human immune system produces antibodies to a particular type of food, recognizing this food as dangerous to the body. This is followed by nausea, indigestion, diarrhea etc.
3. **Skin allergy**. It is a type of allergy where a physical reaction occurs in contact to substances in the environment, resulting in rashes, itching, allergic contact dermatitis, allergic contact eczema.
    - Allergic contact dermatitis is a reaction of the body to a certain allergic stimulus and an allergic reaction that occurs at its site: redness, itching, rash, swelling.
    - Allergic contact eczema is a chronic inflammation of the skin caused by various allergic stimuli in our environment. The most common such allergens are: metals, chemicals, paints, glues, preservatives, parabens, various detergents – dishwashing detergents, washing powders etc. used in the household.

In terms of allergens, allergies are divided into:

1. **Pollen allergy**. It is the body's reaction to the pollen of trees, grasses and flowers, present is in the air when they bloom (spring – summer). Spring and summer are the hardest times for those who suffer from pollen allergies. This most common form of allergy is called polinosis. Pollen allergy is an allergic disease caused by an inadequate reaction of the immune system to the pollen of various plants. From the environment they settle on the mucous membranes of the nose, mouth and eyes, enter the bronchi, come into contact with the skin and cause allergy symptoms in sensitive people.

Symptoms of pollen allergy:

- nasal congestion
- watery and mucous discharge from the nose
- sneezing
- eye itching
- shortness of breath
- dry cough
- rash
- there are also known cases of migraine
- pollen epilepsy

Plant allergens are divided into several groups: trees, meadow plants and seed plants.

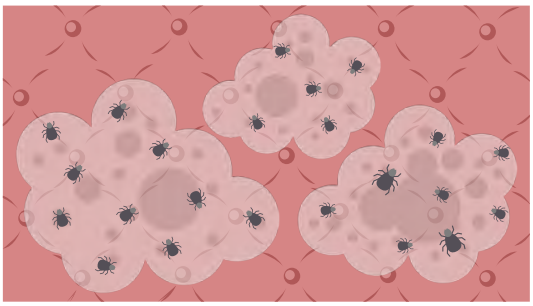
- The first stage of pollen allergy exacerbation is spring (March-May). At the time the **trees are in bloom**: birches, poplars, alders and maples are among the first to bloom. In May, it's oaks, oils, apples and conifers (pines, spruces). The most active allergens in spring plants are from from birches and oaks. July at the latest.
- **Meadow plants**. Meadows bloom in early summer. Meadow plants bloom from May to August. Their blossoming time is long, some species bloom twice, pollen allergies are especially common in June and July.

- **Seed grasses**. Buckwheat, nettle, plantain bloom in the late summer period (August - September).

2. **Dust mite allergy**. It is an allergy to the secretions, the faeces of dust mites, emitted by them in our environment. Mites are microscopic organisms that live in house dust and household items: bedding, mattresses, sofas, beds, carpets, curtains. Mites feed on the microparticles of our skin. Every day, on average, we lose about 1 to 2 grams of skin particles, which "feed" about 1.5 million mites per day. Mites survive for 2 to 4 months and multiply rapidly. Mites in particular like temperatures around 25 degrees, and more than 50 percent humidity. More than 2 million mites can live in one mattress, and about 2,000 mites can breed in one gram of dust. Allergy to house dust mites accounts for 75% of all allergies. Today, it is called the disease of civilization, which increases in proportion to the growth of urbanization, environmental pollution, with a lot of time spent in poorly ventilated or artificially ventilated premises.

Mite allergy causes the following symptoms:

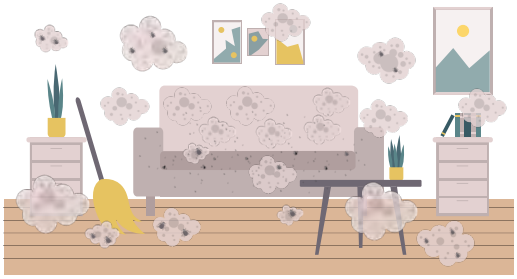
- runny nose in the morning,
- sneezing,
- watering eyes,
- respiratory disorders,
- eczema.



3. **An allergy to house dust** is an allergy to various allergens in the home environment or a mixture of them, such as fabric fibers, pet hair, mold. Most common allergies are to cats or dogs, but one can also be allergic to rats, mice, guinea pigs, birds, horses, cows, or poultry.

Proteins in the hair, saliva or urine of animals can cause the following **symptoms**:

- eye watering,
- increase in nasal discharge,

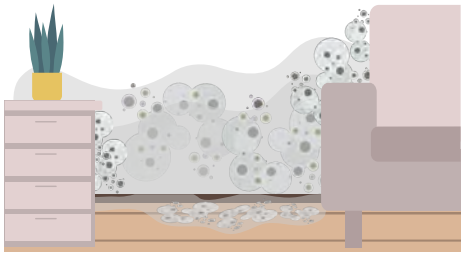


- asthma attack,
- urticaria,
- atopic dermatitis.

4. **Allergy to mold**, like other allergies, is a body's abnormal immune response to environmental factors to which non-all ergic organisms do not respond. Various fungi are widespread in our environment, but only a few of them cause allergies in sensitive people.

Allergy to mold **can provoke**:

- asthma attacks,
- cause allergic fungal sinusitis,
- pneumonia.



5. **A food allergy** is a reaction to certain foods that cause an allergic reaction immediately after eating. Food allergy is an abnormal condition of the body, presenting as hypersensitivity to certain foods. Somebody with this condition can be hypersensitive to different foods. After eating such food, sometime later an allergic reaction may occur. The most common allergens are eggs, nuts, dairy products, cow's milk, soy, fish.

The main signs of food allergy:

- recurrent skin rashes, flushing, oozing of skin areas,
- gastrointestinal disorders, abdominal pain, vomiting, diarrhea,
- respiratory disorders: runny nose, cough, shortness of breath or difficulty breathing.

6. **An insect-induced allergy** is a reaction of the body to the sting of a certain insect, when it injects poison into a person's body (for example, a bee sting). Insect stings are not only painful – they can lead to an acute allergic reaction. Even for non-allergic people, it can be dangerous if the hornet bites the palate or the root of the tongue. For people allergic to insect venom,

even a single sting can be fatal. The stinger of the bee gets stuck, contrary to the stinger of the wasp or hornet. An allergic reaction is usually caused by bee venom. The first sting does not necessarily cause a reaction, usually several stings are needed to develop an allergy.

If you have an allergic reaction, **you may experience**:

- redness,
- swelling,
- Itching,
- shortness of breath,
- difficulty breathing,
- urticaria of the whole body may occur,
- decreased blood pressure.

7. **Allergy to honey and bee products**. Honey usually causes allergic reactions in people who are allergic to pollen, propolis, mold, algae, bee venom and various substances excreted in bee saliva, as well as other organic substances that enter the honey during its production.

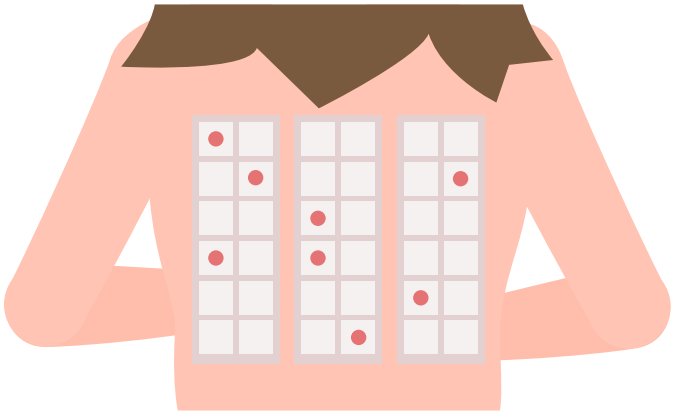
Bees make honey from nectar, which is secreted by the plant's glands. Bees make use of both chemical and physical factors to make honey from nectar. Bees secrete various enzymes from their glands, that are needed to break down sucrose, produce gluconic acid and hydrogen peroxide, which protect honey from the growth of microorganisms. The bees use their wings to evaporate most of the water in the nectar. The final product - honey is made up of many, up to 200, different substances. However, it mostly consists of sugars (glucose, fructose, sucrose, etc.), water, protein, organic acids, vitamins, minerals, pigments, phenolic compounds, and hard particles that enter the honey during harvesting. The most common allergens in honey that cause symptoms in humans are plant pollen proteins and various substances that enter the honey from bee saliva and pharyngeal glands. As already mentioned, during the honey production process, various organic substances, such as mold spores, algae, also enter the honey, which could theoretically also be the cause of allergies.

8. **Allergy to cold** is allergic reactions of the body to low temperatures, including cold air, cold water, and contact with cold objects. In some people with allergies, cold causes the release of histamine and other chemicals. Then redness, itching, swelling, rash, red spots appear in various parts of the body. Such allergic skin reactions are often caused not only by cold, winter weather, but also by cold water. Sometimes allergy to cold can also be a cause of a congested or runny nose. In summer it is not so prevalent, but it can prevent some people from enjoying swimming in the sea, lake and rivers. There are cases when even tap or well water, or cold food (straight from the fridge), or even cold rain and wind can cause cold allergy.

Cold allergy **can cause**:

- redness, itching, swelling, rash, red spots on the body,
- bronchospasm,
- headache,
- disorientation,
- diarrhea,
- uterine smooth muscle spasm.

PATCH TEST HELPS TO DIAGNOSE ALLERGIC REACTIONS.



Anaphylactic shock

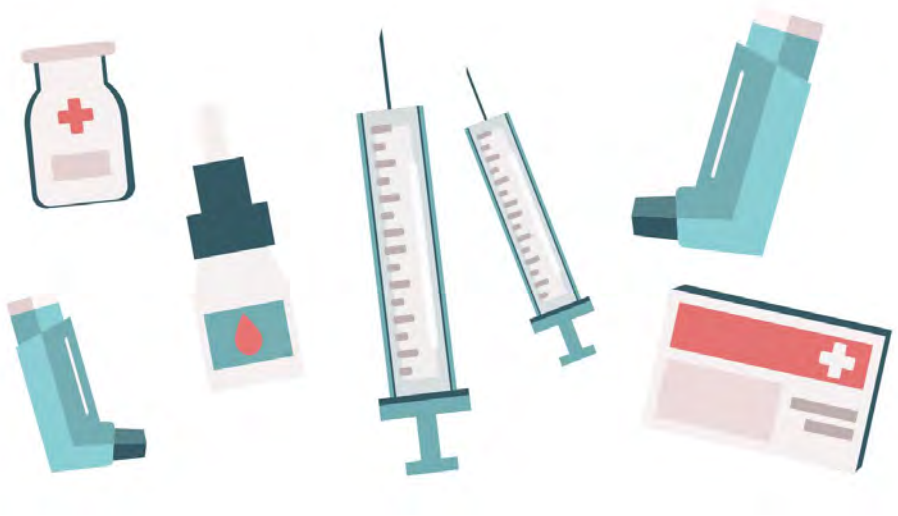
is **the most severe manifestation of an allergy**, an acute, systemic, life-threatening reaction associated with a cardiac, respiratory, and skin reaction.

First aid:

1. Prevent the access of the allergen to the body, **remove the person from the "allergic" environment**.
2. Initiate victim assessment using the **ABCDE system**:
    1) Check the airway (A) for obstructions,
    2) see if the victim has problems breathing (B),
    3) check if the blood circulates (C) well,
    4) assess possible disabilities (D), and finally,
    5) fully expose (E) the patient to examine him.
3. **For unconscious patient**: ensure airway patency. Settle the patient in a proper position.
4. Connect a **pulse oximeter**.
5. If the condition becomes life-threatening (the person suffocates, has difficulty breathing, feels weakness), **monitor** him, if the vital functions are impaired – **resuscitate**.
6. In case of a **bee sting, the stinger must be removed**. If the stinger is not removed, the body receives the maximum dose of the poison.

Medication consists of drugs that relieve symptoms or mitigate them for a shorter or longer time:

- **Histamine** is considered to be one of the most important mediators of the immune response, so drug treatment is usually focused on inhibiting the effects of histamine. Antihistamines, Tavegyl 2 mg/2 ml solution for injection The usual dose is one ampoule of 2 ml, i.e. 2 mg. It is injected slowly into a vein to control the heart rate. The solution for injection in the ampoule can be diluted 1:5 in 0.9% sodium chloride or 5% glucose solution. Use immediately after dilution.
- **Glucocorticoids** are adrenal cortical steroid hormones (cortisol and corticosterone). Dexamethason Krka 4 mg/ml solution for injection into a vein is diluted in 0.9 % sodium chloride solution.
- At the onset of bronchial asthma, **bronchodilators** are used to relieve the symptoms caused by a bronchospasm. Salbutamol to relieve a bronchospasm is administered in 1-2 sprays (100-200 micrograms).



DRUG POISONING

What is drug poisoning?

There is a first aid kit in everyone's home where you can find a wide variety of prescription and **OVER-THE-COUNTER DRUGS**. Their proper use does not cause any negative consequences, but not everyone is aware what the consequences are of irresponsible drug use without proper intervals, or overdosing.

Sometimes we don't realize what damage simple Paracetamol, which we take for pain and fever relief and which is part of most cold medicines, can do to the body. Drug poisoning is the entry of toxic drug substances into the human body, which disrupts the functions of key organs and systems.

Causes of drug poisoning

Both children and adults can experience drug poisoning. However, the causes of drug overdose are different. **The most common drug poisonings happen**:

- When a higher dose is taken accidentally. These are usually children who are curious for the taste of bright-coloured tablets left in an easily accessible place.
- When a patient forgets that they have already taken a dose – this is common in elderly people who are prescribed sedatives.
- Patients take double or multiple doses in the hope that the medicine will work better – "to work faster, stronger".
- Due to improper use of drug combinations.
- When taking medicines after drinking alcohol.
- To commit suicide.
- In children, a single dose or merely a lick of some medicines can prove fatal.

Central nervous system agents:

- Psychostimulants – stimulants are substances that stimulate the central nervous system (cocaine, crack, ecstasy, amphetamines, nicotine, caffeine).
- Depressants – depressants inhibit the central nervous system, make it less active (alcohol, heroin, inhalants, sedatives, anaesthetics).
- Hallucinogenic substances change perception, thinking and sensations so that the user begins to hear and see various things (LSD, hallucinogenic mushrooms, high doses of marijuana). The mental changes caused by hallucinogenic substances may be identical to the signs of mental disorders. Many psychoactive substances have mixed effects.

General symptoms of poisoning: dizziness, somnolence, impaired coordination, nausea, agitation, loss of consciousness, nausea, vomiting, respiratory distress.

Painkillers

Paracetamol, non-steroidal anti-inflammatory drugs (aspirin, ibuprofen, diclofenac, etc.), combination drugs for colds and pain (thera-flu, coldrex, gripex, solpadein, panadol extra, saridon, citramon, etc.) Pain relief: Ibumetin; Ibuprom; Solpadein, Dolmen (NVPU). Most commonly, abuse of these drugs causes gastrointestinal ulcers or other problems, gastrointestinal bleeding, ulceration or perforation, i.e. complications that can be fatal. Paracetamol overdose can cause liver damage.

What should I do if I take too much Ibumetin?

Symptoms may include nausea, stomach pain, vomiting (there may be some blood), headache, tinnitus, confusion, and uncontrolled eye movements. Drowsiness, chest pain, strong and rapid heartbeat, loss of consciousness, convulsions (usually in children), weakness and dizziness, blood in the urine, feeling cold and breathing problems have been reported at high doses.

Ibuprofen should be used with caution in combination with medicinal products that may increase the risk of gastrointestinal toxicity or bleeding, such as corticosteroids or anticoagulants (e.g. warfarin) or antiplatelet agents (e.g. aspirin). Taking high doses of this medicine may be associated with a small

increase in the risk of heart attack or stroke. Ibumetin should not be used in children and adolescents under 12 years of age.

Symptoms of aspirin poisoning: tinnitus, flushed face, nausea, vomiting, stomach pain.

Vitamins and food supplements

Vitamins can be dangerous if you consume large amounts, overdose for extended periods of time, or overdose on vitamins with iron.

Symptoms of overdose:

- On vitamin B6. If several weeks in a row, nerve damage is possible, leading to numbness and muscle weakness.
- On vitamin B3. Beside nausea, liver damage can occur.
- On vitamin D. In adults, thirst, frequent urination, general muscle weakness. Prolonged excess of this vitamin can cause high blood pressure or increase blood cholesterol. Children respond to excess vitamin D with nausea, diarrhea, dizziness, or loss of appetite.
- On vitamin A. Nausea, vomiting, hair loss, dry skin, headache. Prolonged overdose of this vitamin can also damage the liver.
- On vitamin C. High doses can damage the kidneys.
- On mineral potassium. Due to heavy sweating, overdose can cause arrhythmia or even cardiac arrest.

High blood pressure medication (antihypertensives)

If you take too much antihypertensives, you may experience: slow or irregular heartbeat, shortness of breath, swelling of the ankles, palpitations, dizziness, fainting, chest pain, cold skin, weak pulse, impaired orientation, anxiety, respiratory arrest, shortness of breath sensation, diminishing or loss of consciousness (coma), nausea, vomiting and bruising.

Diabetes medication

Taking unprescribed drugs to treat diabetes may cause: sweating, tremors, weakness, impaired vision, hunger, palpitations, numbness of the lips, incoherent speech, inability to concentrate, headache, dizziness, irritability, nausea.

Antibiotics

Streptomycin, kanamycin, neomycin, or newer: gentamicin, tobramycin, sisomycin, amikacin. Taking large amounts of these antibiotics impairs kidney function, but does not reduce urine excretion. A person urinates water, while waste products are not excreted and remain in the body. Therefore, before intoxication due to kidney failure occurs, the disorder may go unnoticed. Headaches, sleep, memory problems, hearing problems, and in some cases, complete deafness may also occur.

Gastrointestinal tract and metabolism medication

Mezym is used when the pancreas does not produce and secrete digestive enzymes, causing indigestion.

Mezym **should not be used**:

- If you are allergic to pancreatic powder or any of the other ingredients of this medicine.
- In case of acute or exacerbated chronic inflammation of the pancreas, before the symptoms of the disease become severe.

In patients with cystic fibrosis, the dose should not exceed the amount of enzyme needed to digest the fat in the food eaten. The dose may only be increased under the supervision and evaluation of the disease symptoms (such as faecal fat and the intensity of abdominal pain). The daily dose of 15,000-20,000 lipase units per kilogram body weight should not be exceeded. In patients with cystic fibrosis taking high doses of pancreatic powder, isolated cases of narrowing of the lower small intestine can occur. In patients with cystic fibrosis, isolated cases of constipation or obstruction can occur. On the onset of such signs, the possibility of intestinal narrowing should be assessed. Prolonged use of

pancreatic enzymes increases the likelihood that the pancreas will become accustomed to remain idle and may begin to secrete fewer enzymes. Once a person is accustomed to consuming pancreatic enzymes on a regular basis, this cannot be discontinued for the rest of their lives.

Amtotissives or complex drugs with decongestive properties (Actifed, Theraflu)

When used at higher doses, they usually have an inhibitory effect. Anxiety, euphoric mood, hallucinations, restlessness, headache, feeling of 'crawling ants', psychomotor hyperactivity, drowsiness, involuntary tremor, arrhythmia, palpitations, tachycardia, fatigue, hypersensitivity, nasal bleeding, stomach discomfort, vomiting, reddening of the skin, rash, hives, painful urination, urinary retention, high blood pressure. Overdose of pseudoephedrine, as with other sympathomimetic agents, increases irritability, tremors, tremors, convulsions, palpitations, blood pressure and difficulty urinating.

First-aid measures after large overdose: measures must be taken to sustain breathing and eliminate seizures. If necessary, gastric lavage can be indicated. The elimination of pseudoephedrine from the body can be accelerated by uric acidification or dialysis.

Cold medicines (Gripex, coldrex, wipar)

(Active substances: Paracetamol, Pesudoephedrin, Dextromethorphan)

If you take more cold medicines than you should, the following symptoms may occur: nausea and vomiting, involuntary muscle contractions, agitation, confusion, drowsiness, loss of consciousness, involuntary and rapid eye movements, heart problems (tachycardia), coordination problems, psychosis with visual hallucinations and hypersensitivity. Other symptoms caused by a severe overdose may include coma, severe breathing problems and seizures.

First aid for drug poisoning

In the first hour after poisoning, induce vomiting or perform gastric lavage.

NOTE – parents are not advised to induce vomiting in a child under the age of five. Inserting your fingers into a child's throat can cause severe damage to the throat. Irritation of the root of the tongue can disrupt heart rhythm. If a vomiting child inhales the contents of the stomach, there is a risk of damage to the lungs.

If the poisoned person is conscious, you can always give some plain water to drink. For a child - about 5 ml, but not more than 200 ml, per kilogram of body weight, for example, about 100 ml for a child weighing 20 kg. Give an adult to drink a glass of water.

NOTE – If possible, locate and save ALL medicine packages so that you can identify as accurately as possible which drugs have caused poisoning, their quantities, and potency.

First aid

1. **Ensure airway patency, respiration and blood circulation** (DRABCD principle should be followed).
2. Make sure the victim gets to the **hospital**.

Actions:

1. If the victim is conscious, settle him a comfortable position.
2. Ask what, how much and when he drank, while talking to the victim, monitor his condition
3. Call 112 for an ambulance.
4. Assess vital signs: consciousness, breathing, and blood circulation until an ambulance arrives.
5. Look around for empty medication packs around the victim. Save them upon finding. Information about the medication that may have caused the poisoning can help doctors apply the right treatment.

Hazards and remarks:

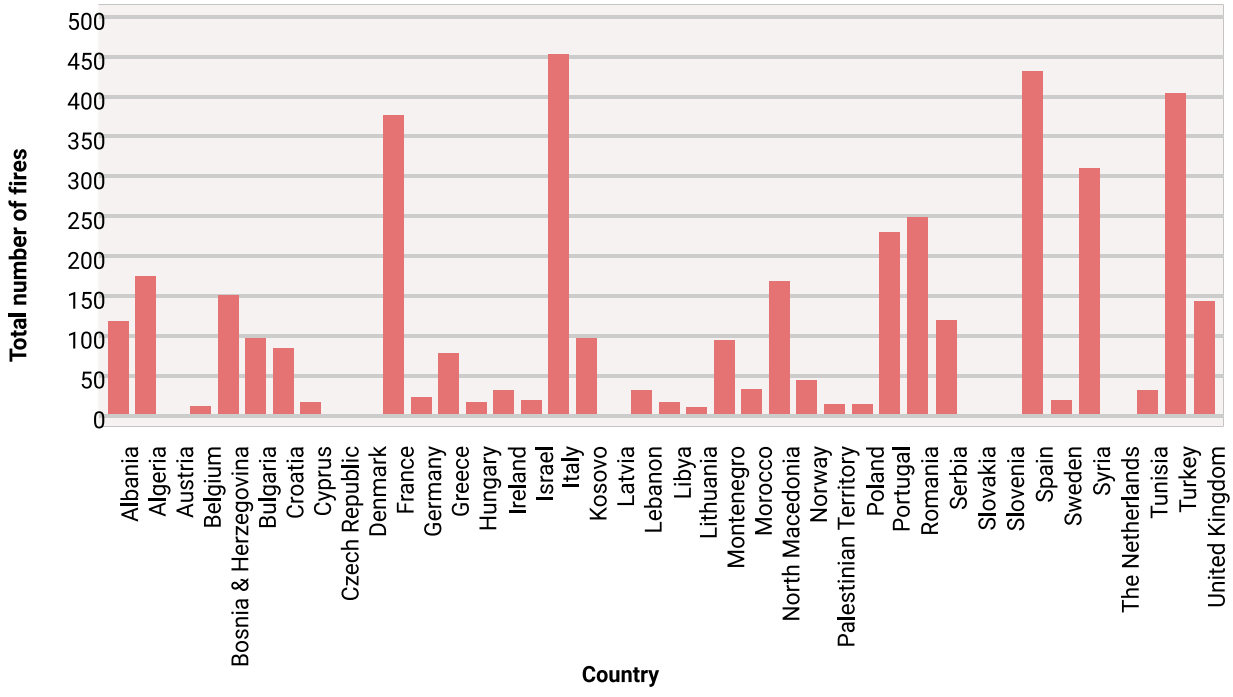
- **Do not induce vomiting** unless the person has just been poisoned, is conscious, and it has been advised to do so by a specialist. In this case, give a glass of warm water to drink, advice putting his fingers in his mouth until vomiting begins. These steps should be repeated until clean water starts to flow out of the stomach.
- If the victim is unconscious, access their airway and **check if the person is breathing**. If he is not breathing, blow some air into his mouth and prepare to press down onto his chest. If he is breathing, put him in a stable lateral position.
- **Call 112** for an ambulance as soon as possible.

LIGHTING, NATURAL FOREST FIRES

Every summer, a region or land area on the planet is subject to violent destructive forces in the form of wildfires. We look with terrified eyes at the many meters high flames and sympathize with the people who, at worst, perish in the disaster or who destroy great values – both financially and throughout their life story. Rarely does the scale and disaster become as extensive as has been seen in both Sweden and Greece, but fire is a powerful devouring force.

Statistics

In 2019, there were 3864 forest fires in Europe. 30% of them were caused by lightning and 15% were proven arson. The remaining 55% are carelessness fires. During these fires, about 500 people per year and many animals perish.



A true story

A fire at Gran Canaria where the cause of the fire has not been determined. The fire spread at lightning speed, and it was therefore clear that the island's crew and vehicles could not cope on their own. It soon poured in from both the other islands, as well as the mainland by air and crew. At the time of the aid, more than 1000 men, 9 helicopters and 2 aircraft were extinguishing the fire.

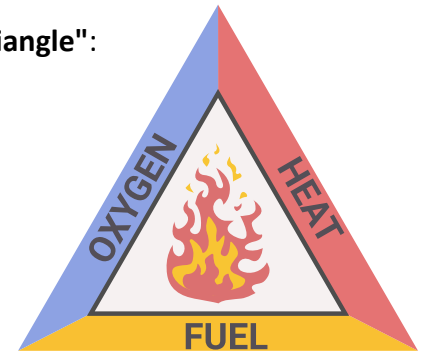
After 3 days, the wind settled at night, and it started raining. Everyone held their breath and turned their eyes to the sky, but alas, it only lasted until the morning, then it blew up again, from a slightly different direction, so now the fire flared up again.

After another 24 hours, it was finally sorted out, and you could soon declare the fire extinguished. Now came the terrible balance. Two people were found dead, 800 people evacuated, an unknown number of animals, and more than 2,700 Hectares of forest and plantation had gone up in smoke. Of course, there were also several buildings where there were only a few sooty wicks left, the fire had housed 5 smaller buildings – everything was gone.

No one can imagine what it means to lose EVERYTHING, think that after a long and laborious life, you only have what you stand and walk in.

Theoretical part

The conditions of fire are often illustrated with the so-called **"fire triangle"**: combustible material and oxygen together with high temperature provoke fire. Removing just one element both extinguishes and prevents fire.



It can be described as follows:

- **COMBUSTIBLE MATERIAL**: As in the case of living organisms, the fire dies if it is not nourished. That's why you clear a firebreak to fight forest and field fires. If it burns in a gas stove, you can remove, or eliminate, the flammable material by shutting off the gas. In other cases, it may be either difficult or impossible to remove the combustible material.
- **OXYGEN**: Another similarity between fire and living organisms is that they must have air. If you throw a shovelful of soil or a fire blanket over a fire, the fire suffocates. Incidentally, this happens even when the oxygen content of the air comes below a certain limit. Many materials, for example flammable liquids and even some solids, cannot burn if the oxygen percentage drops from the normal 21 to 15 percent. Embers can survive 0% oxygen for up to an hour, so always remember to pour water on the embers if you have used a fire blanket.
- **HIGH TEMPERATURE**: The critical heat can come from a heater, a stove, overloaded electrical installations, embers, a spark, a piece of glowing coal, a lightning bolt, a heap of compost, volatile chemicals, and a host of other heat sources. If you see smoke, especially from fats such as oil during heating, there is a risk of self-ignition in a matter of seconds.

One of the most frequent ways a fire spreads, via embers, and burning materials blown away from the fire. Radiant heat from the fire can also ignite the surrounding materials.

The temperature of flames and embers in a bonfire is about 1000°C. Dry wood, leaves and grass have an ignition temperature of about 300°C. Therefore, under the right circumstances, only a single glow or flame is needed to ignite things.

It is quite simple to put into words the conditions for a wildfire to occur. Wildfires sometimes occur naturally, and in other cases, which are probably most, they occur through human influence. But common to all of them is that nature must first undergo a drying period in which the water in the soil and plants evaporates, leaving dry flammable material. Naturally, the weather is an important player here, because drying out occurs when the water evaporates without water being supplied from other sources – and this is especially true of precipitation. It is possible to counter drying out to some extent by irrigation, but it is both expensive and cumbersome. In areas with watercourses, the water from

here can be directed into the fields, but only to the extent that the streams can be maintained with water supply from more distant areas.

Looking across the globe, the climate system has built-in areas where drought naturally occurs. It is especially the subtropical high-pressure areas that are located in two belts around 30 – 40 degrees north and south. These areas arise due to the general atmospheric circulation, which overall divides the soil into six zones – three in each hemisphere.

The subtropical high-pressure areas are formed between the Passat wind belt and the west wind belt. But there is even a seasonal variation, so that the subtropical high pressures during the summer period are drawn towards the poles, which is why in the northern hemisphere during the summer they can lie around the Mediterranean region.

In high pressure areas there is a general subtly of air in the atmosphere. The movement will dry out the air and prevent the formation of large cloud formations. Therefore, the Mediterranean region in summer is the destination for many holidaymakers who want to be sure of warm and sunny weather. The warm and sunny weather has a backside that is rarely recorded with the holidaymakers, who are most often in coastal areas. Inland, the sun, together with right temperatures and lack of precipitation, will lay the foundations for wildfires. If ignition does not occur, plants and trees will simply dry out without any consequences other than a reduction in growth. Since this is a recurring situation every year around the Mediterranean, the normal plant growth in the area is accustomed to it as part of the life cycle of the plant.

But sometimes there will be an ignition. This can happen naturally in a lightning strike if the conditions of thunderstorms occur. It requires heat, humidity and special temperature conditions up through the atmosphere, but it is not uncommon for such situations to occur. Lightning, which strikes dry woodlands, can then ignite the trees, and the wildfire is a reality. The rain, which is also part of the thunderstorm, will not necessarily be able to extinguish the ignited wood. On the one hand, the rain falls in a very small area, which is not necessarily one where lightning struck, and on the other hand, thunderstorms may have formed high up in the atmosphere, which is why the rain reaches evaporate before it reaches the ground level.

The rain that is also part of Human Intervention is more diverse and is due in most cases to carelessness and inconsiderateness. Direct ignition can be done with littered cigarette butts or from bonfires and barbecues that are not completely extinguished. More surprisingly, glass tumble from bottles can act as a burn glass when the sun is shining, and in this way can ignite dry grass.

Regardless of how the ignition takes place, local conditions will subsequently determine whether the fire can spread. It will be a question of how much combustible material is available, and weather-wise, the wind will be a crucial factor. Quiet weather will make extinguishing easier, but the fire and the heat that appears will be able to create its own local wind system. The heat produced by the fire will heat the air, which then rises.

This will cause air from the side to be drawn into the flame sea to compensate for the rising air. This creates strong gusts of wind that can cause the flames to burst many meters. It is precisely these gusts of wind that are completely unpredictable and thus one of the greatest risks in these wildfires. Many times, the authorities assess whether a wildfire should simply be allowed to burn out by itself. This can happen if the ignited area does not pose a greater risk of dispersion. But there are also attitudes that say that the fires that occur can contribute to the rejuvenation of nature. It is well known that a burnt-out area, where trees and shrubs have for years prevented sunlight from reaching the ground level, the following year bursts into bloom in a completely new way, because seeds have lain hidden in the earth's crust and simply waited for light and heat.

Risks and threats

It is important that when in nature you interact with open fire and heat sources with care. It's bonfires, barbecues, cigarettes, and heat sources from machines and looked like. A forest fire can get out of control and can have high costs for the environment, nature, animals and people.

When the accident happens: how to survive a forest fire

Should you have the misfortune to get near a forest fire, here are 6 tips on how best to handle and survive the situation.

STEP 1

The first step, of course, is to make sure that you are away from the forest fire before it develops into something dangerous. The authorities usually warn well in advance if there is a possibility that a forest fire could reach you. Evacuate immediately and do not spend unnecessary time saving anything but the most necessary.

STEP 2

If for some reason you have held a few radio, TV, and smartphone-free days and therefore first discover the forest fire because it smells difficult with smoke – well, then you need to react quickly. If the fire is coming towards you, and if your tent or house is surrounded by trees, you need to get out of here in a hurry.

STEP 3

Wildfires can move faster than you can, but there are still ways to optimize your chances. Deciduous trees, for example, are slower to ignite than conifers. So, if you have the choice, run towards deciduous forest. Heat also rises upwards, so a fire will move uphill faster than downwards. Find a route that goes down.

STEP 4

Search for natural firebreaks such as openings, rock ridges, rivers or lakes. They will dull the fire or, if they are big enough, completely slow it down. Another option is to find a place that has already burned off. However, it can still be incredibly hot. Beware of large branches or dead trees that can topple over.

STEP 5

If the fire gets close, be sure to breathe under a scarf or sweater so you don't breathe hot or smoky air.

STEP 6

If you get caught by the fire, lie down in a shallow, ditch or similar and cover yourself with soil and other organic matter. Make sure you are not wearing synthetic clothing as it melts in the heat. If you're lucky, the wildfire is fast and passes you in minutes.

REMEMBER!!!

A forest fire can move up to 25 kilometers per hour. The speed depends a lot on the wind speed, what trees the forest consists of and how dry it is.

DOS and DON'TS (Summary):

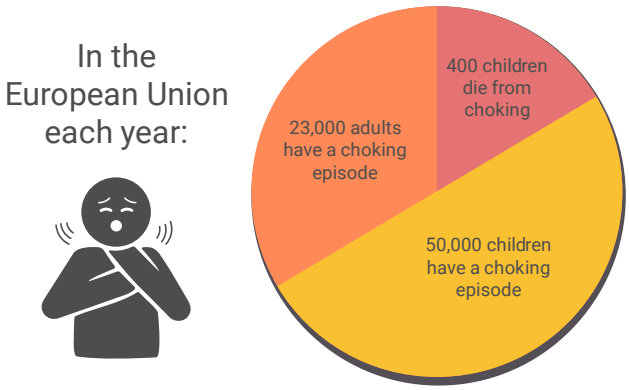
- **Always** know your position so you can leave the forest as soon as possible.
- **Never** stay in the forest in a thunderstorm.
- **Always** deal with open flames with extreme caution.
- **Never** leave a bonfire or a grill in use.
- **Alway**s make a safe fire pit or barbecue place.

CHOKING

Every year, many people are injured in choking accidents. Some of them have fatal consequences, resulting in death. **CHOKING OCCURS** when a foreign object lodges in the throat or windpipe, blocking the flow of air. In adults, a piece of food often is the culprit. Young children often swallow small objects. Because choking cuts off oxygen to the brain, give first aid as quickly as possible

Statistics

In the European Union each year, an estimated 400 children (14 years or younger) die from choking. In the European Union each year, an estimated 50,000 children (14 years or younger) have a choking episode. And estimated 23,000 adults (14 years or older) have a choking episode.



A true story

One day, Nikelle and Dalan Judd realized their 22-month-old son Maverik was struggling to breathe. “All of a sudden, I heard Maverik screaming and I could tell something was really wrong,” Nikelle recalled, describing his labored breathing as wheezing. “I started just pounding his back seeing if I could just get whatever it was out.”

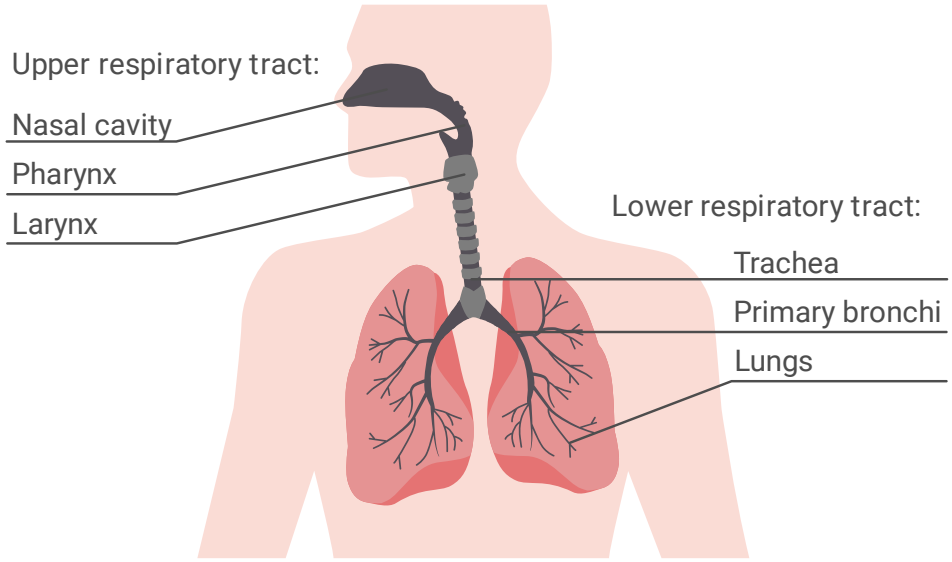
“He was starting to turn blue and I was really getting worried at that point and Nikki called EMS,” Dalan said. They believe Maverik aspirated a dry pinto bean from a sensory play bin. When the

paramedics arrived, the EMT couldn't hear anything from his right lung. Dalan said Maverik was only getting 60 to 70 percent of the oxygen he needed. The EMT put him on an oxygen mask to prevent brain damage or even worse, death. They rushed him to Hospital where doctors determined he needed advanced emergency care at another hospital. He was promptly flown there by medical helicopter.

Nikelle was at home with her new baby and older son, desperately waiting for updates from her husband. "I just remember being in my kitchen and just literally falling to my knees just praying that my son would stay alive," she said through tears. Since Maverik's oxygen levels continued to drop on the helicopter, they took him directly to surgery and connected him to ECMO (extracorporeal membrane oxygenation) providing heart and lung bypass support outside of his body "Just do whatever you need to save our child," Nikelle remembered telling the doctors.

Dr. Albert Park, a pediatric ear, nose and throat specialist at the Hospital, removed the bean which was lodged in Maverik's right lung through a tracheotomy after hours of surgery.
"These objects are really dangerous because as they get hydrated, they'll actually expand in size and so they'll actually cause a complete airway obstruction if you allow it to," Park explained. After 10 days in the hospital, Maverik was finally healthy enough to go home!

Theoretical part



Choking is often caused by a **foreign body** blocking the airway. The object can block the upper or lower airway passages. The airway obstruction is often partial but can be complete.
Among children, the most common causes of choking are food, coins, toys, and balloons. In one study, **peanuts** were the most common object found in the airway of children evaluated for suspected **foreign body aspiration**. Foods that pose a high risk of choking include hot dogs, hard candy, nuts, seeds, whole grapes, raw carrots, apples, popcorn, peanut butter, marshmallows, chewing gum, and sausages. The most common cause of choking death in children is latex balloons. Small, round non-food objects such as balls, marbles, toys, and toy parts are also associated with a high risk of choking death because of their potential to completely block a child's airway.

Children younger than age three are especially at risk of choking because they explore their environment by putting objects in their mouths. Also, young children are still developing the ability to chew food completely. **Molar teeth**, which come in around 1.5 years of age, are necessary for grinding food. Even after molar teeth are present, children continue developing the ability to chew food completely and swallow throughout early childhood. A child's airway is smaller in **diameter** than an adult's airway, which means that smaller objects can cause airway obstruction in children. Infants and young children generate a less-forceful cough than adults, so coughing may not be as effective in relieving an airway obstruction. Children with neuromuscular disorders, developmental delay, traumatic brain injury, and other conditions that affect swallowing are at an increased risk of choking.

In adults, choking often involves food blocking the airway. Risk factors include using alcohol or **sedatives**, undergoing a procedure involving the **oral cavity or pharynx**, wearing oral appliances, or having a medical condition that causes difficulty swallowing or

impairs the **cough reflex**. Conditions that can cause difficulty swallowing and/or impaired coughing include neurological conditions such as **strokes, Alzheimer's disease, or Parkinson's disease**. In older adults, risk factors also include living alone, wearing **dentures**, and having difficulty swallowing.

Children and adults with neurological, cognitive, or psychiatric disorders may experience a delay in diagnosis because there may not be a known history of a foreign body entering the airway.

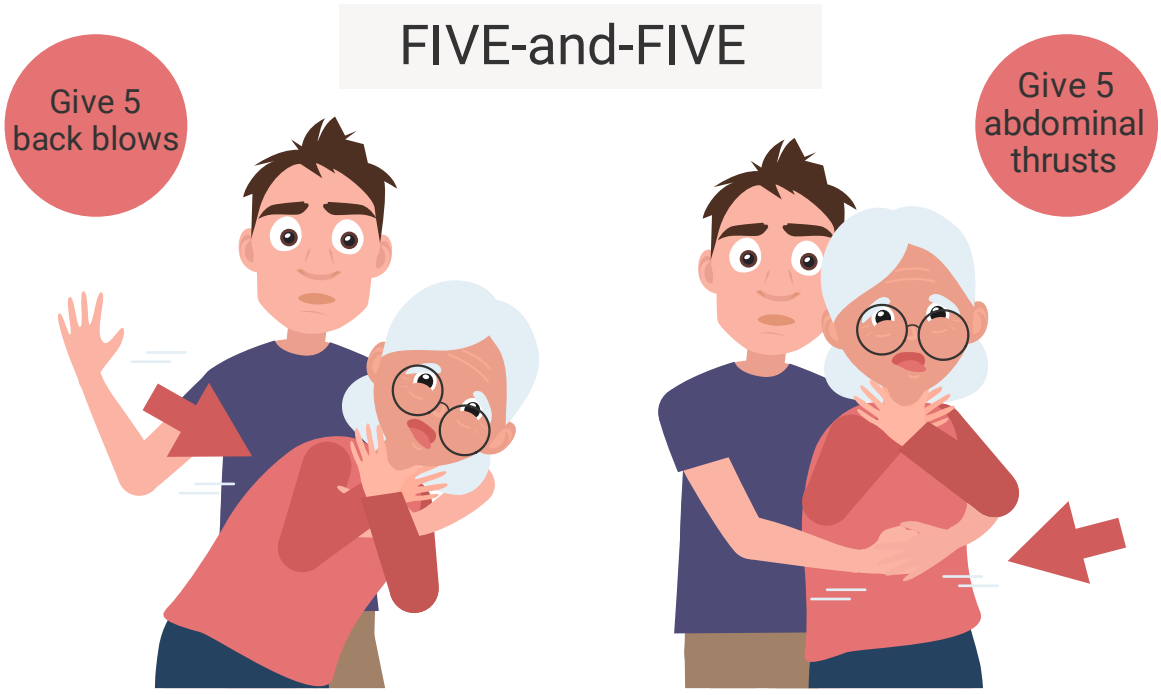
Risks and threats

It is important to understand that you need to act fast when a person is choking. When the airways are blocked, the blood does not get the right amount of oxygen to transport around to the cells. This can cause lasting damage to organs and especially the brain. In the worst case, the person can die.

When the accident happens

The universal sign for choking is hands clutched to the throat. If the person doesn't give the signal, look for these **indications**:

- Inability to talk
- Difficulty breathing or noisy breathing
- Squeaky sounds when trying to breathe
- Cough, which may either be weak or forceful
- Skin, lips and nails turning blue or dusky
- Skin that is flushed, then turns pale or bluish in color
- Loss of consciousness

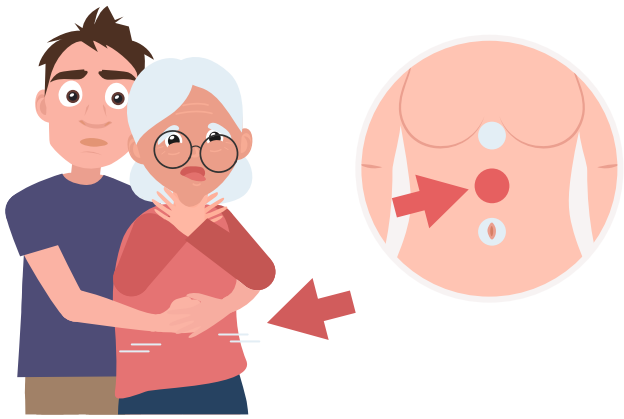


If the person can cough forcefully, the person should keep coughing. If the person is choking and can't talk, cry or laugh forcefully, the American Red Cross recommends a "five-and-five" approach to delivering **FIRST AID**:

- **Give 5 back blows.** Stand to the side and just behind a choking adult. For a child, kneel behind. Place one arm across the person's chest for support. Bend the person over at the waist so that the upper body is parallel with the ground. Deliver five separate back blows between the person's shoulder blades with the heel of your hand.
- **Give 5 abdominal thrusts.** Perform five abdominal thrusts (also known as the Heimlich maneuver).
- **Alternate between 5 blows and 5 thrusts** until the blockage is dislodged.

To perform abdominal thrusts (HEIMLICH MANEUVER):

- **Stand behind the person.** Place one foot slightly in front of the other for balance. Wrap your arms around the waist. Tip the person forward slightly. If a child is choking, kneel behind the child.
- **Make a fist with one hand.** Position it slightly above the person's navel.
- **Grasp the fist with the other hand.** Press hard into the abdomen with a quick, upward thrust — as if trying to lift the person up.
- **Perform between six and 10 abdominal thrusts** until the blockage is dislodged.
- If you're the only rescuer, perform back blows and abdominal thrusts before calling your local emergency number for help. If another person is available, have that person call for help while you perform first aid.



If the person becomes unconscious, perform standard cardiopulmonary resuscitation (CPR) with chest compressions and rescue breaths.

To clear the airway of a **PREGNANT WOMAN OR OBESE PERSON**:

- **Position your hands a little bit higher** than with a normal Heimlich maneuver, at the base of the breastbone, just above the joining of the lowest ribs.
- **Proceed as with the Heimlich maneuver,** pressing hard into the chest, with a quick thrust.
- **Repeat** until the food or other blockage is dislodged. If the person becomes unconscious, follow the next steps.

To clear the airway of an **UNCONSCIOUS PERSON**:

- **Lower the person** on his or her back onto the floor, arms to the side.
- **Clear the airway.** If a blockage is visible at the back of the throat or high in the throat, reach a finger into the mouth and sweep out the cause of the blockage. Don't try a finger sweep if you can't see the object. Be careful not to push the food or object deeper into the airway, which can happen easily in young children.
- **Begin CPR** if the object remains lodged and the person doesn't respond after you take the above measures. The chest compressions used in CPR may dislodge the object. Remember to recheck the mouth periodically.

To clear the airway of a choking **INFANT YOUNGER THAN AGE 1**:

- **Assume a seated position and hold the infant face down** on your forearm, which is resting on your thigh. Support the infant's head and neck with your hand and place the head lower than the trunk.
- **Thump the infant gently but firmly** five times on the middle of the back using the heel of your hand. The combination of gravity and the back blows should release the blocking object. Keep your fingers pointed up to avoid hitting the infant in the back of the head.
- **Turn the infant faceup on your forearm,** resting on your thigh with the head lower than the trunk if the infant still isn't breathing. Using two fingers placed at the center of the infant's breastbone, give five quick chest compressions. Press down about 1 1/2 inches, and let the chest rise again in between each compression.

- **Repeat the back blows and chest thrusts** if breathing doesn't resume. Call for emergency medical help.
- **Begin infant CPR** if one of these techniques opens the airway but the infant doesn't resume breathing.

If the child is older than age 1 and conscious, give abdominal thrusts only. Be careful not to use too much force to avoid damaging ribs or internal organs.

IMPORTANT! Each time the Heimlich maneuver has been used, the patient must be **checked by a doctor**, as the maneuver may cause damage to the abdominal cavity.

DOS and DON'TS:

- **Always:** Always react fast so that you can get the best help.
- **Always:** Start with 5 back blows.
- **Never:** Start with the Heimlich maneuver.
- **Always:** Send the person to a doctor or emergency room after using the Heimlich maneuver.
- **Never:** Leave young children alone if there is a risk that they may put small objects in their mouths.

Case

LINK: https://www.youtube.com/watch?v=NWC5WWK7zI0

This video shows a young man choking on some food. Fortunately, someone's coming to help him. He starts by applying the Heimlich maneuver and his blocking comes up. Have a chat about the importance of starting with the 5 back blows. In most cases, it works. When using the Heimlich maneuver, there is a high risk of damage to the organs. It is important to react quickly and correctly in such situations, which means that people can get the best help and avoid unnecessary harm in receiving first aid.

LINK: https://www.youtube.com/watch?v=_E72CuBaUus

This video tells the story of a young woman who is helped by two policemen as her infant is choking. The child happily survives, thanks to the quick help. As soon as the woman shouts for help, passers-by come to help and shortly after the two police officers. While the two police officers are helping the child, another woman comforts the mother. Have a chat about the importance of psychological first aid.

Links:

https://erc.europa.eu/

https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Main_Page

ARSON

ARSON is a crime that police officers call one of the most heinous and deadly forms of criminal behaviour. Arson can escalate into an emergency situation, causing a sudden and serious danger to the life or health of people, to property, the environment, or to death, injury or other damage to people.

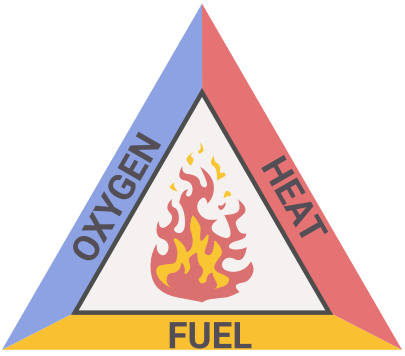
Not every emergency triggers an emergency situation. The first and most important fire hazard is poisonous gases (carbon monoxide, cyanide gas, etc.), which usually precede the flame. This is followed by rising temperatures and flames. Temperatures of around 120°C cause first-degree burns after about 8 minutes while 200°C—after 2-3 minutes. Temperatures above 200°C cause respiratory burns.

Fire is an uncontrolled combustion occurring in a place other than a designated area, posing a danger to people, property, or the environment.

Outbreak is the place where a fire occurs and the areas within the zone of exposure to fire.

For burning to take place, three main elements are needed:

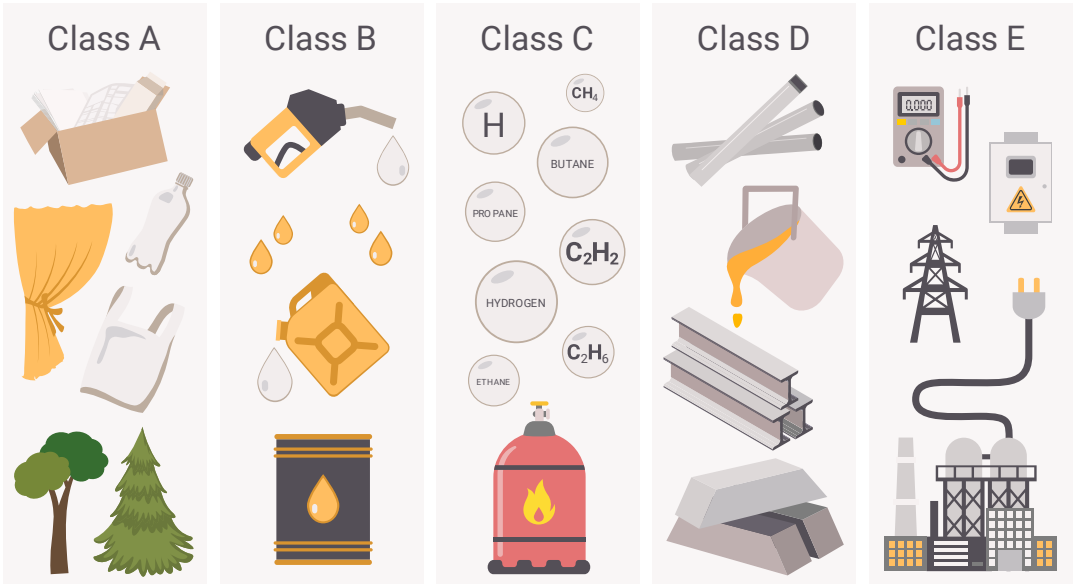
- Air (oxygen)
- Combustible material (fuel)
- Ignition source (temperature/flame)



The combustible material produces combustible gas, which combine with oxygen to burn. The combustible material must be hot to produce flammable gas. Extinguishing a fire means removing at least one of the following components.

Classification of fires:

"A" class	burning of common materials: wood, paper, rubber, plastic, textiles, etc.
"B" class	fires are much more difficult to extinguish because liquids such as petrol, alcohol, varnish, lubricants, etc. are burning
"C" class	burning gases (hydrogen, acetylene, hydrocarbons, etc.).
"D" class	burning of metals and their alloys (potassium, sodium, magnesium).
"E" class	"electrical" fires are most common in industrial buildings and installations with electrical power.



Outstanding examples of arson

Cars burning in Copenhagen

In 2016, arson attacks were rampant in Copenhagen, burning cars. One weekend in September, 11 cars burnt down in the city, bringing the total number of burnt cars that year to more than 200. Of course, these events attracted a lot of public attention, and a 17-year-old boy was arrested shortly afterwards. The suspected arsonist was reported to the police by people who knew him, because he had burns on his body after the weekend of arson. He later confessed to the police only to one of the arsons.

Dublin arsonist rampages through National Children's Hospital

In May 2021, a serial arsonist started up to 15 fires in a week at the new National Children's Hospital under construction, some of them large, forcing a temporary halt to work and the evacuation of staff from the huge area. At one point, there were around 1500 construction workers. Fortunately, no one was injured in these fires. The investigation is ongoing and the arsonist has not yet been identified.

Arsonist sentenced to imprisonment in Latvia

On June 7, 2016, a man entered a nine-storey building, went up to the sixth floor, scattered papers over an electrical panel and set them on fire. The fire damaged stairwells from the sixth to the ninth floor. At the end of July, a man entered another residential building and set fire to wooden furniture in the stairwell. In May 2017, the convict entered a nine-storey building where he had already been and set fire to the building materials there. In February 2018, the man set fire to a wooden table near the door of his apartment.
During the trial, the man confessed to having set the fires while under the influence of alcohol and drugs.

Arsonist working at the seaside

Intentionally set fires horrified the Lithuanian seaside in May 2017. The first fires had to be extinguished in Nida, in even nine outbreaks covering an area of 12 hectares in the vicinity of Urbas mountain. The fires recurred there at midday the next day. The forest burned in six places, scorching areas of forest undergrowth, and charring some trees.
At night, after the fires in Nida, a newly started fire had to be extinguished in Melnragė forest in Klaipėda. Within a couple of hours, the forest undergrowth and pine trees over an area of 25 hectares were burnt. Exactly one week later, several fires in open areas were reported again in Klaipėda. Although the investigation is still ongoing, it has been established that the fires were started by a young boy with a morbid craving for arson.

Age difference between the arsonists

Arson committed by young arsonists is a widespread problem with a wide range of problems. In North America, for example, half the people arrested for arson were young arsonists. Every year, arson causes hundreds of deaths and millions in financial losses worldwide. All of this prompts the question of what are the reasons that might lead young people to behave this way?

While revenge, hatred and jealousy are the most common motives for adult arsonists, adolescent arsonists are dominated by the motives of hostility, anger, rage, fun in starting fires, arrogance, and the search for recognition.

Characteristics of young arsonists:

- **Self-control.** One of the most commonly observed signs among young arsonists are difficulty controlling their behaviour and emotions. Their behaviour can be highly impulsive, hyperactive, risk-taking, and seeking to experience intense sensations. Some young arsonists are diagnosed with mental disorders such as attention deficit disorder and behavioural disorders.
- **Anger and aggression.** Aggression can be expressed through physical violence, cruelty to animals or children, or defying adults. For some young people, starting fires is a way of releasing anger or taking revenge.
- **Other emotional difficulties.** Compared to other children and adolescents, arsonists are more likely to face psychological difficulties. Sometimes the accumulated anger is directed not at others, but at oneself, often contemplating suicide.
- **Communication problems.** Young arsonists are more likely than other young people to feel lonely and disconnected from others.
- **Anti-social behaviour and crime.** A very small proportion of young arsonists commit arson again in adulthood. Nevertheless, they tend to commit other forms of crime. For example, one study in New Zealand found that among young arsonists, as many as 55% had committed at least one crime in adolescence or early adulthood.

It is important to note that many of the characteristics of young arsonists are shared by other young people with behavioural problems, but the characteristics shared by the group of young arsonists are not necessarily shared by each individual arsonist as an individual. Everyone's personal qualities are shaped by a variety of factors – in other words, on an individual basis.

Various scientific studies have tried to explain the behaviour of young arsonists. There are many theories that seek to explain the origins of young arsonists' behaviour (table from Putnam & Kirkpatrick, 2005):

Theory	Motive	Origin	Reason
Opportunity theory	Expressive and instrumental	External	Arson is caused by the open and unrestricted access to fire, which can be used as an instrument or weapon (Cohen & Felson, 1979).
Learning theory	Expressive and instrumental	External	Such behaviour is learned from family, peers, and environment, which consciously or unconsciously fuels the misuse of fire (Kolko & Kazdin, 1986).
Expressive trauma theory	Expressive	Internal	Arson is an expression of childhood trauma, designed to vent pent-up frustrations (Lowenstein, 1989).
Stress theory	Expressive and instrumental	External and internal	Arson becomes a way of releasing accumulated stress or a way of having a more intense experience when a young person finds life boring (Lyng, 1990).
Power association theory	Instrumental	External and internal	Arson is a way to gain power, to become superior to other people, to control the environment. This is typical of young people who tend to feel cornered (Sakheim & Osborn, 1986).
Social acceptance theory	Expressive and instrumental	External and internal	Arson is motivated by the desire to be accepted by peers (Swaffer and Hollin, 1995).
Public reaction theory	Instrumental	External and internal	The knowledge that arson will provoke a strong reaction from the environment (e.g., arrival of police, firefighters) (Macht & Mack, 1968).

It is important to note that all types of arsonists are very dangerous to those around them and to the public, as the flames started by the perpetrator's hand can spread rapidly and destroy everything in their path and can even escalate into emergencies.

The results of an arson risk factor survey conducted in Lithuania found that:

1. Arson is much more common in **men** than in women.
2. The predominant age group of arsonists is **21-25 years**.
3. Most of the arsonists are **poorly educated**.
4. Most arsonists aren't married (they are **single or divorced**).

5. More than half of the arsonists were **first-time offenders**.
6. Arsonists have a high incidence of **mental disorders**, most commonly **intellectual disability**, schizophrenia, **personality disorders** and **alcohol dependence**.
7. A quarter of the arsonists investigated were found not guilty by reason of mental incapacity. The most common diagnoses are **schizophrenia, intellectual disability and dementia**.
8. Almost half of the arsonists were **intoxicated** at the time of the arson.
9. For men, arson can serve to **cover up another crime**, which is not common for women.
10. For both men and women, **revenge and anger** are the dominant motives for committing arson.
11. Seeking direct **material gain was rarely found** among arsonists.
12. Pyromania, a craving disorder, is a very **rare phenomenon**. (Martinkienė, 2012)

Exceptions to arson

Different countries provide different penalties for arson. However, there are exceptions where arson involving the burning of grass is allowed, provided that the approved Environmental Protection Requirements for the outdoor burning of plants or parts of plants are complied with: dry grass, reeds, fallen leaves, straw, farming, horticultural and plant residues may be burned outdoors when they cannot be composted (or if composting contributes to the spread of plant pests) or otherwise used, at a permissible safe distance from structures and only after being collected (raked) into piles. In addition, burning must be monitored at all times and the smouldering fire must be extinguished with water or sand when finished.

In European Union countries, it is necessary to comply with the fire safety and environmental requirements of that country, which impose specific requirements, bans or permits on the burning of plants or other waste.

How to avoid arson threats

All fire reduction strategies should be based on the four proven axes:

- Prevention
- Education
- Detection
- Investigation

Prevention in the family

- **Setting a positive example.** The most important message for children to learn is that matches and lighters are tools, not toys! Parents should not use lighters, matches and fire for their own enjoyment; children will imitate their parents, and doing so unsupervised can lead to tragic events.
- **Attentiveness.** Pay attention to your children. If they are using or carrying ignition tools (matches, lighters) for no known reason, talk to them and listen. Observe and talk about their moods, feelings and relationships inside and outside the home.
- **Open conversation.** Talk to your children about rules and laws. If you start a fire, you could face legal liability. This is a serious crime. Fire can destroy property, cause injury or death.

Education

Experts say that prevention programmes in school communities are the best way to avoid arson threats.

- Multi-component learning programmes
- Social skills training programmes
- Conflict resolution and violence prevention programmes
- Prevention of bullying
- Extracurricular activity programmes and their promotion
- Mentoring programmes

Recommendations for educators

- **Identification.** School staff can identify risks in several ways. In some cases, a pupil may try to start a fire in the school. This usually happens in the toilet and should be dealt with immediately. In other cases, teachers may smell petrol or overhear conversations with other pupils about arson.
- **Evaluation**. If a risk is identified, it should be clarified, investigated and concerns should be raised. Punishment is not effective, so education, cooperation with other professionals and the Fire and Rescue Department under the Ministry of Interior should be undertaken.
- **Intervention.** If the risk is confirmed, the adolescent should be educated and referred to specialists, rather than trying to hide, punish or scare them. Problematic behaviour will not stop without intervention, and it is important to seek help. You must also report the suspicions to law enforcement, who can then help you get help for the teenager.

What to do in the event of an arson threat

Most fires start outside. An arsonist must not be able to easily start a fire or allow a fire to spread into the building from the outside. **Actions that can be taken to prevent arson**:

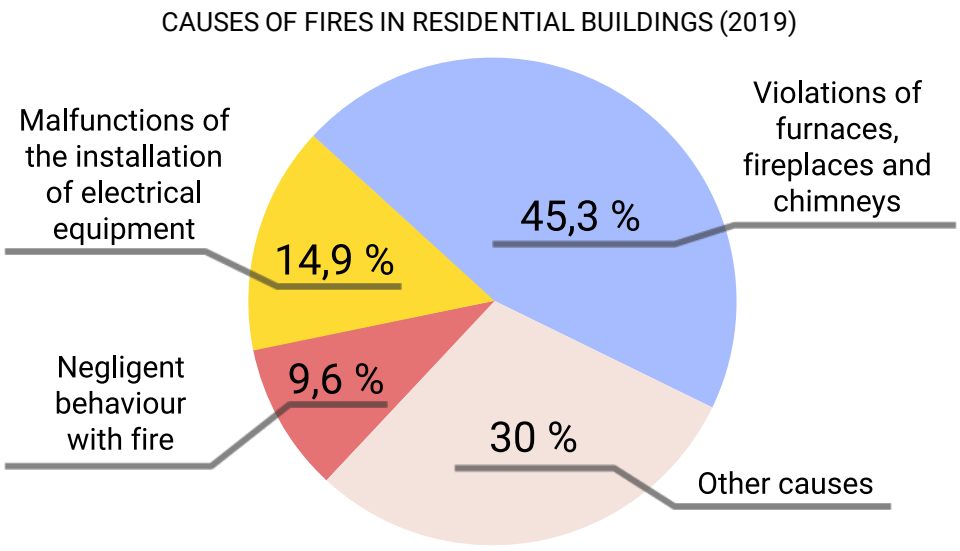
- **Keep leaves, firewood, bushes, and other flammable objects away from buildings**. Remember to lock your doors and close your windows before you leave.
- **Protect buildings** that are not in use (board up windows and doors to prevent access).
- **Always leave the key in the lock** when locking the door at night, so it can be unlocked quickly if needed, or use locks with a twist on the inside, so you can get out quickly in case of danger.
- **Equip your home with fire and security alarms with mobile phone notifications** so you'll always know if something happens to your home.
- **Keep all flammable liquids** such as dyes, cleaners, petrol for lawnmowers, etc. **out of the living area** in secure metal cabinets with a lock.
- If you are threatened with retaliation, or if you know or suspect that arson has been committed, or if you see suspicious activity near your home or other buildings, **make sure you report it to the police**.

HOUSEHOLD APPLIANCES
and the risks they pose in our daily life

It is hard to imagine a flat or a house with no household appliances in the modern world. The purpose of the use of every electronic device is specific and they are made to alleviate certain situations in life — to do household chores, protect food, provide certain information or act as a communication tool. Most household devices work using electricity. Electricity is a powerful but dangerous energy. Every household uses electrical devices day and night.

The electrical devices which work the most during the night are fridges, freezers, ovens, clocks, TVs in standby mode, video players, alarm clocks and mobile phone chargers.
The electrical devices, which are not used during the night but are plugged in sockets are kettles, radios, computers, microwaves, electric ovens. These devices are plugged in the electricity grid and that is enough to cause a fire under certain conditions.

2019 Lithuanian statistics show that flats, kitchens, cellars, basements, balconies, loggias, attics and mansards, rooms, stokeholds, roofs, stairwells and corridors burned the most often. The main reasons of these fires were violations and malfunctions of the installation and operation of furnaces, fireplaces and chimneys (45.3%), malfunctions of the installation of electrical equipment, devices, installation (14.9%), negligent behaviour with fire (9.6%).



One more cause of fires is overload in the electrical grid when too many electrical devices are plugged in the grid at the same time.**-In order to prevent fires, please try not to plug in several electrical devices in the same socket, especially powerful devices, like heaters.**

Outstanding examples

Grease fire in a flat

A common occurrence in the kitchen is the ignition of over-heated oil on the stove. One day, this happened to a girl, who wanted to cook some pancakes. She put oil on heat on the stove and went to another room to use the computer. While using the computer, she didn't realise how quickly a few minutes had passed. Soon, she felt an unpleasant smell in the apartment, quickly ran to the kitchen and saw fire arising out of the pan with oil. Without thinking, she grabbed the pan by its handle and put the pan on the floor, thinking that the fire would go out. At that time the girl panicked, and she didn't know what to do so she soon made a big mistake. She grabbed a container of water and squirted it into the burning oil. As soon as the water was on the fire, a huge flame erupted and caused severe damage. Luckily, that time the girl was not severely harmed by the flames as the flames went out and the flat didn't catch fire.

Water and electricity together are extremely dangerous, so **make sure to**:

- not get any electrical wires, sockets, plugs, or devices wet or damp.
- if you are wet, taking a bath or a shower, don't use any electrical devices (hair dryers, straighteners, etc.), and don't plug in any devices not designed to use in wet conditions (e.g., vacuum cleaners, floor lamps).

Effects of an electric current on the human body:

- Muscle cramps, paralysis of the legs and arms.
- Damage to body tissues and vital organs.
- Heart problems.
- Paralysis of respiratory muscles.
- can be fatal.

Kitchen equipment RISKS AND HAZARDS

It would be impossible to satisfy everyday needs if people didn't have kitchen household appliances. The **stove** is the main kitchen household appliance, and its main purpose is food preparation, regardless if this appliance is a gas or electrical stove.

Gas stoves

Safety rules for working with a gas stove:

- The flame must be blue (if the gas isn't fully burnt, it will be yellow or orange)
- When using a stove or an oven, always open a window
- The bottom of the cooking dish must be dry and clean
- If the stove or oven doesn't have an electric ignition, then light the fire in the following order: first, light the match and then open the gas valve.

You can minimise the damage caused by the stove and **protect your health by following these rules**:

- The fire must be smaller than the bottom of the dish.
- It's forbidden to dry or hold flammable fabrics over the stove.

- Don't leave the stove unattended to prevent the flame from being extinguished by overflowing water from the pot.
- It's forbidden to self-repair gas appliances.
- It's forbidden to use the stove as a heater and heat premises with it.
- Do not sleep in the same room where a gas stove or oven is used.

IMPORTANT! If you smell a specific gas odour in the room, you must:

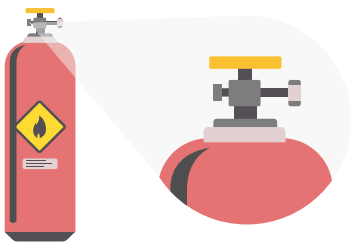
1. **Not use the stove** and quickly **close the gas valve**.
2. **Cover your nose and mouth** with a damp cloth or handkerchief.
3. It's **forbidden to turn on the light**, use electrical devices and use an open flame (it may cause an explosion).
4. **Open all the windows** wide to ventilate the room.
5. If it's impossible to enter the kitchen – **tell everyone to leave the flat**, **warn the neighbours** to also leave their flats.
6. Urgently **call the emergency** gas services and the firefighters.

IMPORTANT — WAIT FOR THE EMERGENCY SERVICES OUTSIDE!

If the gas smell is noticeable in the stairwell of the block of flats, immediately call the emergency gas services, open the stairwell doors and windows. As natural gas is lighter than air, its biggest concentration will be in the top part of the stairwell, so you must open the windows there.

Gas cylinders

Gas cylinders, which supply the gas for the stove, are often an integral part of the kitchen. As of 2020, all gas cylinders must have pressure relief valves and, in the case of fires, this requirement to use cylinders with safety devices is particularly relevant.



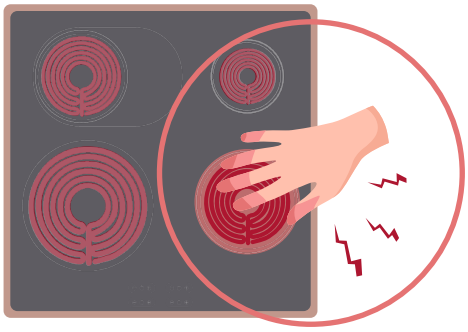
When using a gas cylinder, it's forbidden to:

- Self-repair the gas cylinder or valve.
- Search for the gas leak with fire.
- Store a leaking and faulty gas cylinder.
- Store a full gas cylinder in sunlight, in the basement or an unventilated room.

Electric stoves

The main dangers of using an electric stove are burns or electrical injuries. Electrical injury may be caused by touching faulty electrical wires carrying electric current, incorrect use of appliances or lightning.

What is electrical injury? Electrical injury is an injury to the body caused by an electric current. It is the most dangerous when the current flows between the arms, from an arm or the head to a leg, as it passes through the heart and can cause damage to it; when it passes through the head, it may interfere with breathing.



The effect of an electric current is weaker when the conductor conducting the electric current:

- is touched by the person briefly,
- to a small body surface area,
- when wearing dry clothes,
- when wearing shoes with rubber soles.

Electric current injures children, the weak and the drunk the most.

Safety rules for working with an electric stove or you can minimise the damage caused by the stove and protect your health by following these rules:

- When cooking, **pour no more than ¾ of the liquid** volume in a pot to prevent boiling liquid to overflowing and flooding the heating elements of the electric stove.
- Before cleaning an electric stove, **unplug it**.
- In the event of a short circuit and the stove catching fire, immediately unplug it and put out the fire with a carbon dioxide or powder extinguisher and contact the firefighters by **calling 112**.

Grease fires are a common hazard when using both electric and gas stoves.

Grease fire

Stress and panic are natural emotions during a fire. They cause fires in households to spread often, despite attempts to put them out on their own. Reckless and careless behaviour during a fire can cause injury or cause the fire to spread even further and faster.

What to do during a grease fire:

- **Turn off the stove**. As soon as the grease stops heating, the evaporation from the surface will decrease and the flame is likely to extinguish on its own.
- **Cover the burning dish with a metal cover**. Instead of a cover, you may also use another pan or dish to tightly cover the burning dish. You may only uncover the dish after the grease cools down.
- It is **FORBIDDEN to put out grease fires with ceramic or glass covers**.
- It is **FORBIDDEN TO EXTINGUISH BURNING GREASE WITH WATER**, as it creates a powerful and dangerous burst of flames.
- Assess your ability to control the fire. If you think you cannot control the fire, leave your home with your family members, and contact the firefighters by calling the emergency phone **number 112**.

What happens if you try to extinguish burning grease with water?

The density of grease is lower than water's, so after mixing these two liquids, the grease will always float on top. Therefore, when extinguishing with water, grease will always raise to the top and the water won't be able to isolate the flammable material from oxygen.

The pillar of flame will immediately grow 2–3 times and may light up curtains, kitchen furniture and the ceiling. Moreover, the burning splashes will spread throughout the entire kitchen and will splash you, causing burns and speeding up the spread of the flame in the room.

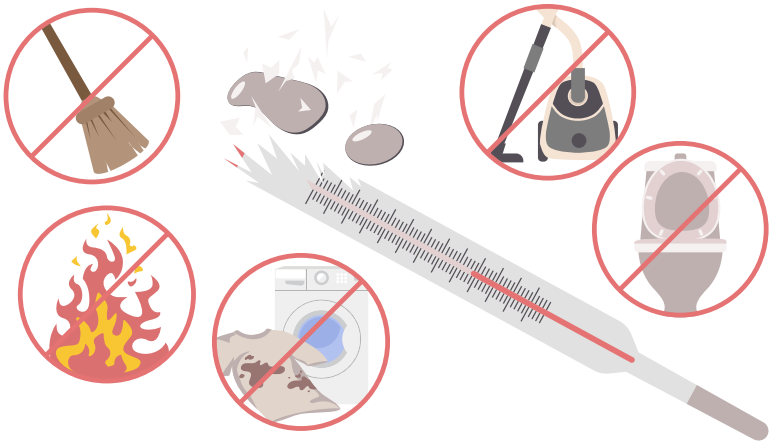
Household appliances for measuring

Sometimes, in order to assess a certain quantity, a measuring device is needed. One of the most dangerous measuring devices is a mercury thermometer. Although the old mercury thermometers have been discontinued in pharmacies for a decade under the European Union directives, some people still own such a thermometer in their home medicine cabinet.

A broken mercury thermometer may cause serious dangerous to people. Its effect on health depends on the dose, which enters the organism. Mercury can enter the body through skin, the digestive system, through the respiratory tract (when breathing in). Most poisonings happen through the respiratory tract. Mercury is the only metal whose metallic form can cause poisoning under normal conditions. Metallic mercury is absorbed poorly in the gastrointestinal tract; therefore, it is practically non-poisonous when ingested.

If you have broken a thermometer and the mercury has spread on a table and/or the floor, you must inform your parents or other adults in the house and mustn't:

- Throw it in the fire, as dangerous gas concentrations of mercury form in high temperature
- Vacuum — the heat will increase its evaporation and will contaminate the vacuum cleaner
- Sweep — this will break it up into small droplets and spread it even more widely
- Pour it down the drain — it may enter surface waters and accumulate in fish, settle in the coiled pipe and gradually evaporate into the ambient air
- Wash mercury-contaminated clothes and things as the mercury will contaminate the washing machine



If there aren't any adults in the house, call the emergency phone line 112 and inform them about a broken mercury thermometer at home. Firefighters will be sent to help you collect the spilled mercury.

TV

The main hazard caused by most household appliances, including the TV, is fire. Don't leave a turned-on TV unattended. You must follow these rules when using the TV:

- **Don't place the TV in a poorly ventilated place**, e.g., near heating devices, in alcoves.
- **Don't block vents** in the back and the bottom of the body.
- Make sure to install the TV in a place where it **can be unplugged quickly and safely**, don't install it close to flammable materials (e.g., curtains, paintings).

- In the event of a malfunction, immediately **turn off the TV** using the physical button, unplug the power cord from the socket when it's completely turned off.
- When leaving home, **don't leave the TV in standby mode**, as a malfunction in this mode can cause a fire. You must unplug the power cord from the socket only when the TV is completely turned off.
- Regularly **dust the TV**.

If the TV catches fire:

1. **Unplug** the TV from the mains. If you cannot reach the power socket because of a fire, turn off the electricity throughout the flat by disconnecting the automatic fuses.
2. Report the fire to the emergency phone **number 112**.
3. **Cover the TV with a thick material** (non-flammable fabric, e.g., a thick blanket). This will prevent oxygen from entering the fire and allow the fire to put itself out.
4. If you think you cannot control the fire, **leave the room** immediately by closing the door behind you.

REMEMBER! Do not use water to extinguish burning electrical appliances plugged into the mains.

Devices with lithium-ion batteries

Lithium-ion batteries resemble conventional cylindrical batteries on the outside, but their high amperage and capacity give them a huge advantage. These batteries are often found in modern household appliances, from smartphones to electric vehicles. The most common household device is the mobile phone. Despite the battery's relatively small size, it carries some risks. Its explosion or fire can have very severe consequences. Lithium-ion batteries, on the other hand, have safeguards (surge protectors, temperature switches, etc.) and can be reasonably safe when used properly.

You must follow these rules when using devices with lithium-ion batteries:

- Don't throw, smash the devices.
- Use the chargers provided by the manufacturer.
- Don't charge the devices in direct sunlight or under cover (e.g., charging under a pillow or blanket). If the device becomes very hot during use, it should be turned off and placed in a safe place with regard to fire until it cools down.

IMPORTANT! The greatest risk of spontaneous combustion is mechanical damage to the battery, which can cause short circuits and fire or even explosion, so never dispose of lithium-ion batteries by throwing, squeezing, puncturing, burning, or using them at high temperatures.

Keep a fire extinguisher to properly protect your home. However, having a fire extinguisher alone won't guarantee protection against the spread of fire, and all family members need to learn how to use a fire extinguisher, and the fire extinguisher needs to be checked at the scheduled intervals.

How to use a fire extinguisher?

First, you need to read the extinguisher instructions, which are attached to the body of the extinguisher. They usually contain pictures showing how to extinguish and how to use a fire extinguisher. All fire extinguishers are started in a similar way: by breaking the seal and pulling out the safety pin, pointing the extinguisher hose with the diffuser at the centre of the fire, and pressing the knob. **Once the fire is out, keep an eye on the fire area** to prevent it from reigniting.

How to properly use a fi re extinguisher?

Extinguish the fi re downwind.

When extinguishing a flat su rface, start on the side closest to you.

Extinguish a burning wall from the bottom up.

If there are several extinguishers, use them simultaneousl y.

The main rules for using household – electrical appliances:

- Electrical installation malfunctions should only be repaired by qualified technicians.
- Do not plug more than two appliances that consume a lot of electricity into the same socket.
- Never pull the plug out of the socket by the cord, much less touch it with wet hands.
- Unplug all electrical appliances when you leave the house even for a few minutes.
- All electric heating appliances (irons, kettles) should be mounted on a special fireproof stand.
- It's forbidden to use electrical wires with damaged insulation.
- It's forbidden to bundle electrical wires in knots, twist them together, wallpaper wires on the outside of the wall, or cover them with flammable finishes.
- Don't place extension cords under carpets or across door thresholds.
- Use only certified electrical products.

In case of fire:

- Immediately **call 112** for help.
- Try to **get out of the burning room** as quickly as possible and help small children and the elderly to leave the dangerous area.
- **Close all doors and windows** behind you when escaping from a burning room, otherwise the fire will be ignited even more quickly by the rush of fresh air.
- Smoke is more dangerous than flames in a fire, so if the room is covered in smoke, move towards the exit **on all fours** (closer to the floor for more fresh air), **covering your nose and mouth** with a wet towel.
- If you can't call the firefighters and the fire has **blocked your escape route, knock on floors and walls and shout loudly for neighbours to help**. If you can, go to the balcony and shout loudly for help.
- When the firefighters arrive, obey them and don't be scared — they know the best way to save you!

HYPOTHERMIA

The Præstø-accident

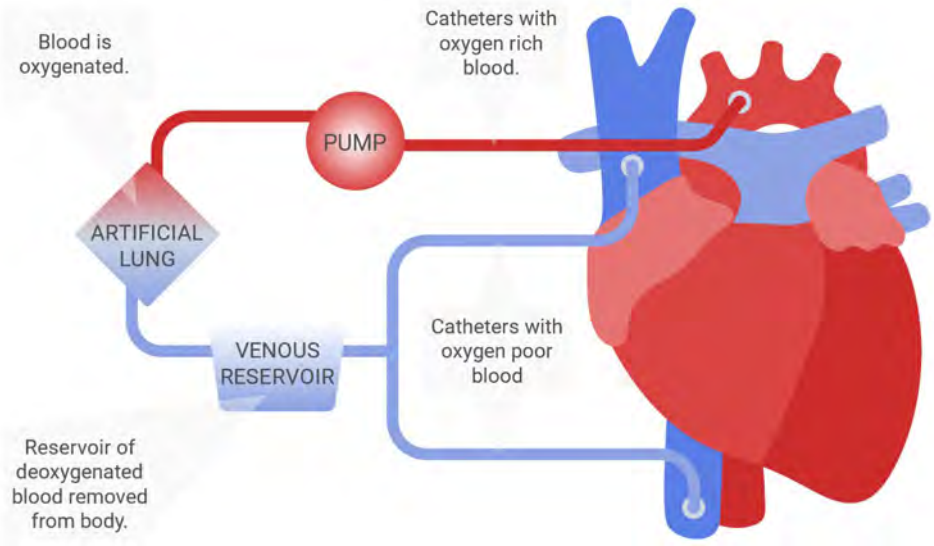
On a Friday morning at 11.00, the 11th of February 2011 a dragon boat, which is a kind of large canoe, is sailing out on Præstø Fjord, just 90 kilometers south of Copenhagen, Denmark. It carries 2 teachers and 13 students from Lundby Efterskole, which is a local continuation high school.

The boat capsized due to the wind, throwing the students in the cold water. The students had to swim the 1.7 kilometers ashore and call the alarm center. 1 hour and 21 minutes after the accident occurred, the authorities was alerted and initiated a large-scale rescue mission with rescue boats and helicopters. They found several of the students unconscious and seven of the students were found clinically dead in the cold water. 13 students and a teacher were pulled out of the water and transported to different hospitals in the country. And now the real struggle between life and death started.

The seven students, that were believed to be dead, was put into a coma to reduce risks of brain damage due to lack of oxygen. The students had body temperatures in the range from 15,5 – 20.2 degrees Celsius. The rest of the students and the teacher suffered from severe Hypothermia with a core temperature in the body as low as 23 degrees Celsius.

Slowly the process of warming their bodies up again began. If the accident had happened just 10 years earlier, the seven students would probably have been declared dead. But luckily the research and development of treating patients with hypothermia have progressed rapidly the recent years. Intense CPR and efficient use of Heart-Lungs machines made sure that all seven students who were

believed to be dead, came to life and survived the tragic accident. Six out of seven survived with a mild to moderate brain damage due to lack of oxygen. The last student survived but with a severe brain damage.

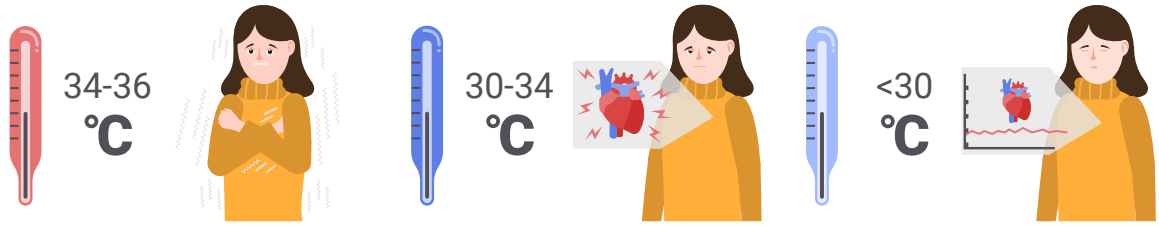


The Heart-Lung machine is connected to a vein in the groin, where it subtracts blood and warms up and oxygenates the blood, and pumps it back in the arteries in the opposite side. This way the machine is bypassing the heart and is making sure that the blood is still pumping and provides oxygen to the brain and the rest of the vital organs in the body.

Theory

What happened with the students and their bodies during their long stay in the freezing cold water that day? To understand hypothermia, we need to know how the body reacts to the different stages of the cooldown. As the body temperature drops, there will be an increasing shutdown of the systems in the body along with a decreasing ability to consume oxygen. The degree of hypothermia can be put into three categories based on the core temperature:

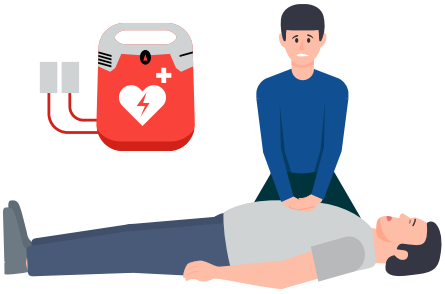
- **Mild** hypothermia is 34 to 36 degrees.
- **Moderate** hypothermia is 30 to 34 degrees.
- **Severe** hypothermia is below 30 degrees.



Temperature Celsius	Symptoms
37	Normal core temperature
35	Maximum shivering to generate energy
34	Amnesia, poor judgement and maladaptive behavior, poor speech ability
33	Apathy develops
31	The shivering stops
30	Disturbances in the heart rhythm
29	Decrease in pulse, respiration and level of consciousness
18	Asystole (or flatline)

When the core temperature in the body gets below 30 degrees Celsius and the person enters a degree of severe hypothermia, it can be really difficult to determine whether the person is dead or alive. The person will probably be unconscious, there will be no reflexes and the person will also be unresponsive to pain. The electric impulses in the heart will be very hard to detect, even with an Automatic External Defibrillator (AED), which is the reason why a lot of victims to hypothermia could have been saved with an increased knowledge. In the case with the Danish students, there were no signs of life on several of the students. The AED could not detect any electric impulses in the heart and would not recommend to give a shock. But the rescuers kept on warming their bodies up along with a continuous CPR and slowly, as the core temperature kept rising, the AED was finally able to detect a measurable heart rhythm and could recommend a shock and bring the cold students back to life. Somehow the cold had protected the vital organs in the bodies, and when warmed up again they regained the functionality.

A severe hypothermic patient is not dead until they are warm and dead, so never give up on the CPR!



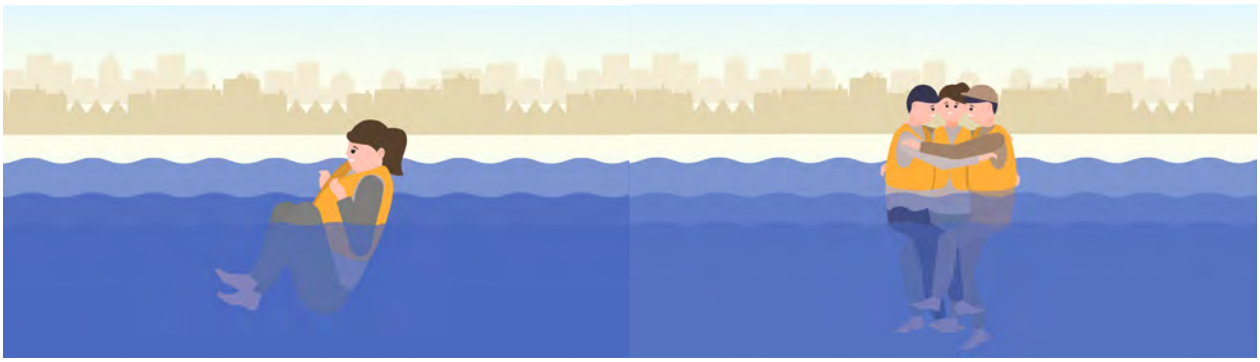
Risks and Threats

Before sailing out on the water, be sure to:

- Check the **weather forecast and water temperature**.
- Prepare yourself with **dry clothes and hot beverages**.
- **ALWAYS wear a lifejacket**. It will preserve body heat and make sure that your head will stay above the water line and prevent you from inhaling water if you are entering a state of shock. Preventing Hypothermia in the water, can be difficult, but there are a few things that we can do to delay the time until it happens.

If you fell off in the water from a boat, you should:

- **Try to resist the urge to swim** for the shore and stay by the boat. Swimming will increase your heat loss.
- **Go into H.E.L.P. position**. Draw your knees to your chest and lock your arms around your knees. Stay in that position. (H.E.L.P. = Heat Escape Lessening Position).
- If you are not alone in the water you should go for the **HUDDLE position**. Huddle close together so you can protect your chest and arms. This way you can extend your survival time with up to 50% as it greatly reduces body heat loss.



HELP position to the left and HUDDLE position to the right:

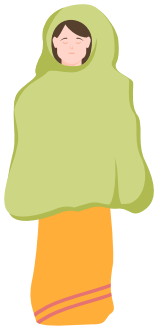
- It's always a good idea to have extra dry clothes on land to replace the wet clothing, and try avoid becoming wet.
- Avoid alcohol. You might feel it gives you some inner warmth, but instead you will experience heat loss much faster as the blood vessels expands.

FIRST AID

When treating a person suffering from hypothermia, it's important to warm them up slowly, keeping the arms separated from the body to prevent the cold blood in the arms to run back into the heart, which can lead to a cardiac arrest.

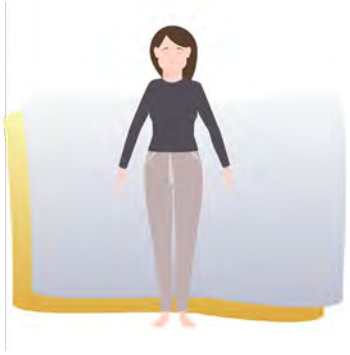
If you have two blankets, you can place them like the first picture. Wrap the orange blanket around the body from the chest and down. If you have an emergency foil blanket, you might want to use that instead of the orange blanket and place it with the silver colored side on the inside.

When the blanket are tugged firmly around the body, the persons arms can be put down alongside the body. Roll the top corner of the upper blanket as in the picture:



Take the right corner of the green blanket and tug it around the opposite hand and arm. Then finish up the wrap doing the same thing with the left corner of the green blanket. Now make sure the blanket is placed tight and firm around the head. Talk calmly to the person and offer some hot (nonalcoholic) beverage to warm the person up from the inside.

If you have **a foil blanket** at your disposal in your first aid kit, you can use that as well. Always have the silver-colored side towards the body. It is extremely effective and reflects the majority of the persons own body heat.

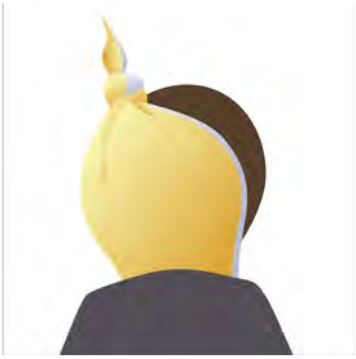


Steps:

1. Tie a knot in one of the corners.

2. Place the hand just below the knot and lead the blanket under the shirt on the back of the victim. Lead the blanket up to the neck.

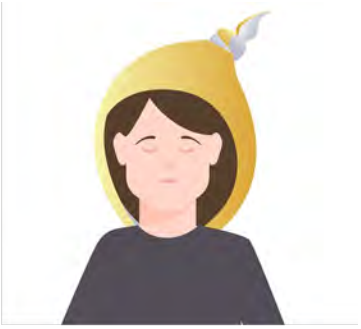
3. Once out of the shirt, pull the blanket up a few centimeters above the head from the knot. Now we have a hood ready but wait with equipping the hood until the end as it is very noisy.



4. Wrap the blanket around the skin on the stomach, and make sure it is fairly tight.

5. Now you have two ends in the front and in the back. Tie the ends together between the legs, and you have what might look like a diaper.

6. Place the hood around the head.



7. After about an hour, remove the foil blanket, as the body can find it difficult to “breathe” and you might end up damp and wet instead.

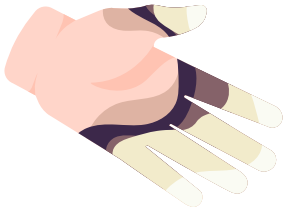
Frostbites

When you are exposed to cold weather, its not only the core temperature in your body that you should look out for. Skin and tissue can get damaged in the cold environment and can cause a

frostbite. A local freezing on the skin can cause the skin to be hard, pale and cold and when the tissues warms up, the skin will turn red and painful.

There are two types of frostbites:

- The superficial frostbite where the skin has been damaged. It can leave you with a wound, as the skin can peel of.



- If unlucky, you can en d up having a deep freeze. The cold has pierced through all skin layers and causing the skin to look white or yellow with dark shadows of blue and grey colours. The bodypart will be numb and have a hard layer of skin.

First Aid for frostbites:

- Find a place away from the cold and wind. **Indoor** is preferred if possible.
- Drink some **hot beverages** like cocoa, tea or coffee.
- If hands or fingers have frostbites, try and **place them under the armpits**, and warm them slowly with your bodyheat.
- If your face, nose or ears have been damaged, **cover them with your hands with dry mittens or gloves on**.
- Severe frostbites on hands or feet should be **warmed up in warm clean water**, with a temperature around the 40-42 degrees Celsius. **DON'T use open fire like a fireplace or an oven**. The frostbite will be so numb that you can't feel the intensive fire or heat, and you can get a burn instead.
- If the person don't regain color or feelings in the bodypart that has been damaged, severe damages might have occurred and treatment by a **doctor** might be necessary.
- Remember that people with frostbites **might be exposed to hypothermia** as well.

Form a discussion group and try to come up with a solution to the following cases:

CASE 1:

You and two other friends are on a boat trip in January, when the small boat suddenly is tipping over and you all end up in the freezing water. One of your friends can't swim, but the two others are fairly experienced swimmer. You are about 500 meters from the shore. You are all wearing lifejackets and the temperature is close to 0 degrees Celsius. What do you do?

CASE 2:

You have taken your best friend up to a cabin in the forest during Winter break from school. You would use the opportunity to do some ice fishing in a lake near the cabin. After fishing for a few hours out on the frozen lake, you are surprised by a blizzard, and you decide to go back fast, as it is already freezing cold and you have been outdoors for many hours. In the blizzard you get lost and you can't find your way back. Your friend starts to complain about pains in the foot and you discover that he has frostbites in 4 toes and they are turning purple. It is getting dark soon. What will you do?

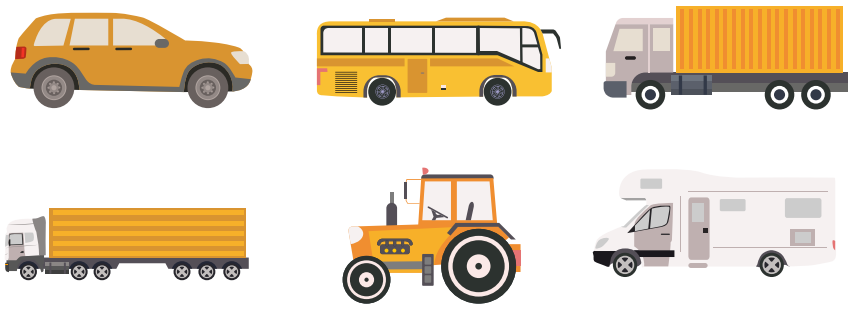
VEHICLE FIRES

A VEHICLE FIRE is an undesired **conflagration** (uncontrolled burning) involving a **motor vehicle**.

It is one of the most common causes of **fire-related property damage**.

There are various types of vehicles on the local roads and motorways, these include:

- Private cars.
- Buses.
- Trucks.
- Heavy goods vehicles.
- Agricultural vehicles (e. g. tractors).
- Leisure vehicles (caravans, mobile homes).

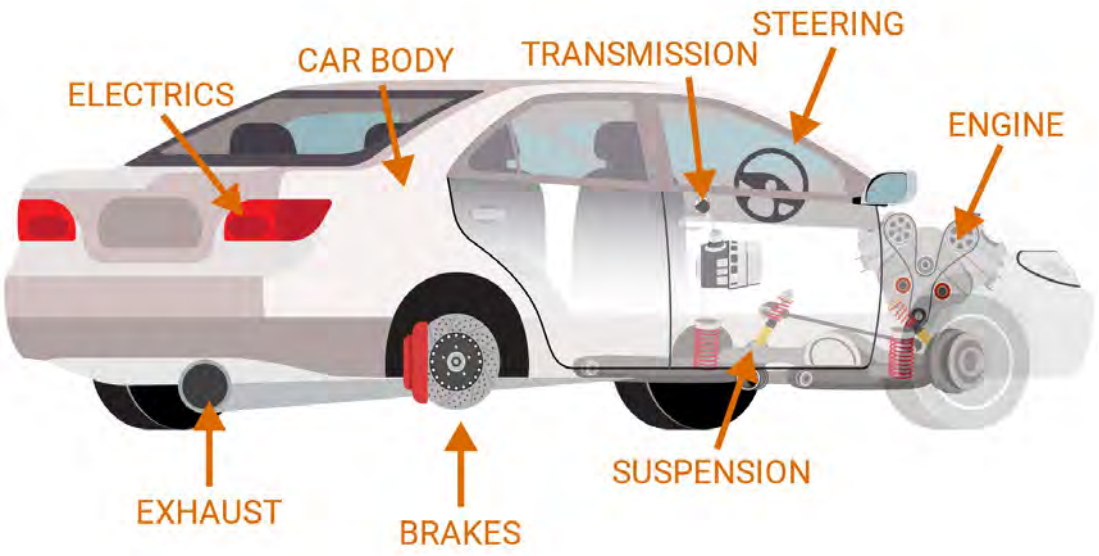


Cars can catch fire for several reasons:

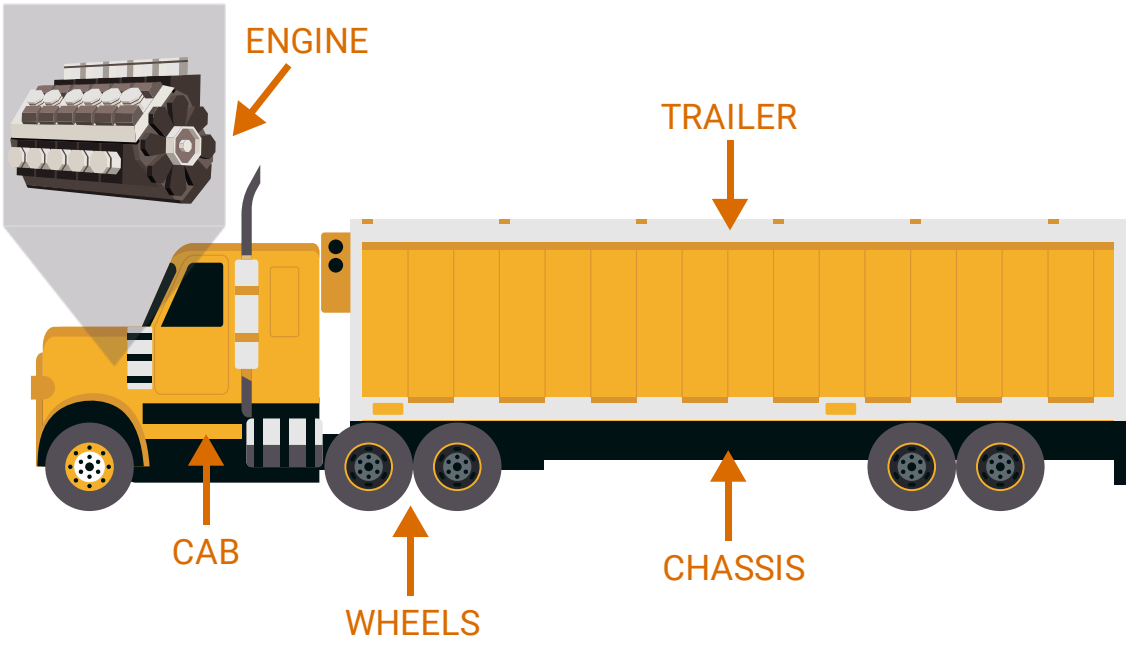
- **Car Accidents**. Many vehicles today are well-designed with crumple zones that protect internal spots like the engine, battery, and gas tank in the event of an accident.
- **Fuel System Leaks**. A fuel system leak is incredibly dangerous. Petrol is the most corrosive and flammable fluid a car carries. It can quickly catch fire from a single spark.
- **Electrical System Failures**. A car's electrical system throughout the entire vehicle – including into door, under carpets, and through powered seats. Faulty wiring or a bad battery can quickly lead to a fire.

- **Poor Maintenance**. Forgetting or neglecting to take care of a vehicle can increase the chances of a fire e. g. allowing faulty wiring, or leaky seals go unfixed can create flammable conditions.
- **Design Flaws**. While it's unlikely that a design flaw will cause a fire on its own, they can create conditions that lead to an eventual fire.

Typical components of a car



Typical components of a heavy goods vehicle (HGV)



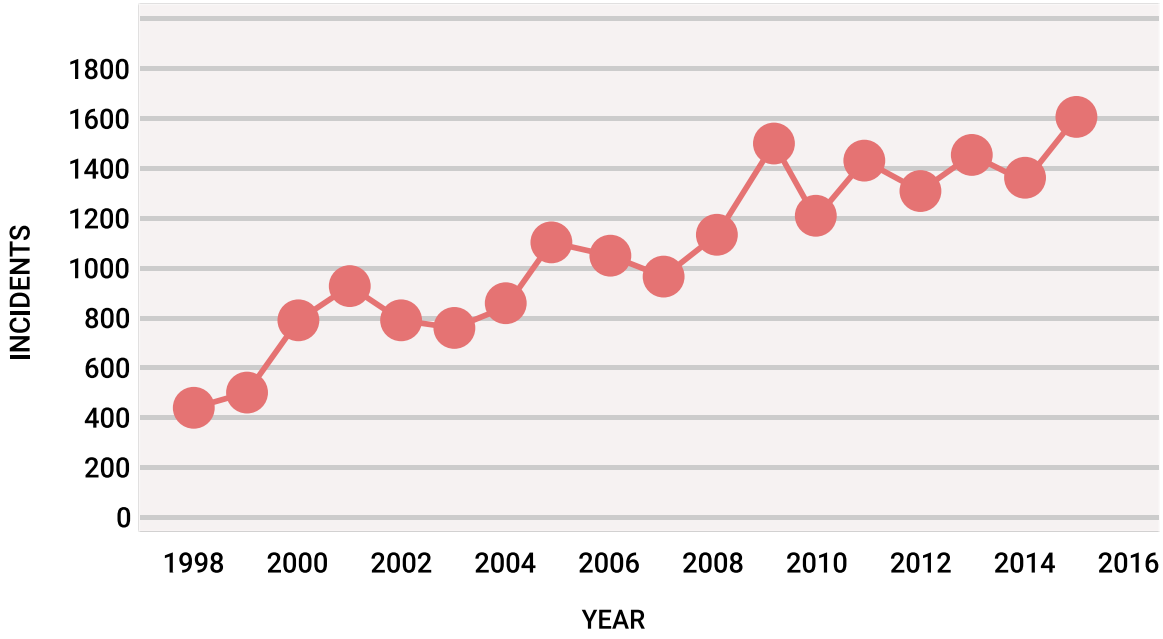
Statistics

It is often the case in accidental auto fires that the bulk of the fire is (at least initially) contained in the engine compartment of the vehicle.

In the UK & IRL, accidental car fires are declining but deliberate car fires (arson) are increasing. Abandoned cars are commonly set on fire by vandals. Around two cars out of every thousand registered in the UK & IRL catch fire each year.

In France, widespread arson of cars is regularity commuted by youths during **New Year's Eve celebrations**. This began during the 1990's in poorer areas of Strasbourg, but has since spread nation-wide.

In Sweden, a pattern has emerged in recent years of cars being set on fire by youths in the summer, towards the end of the school summer holidays.



Number of vehicle arson fires in Sweeden 1998-2015.
Source: Swedish Civil Contingencies Agency statistics database.

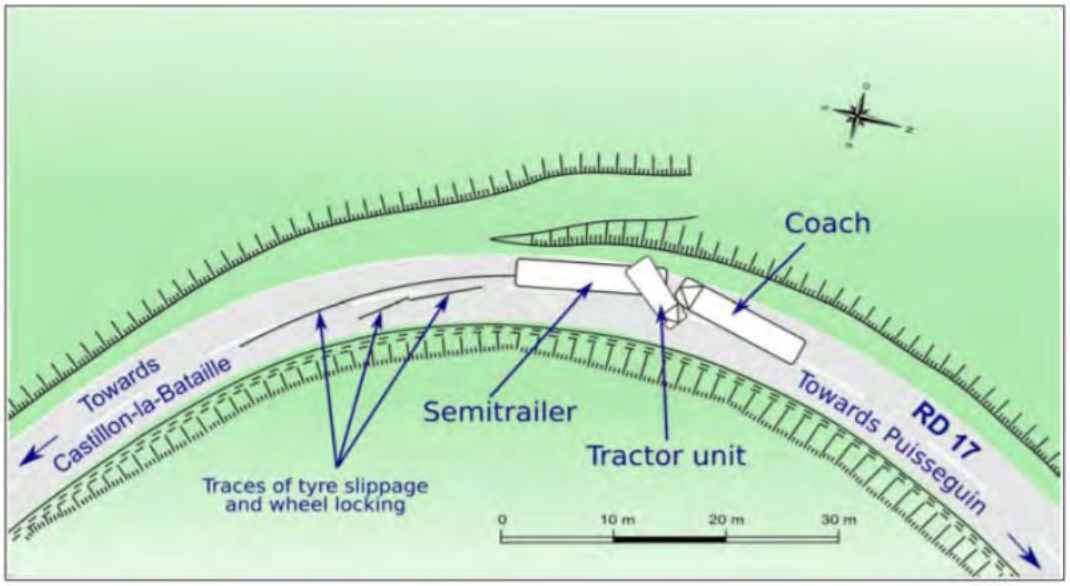
Rakovic, Försth, and Brandt reviewed the data on commercial bus fires in Sweden in 2005–2013. They found that 61 percent of the commercial bus fires started in the engine compartment, 20 percent began in the wheel well, 5 percent started inside the bus or other area, and 14 percent began in an unknown location.

Case Study: collision (and resulting fire) between a coach and HGV

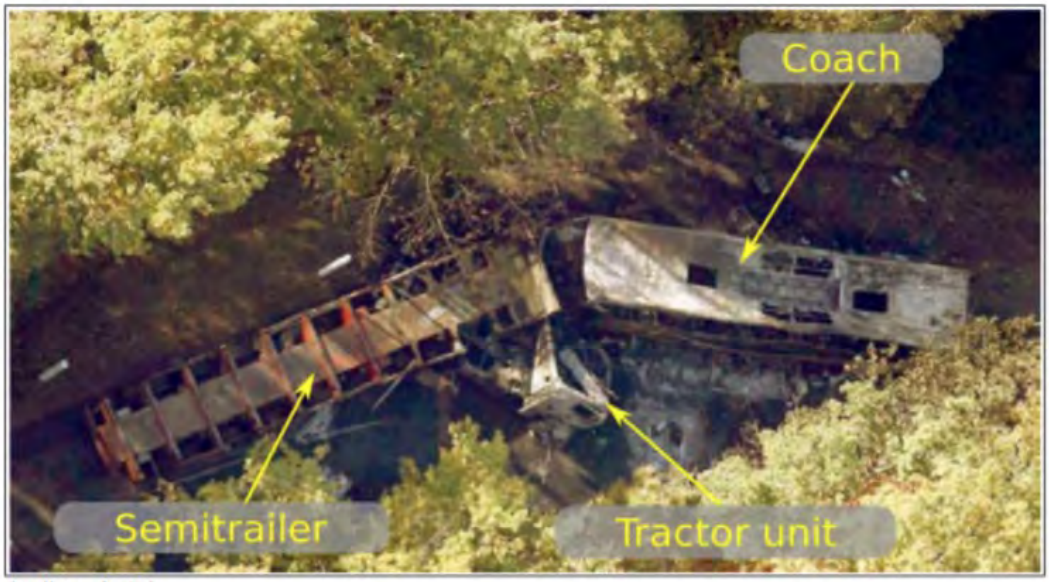
On a French road on October 23, 2015, forty-three people died after a truck crashed into a bus and a fire erupted. The driver of the truck, which was pulling an empty wood trailer, lost control of the vehicle when navigating a tight bend. His vehicle jackknifed and crashed into a bus heading in the opposite direction, crushing one of the bus's fuel tanks and damaging the tractor unit's added tank. A fire erupted between the truck and the bus almost immediately.

Interior materials in the bus caught fire, resulting in toxic smoke. Forty-nine people were on the bus, including members of an older adult club on an excursion and their tour leader.

After the impact the lights on the bus went out. The driver used the manual emergency system to open the front door, exited, and opened the central door from outside. Only one passenger escaped out the front door. Six evacuated through a side door. The stairs were narrow and steep, posing challenges for those with limited mobility. The impact also damaged a safety barrier, partially obstructing the stairwell. A passenger broke a window with an emergency hammer to create an escape hole, out of which they escaped. Forty-one passengers died, as did the truck driver and his passenger. Investigators believe that the truck driver was traveling at an excessive speed for the location. The tractor also had an unapproved fuel tank installed in the back of its cabin.

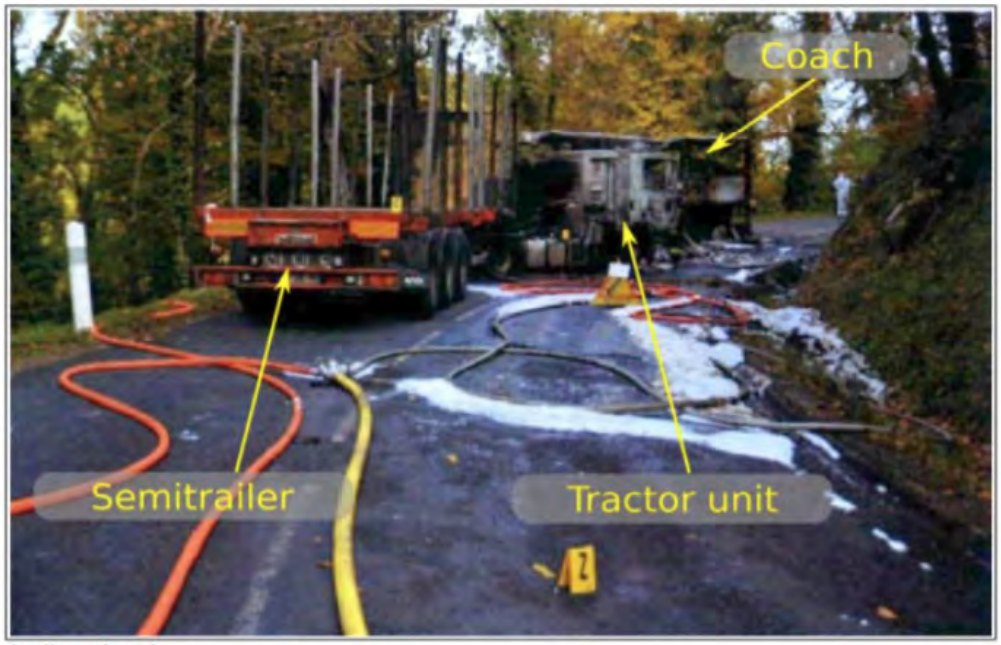


Position of the vehicles upon the arrival of emergency services



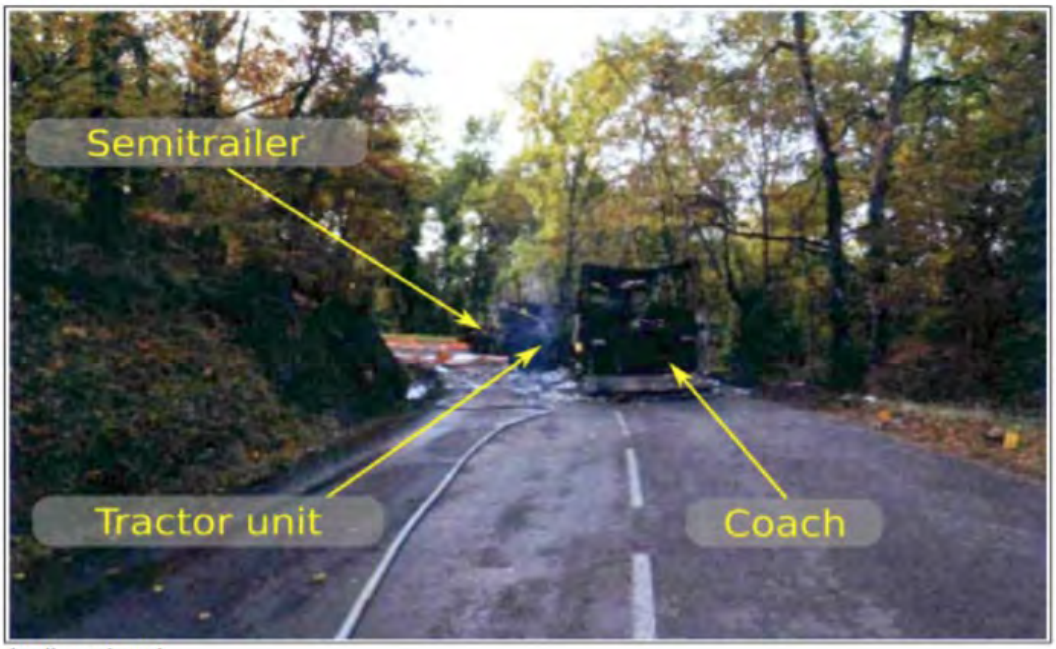
(police photo)

Aerial view of the position of the vehicles following the collision



(police photo)

View (from the direction in which the articulated lorry was travelling) of the position of the vehicles following the collision



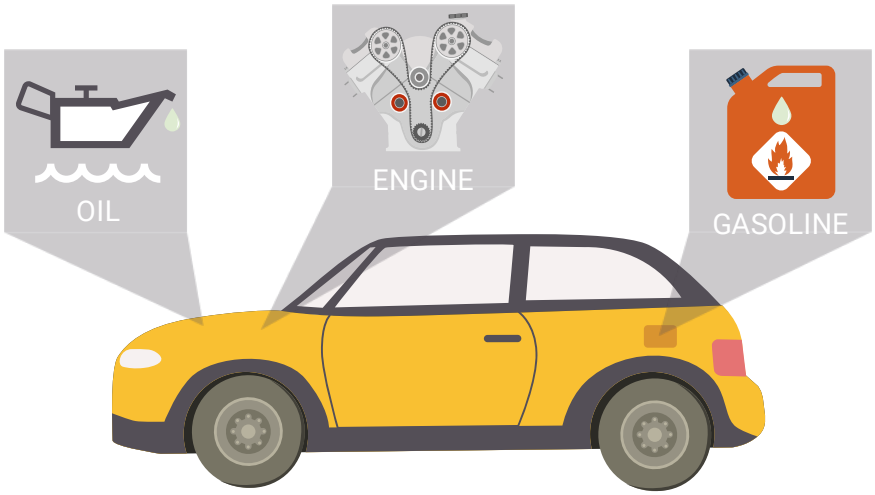
(police photo)

View (from the direction in which the coach was travelling) of the position of the vehicles following the collision

Theoretical part

A motor vehicle contains many types of **flammable** materials, including flammable liquids **like gasoline and oil** as well as solid combustibles (plastics, fabrics). **Fuel** leaks from ruptured **fuel lines** also can rapidly **ignite**, especially in petrol fuelled cars where sparks are possible in the engine compartment. Fires have been caused by **ozone cracking of nitrile rubber fuel lines**.

It is often the case in accidental auto fires that the bulk of the fire is (at least initially) contained in the engine compartment of the vehicle. In most vehicles, the passenger compartment is protected from engine compartment fire by a firewall.



Risks and threats

Why are vehicle fires so dangerous?

The first thing to remember about car fires is that they are rare, even in accidents.

- The main cause of vehicle fires is faulty wiring. Which can be caused by neglect (failing to look after the vehicle) or poorly executed electrical repairs.
- A motor vehicle contains many types of flammable materials, including flammable liquids e.g. petrol and oil as well as solid combustibles (plastics, fabrics).
- Fuel leaks from ruptured fuel lines also can rapidly ignite, especially in petrol fuelled cars.

- Vehicles contain many potential sources of ignition including electrical devices that may short circuit, hot exhaust systems, and modern car devices such as air bag detonators.
- Car manufacturers have minimised the risk. Modern car design puts the petrol tank in a position where it is least likely to be damaged in all except the worst accidents.

What to do in the event of a car fire:

1. **Pull Over.** The moment you believe your car is catching fire, pull over to a safe location where you're not blocking traffic, and put your vehicle in neutral/park. If you are stuck in heavy traffic with no way to get off the road, turn your hazard lights on and park the car.
2. **Turn Off the Engine.** Once the vehicle has stopped completely, turn the engine off. This will reduce the chances of flames igniting if there is only smoke.
3. **Get Everyone Out and Move Back.** It's crucial to help all passengers get out of the vehicle as quickly as possible leaving personal belongings in the car. Move as far away from the vehicle as possible, at least 25m.
4. **Call 112.** Once you've completed the steps above, call 112. Emergency responders should arrive at the scene promptly and do what they need to do to put the fire out.

Prevention

Use the following tips to prevent potential vehicle fires:

- If you notice any fluid leaks or your fuel levels drop rapidly, have your **car checked**. Leaking oil or fuel can spark a fire.
- **Secure your oil and gas caps** properly.
- Pay attention to if your vehicle is **overheating**. A hot engine can cause fluids, such as oil or coolant, to leak. When fluids drip onto hot areas of the engine, they can start a fire.
- If your exhaust system is too hot, **have it checked**. **The normal temperature range of an exhaust system is 300-500 degrees Fahrenheit (150-260 degrees Celsius).** If the catalytic converter is clogged or over-laboured, it can reach scorching temperatures of 1,200 degrees or higher. An overheating catalytic converter that contacts dry grass or any flammable material can spark a fire.

- **Do not smoke in your car**. Cigarettes are a common cause of fires, including in vehicles. Embers may fall on the seat or floor carpet and start a fire. If you can't wait until you arrive at your destination to smoke, pull over in a safe place to smoke, and extinguish your cigarette properly.
- **Do not leave flammables**, such as cans of petrol, lighter fluid, or aerosol cans in your car. If you are transporting gasoline, do so in a certified gas can that is sealed and transport it in the trunk, not the passenger compartment.
- It is mandatory to carry an in-car **fire extinguisher** in some countries, such as Belgium, Bulgaria and Poland.

DOS AND DON'TS:

- **Always** pull over to a safe location the moment you believe your vehicle is catching fire.
- **Never** smoke in your vehicle, cigarettes are a common cause of vehicle fires.
- **Always** secure your oil and gas caps properly.
- **Never** leave flammables, such as cans of gasoline, lighter fluid, or aerosol cans in your vehicle.
- **Always** call 112 in the event of a vehicle fire.

Video:

https://www.youtube.com/watch?v=XDYleNpP_qI

Discuss what you see in the picture and answer the following questions.

Question: Is the vehicle parked in a reasonably safe location?
Answer: Yes, the moment you believe your car is catching fire, pull over to a safe location where you're not blocking traffic, and put your vehicle in neutral/park.

Question: What actions should the police take to try and make the scene safer whilst awaiting the arrival of the fire service?
Answer: They should fend off the incident with their vehicles and setup a cordon an as far away from the vehicle as possible, at least 25m.

Question: What additional hazards could be in the car that the responding fire service should consider?

Answer: A motor vehicle contains many types of flammable materials, including flammable liquids like gasoline and oil as well as solid combustibles. Fuel leaks from ruptured fuel lines also can rapidly ignite, especially in petrol fuelled cars. A motor vehicle could potentially be carrying cans of petrol, lighter fluid, or aerosol cans.

Links:

https://en.wikipedia.org/wiki/Vehicle_fire

https://driversed.com/trending/national-burn-awareness-week-how-prevent-vehicle-fires

Land Transport Accidents Investigations Bureau. Report following the technical investigation into the collision (and resulting fire) between a coach and a HGV that occurred on October 23rd, 2015 on Departmental Road No 17 near the town of Puisseguin (South-West of France). (p. 33. Commissioned by: Ministry for an Ecological and Solidarity Transition (MTES).

https://unece.org/fileadmin/DAM/trans/doc/2017/wp29grsg/GRSG-113-05e.pdf

INCINERATION OF GRASS, STUBBLE AND RUBBISH

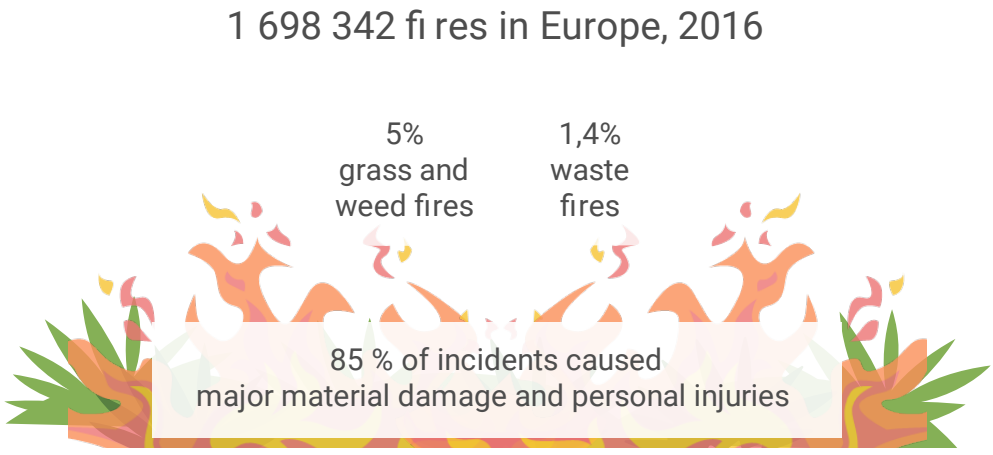
Fire can get out of control. When that happens, it is not just material values that are wasted. Every year, many people are injured by careless dealings with fire. Therefore, you need to be careful when dealing with fire and embers.

When making open fire in nature, such as burning waste, grass and weeds, one must be very careful. If you are not aware of the wind, weather and surroundings, it can quickly go wrong. This also applies to the use of weed burners, which are also dangerous when you are not paying attention. It is also responsible for many unintentional fires.

In the following sections we go through what to be aware of, so that the burning can take place safely.

Statistics

In 2016, there were a total of approximately 1698342 fires in Europe. Of these, approximately 83916 incidents of burning with grass and weeds were about 5 % of all fires. In the same year there were 23202 incidents of waste incineration that is about 1.4 % of all fires. Most of the incidents, about 85 %, are responsible for major material damage, but also personal injuries.



A true story

On a hot summer's day, 2 young men decided to burn off some garden waste at their parents' vacation house. They had collected branches, grass, and withering leaves in pile about 20 meters from the house.

After they had ignited it, they sat next to it and watched the fire. After an hour and a half, the fire had burned down and there were only embers left. They decide to go in and make dinner.
In the meantime, the wind picked up and they had no idea that some of the embers had blown into a hedge next to the neighboring house.

After a few hours they discovered that there was smoke in the garden, but by then the fire already had a hold of the neighboring house. They ran into the garden and saw the neighboring house burning. They called the fire department and ran over to the neighboring house to see if they could put out the fire. They found a garden hose, but when they tried to open the water, one of them came to close the fire. The fire got hold of his shirt sleeve and he got a severe burn at his arm.

The fire department put out the fire, but there was a lot of damage to the house and surroundings. The young man, who was burned, suffered major injuries to his arm and suffered permanent injuries.

Theoretical part

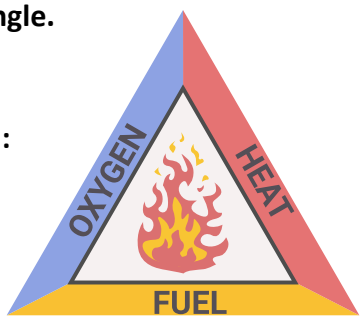
It is important when burning grass, weeds, and waste that the fire is located at a good distance from buildings, trees, shrubs and other combustible material.
You must also always have extinguishing tools nearby. It can be a garden hose, watering can, bucket of water, powder extinguisher or water extinguisher.

Lighting a fire

Lighting fires is most safe if you use paper, ignition blocks or the like. Never pour flammable liquid such as gasoline, alcohol or (bio) ethanol on a fire. Flammable liquids evaporate very easily. The

vapors are very easily flammable and have a high combustion rate. This can create an explosion-like combustion with large flames.

To understand how a fire is extinguished, we need to review the fire triangle.



The conditions of fire are often illustrated with the so-called **"fire triangle":**
fuel and oxygen together with high temperature provoke fire.
Removing just one element both extinguishes and prevents fire.

It can be described as follows:

- **FUEL:** As in the case of living organisms, the fire dies if it is not nourished. That's why you clear a firebreak to fight forest and field fires. If it burns in a gas stove, you can remove, or eliminate, the flammable material by shutting off the gas. In other cases, it may be either difficult or impossible to remove the fuel.
- **OXYGEN:** Another similarity between fire and living organisms is that they must have air. If you throw a shovelful of soil or a fire blanket over a fire, the fire suffocates. Incidentally, this happens even when the oxygen content of the air comes below a certain limit. Many materials, for example flammable liquids and even some solids, cannot burn if the oxygen percentage drops from the normal 21 to 15 percent. Embers can survive 0% oxygen for up to an hour, so always remember to pour water on the embers if you have used a fire blanket.
- **HIGH TEMPERATURE:** The critical heat can come from a heater, a stove, overloaded electrical installations, embers, a spark, a piece of glowing coal, a lightning bolt, a heap of compost, volatile chemicals, and a host of other heat sources. If you see smoke, especially from fats such as oil during heating, there is a risk of self-ignition in a matter of seconds.

One of the most frequent ways a fire spreads, via embers, and burning materials blown away from the fire. Radiant heat from the fire can also ignite the surrounding materials.

The temperature of flames and embers in a bonfire is about 1000°C. Dry wood, leaves and grass have an ignition temperature of about 300°C. Therefore, under the right circumstances, only a single glow or flame is needed to ignite things.

Risks and threats

The possibility of a fire spreading is great in strong winds or if the fire is located close to other combustible materials. There is also a risk that humans and animals may be injured if they get too close to the fire or are hit by embers.

When the accident happens

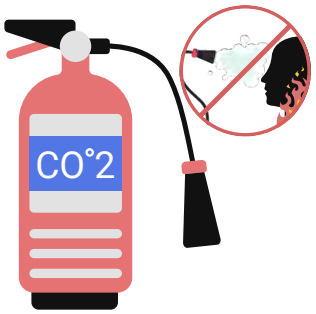
Once the accident happens and the fire has spread, it is important to react fast. The best way to put out fire in embers and flames is by using water. Water has a cooling effect and prevents from re-ignition. A powder extinguisher can also be used but has a limited use of time.

Fire in person

Fire in a person's clothes is most effectively extinguished with water but can also be suffocated by rolling the person around on the ground, or by wrapping the person in a fire blanket or the like. Lay the person down as flames and smoke rise upwards and can, for a person standing or sitting upright, cause head and face burns as well as lesions and suffocation caused by inhalation.

The powder extinguisher is not very suitable for putting out fire in a person, it is unpleasant, stings in the eyes and tastes ugly. It should not be directly harmful to health and if you have no other option it is better to use the powder extinguisher with caution, than the alternative of the person perishing or being badly burned. However, never spray directly in the face of the person, as you risk filling the airways with powder, thus suffocating the person.

The carbon dioxide extinguisher, which is after all suitable for EL fires, is certainly not suitable for extinguishing fire in a person, the temperature of the carbon dioxide (CO_2) is -78°c. Carbon dioxide is not directly harmful to health, but since it is so cold, it will easily cause frostbite. However, never spray directly in the face of the person, as carbon dioxide displaces the oxygen and thus suffocates the person.



Burns are divided into 3 degrees:

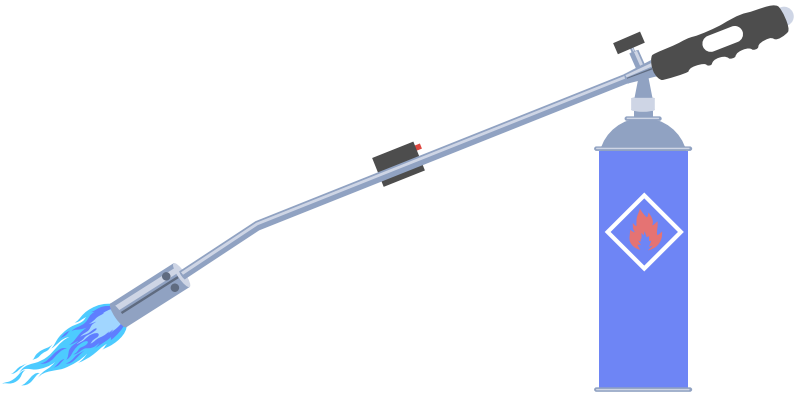
- 1st degree burns, red and sore skin.
- 2nd degree burns, red and with glare
- 3rd degree burns, skin burned away possibly into muscles and bones.

Burns are treated with cool water (not icy water, it is unpleasant and increases the risk of undercooling). Remember to find the cool water that needs to be poured over the burned place as soon as possible, such as a burnt hand under the cold tap. When given time, you can remove loose-fitting clothing if it's in the way, and you need to make sure the water has a temperature, so it feels pleasantly cool, but not icy (15-20 degrees). You need to keep the burned place in cool water until the pain stops. It is important to start cooling with cool water as soon as possible after the combustion

has occurred. Therefore, do not initially think about the temperature of the water, but just rush to get water poured at the burned place. Do not interrupt the cooling but keep the burned place in cool water until the pain stops. It lasts at least half an hour, but often 3-4 hours or more.

Weed burner

Weed burners typically start a fire because they get too close to dry grass or shrubbery, a building or the car in the driveway. Children and adults may also be at risk of burns because they get too close to a lit or hot weed burner.



The burner should only be turned up so much that the weeds are briefly fried. It is also important to keep the weed burner at a distance from buildings, stands and cars. The flame from the burner ignites easily flammable materials - even those you do not want to set fire to. Finally, we call for the weed burner to remain in the tool shed during the dry periods and in windy weather, where it can be difficult to control the flame. After using the weed burner, the area should be checked for overlooked embers. Allow the weed burner to cool before putting it away and remember to remove the gas cylinder or gas can. A weed burner must bear the CE mark – then it is approved for use in Europe.

Prevention

If you simply plan to make a **small bonfire with a diameter of no more than 120 cm or a fire in a bonfire dish**, the instructions from the Danish Emergency Management Agency are as follows:

- The fire must be placed at least **10 meters from buildings**. If there are thatched houses, place the fire at least **15 meters from the thatched roof**.
- The fire must be placed at least **15 meters from coniferous vegetation**, heather-clad areas and flammable vegetation such as fields.
- The fire must be placed at least **15 meters from flammable**, **combustible or oxidizing substances**.
- At wind speeds of even to fresh winds, i.e., wind speeds between 5.5-10.7 m/s, **the distances must be doubled in the direction the wind blows** (i.e., in the presence of westerly winds, the distances must be doubled to the east, as this is the direction sparks from the fire will fly).
- **At wind speeds of more than 10.7 m/s, bonfires are not allowed**. If you've lit a fire, put it out.
- If the fire in your boat barrel is less than 80 cm in diameter, you may place it closer to buildings than the 10 meters, provided that the building does not have thatched roofs.
- **Turn off the fire if left.**

DOS and DON'TS :

- **Always** have water nearby when making bonfires.
- **Never** make bonfires in windy weather.
- **Always** keep a good distance from buildings and flammable material.
- **Never** leave the fire when it burns.
- **Always** keep a good distance from the fire to avoid burns.

Case:

https://www.youtube.com/watch?v=i-tbdyXKD7I&list=PLdQxGUdjgAEaHdJmR9Y5fXEzqXMbFXQxo&index=1

The man in the film is lighting a fire he poured gasoline on the fire and made a fuse of gasoline for the fire. There are many things that go wrong in this movie. The location of the fire is horrible, and the

general handling of the situation is very dangerous. Watch the movie and discuss the way he handles the situation. Discuss at the same time what he could do differently to handle the burning more safely.

Subsequently, there are 3 questions that support the film clip:

Question: Is the safety distance to the house and surroundings big enough?
Answer: No, there must be at least 10m distance to the house and there is also not enough distance to the car and the other surroundings.

Question: What is the danger of pouring petrol on the fire when it burns?
Answer: The fire can ignite the gasoline but also the canister.

Question: Why does a small explosion happen when he lights the fire 2nd time?
Answer: The vapors from the petrol can accumulate between the branches and when ignited, there is a rapid combustion that can act as an explosion.

Links:

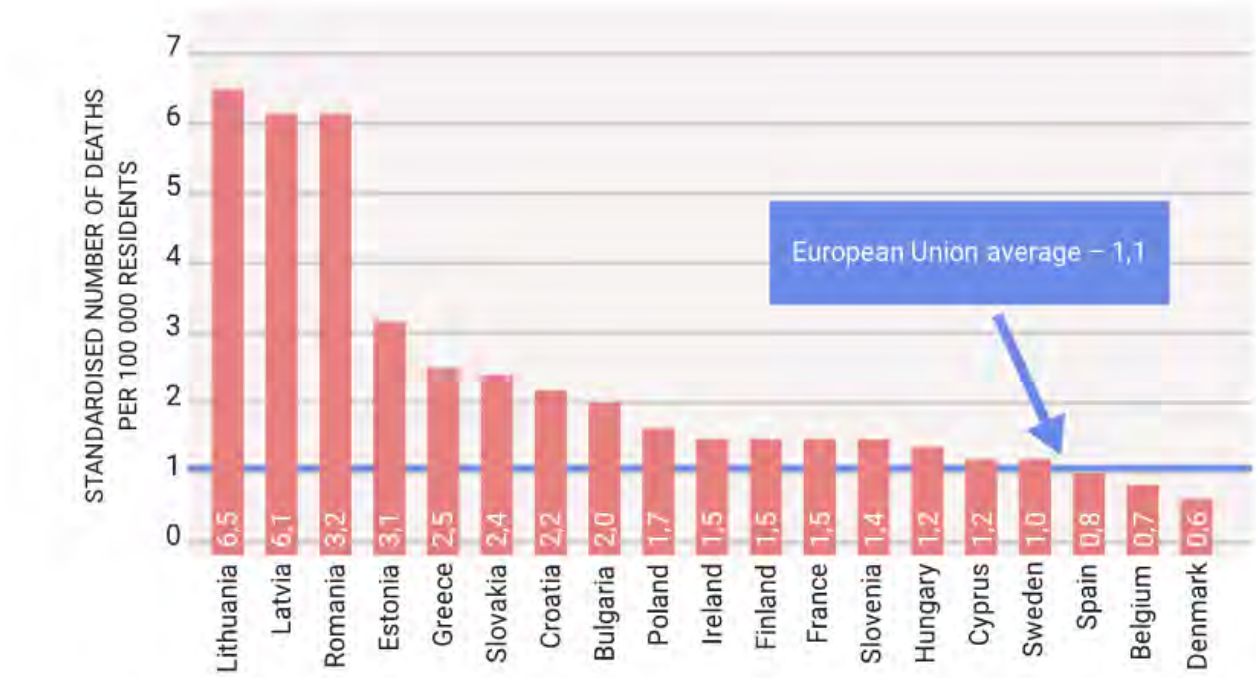
https://brs.dk/
https://www.tryghed.dk/

DROWNING

Drowning claims the lives of 372 000 people a year worldwide, with over 90% of these deaths occurring in low- and middle-income countries. In the WHO European Region, drowning causes the loss of 37 00 lives every year. It is the second leading cause of death in children aged 5–14 years and the fourth leading cause among young people aged 15–29 years.
In addition, it also costs society a lot of money for patient care, rehabilitation and hospital admissions.

Statistics

In 2016 there were 5 537 deaths of European Union (EU) residents caused by accidental drowning and submersion. The figure has been falling each year since a peak of 6 090 deaths in 2013 and corresponds to an EU average of 1.1 deaths per 100 000 residents.



Deaths caused by accidental drowning and submersion, 2016

(Standardised number of deaths per 100 000 residents)

A true story

An 11-year-old saved a drowning man more than twice his size. Advaik Nandikotkur, who weighs 70 pounds, pulled the man from the bottom of a swimming pool in an apartment complex. The 170-pound man was then resuscitated by adults on the pool deck, and apparently has made a full recovery. Srinivasa Yalavarthi wandered to the other end of the pool, where the water was about 8 feet deep. He sank to the bottom and remained there for several minutes.

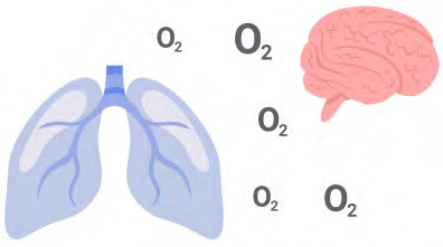
Then adults on the pool deck spotted him and began to shout for help as none of adults could swim. 11-year-old Advaik dived to the bottom, grabbed the unconscious Yalavarthi and lugged him to the side of the pool. Then the adults dragged him out before rescuers arrived at the apartment complex near Yankee Doodle Road and Lexington Avenue.
Yalavarthi regained consciousness after being resuscitated and was able to walk to the ambulance on his own.

Theoretical part

Drowning and near-drowning

Drowning is defined as death from suffocation caused by submersion in water. A near-drowning victim is defined as a person submerged in water for so long that some form of cardiac resentment is required immediately after the person is pulled out of the water.

Drowning can happen in many ways. But all drowning deaths are due to lack of oxygen (asphyxiation). It is less important whether the lungs are filled with water or whether it is salty, fresh or fresh water. Importantly, it is how much oxygen continues to reach the victim's brain.



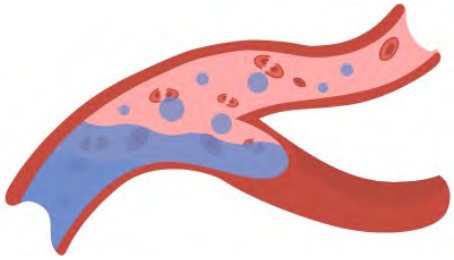
What happens when a person drowns?

Drowning can be the result of chilling, fatigue, injuries, disorientation, poisoning or limited swimming ability. The drowning victim struggles to inhale as much air as possible. Often the victim inhales water or gets a muscle spasm in the larynx, which closes the airways. Loss of consciousness, convulsions, cardiac arrest and death can occur.

The body's reaction to drowning and factors that influence

Freshwater versus Saltwater – in principle:

- In a freshwater- drowning, the water passes through the lungs and into the blood. There, it can cause an unfortunate dilution of the blood, resulting in the destruction of red blood cells and suffocation (osmosis).



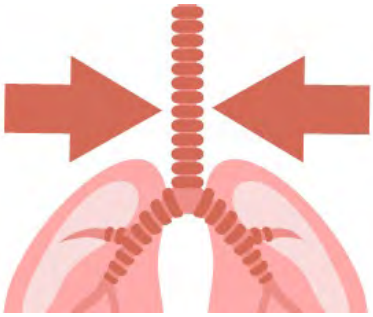
- Salt-water drowning, the water that enters the lungs is saltier than the fluid that is in the bloodstream.

  So, water in this case leaves the blood and enters the lungs, where salt is diluted (osmosis) The water in the lungs is mixed with foaming body fluid, which complicates an oxygen uptake.

Wet drowning and dry drowning:

- Wet drowning occurs when water enters the lungs.

- Dry drowning occurs when a strong muscle spasm in the throat (larynx) contracts the airways together and makes breathing impossible.



Hot water versus cold water:

- There is a significant difference between hot water drowning and cold-water drowning.
- Cold water drowning has resulted in successful resuscitation, even up to an hour after submersion and suffocation.

Risks and threats

It is important to understand that you need to act fast when a person is drowning. It is also important to think about your own safety, it can be associated with high risk jumping into the water to save someone. When the airways are full of water, the blood does not get the right amount of oxygen to transport around to the cells. This can cause lasting damage to organs and especially the brain. In the worst case, the person can die. There is also a big risk that the water entering the respiratory tract will be transferred to the lungs or bloodstream.

When the accident happens

A person drowning often cannot cry out for help, so it is important to pay attention to signs of drowning. Most drownings occur where help is within a short distance. Expect a drowning accident if you see someone in the water with all your clothes on. Keep an eye out for irregular swimming movements. This indicates that the swimmer is getting tired. Often the body sinks and only the head breaks the water surface. Call emergency and medical assistance immediately. If you are unable to recover the person yourself without endangering life yourself, you must also call for help immediately!

How to rescue the person from the water?

Step 1: Place yourself next to the victim.

Step 2: Stretches his arms above and behind the crash's head. This creates a "locking" of the upper body of the crashed, allowing the upper body to be rotated/ twisted.

Step 3: Start rotating the victim's torso towards yourself.

Step 4: As you rotate in a back position, you sink slightly to your knees, easing the rotation.

Step 5: Maintain the stabilization of the accident by holding the head of the accident between his or her arms.

After rotating victim so that this floats on the back with his mouth free of the water:

- If the victim's breathing stops**, rescue breaths** is initiated according to the mouth-to-mouth method as early as possible. The artificial respiration is therefore initiated before the accident has come ashore. Continue with the rescue breaths as you head for land with the victim. Practice **CPR if required**.
- To **prevent hypothermia** (the victim being cooled), wet clothing are removed from the victim. After that, the victim is **wrapped in a dry and warm blanket**.
- Give the victim **first aid** for any possible injury.

- When the victim wakes up and comes back to himself, he or she may have difficulty breathing. Soothe the victim with speech, touch and presence until medical help arrives.
- ALL near-drowning victims should be **checked by a doctor**.

Hypothermia

Hypothermia is a medical emergency that occurs when your body loses heat faster than it can produce heat, causing a dangerously low body temperature. Normal body temperature is around 37°C. Hypothermia occurs as your body temperature falls below 35°C.

When your body temperature drops, your heart, nervous system and other organs can't work normally. Left untreated, hypothermia can lead to complete failure of your heart and respiratory system and eventually to death.

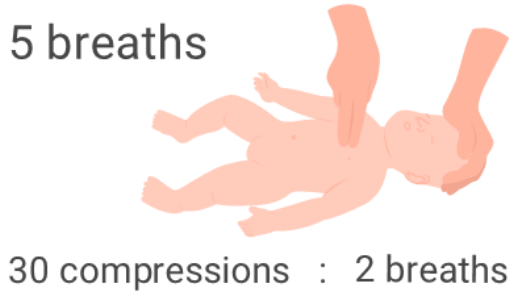
Hypothermia is often caused by exposure to cold weather or immersion in cold water. Primary treatments for hypothermia are methods to warm the body back to a normal temperature. If it is cold, people will not start to regain consciousness until their body is warm enough. Be sure to put a blanket around the injured person to prevent hypothermia.

CPR:

Once on dry land, turn them on their back, tilt their head and lift the chin to open the airway. If they're not breathing start resuscitation. Use a defibrillator immediately if there is one available.

If it is warm and they haven't been in the water very long, you may find they start to regain consciousness quickly. If this happens, swiftly put them into the recovery position to help them drain water and vomit. Keep checking they're still breathing.

For an adult, start with 30 chest compressions then 2 rescue breaths. For a child or baby, start with 5 rescue breaths then 30 compressions to 2 breaths. Push hard and fast and keep going.



Prevention

In a near-drowning situation, immediate intervention and first aid can prevent death!

ADULTS:

- Receive adequate **swimming training** and swimming lessons!
- Swim as close as possible near a **lifeguard**.
- Lifeguards should be employed at all publicly available swimming pools.
- **Never swim alone** in deep water.
- Do not swim without the presence of a swimmer if you have not learned to swim yourself. If you are a beginner, you should always use approved **flotation agent**, e.g. approved float belt

or approved life jacket. This applies when swimming in a lake or swimming pool or are on board a boat.

- **Always check the water depth before jumping** into the water.

CHILDREN:

- **Never leave a child alone by the water**. This applies whether it is the North Sea, a swimming pool, a rainwater pool or a lake.
- **Never leave a baby in a bathtub** or baby bathtub. A child may drown or be seriously injured in seconds; the time it takes to pick up the phone or to go out to the door.
- **Teach your child to swim**.
- **Teach your children never to swim alone** and never swim far away from the shoreline.
- Warn your children to **always check the water** depth before jumping in.
- **Keep your children away from the bathroom** unless accompanied by an adult. Install parental controls on the bathroom door if necessary.

DOS and DON'TS:

- **Always:** Always react fast so that you can give the best help.
- **Never:** Leave children alone by the water**.**
- **Always:** Start rescue breaths as soon as possible.
- **Never:** Try to rescue somebody if you put yourself in danger.
- **Always:** Prevent hypothermia.
- **Never:** Put yourself at risk by try rescuing others.

Case:

Link: https://www.youtube.com/watch?v=mnfhnyY-Udk

Here, a paramedic explains and shows how to perform CPR on a drowned person.
Have a chat about the importance of self-safety when rescuing someone lying in the water.

It is also important to talk about the benefits of swimming out to the injured person with a lifebuoy, surfboard, buoy or like.

Link: https://www.youtube.com/watch?v=_8tZT2Jx8H0

The film shows a rescue operation on Bondi Beach in which a man is rescued by the beach's lifeguard. The man is without signs of life as he emerges from the water, lifeguards revive him through CPR and an defibrillator.

Have a chat about the importance of getting the victim completely out of the water before starting CPR and especially if using an defibrillator.

Link: https://www.youtube.com/watch?v=OWvi_Y7UJJI

This film shows a situation where a young man is trapped in a strong current and large wave near the shore. Two men jump into the water and rescue the young man.

Have a chat about the risks of jumping into the water somewhere like this. What could the danger be? Also have a chat that it is not wrong not to jump in the water to protect yourself and call for help.

Links:

ERC Guidelines (cprguidelines.eu)
Accidental drowning in the EU: how countries compare - Products Eurostat News - Eurostat (europa.eu)

RESUSCITATION OF THE VICTIM OF A TRAFFIC ACCIDENT

Life of an accident victim can be saved by administering timely medical aid. The 'GOLDEN HOUR', the first hour after the trauma is called the 'golden hour' Instant and proper first aid given to road accident victims during this hour increases the chance of survival manifold and reduce the severity of injuries. Many deaths and impact of injuries can be prevented with First Aid if causalities are treated immediately.

First aid is the initial care given to an injured person. This timely care prior to the arrival of the medical help means the difference between life and death. As it is not always possible that proper medical care reaches the victim within an hour. In that case the passerby, onlookers and other people involved can provide the first aid to serious victims. However, improper handling to victims sometime worsens the situation. Though providing proper first aid to an accident victim is not so complicated but one should be aware of the procedures and precautions.
One of the misconceptions about road accidents death is that most of them happen due to sever injury and loss of blood. But reality is that most common cause of death in road accidents due to loss of oxygen supply. Most of the times it happens because airway gets blocked due to great impact and shock to body. Normally it takes less than four minutes for a blocked airway to cause death.

Resuscitation is the process of correcting physiological disorders (such as lack of breathing or heartbeat) in an acutely ill patient. It is an important part of intensive care medicine, trauma surgery and emergency medicine. Well known examples are cardiopulmonary resuscitation and mouth-to-mouth resuscitation.

CPR (Cardio Pulmonary Resuscitation) is a life-saving emergency response technique. Performing CPR pumps oxygen-rich blood into the heart and brain. It can prevent brain damage and may save a life.

First aid for road accident victims

Arriving at the accident scene

The first thing you need to know when you come across a road accident is whether the scene is safe to enter and accessible before attempting to render first aid. This is to ensure your safety first before helping the casualties.

Check for injuries

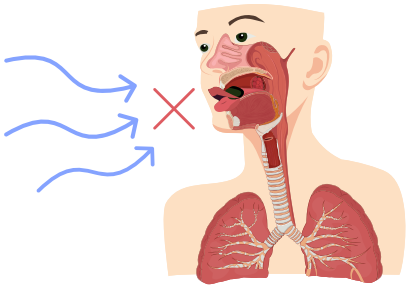
If you have been injured in the accident, check yourself first of any injuries or bleeding. If others are injured, assess the extent of their injuries. Look for any bleeding in the head, neck, arms, legs, abdomen, and other parts of the body.

Call ambulance services

Immediately call for an emergency ambulance or emergency medical services to inform them about the incident. Ask their advice to resuscitate and rush the victims to the nearest medical facility.

Check for obstructions in mouth or throat

If the victim has stopped breathing, check his mouth for any obstruction. Use your index and middle finger to remove the obstruction and to clear the airway.



Perform life-saving techniques

If there is no pulse and the victim is unresponsive and not breathing, perform CPR immediately. Place the victim's body in the recovery position, keep the neck straight, then proceed with CPR.

Treat bleeding wounds

Bleeding can be stopped by applying continuous pressure to the open wound using a clean cloth or soft pad. Press down with your palms and treat the fracture.

Dealing with spinal injuries (always suspect spinal injuries)

Neck and spinal injuries are expected in a road accident. If the victim is unconscious or the neck is not normally placed, it's best to not move the victim unless they are in immediate danger. Rough handling or moving the victim with suspected neck and spinal injuries can cause more harm.

Keep the victim warm

Victims feel excessive cold after the accident due to shock. Therefore, keeping them warm is crucial for their survival. Use a jacket, a pullover, or whatever available in the scene.

Moving a victim in an emergency is necessary if:

- the vehicle is smoking or on fire;
- the victim is in a dangerous post, such as in the middle of the road, or in danger of suffocation, for example by drowning;
- the patient is not breathing or is breathing abnormally. Move the victim onto a hard surface and perform CPR.
- The victim can be moved by dragging them by their clothes on the ground. If the victim is unconscious (but breathing), turn them into the recovery position. If the victim is unresponsive (not breathing), start CPR.

Helping Accident Victims

Priorities of treating an accident victim:

- Asphyxia (loss of oxygen).
- Cardiac Arrest.
- Severe Hemorrhage (Bleeding).
- Other Injuries/Illnesses.

Immediate requirement

Critical four minutes – One of the most common causes of a d accident death is due to loss of oxygen supply. This is mostly caused by a blocked airway.

Remember:

- Make the scene safe.
- Look for the injured.
- Assist them.
- Call help & look for the unconscious victims.

Follow the rule of ABC:

- Airway – clear the airway i.e., breathing track.
- Breathing – help restore it by mouth to mouth resuscitation.
- Circulation – stop any bleeding.

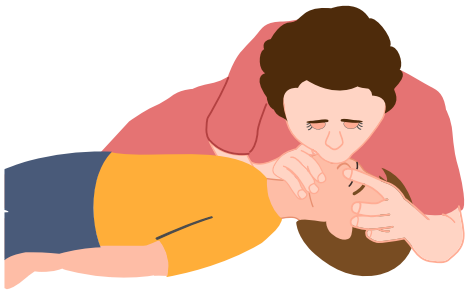
Clearing Airway:

- Put the victim on ground very gently and cautiously without vigorous handling to prevent further injury.
- Turn the victim to one side.
- Loosen clothing at neck, chest and waist.

- Tilt the head back, point the face slightly down so the tongue can fall forward allowing blood and vomit to drain out.
- Remove dirt, blood, vomit or loose teeth from mouth.

Restoring breath – mouth to mouth resuscitation. If the victim is still not breathing, give him artificial breathing.

- Turn the victim onto the back and start mouth-to-mouth resuscitation immediately.
- Tilt head back, support jaw, keep your fingers clear of throat.
- With good mouth to mouth seal and your cheek sealing the victim's nose, blow into the mouth until the chest rises.
- Lift your mouth, turn your head to see chest fall and listen and feel for air escaping from nose and mouth.
- If chest does not rise, check; For blocked airway.
- Mouth to mouth seal.
- Continue mouth-to-mouth resuscitation until breathing is restored. Blow every four seconds with adults and every three seconds with children.



Circulation – stop any bleeding

- Uncover bleeding wound. Stop bleeding by direct pressure on the wound with thick pad of bandage or cloth.
- Bleeding limbs should be elevated to prevent bleeding.
- Do not remove foreign objects from bleeding wound.
- Apply pads and bandage them around the wound. Do the same if broken bones are visible.

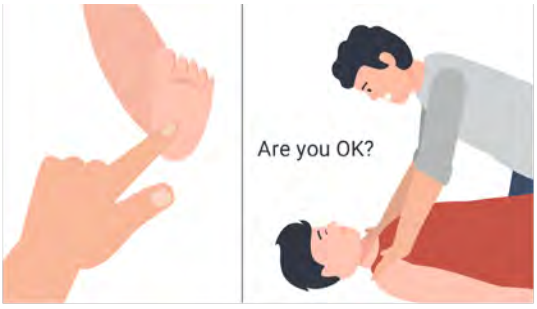
Cardiopulmonary resuscitation (CPR)

Cardiopulmonary resuscitation (CPR) is a lifesaving technique. It aims to keep blood and oxygen flowing through the body when a person's heart and breathing have stopped. CPR can be performed by any trained person. It involves external chest compressions and rescue breathing. CPR performed within the first six minutes of the heart stopping can keep someone alive until medical help arrives. Although rescue breathing techniques were used to revive drowning victims as early as the 18th century, it wasn't until 1960 that external cardiac massage was proven to be an effective revival technique.

Performing hands-only CPR

People without CPR training can perform hands-only CPR by following the steps below.

1. **Survey the scene.** Make sure it's safe for you to reach the person in need of help.
2. **Check the person for responsiveness.** Shake

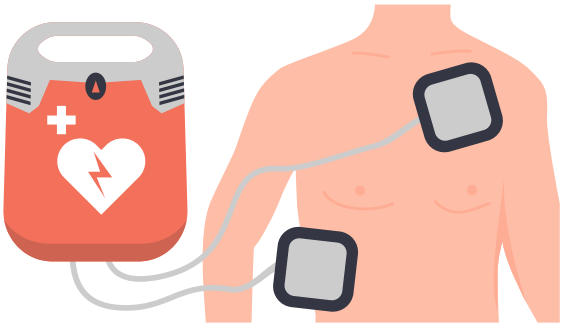


their shoulder and ask loudly *Are you O*K?". For an infant, tap the bottom of the foot and check for a reaction.

3. **If the person isn't responsive, seek immediate help.** Call 112 or your local emergency services if the person isn't responsive. You can also ask someone else to call. If you're alone and believe the person is a victim of drowning, or if the unresponsive person is a child from age 1 to 8, begin CPR first, perform it for two minutes, then call emergency services.

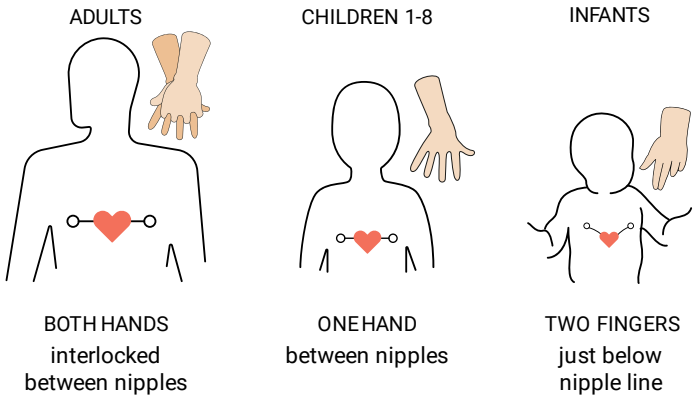
4. **Check the heart with an automated external defibrillator (AED).** If an AED is readily available, use it to check the person's heart rhythm. The machine may also instruct you to deliver one electric shock to their heart before beginning chest compressions.

   If the person is a child from age 1 to 8, perform CPR first for two minutes before checking their heart with an AED. Use the device's pediatric pads if they're available. The use of an AED in infants under 1 years old isn't conclusive or strongly recommended. If an AED isn't immediately available, don't waste time looking for the device. **Start chest compressions immediately.**



5. **Locate hand position.** If the person is **an adult**, place the heel of one of your hands in the center of their chest, between the nipples. Put your other hand on top of the first. Interlock your fingers so they're drawn up and the heel of your hand remains on their chest.

   For children from age 1 to 8, use just one of your hands in the center of their chest. **For infants**, place two fingers in the center of their chest, slightly below the nipple line.



30 compressions at 100-120 compressions per minute allow chest to recoil between compressions. Immediately follow with rescue breaths.

Begin compressions

To start compressions on **an adult**, use your upper body to push straight down on their **chest at least 5 centimeters**. Perform these at a rate of **100 to 120 compressions per minute**. Allow their chest to recoil between compressions.

For **children from ages 1 to 8**, push straight down on their chest about **5 centimeters at a rate of 100 to 120 compressions per minute**. Allow their chest to recoil between compressions.

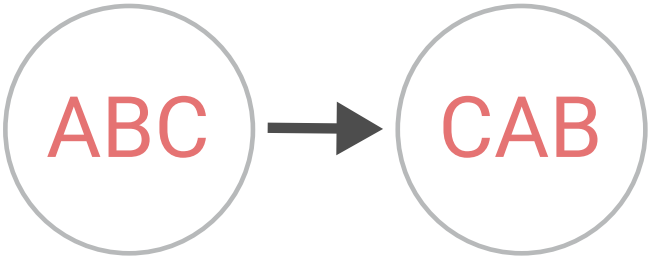
For an infant, push straight down on their **chest 3,5 centimeters at a rate of 100 to 120 compressions per minute**. Once again, let the chest recoil between compressions.

Continue compressions

Repeat the compression cycle until the person starts to breathe or medical help arrives. If the person begins to breathe, have them lie on their side quietly until medical assistance is on the scene.

Performing mouth-to-mouth resuscitation

When the AHA revised its CPR guidelines in 2010, it announced that chest compressions should be performed first before opening the person's airway. The old model was ABC (Airway, Breathing, Compressions). This was replaced by CAB (Compressions, Airway, Breathing).



A - airway; B - breathing; C - compressions

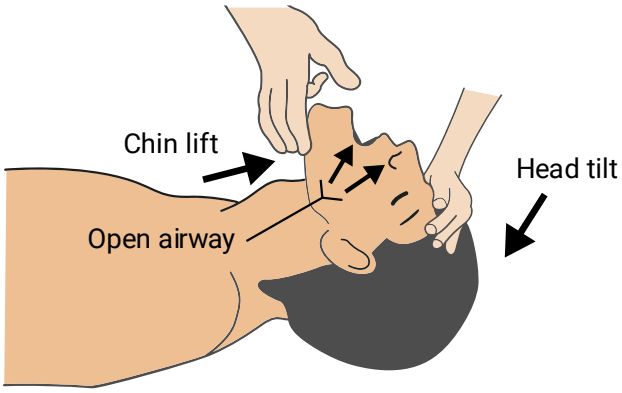
In the first few minutes of cardiac arrest, there's still oxygen in the person's lungs and bloodstream. Starting chest compressions first on someone who's unresponsive or not breathing normally can help send this critical oxygen to the brain and heart without any delay.

If you're trained in CPR and come across someone who's unresponsive or having difficulty breathing, follow the steps for hands-only CPR for 30 chest compressions.

Then perform the following actions:

1. **Open the airway**

Put the palm of your hand on the person's forehead and tilt their head back. Gently lift their chin forward with your other hand.
For infants and children from age 1 to 8, a head tilt alone will often open their airway.



2. **Give rescue breaths**

Rescue breaths are appropriate for anyone age 1 and older. With the airway open, pinch the nostrils shut, and cover the person's mouth with a CPR face mask to make a seal. For infants, cover both mouth and nose with the mask.
If a mask isn't available, cover the person's mouth with yours. Give two rescue breaths, each lasting about 1 second. Watch for their chest to rise with each breath.
If it doesn't, reposition the face mask and try again.

3. **Alternate rescue breathing with chest compressions**

Continue alternating 30 compressions with two rescue breaths until the person begins to breathe or until medical help arrives.

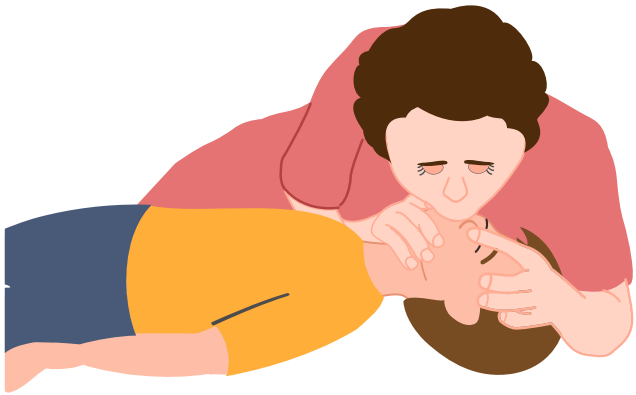
If the person begins to breathe, have him or her lie on their side quietly until medical assistance is on the scene.

CPR on children

You should carry out CPR with rescue breaths on a child. It's more likely children will have a problem with their airways and breathing than a problem with their heart.

Children over 1 year:

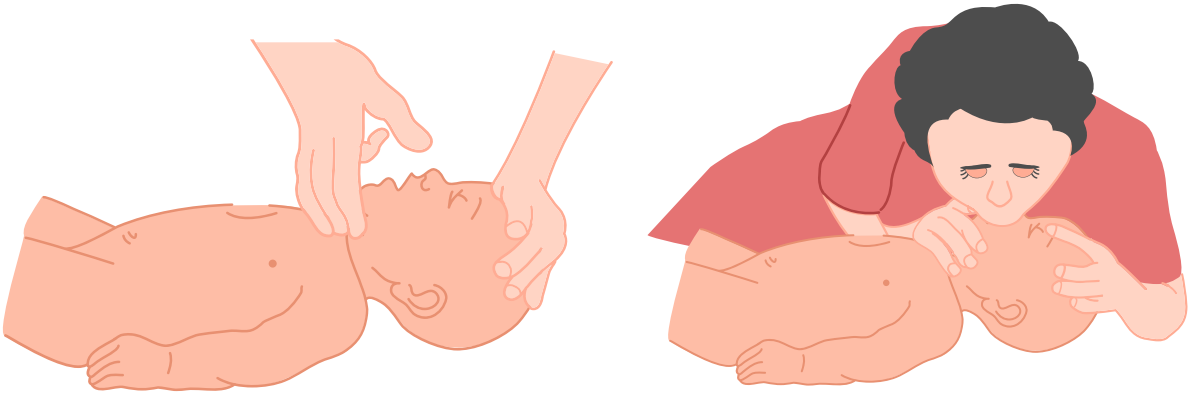
- Open the child's airway by placing 1 hand on their forehead and gently tilting their head back and lifting the chin. Remove any visible obstructions from the mouth and nose.
- Pinch their nose. Seal your mouth over their mouth, and blow steadily and firmly into their mouth, checking that their chest rises. Give 5 initial rescue breaths.
- Place the heel of 1 hand on the centre of their chest and push down by 5cm, which is approximately one-third of the chest diameter. The quality (depth) of chest compressions is very important. Use 2 hands if you can't achieve a depth of 5cm using 1 hand.
- After every 30 chest compressions at a rate of 100 to 120 a minute, give 2 breaths.
- Continue with cycles of 30 chest compressions and 2 rescue breaths until they begin to recover or emergency help arrives.



Infants under 1 year:

- Open the infant's airway by placing 1 hand on their forehead and gently tilting the head back and lifting the chin. Remove any visible obstructions from the mouth and nose.
- Place your mouth over the mouth and nose of the infant and blow steadily and firmly into their mouth, checking that their chest rises. Give 5 initial rescue breaths.

- Place 2 fingers in the middle of the chest and push down by 4cm (about 1.5 inches), which is approximately one-third of the chest diameter. The quality (depth) of chest compressions is very important. Use the heel of 1 hand if you can't achieve a depth of 4cm using the tips of 2 fingers.
- After 30 chest compressions at a rate of 100 to 120 a minute, give 2 rescue breaths.
- Continue with cycles of 30 chest compressions and 2 rescue breaths until they begin to recover or emergency help arrives.



Shock

In the case of a serious injury or illness, it's important to look out for signs of shock. Shock is a life-threatening condition that occurs when the circulatory system fails to provide enough oxygenated blood to the body and, as a result, deprives the vital organs of oxygen. This is usually the result of severe blood loss, but it can also occur after severe burns, severe vomiting, a heart attack, a bacterial infection, or a severe allergic reaction (anaphylaxis).

The type of shock described here isn't the same as the emotional response of feeling shocked, which can also occur after an accident.

Signs of shock include:

- pale, cold, clammy skin;
- sweating;
- rapid, shallow breathing;

- weakness and dizziness;
- feeling sick and possibly vomiting;
- thirst;
- yawning;
- sighing.

Seek medical help immediately if you notice that someone has any of the above signs of shock.

If they do, you should:

- call 112 as soon as possible and ask for an ambulance;
- treat any obvious injuries;
- lie the person down if their injuries allow you to and, if possible, raise and support their legs;
- use a coat or blanket to keep them warm;
- do not give them anything to eat or drink;
- give them lots of comfort and reassurance;
- monitor the person – if they stop breathing, start CPR and call 112.

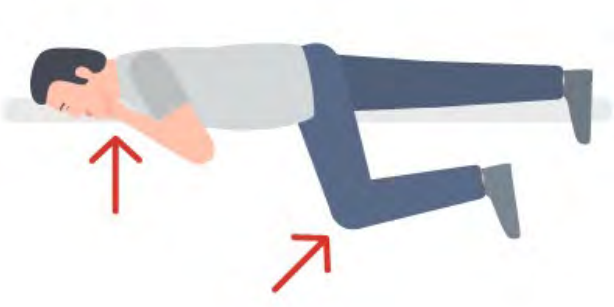
Recovery position

If a person is unconscious but is breathing and has no other life-threatening conditions, they should be placed in the recovery position. Putting someone in the recovery position will keep their airway clear and open. It also ensures that any vomit or fluid won't cause them to choke.

This video provides a step-by-step guide on how to put someone into the recovery position:
https://www.youtube.com/watch?v=TRQePNmR66w

Follow these steps:

- With the person lying on their back, kneel on the floor at their side.
- Extend the arm nearest you at a right angle to their body with their palm facing up.
- Take their other arm and fold it so the back of their hand rests on the cheek closest to you, and hold it in place.
- Use your free hand to bend the person's knee farthest from you to a right angle.
- Carefully roll the person onto their side by pulling on the bent knee.
- Their bent arm should be supporting the head, and their extended arm will stop you rolling them too far.
- Make sure their bent leg is at a right angle.
- Open their airway by gently tilting their head back and lifting their chin, and check that nothing is blocking their airway.
- Stay with the person and monitor their condition until help arrives.



Overview – First aid

In October, 2015 the American Heart Association issued new guidelines for the performance of CPR. The major change compared to the prior guidelines is to start with chest compressions rather than ventilations. **Thus the new sequence is**:

- Check for unresponsiveness and lack of breathing or abnormal breathing.
- Activate emergency response (call 112).
- Perform 30 chest compressions - push hard and push fast in the center of the chest at a rate of 100-200 per minute and a depth of 5 centimeters.
- If you are trained give 2 ventilation and then alternate 30 compressions with 2 ventilations.
- If you are not trained in ventilations continue with chest compressions.

What to do:

1. **If someone is injured, you should:**

- First check that you and the casualty aren't in any danger, and, if possible, make the situation safe.
- If necessary, dial 112 for an ambulance when it's safe to do so.
- Carry out basic first aid.

2. **If someone is unconscious and breathing:**

- If someone is unconscious but breathing, and has no other injuries that would stop them being moved, place them in the recovery position until help arrives.
- Keep them under observation to ensure they continue to breathe normally.
- If someone is unconscious and not breathing
- If someone is not breathing normally, call 112 and start CPR straight away.

Story

Quick-thinking secondary school girl saves traffic accident victim with CPR. What began as a usual bus ride home for a student ended with her saving a woman’s life.

Diniy Qurratuaini, a National Civil Defence Cadet Corps (NCDCC) cadet from Temasek Secondary School, was on her way home when the bus she was on collided into a pedestrian, knocking her unconscious. Without hesitation, Diniy instructed a fellow passenger to call 995 before she rushed down to attend to the collapsed woman.

After assessing that the woman was not breathing and had no pulse, Diniy immediately performed CPR on her. After a few cycles of CPR, the woman regained consciousness. Diniy stayed by her side until SCDF emergency responders arrived to render further medical assistance. Diniy's quick-thinking and selfless act showed that age is no barrier to saving lives. "I continued my journey home and told my parents about the incident. Only then did I realise the magnitude of the situation. I'm glad I was there to render help and I am thankful to NCDCC for teaching me skills I can use in such life-threatening emergencies" – Diniy Qurratuaini.

Links

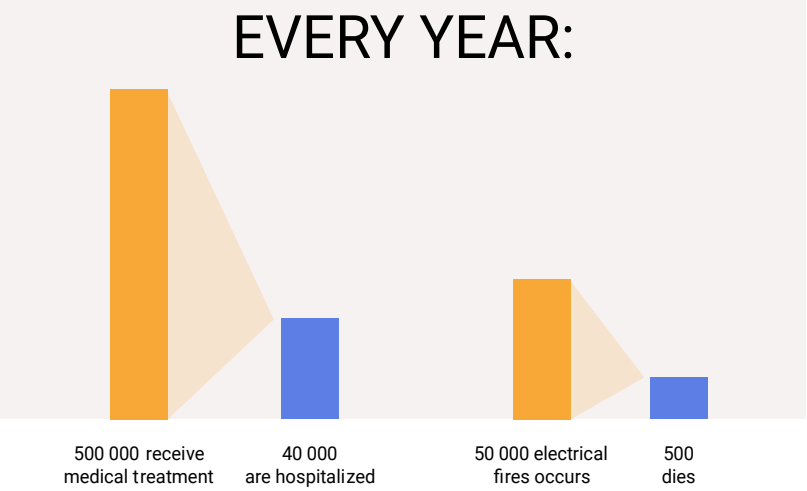
Story:
https://www.straitstimes.com/singapore/quick-thinking-secondary-school-girl-saves-traffic-accident-victim-with-cpr

ELECTRICAL EQUIPMENT

Electrical equipment means any apparatus, appliance, cable, conductor, fitting, insulator, material, meter or wire that is used for controlling, generating, supplying, transforming or transmitting electricity.

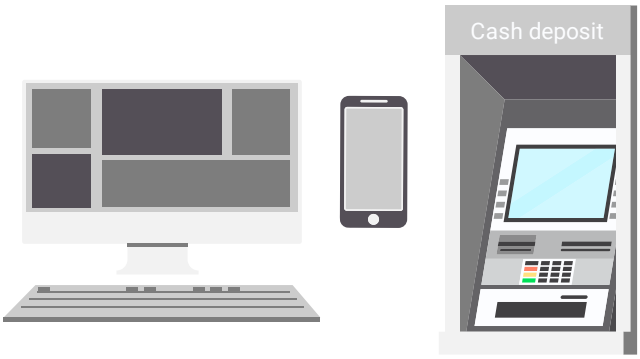
Facts

Electrical fires are common in both commercial and residential settings. According to data from Electrical Safety Foundation International, more than 50,000 home electrical fires occur annually with nearly 500 deaths and over 1,400 injuries. The property damage for residential is over $1 billion. On the commercial side, according to the U.S. Fire Administration 8,200 fires occurred from electrical malfunction, totaling $431 million in losses in 2017. With electrical fires becoming increasingly common, residences and commercial businesses need to take action.



What are electronic equipment examples?

Electronic Equipment means any electronic equipment including an electronic terminal (for example, a merchant terminal or ATM), computer, cash deposit machine, television, fax machine, telephone and mobile telephone.



How can you relate fire safety to electrical safety?

Excessive or uncontrolled heat can start fires. To help prevent electrical fires, know how to use and store plugs and electrical cords and take these precautions: Don't run cords under carpeting, bedding, or other combustible materials; also avoid placing cords across doorways or frequently traveled areas.

Electrical fire

A failure or malfunction within the electrical components of equipment or machinery can cause electrical fires. Electrical fires originate in electric wires, cables, circuit breakers, and within electrical components. Fires start in electrical panels from overloaded circuits or age of the panel. The panel and circuits become overloaded when the distribution of electricity is inadequate. Occasionally, lighting equipment acts as a source of heat that is too close to easily combustible materials.

What is an electrical accident?

By definition, an electrical accident is an undesired, unexpected event that has been caused by an electrical current and has resulted in either injury to property damage. This is different from an electrical incident, which relates to an event that may have lead to injury or damage, but did not.

If you or a loved one has suffered a burn injury, you are not alone. Each year, approximately 500,000 people receive medical treatment for these injuries, and 40,000 of those victims are hospitalized. The

following burn injury statistics provide a glimpse into the causes and outcomes of fires as well as exposure to chemicals, electricity, and radiation.

Types of electrical accidents

There are three main types of electrical accidents that you may encounter at home or even in the workplace. Each of these can vary from mild to severe depending on the strength of the electrical current and factors such as water enhancing the danger.

The three main types of electrical accidents are:

- **Electrical shock**

  Damaged or frayed cords or extension leads. Electrical appliances coming in contact with water. Incorrect or deteriorated household wiring. Downed powerlines.

- **Electrical burn**

  Electrical burns and injuries happen when electric currents pass through the body. The currents can damage the skin, tissues, and major organs. The damage can range from minor to severe. Sometimes it is fatal.

- **Electrical fires**

  A failure or malfunction within the electrical components of equipment or machinery can cause electrical fires. Electrical fires originate in electric wires, cables, circuit breakers, and within electrical components.

What are the 6 types of electrical incidents?

That being said, there are six main types of electrical burns: **arc burns, low voltage burns, high voltage burns, oral burns, flash burns,** and **flame burns.**

An example of electrical safety?

General electrical safety tips include:

- Treating all electrical wires as if they are live.
- Inspecting electrical cords and plugs for damaged insulation and broken ground pins before use.
- Reporting all exposed electrical parts, including wires, terminals, and missing circuit breakers, immediately

Here are the 7 most common causes of electrical fires in the home:

- Faulty electrical outlets and aging appliances.
- Using ungrounded plugs.
- Overloading light fixtures.
- Placing flammable material near light fixtures.
- Extension cord misuse.
- Old wiring.
- Space heaters.

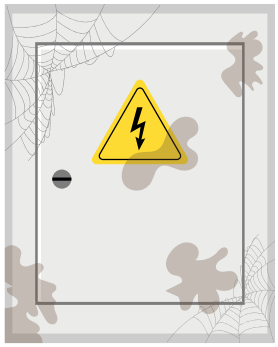
How do electrical fires start?

Common causes of electrical fires

In 2018, our global consumption of energy was 62 billion kWh per day. We rely heavily on electricity to power our businesses, homes, and, for a growing number, our cars. Don't assume your electrical systems are functioning properly because they work on a day-to-day basis with no issues. Electrical

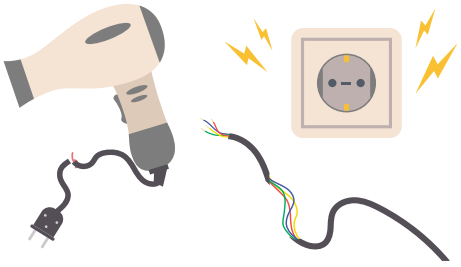
systems pose an ongoing fire risk. Understanding common causes of electrical fires and following preventive measures to maintain your electrical systems will mitigate your chance of a fire.

Poor maintenance



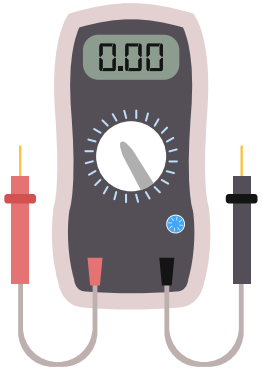
Poor maintenance is the leading cause of electrical fires. Performing regular maintenance on electrical panels will reduce the risk of fire. Maintenance includes removing dirt and dust and inspecting and replacing faulty circuit breakers. Kinks in wiring cause electrical resistance within the wire, which creates heat and could cause an electrical fire. Arcing can lead to a fire and occurs in electrical panels and enclosures, frayed wires and extension cords, and even in damaged phone chargers.

Old equipment and appliances



Aging equipment and appliances cause a staggering number of electrical fires. According to the U.S. Fire Administration, 19% of non-residential building fires and 13% of residential fires are due to equipment, appliance, or electrical malfunctions. Replacing outdated and faulty circuits within electrical panels, equipment and appliances reduce your fire risk.

Not keeping up with safety codes



With the demand for electricity on the rise, it is important to stay up-to-date with safety codes. Old wiring that does not support the current demand is common in old homes and older commercial spaces. Wiring with deteriorating coating or wires can easily arc and start a fire, especially if the wire does not match the circuit amperage. The higher the amperage rating of the circuit, the larger the wires need to be in order to avoid excess heat that can melt wires and cause fires. If an arc flash does occur, it can reach temperatures up to 1,000 degrees. The wire coating is only able to

withstand around 200 degrees. Making sure wiring matches the circuit amperage and is free of imperfections is an easy way to prevent electrical fires.

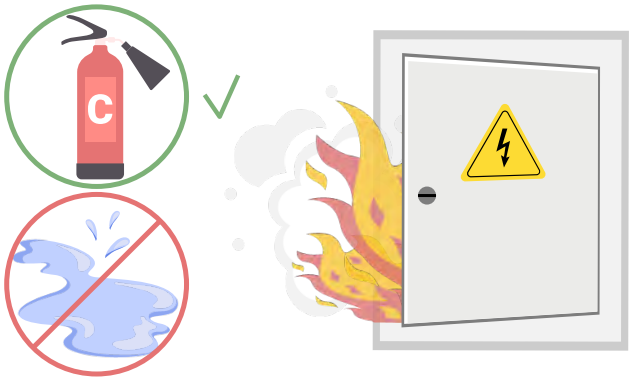
Electrical panels and circuit breakers

A circuit breaker protects an electrical circuit from damage by automatically shutting off power to the circuit. Breakers trip because of overloaded circuits, power surges or spikes, a short circuit, and ground fault. If the circuit breaker fails, it can damage appliances or equipment on the circuit or lead to a fire. Keeping your electrical panel and circuit breakers up-to-date reduces the failure rate. Some of the warning signs that you need to replace circuits is a burning smell in the electrical panel, the breakers trip frequently or will not stay reset, physical damage, and old age.

How to put out an electrical panel fire

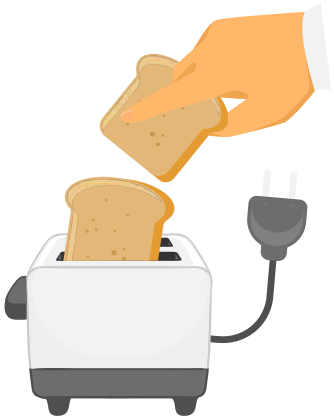
There are several classes of fires, and electrical fires fall under the Class C category. In the case of a fire occurring in an electrical panel, do not try putting it out with water. Trying to put out the fire with water will only worsen the situation and puts you and others in more danger. Water conducts electricity, and dumping water on or near a power source can give you a severe electrical shock. It might even make the fire worse.

Two options to put out an electrical panel fire is a handheld fire extinguisher or an automatic fire suppression system. If using a fire extinguisher, make sure it has a rating to extinguish Class C fires. The drawback of using a fire extinguisher is that a person must be present when the fire starts. A person will need to grab the fire extinguisher, open the electrical panel, and release the fire suppression agent from the extinguisher.

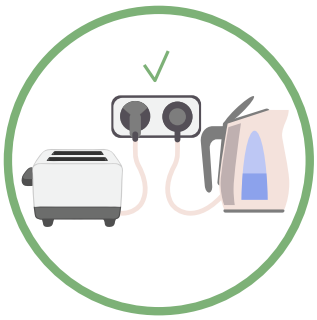


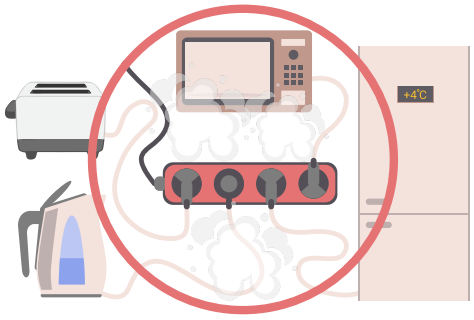
Top electrical safety tips for kids

- Unplug the toaster before trying to dislodge stuck toast.

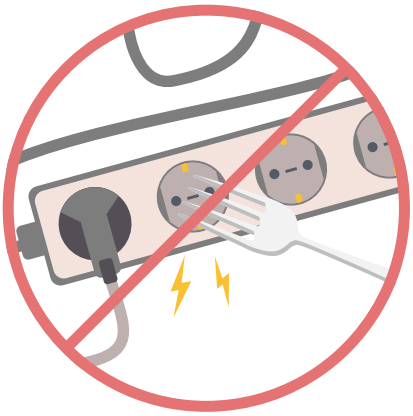


- Multi-outlets: get the right power bars.

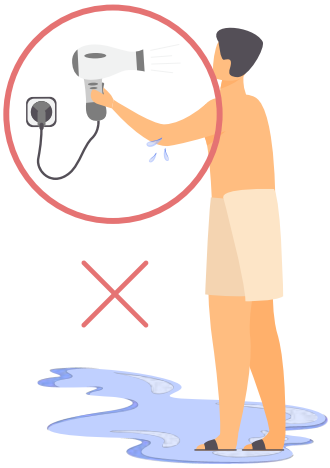




- Never put your fingers or anything into a plug socket.

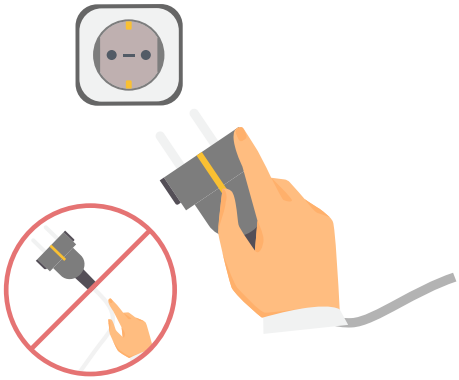


- Keep water away from electricals, such as hairdryers. In the bathroom, never use electrical devices if you are wet or the humidity level is high.

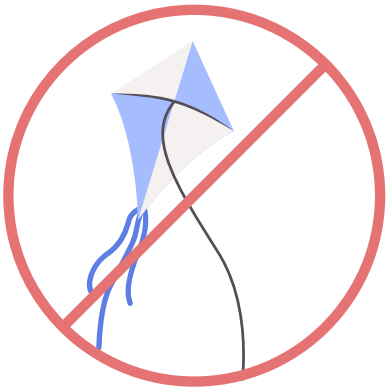


- Obey warning signs, never put yourself/others in danger.

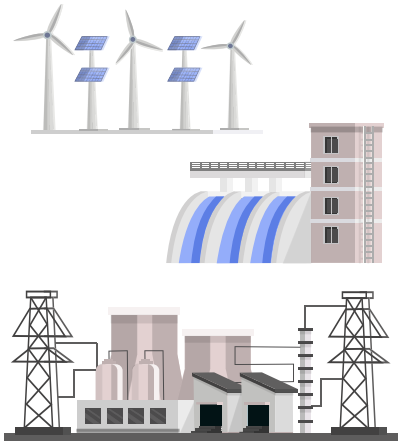
- When removing a plug, turn it off and don't pull on the cord.



- Never fly kites near power lines, always find open space.



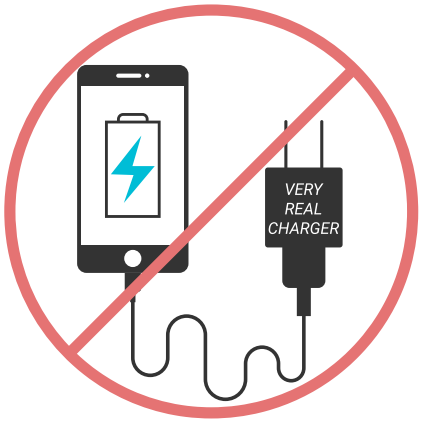
- Stay away from power stations no matter the situation.



- If you see a broken wire, don't touch it and tell a parent.

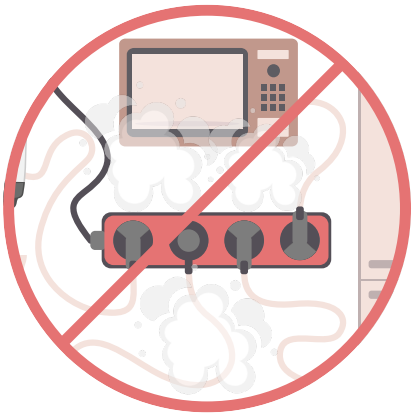
- Never leave devices plugged in and charging while you sleep.

- Do not buy or use a fake charger.

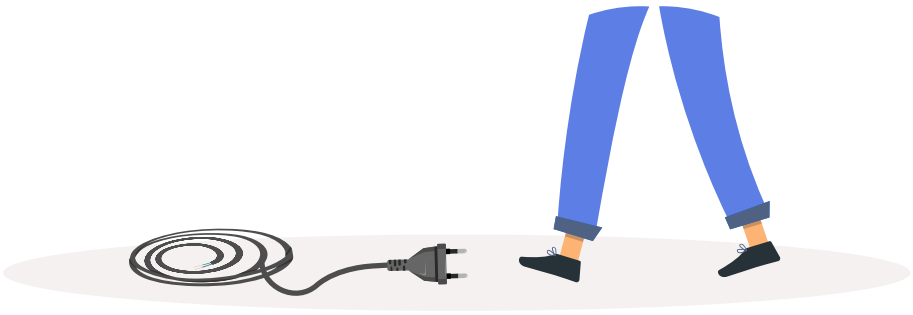


- Do not use electrical devices or extension cords near a pool.

- Don’t overload sockets or extension plugs/cables (you could start a fire!).



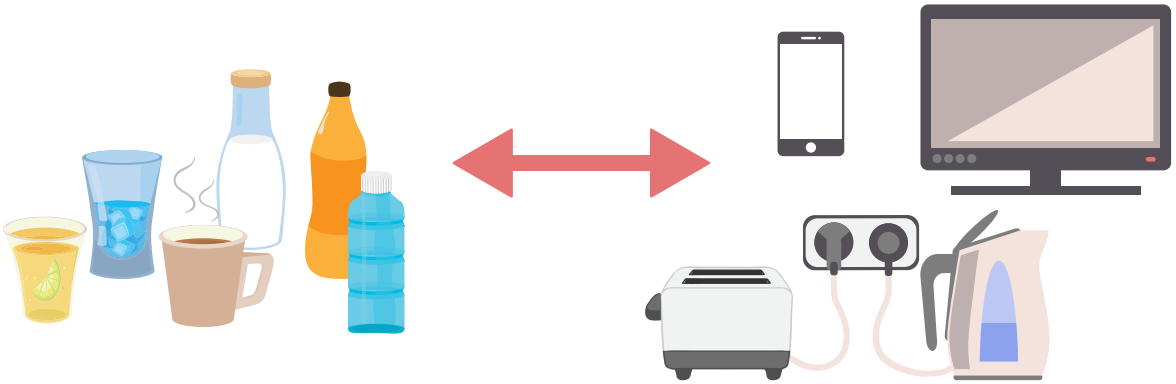
- Make sure there aren’t any cables where people walk.



- Turn off electrical objects by the switch and unplug.

- Make sure cables are not caught or knotted on furniture or chair legs.

- Keep water, juice, or any other types of liquid away from electronics.



Electrical safety stories

Arc flash accident at Air Force base

June 9, 2017

Two people were injured in an industrial accident at Offutt Airforce Base near Bellevue, Nebraska. The injured were working on an electrical circuit around 2:30 p.m. when the accident occurred.

Mich. contractor killed in electrical accident

July 21, 2017

A contractor for a Michigan utility company died Wednesday after being electrocuted during what was apparently a routine pole change procedure.
People love stories of near-fatal accidents. And back in the 1920s - when home electricity was really starting to become mainstream – there were more than enough death defying electric shock stories to go around.

"What 4,000 Volts Feel Like"
C.R. Mullins of Watertown, South Dakota - won $20 (about $270 adjusted for inflation)

Having read various articles on subject of electrical shocks, generally written by those who never felt the sensation, and having had the pleasure of getting across a 4,000-volt 60-cycle line, my experience may prove of interest to both the experienced and the layman.

While running pot-head jumpers to an oil switch on the bottom of a switchboard, those I was working on were dead, but next to them was a live one. I had rubber gloves on and was putting the last jumper into place, when - zip! There was a snapping crackle of high voltage. I gripped the jumper tighter and became powerless to release my hand; the current flowed through me, growing more violent as my body tissue vibrated in unison with the 60 cycles.

While not afraid of death, I began to wonder if and how I would get loose, and the position I was sitting in caused my body to vibrate rapidly, creating a tickling sensation caused by a small coil of wire- solder hung on my overalls. I was seated on a box in front of the grounded switch- board frame, and finally the power of the current became so intense that I straightened out and fell backwards off the box to the floor. Half dazed I crawled into an adjoining room, where I managed to get upon my feet.

My left knee and right wrist pained and I discovered a black hole the size of a dime, burned about a quarter inch deep in each. I found out later that I had over-reached the limit of the rubber glove and had laid my bare forearm on the top of the pot-head, while my knee had been pressed against the

grounded switch frame. Four thousand volts had been connected across my body, leaving the two burned spots and badly shattered nerves as testimony of the power of the current.

The accident happened at noon when I was alone, and I found afterwards that I had no desire to eat. Later in the day I saw a doctor and then worked the rest of the afternoon near the disconnects. The next day my nerves were very jumpy. I seemed afraid to touch anything and was weak and listless.

I had previously experienced 440 volts, but I think the 4,000 volts is the lesser evil. The 440 volts seize and contract the muscles into knots, while 4,000 volts cause squirming and, on account of the high voltage, affect the muscles and tissue quite differently. In my opinion electrocution must be a most painful death and not so speedy a one as is imagined.

The racist street car conductor shocks a passenger

"A Protective Shock"

D.S. Yount of Greenville, Ohio — won $10 (about $135 adjusted for inflation)

The following incident occurred about a year ago in the course of my duty as conductor for a street car company.

One evening four negroes, two women and two men, all drunk, entered the car. They took seats in the center of the car, and in a few minutes the largest man of the party said: "Well, I's a gwine to put the conductor off dis car!" He arose and came in my direction to do so.

But he was so stupefied that he had to grasp the railing on the side to keep from falling. There was also a railing in the center of the car at the back, grounded to the rails, and I had a premonition that he would catch hold of this rail also.

I had a wire about six feet in length and connected with the trolley pole; I reached up and pulled the wire down; by that time he had hold of both rails. So I put the wire on the rail on the side of the car. In an instant he turned a complete somersault and landed in the corner, where he remained for a few minutes. In a little while he got up, looked around and said: "Say, mistah, will youse tell me what done

put me in dat corner so quick?" Receiving no reply, he went back to his seat, and gave me no further trouble.

Dude takes a hacksaw to a mystery pipe, finds electricity

“Cutting a Live Conduit”

J. Federocka of New York City — won $2.50 (about $30 adjusted for inflation)

While working in an old establishment I came across a few carpenters putting in a new stairway. About an hour later I heard a scream from the floor above, and upon going up found that one of the carpenters had been cutting a pipe, not knowing what it contained, nor finding out whether he could cut it or not. So he had cut into a two-inch conduit with a hacksaw, which conduit contained a pair of large-sized feeders.
It is needless to say where that carpenter is now, but he promises not to cut any more pipes.

Video:

This video will help kids learn all about electricity in a simple and easy way:
https://www.youtube.com/watch?v=Uf76pThNXZc

Outdoor Safety / Safety Sadie. This video is provided by Safe Electricity (www.safeelectricity.org):
https://youtu.be/GuqAjXraj88

Links:

Meaning of electrical equipment:
https://staffhelp.secure.griffith.edu.au/app/answers/detail/a_id/4038/~/what-does-electrical-equipment-mean%3F

Causes of electrical fires in the home:
https://www.firerescue1.com/fire-products/firefightingtools/articles/5-common-causes-of-electrical-fires-olFt6TUMOsWg7re2/

Electrical safety tips:

https://www.mywcec.coop/kidscorner

Burn injury statistics:

https://www.impactlaw.com/personal-injury/catastrophic/burn/statistics

Top electrical safety stories of 2017:

https://www.ishn.com/articles/107767-top-electrical-safety-stories-of-2017

Stories:

https://gizmodo.com/the-4-most-amazing-electrocution-stories-according-to-a-1496651414

BLEEDING WOUND BANDAGING

Injuries and certain medical conditions can result in bleeding. This can trigger anxiety and fear, but bleeding has a healing purpose. Still, you need to understand how to treat common bleeding incidents such as cuts and bloody noses, as well as when to seek medical help.

Bleeding emergencies

Before you begin to treat an injury, you should identify its severity as best you can. There are some situations in which you shouldn't try to administer any kind of first aid at all. If you suspect that there's internal bleeding or if there's an embedded object surrounding the site of the injury, immediately call your local emergency services.

Cuts and wounds

When your skin is cut or scraped, you begin to bleed. This is because blood vessels in the area are damaged. Bleeding serves a useful purpose because it helps to clean out a wound. However, too much bleeding can cause your body to go into shock.

You can't always judge the seriousness of a cut or wound by the amount it bleeds. Some serious injuries bleed very little. On the other hand, cuts on the head, face, and mouth may bleed a lot because those areas contain a lot of blood vessels.

Abdominal and chest wounds can be quite serious because internal organs may be damaged, which can cause internal bleeding as well as shock. Abdominal and chest wounds are considered an emergency, and you should call for immediate medical help.

Also seek immediate medical care for a cut or wound if:

- It's jagged, deep, or a puncture wound.
- It's on the face.
- It's the result of an animal bite.
- There's dirt that won't come out after washing.
- The bleeding will not stop after 15 to 20 minutes of first aid.

If a person is bleeding profusely, be on the lookout for symptoms of shock. Cold, clammy skin, a weakened pulse, and loss of consciousness can all indicate that a person is about to go into shock from blood loss. Even in cases of moderate blood loss, the bleeding person may feel lightheaded or nauseous.

If possible, have the injured person lie down on the floor while you wait for medical care to arrive. If they are able, have them elevate their legs above their heart. This should help circulation to the vital organs while you wait for help. Hold continuous direct pressure on the wound until help arrives.

This is especially important if there are symptoms of shock, which may include:

- dizziness;
- weakness;
- pale and clammy skin;
- shortness of breath;
- increased heart rate.

A first aid kit that's properly stocked can make all the difference in stopping heavy bleeding. You should keep the following items around for situations where you may need to close a wound:

- sterilized medical gloves;
- sterile gauze dressings;
- small scissors;
- medical grade tape.

Saline wash can also be helpful to have on hand in order to clear out debris or dirt from a wound without touching it. An antiseptic spray, applied at the site of the cut, can help staunch blood flow and also reduce the risk of a cut becoming infected later on.

In the days following an injury, be on the lookout to ensure that a wound is healing correctly. If the initial scab covering the wound grows bigger or becomes surrounded by redness, there may be an infection. A cloudy fluid or pus draining from the wound is also a sign of possible infection. If the person develops a fever or begins to have pain again at the sign of the cut, seek medical attention immediately.

First aid DO'S:

- Help the person to remain calm. If the cut is large or bleeding heavily, have them lie down. If the wound is on an arm or leg, raise the limb above the heart to slow bleeding.
- Remove obvious debris from the wound, such as sticks or grass.
- If the cut is small, wash it out with soap and water.
- After putting on clean latex gloves, apply firm pressure to the wound with a folded cloth or bandage for about 10 minutes. If blood soaks through, add another cloth or bandage and continue putting pressure on the cut for an additional 10 minutes.
- When bleeding has stopped, tape a clean bandage over the cut.

First aid DON'TS:

- Don't remove an object if it's embedded in the body.
- Don't attempt to clean a large wound.
- When first applying the bandage, don't remove it to look at the wound during this time. It may begin bleeding again.

Bandaging injuries from head to toe

Scratches and cuts on the face

Your injury's location can affect how you bandage it. For most injuries, first you'll want to clean it with water to get rid of debris and help prevent infection. Then, stop bleeding by applying pressure with sterile gauze. Face injuries can bleed a lot. But once bleeding stops, minor face cuts can go uncovered. Or a small adhesive strip can work well. You may need stitches if the cut is jagged, deep, or longer than a half inch.

Don't pop blisters

Small, unbroken blisters can be left uncovered and will usually heal on their own. The exception – if a blister is in an area where it might get rubbed, such as on the sole of the foot. In that case, protect the blister with a soft dressing to cushion the area. For a broken blister that has drained, protect it from infection by covering it with a bandage.

Wrap sprains and strains

A sprain means a stretched or torn ligament, while a strain involves an injury of a muscle or tendon. The signs are pain and swelling. In addition to icing the injury, wrap it with an elastic compression bandage and keep it elevated when possible. In some cases of severe sprain or strain, surgery and/ or extensive physical therapy may be needed.

How to treat minor burns

Seek medical help for burns if they are severe; on the face, hands, feet, or genitals; or bigger than 5 centimeters. For treating small minor burns at home, rinse the area under running cool water. Never

use butter, grease, or powder on a burn. After rinsing, cover the burn with a thin layer of antibiotic ointment. Then bandage it. A nonstick dressing is best and you may need tape to hold the dressing in place.

Close open cuts

If the edges of a cut are separated but will go together, use a butterfly bandage to close the wound. This type of bandage should be placed across the cut, not along its length. If the wound is long, more than one bandage may be needed. Seek professional care for cuts that are gaping, longer than a half inch, or don't stop bleeding after 15 minutes of pressure.

Watch surgical wounds for infection

After surgery, you'll need to keep the incision site clean and dry. Change the dressing according to your doctor's instructions. Each time you remove the old dressing, check the wound for signs of infection, such as increasing redness around the wound, a yellow or green discharge, or an unusual odor.

How to cover scraped knees or elbows

Skinned knees or elbows can be awkward to cover. Larger-sized bandages or adhesive bandages with wings can hug joints and move with you. Another alternative: Use a liquid bandage. This will stop minor bleeding and protect the wound from dirt and water. Liquid bandage is shower-resistant and only needs to be applied once.

Bandaging knuckles, heels, and fingers

Fingers, heels, and knuckles move so covering them can be tricky. But you'll want to keep them covered to keep dirt out. Bandages that are hourglass shaped or notched so they are shaped like an "H" can prevent folds and bunching. Or they can wrap around a fingertip for full coverage.

Large scrapes: cover them up

Scrapes that cover a large area should be kept moist to help promote healing. Antibiotic ointment or moisture-enhancing bandages, also called occlusive bandages, can do the job. Some scrapes don't form a scab as they heal, but remain shiny and raw. If this occurs, wash the wound with clean water and apply a fresh bandage regularly. Watch for signs of infection.

Cuts on hands or feet: keep them clean

The hands and feet are exposed to more dirt than the face, so it's best to keep cuts covered. Bandaging can also prevent shoes and socks from irritating wounds on the feet. Adhesive strips can be used for small cuts, but be sure to change the bandage if it gets wet or dirty. Seek medical help for deep cuts or puncture wounds on the hands or feet.

When to see a doctor about an injury

Call your doctor for deep cuts, puncture wounds, or injuries that don't stop bleeding after several minutes of pressure. Adults should call a doctor about getting a tetanus shot if they haven't had one in the past 5 years. For children, check with your doctor. And always look out for infection. Seek medical care if a wound becomes red, painful or swollen, or if it continues to drain, especially if you have a fever.

A bit of blood is good

Blood helps clean wounds, so a little bleeding is good. Most small cuts and scrapes stop bleeding pretty quickly, but you can help by applying firm, gentle pressure with gauze or a tissue. If blood soaks through, put another piece of gauze or tissue on top, don't remove the old one or you may separate the wound and start the bleeding again.

First Aid: Bandaging

Covering a break in the skin helps to control bleeding and protect against infection. Dressings are pads of gauze or cloth that can be placed directly against the wound to absorb blood and other fluids. Cloth bandages cover dressings and hold them in place.

Step 1. Dress the wound:

- Put on gloves or use other protection to avoid contact with the victim's blood.
- Clean the wound with mild soap and water.
- Apply a small layer of topical antibiotic if desired.
- Place a clean dressing over the entire wound. Gauze dressings let in air for faster healing. Nonstick dressings have a special surface that won't cling to the wound.
- If blood soaks through the dressing, place another dressing over the first one.

Step 2. Cover the bandage:

- Wrap roller gauze or cloth strips over the dressing and around the wound several times.
- Extend the bandage at least an inch beyond both sides of the dressing.
- Don't wrap the bandage so tight that it interferes with blood flow to healthy tissue.

Step 3. Secure the bandage:

- Tie or tape the bandage in place.
- Don't secure the bandage so tight that fingers or toes become pale or blue.

Step 4. Check circulation:

- Check circulation in the area below the bandage after several minutes and again after several hours. If circulation is poor, the skin may look pale or blue or feel cold. Signs of poor circulation also include numbness and tingling.
- If circulation is reduced, loosen the bandage immediately. If symptoms continue, seek medical attention.

Types of wound care bandages and medical dressing to keep on hand include:

- Basic transparent adhesive bandages.
- Medicated bandages.
- Dry gauze dressings.
- Hydrogel dressings.
- Hydrofiber dressings.
- Foam dressings.
- Alginate dressings.

Types of bleeding

Arterial

With this type of bleeding, the blood is typically bright red to yellowish in colour, due to the high degree of oxygenation. A wound to a major artery could result in blood 'spurting' in time with the heartbeat, several meters and the blood volume will rapidly reduce.

Venous

This blood is flowing from a damaged vein. As a result, it is blackish in colour (due to the lack of oxygen it transports) and flows in a steady manner. Caution is still indicated: while the blood loss may not be arterial, it can still be quite substantial, and can occur with surprising speed without intervention.

Capillary

Bleeding from capillaries occurs in all wounds. Although the flow may appear fast at first, blood loss is usually slight and is easily controlled. Bleeding from a capillary could be described as a 'trickle' of blood.

The key first aid treatment for all of these types of bleeding is **direct pressure over the wound**.

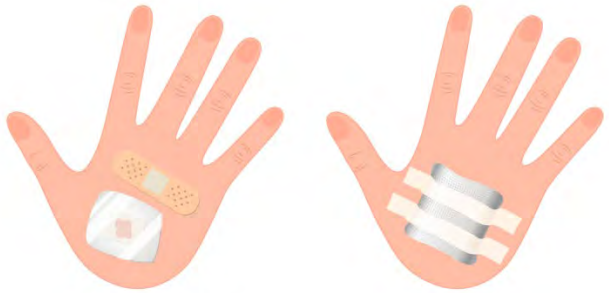
Dressing and bandage

The terms **dressing** and **bandage** are often used synonymously. In fact, the term **dressing** refers more correctly to the primary layer in contact with the wound. A bandage is a piece of material used either to covering wounds, to keep dressings in place, to applying pressure controlling bleeding, to support a medical device such as a splint, or on its own to provide support to the body. It can also be used to restrict a part of the body.

Dressings

Dressings are used to cover wounds, prevent contamination and control bleeding. In providing first aid we commonly used self-adhesive dressings or gauze dressings:

- **Adhesive dressings** are used mainly for small wounds. They come in many different sizes, including specific types for placement on fingertips.
- **Gauze dressings** are thick, cotton pads used to cover larger wounds. They are held in place with tape or by wrapping with a gauze strip (bandage).



Dressings must be sterile and absorbent to deter the growth of bacteria, and should be left in place until the wound heals, unless it needs to be regularly cleaned.

Bandage

The three major types of bandages are:

- Roller bandages.
- Tubular bandages.
- Triangular bandages.

They are necessary for:

- Covering wounds.
- Applying pressure controlling bleeding.
- Supporting a strain or sprain.

Roller bandages are long strips of material. Basically there are two types of roller bandages:

- **An elastic roller bandage** is used to apply support to a strain or sprain and is wrapped around the joint or limb many times. It should be applied firmly, but not tightly enough to reduce circulation.
- **Cotton or linen roller bandages** are used to cover gauze dressings. They come in many different widths and are held in place with tape, clips or pins.

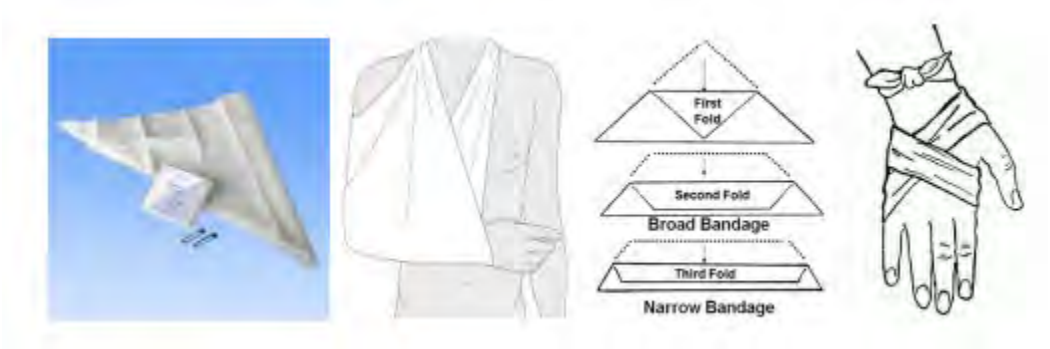
They can also be used for wound compression if necessary, as they are typically sterile.

Tubular bandages are used on fingers and toes because those areas are difficult to bandage with gauze. They can also be used to keep dressings in place on parts of the body with lots of movement, such as the elbow or knee.

Triangular bandages are made of cotton or disposable paper. They have a variety of uses:

- When opened up, they make slings to support, elevate or immobilize upper limbs. This may be necessary with a broken bone or a strain, or to protect a limb after an operation.
- Folded narrowly, a triangular bandage becomes a cold compress that can help reduce swelling.

They are used also for applying pressure to a wound to control bleeding.



How to apply bandages to specific parts of the body

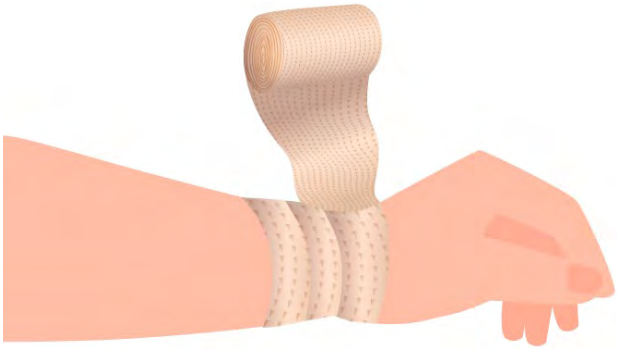
Basic bandaging forms

Each bandaging technique consists of various basic forms of bandaging.

The following five basic forms of bandaging can be used to apply most types of bandages:

- Circular bandaging.
- Spiral bandaging.
- Figure-of-eight bandaging.
- Recurrent bandaging.
- Reverse spiral bandage.

CIRCULAR BANDAGING is used to hold dressings on body parts such as arms, legs, chest or abdomen or for starting others bandaging techiques. For circular bandage we used strips of cloth or gauze roller bandage or triangular bandage folded down to form strip of bandage (cravat).



In the circular bandaging technique the layers of bandage are applied over the top of each other:

- With the roll on the inner aspect, unroll the bandage either toward you or laterally, holding the loose end until it is secured by the first circle of the bandage.
- Two or three turns may be needed to cover an area adequately. Hold the bandage in place with tape or a clip. Almost all bandaging techniques start and end with a few circular bandaging turns.

Injuries that result in bleeding can happen in many ways and you might have heard them referred to in many different ways and how to best treat them.

SPIRAL BANDAGES are usually used for cylindrical parts of the body. An elasticated bandage can also be used to apply spiral bandaging to a tapered body part. Despite the increasing diameter of the body part, the elasticity will allow the bandage to fit closely to the skin. With each spiral turn, part of the preceding turn is covered generally by 1/3 of the width of the bandage.

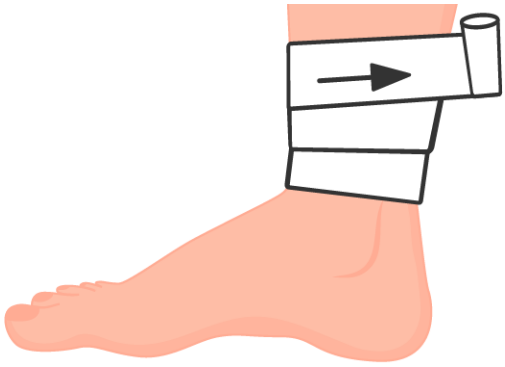
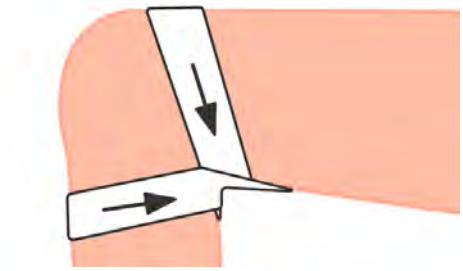


FIGURE-OF-EIGHT BANDAGE involves two turns, with the strips of bandage crossing each other at the side where the joint flexes or extends. It is usually used to bind a flexing joint or body part below and above the joint.



The figure-of-eight bandage can be applied using a roller bandage in two ways:

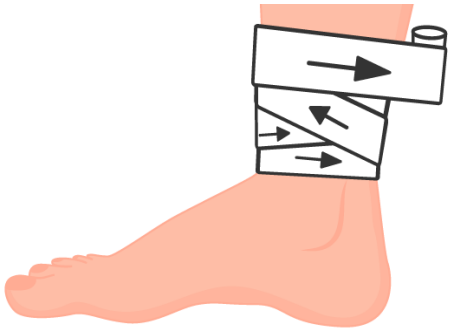
- Following a circular turn around the middle of the joint, the bandage should fan out upwards and downwards. The turns should cross at the side where the limb flexes.
- The figure-of-eight turns can also be applied from a starting point located below or above the joint crease, working towards the joint itself. The cross-over points will be located at either the flexing or extending side of the joint; the side where the turns do not cross remains uncovered.

RECURRENT BANDAGING is used for blunt body parts consists partly of recurrent turns. The bandage is applied repeatedly from one side across the top to the other side of the blunt body part. To be able to fix the recurrent turns well, not only the wound, but the entire length of the blunt body part should be covered.

Depending on the width of the bandage and the body part, successive turns either cover the preceding turn fully or partially.

Recurrent bandages are fixed using circular or spiral turns.

REVERSE SPIRAL BANDAGE is a spiral bandage where the bandage is folded back on itself by 180° after each turn.



This V-shaped fold allows the bandage to fit to the tapered shape of the body part all the way along. This type of bandaging is required when using non-elasticated bandages.
The development of elasticated fixing bandages, which are applied to tapered body parts using the spiral technique, means that the reverse spiral technique is far less commonly used nowadays.

THE DONUT BANDAGE is used to put pressure around an impaled object without putting pressure on the object itself.

Select the appropriate width of bandage

The width of the bandage to use is determined by the size of the part to be covered. guide, the following widths are recommended:

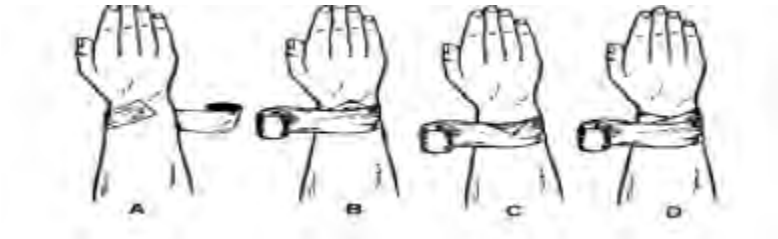
- Lower arm, elbow, hand and foot – 75 mm.
- Hend and fingers – 50 mm.
- Upper arm, knee and lower leg – 100 mm.
- Large leg or trunk – 150 mm.

Prepare the patient for bandaging:

- Position the body part to be bandaged in a normal resting position (position of function).
- Ensure that the body part that is to be bandaged is clean and dry.

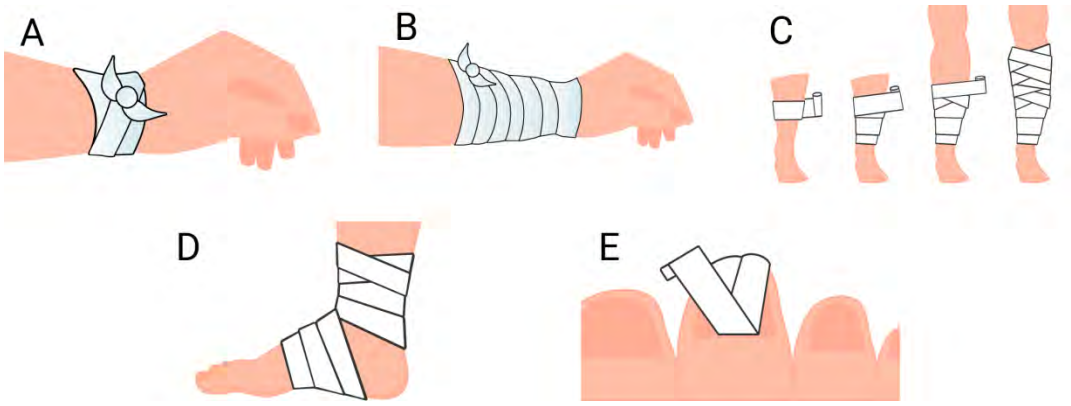
Apply the anchor wrap:

- Lay the bandage end at an angle across the area to be bandaged. (A)
- Bring the bandage under the area turn. (B)
- Fold the uncovered triangle of the bandage end back over the second turn. (C)
- Cover the triangle with a third turn, completing the anchor. (D)



Apply the bandage wrap to the injury:

- Use a circular wrap to end other bandage patterns, such as a pressure bandage, or to cover small dressings (A).
- Use a spiral wrap for a large cylindrical area such as a forearm, upper arm, calf, thigh. The spiral wrap is used to cover an area larger than a circular wrap can cover (B).
- Use a spiral reverse wrap to cover small to large conical areas, for example, from ankle to knee (C).
- Use a figure eight wrap to support or limit joint movemen ankle, or foot (D).
- Use a spica wrap (same as the figure eight wrap) to cover a much larger area such as the hip or shoulder.
- Use a recurrent wrap for anchoring a dressing on fingers, the head, or on a stump (E).



Check the circulation after application of the bandage:

- Check the pulse distal to the injury.
- Blanch the fingernail or toenail, if applicable.
- Inspect the skin below the bandaging for discoloration.
- Ask the patient if any numbness, coldness, bandaged part – remove and reapply the bandage, if necessary.

Elevate the injured extremities:

- To reduce swelling (edema).
- Control bleeding, if appropriate.

Four most common types of bleeding injuries

1. **Abrasions**

Abrasions are usually the result of a rub or scrape on a rough surface, like skinning your knee on the playground or scratching your elbow on a brick wall. Sometimes people call abrasions strawberries or raspberries. Typically, an abrasion will not bleed heavily, but the area should be thoroughly cleaned and washed with soap and water to avoid infection. An abrasion may require a bandage or dressing in extreme cases, but minor abrasions should heal on their own after cleaning.

2. **Lacerations**

Lacerations are cuts, slices, or tears in the skin. Lacerations are often caused by sharp objects like knives or broken glass. Bleeding may occur quickly in the cases of deep lacerations, so it is important to stop the bleeding by covering the wound and applying pressure. If bleeding is severe or won't stop, you may need to proceed to an emergency room or call 112 for additional medical attention.

3. **Punctures**

Punctures can occur when any type of pointed object, such as a nail, penetrates the skin. Puncture wounds may not bleed much outwardly, but a deep puncture can cause internal bleeding. Apply pressure and rinse the wound with clean water to remove all dirt. Before drying and covering with a bandage, apply antibiotic cream or ointment. Watch the puncture for signs of infection, such as spreading redness, pain, swelling, or fever.

Tetanus: If the person with the injury hasn't had a tetanus shot in the past five years, a booster may be needed. It best to get this within 48 hours of the injury.
Rabies: If the wound is from a cat, dog, or other animal bite, it is important to find out if the animal's rabies vaccine is up to date, or consult with your doctor on the best way to proceed.

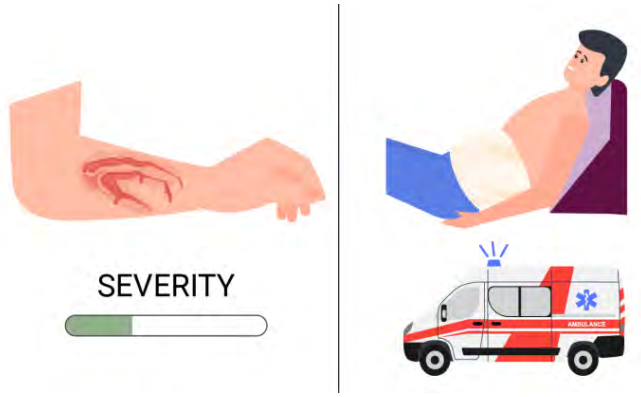
4. Avulsions

Avulsions are severe injuries that can cause uncontrolled, life-threatening bleeding. This type of injury typically occurs when skin or a body part is partially or completely torn away. These injuries often result from serious trauma, such as car or motorcycle accidents, explosions, or gunshots. In avulsions, bleeding will occur instantly and extensively, so you should call 112 immediately and attempt to control the bleeding as quickly as possible. For some avulsions, you may need to apply a tourniquet to stop the bleeding. If a body part is severed, it should be brought to the hospital for possible reattachment. Wrap the body part in a clean cloth and pack it in ice, if possible.

How to stop uncontrolled bleeding

If you encounter someone experiencing uncontrolled bleeding, first make sure you are safe. If you are safe, it's important to remember that any attempt to control bleeding is better than no intervention.

Know when the wound needs immediate medical attention



Although most minor wounds can be bandaged with a Band-Aid and most moderate skin wounds with dressings and medical tape, some are too serious for home care. For example, skin wounds that also involve seriously broken bones need immediate medical attention, as do major injuries to blood vessels that won't stop gushing blood. Wounds to the arms and legs that cause numbness or loss of sensation below the injury may indicate nerve damage, which is also an indication to seek medical care.

- Severe loss of blood will quickly make you feel weak and tired (and maybe pass out), so tell someone around you of the seriousness of your injury right away, or call emergency services for assistance.
- If you have a deep skin wound to your abdomen, your organs may be injured and bleeding internally, so try to get to an emergency medical facility as quick as you can - but get someone to drive you because you might lose consciousness, or call an ambulance.

Control the bleeding

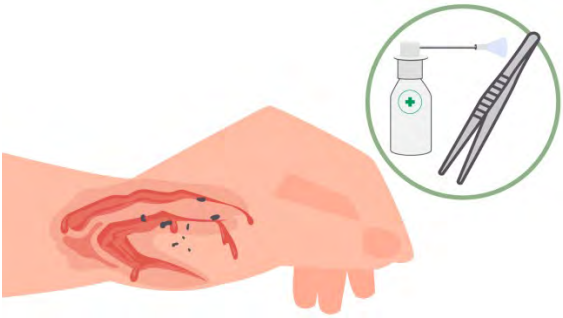
Before you clean and bandage a wound, try to get any bleeding under control. Using a clean, dry bandage (or any clean absorbent cloth), apply very gentle pressure over the wound to control the bleeding. In most cases, the pressure on the wound will promote blood clotting and the bleeding should stop within 20 minutes, although it may continue to ooze a little for up to 45 minutes. The bandage or cloth will also help prevent bacteria from entering the wound and causing infection. In severe cases, a tourniquet can be made by using a neck tie or long piece of cloth to tie a tight knot just above the wound.

- If significant bleeding continues even after you apply pressure for 15-20 minutes, the wound may need immediate medical attention. Continue applying pressure and get to a doctor's office, emergency room, or urgent care center.
- If the bleeding is difficult to control, the person may be on blood thinners or have underlying clotting issues. In these cases, the person should be brought to the attention of a medical professional.
- Before coming in contact with the wound, put on sanitized medical gloves if available. If gloves aren't available, wrap your hands in some sort of clean barrier such as a plastic bag or multiple

layers of clean cloth. Use your bare hands to apply direct pressure to the wound only as a last resort because contact with blood can spread infectious diseases.

- Furthermore, use soap and water to disinfect your hands before contacting the wound, if possible. Doing so will minimize the possibility of transferring bacteria from your hands to the exposed injury.

Remove any visible debris



If there are large pieces of dirt, glass, or other objects embedded in the wound, try to remove them with a clean set of tweezers. Rinsing the tweezers in rubbing alcohol first will help to prevent the transfer of bacteria and other microbes.

Take care not to cause further damage by pushing the tweezers into the wound itself:

- If you're dealing with a gunshot injury, don't probe around the wound and try to pull out the bullet - leave that for medical professionals.
- If you are struggling to remove large pieces of debris from the injury site, consider leaving it for healthcare professionals rather than trying to handle it yourself. Pulling out large debris that is entangled with blood vessels may trigger more bleeding.
- Some first-aid experts recommend waiting to remove all debris until after you've rinsed the wound. If you see only small bits of dirt or grime, this might be the better way to approach the situation, since rinsing will likely wash away the small stuff.

Remove or cut clothing away from the wound

To get better access to the wound once the bleeding is under control, remove any clothing and jewelry from the general area of the injury. This should be done so that if the wounded area swells, the tight clothing or jewelry won't affect blood flow. For example, if you're dealing with a bleeding hand wound, remove the wrist watch above the wound. In terms of clothing, if you can't remove it from around the wound, then consider cutting it away with blunt-nosed safety scissors (ideally). For example, if you're dealing with a thigh injury, remove the pants or cut them away from the wound before trying to clean and bandage it.

- If you can't get the bleeding under control, you may have to use the ripped clothes or belt to make a tourniquet, which puts pressure on the arteries above the wound. However, tourniquets should only be used in emergency life-threatening situations and for short-periods of time because tissue starts to die within a few hours of not getting any blood.
- Once clothes are removed to clean and bandage the wound, they may need to be used as a makeshift blanket to cover the injured person and keep them warm.

Rinse the wound thoroughly

In the best case scenario, wash out the wound thoroughly with saline solution for at least a few minutes until it looks free of dirt and debris. Saline solution is ideal because it decreases the bacterial load by rinsing it away and is typically sterile when bought packaged. If you don't have access to saline solution, then use clean drinking water or tap water, but make sure you let it run over the wound for a few minutes. Squeezing it out of a water bottle works well for this, or hold the wound under the tap if possible. Don't use hot water. Instead use lukewarm or cool water.

- Saline solution can be purchased commercially.
- Some experts recommend using a mild soap, such as Ivory dish-washing liquid, to get the wound as clean as possible, but sometimes soap can irritate injured tissue.
- If you're cleaning a wound near the eye, be careful not to get soap in the eye.

Clean the wound with a washcloth or other soft cloth

Using very gentle pressure, pat the wound with a clean cloth to make sure that it is completely clean after you've flushed it out with saline solution or regular running water. Do not push too hard or scrub too vigorously, but make sure you've removed any remaining debris. Keep in mind that gentle scrubbing may cause a bit more bleeding to occur, so reapply pressure to the wound after the cleaning.

- Apply an antibacterial cream to the wound at this stage prior to bandaging, if available. Antibacterial creams or ointments, such as Neosporin or Polysporin, help prevent infection. The cream will also keep the dressing from sticking to the wound.
- Alternatively, you may wish to add natural sanitizer to the wound, such as iodine solution, hydrogen peroxide, or colloidal silver (which is the only one that won't sting).

- Evaluate the wound after cleaning. Some wounds need stitches to heal properly. If you notice any of the following signs, seek medical attention rather than trying to bandage the wound yourself: the wound appears to be quite deep, it has jagged edges and/or it won't stop bleeding.

Keep an eye out for signs of infection

Despite efforts to keep your skin wound clean and dry, sometimes it can become infected. This is common if you were cut deeply by something rusty or dirty, or if you were bitten by an animal or person.

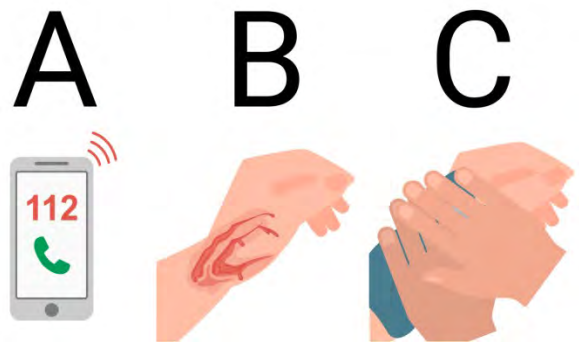
Signs that indicate that your skin wound is infected include: increased swelling and pain, discharge or yellowish or greenish pus, the skin turns red and is very warm to the touch, high fever, and/or a feeling of malaise. If you notice any of these signs within a few days of your injury, see a doctor right away.

They will likely prescribe antibiotics or other treatments to fight the infection.

- Any red streaking of the skin around the wound may indicate an infection in the lymph system (system that drains fluid from tissues). This infection (lymphangitis) can be life threatening, so prompt medical care should be sought.
- Consider a tetanus shot. Tetanus is a serious bacterial infection that can develop from an infected wound, especially if you were punctured by a dirty object. If you have not received a tetanus booster within the past 10 years, you should see a doctor and get caught up on your shots.

Next, follow the ABCs of bleeding:

- A – Alert – Call 112.
- B – Bleeding – Find the source of bleeding. Look on the arms, legs, neck, groin, and abdomen areas for bleeding.
- C – Compress – Once you find the source of bleeding, apply pressure. You can use a piece of clothing, or anything else available that can help stop bleeding. Cover the wound and apply pressure by pushing directly with both hands. You can also pack the wound with gauze or a clean cloth, and then continue to hold pressure with both hands. If bleeding does not slow or stop, and the injury is located on an arm or leg, a tourniquet can be applied high and tight on the limb to stop the bleeding. Keep holding pressure on the injury until help arrives.



WARNING:

- Avoid coming in contact with the injured person's blood to prevent being infected by it. Always use latex gloves if they're available.
- Tetanus shot should be obtained every 10 years. Tetanus is a serious bacterial infection that affects your nervous system. It causes painful muscle contractions of your jaw and neck muscles and interfere with your ability to breathe.
- Bleeding that is difficult to control should be brought to medical attention.

Real-life first aid stories, where ordinary items saved the day

Vicki's story

First aid scenario: heavy bleeding.

Item used: nappy.

Vicki was driving when she came across someone who had been injured in a road accident.

"I was driving and came across an accident where a very pregnant lady had spun her car upside down.

"I stopped to help but wasn't the first one on the scene.

"She had a cut on her arm and hand which was bleeding quite a lot and the people helping her were scrabbling for something to put pressure on the wound."

Vicki was resourceful and found something suitable to put pressure on the wound.

"I went to find something suitable in my boot and thought a clean nappy was probably the cleanest and most hygienic thing I had to hand.

"I handed them over and it worked perfectly!"

Debbie's story

First aid scenario: heavy bleeding.

Items used: towels.

One day, Debbie's doorbell rang out of the blue. It was 16-year-old Amy from next door: "help, my brother Dylan is bleeding" she shouted. Debbie and her sister Ellen ran to their house to find 8-year-old Dylan bleeding heavily from a huge cut in his arm.

Amy had been looking after Dylan while their mum had popped out to the shops. Dylan had fallen while running through the house, accidentally thrusting his arm through a glass door panel. Debbie had recently taken a first aid course and knew what to do. "I knew I needed to apply pressure to stop the bleeding. I grabbed a towel from the bathroom and used it to press on the wound" she said.

Dylan was crying and shaken so Debbie spoke soothingly to him while pressing on the towel to stop the blood flow. She told Ellen to call for an ambulance since she knew the cut would need medical

treatment. Amy was so upset by the sight of Dylan's blood that she had to go and wait in another room.

Just as the ambulance pulled up, Dylan's mum came home. She was deeply shocked but immediately cuddled Dylan and held his arm, then the two of them travelled to the hospital together in the ambulance.

After a few weeks, the wound had healed and Dylan was showing off the scar on his arm to local children. Dylan's mother thanked Debbie and Ellen the day after the incident. "I'm so happy that I learned first aid," Debbie said. "I never thought I'd need to use my first aid skills so soon, but I'm very glad I knew what to do. I didn't need a first aid kit. The towel that was to hand did a great job in stopping the blood flow".

Links:

How to Bandage A Hand - First Aid Training - *St John Ambulance:*
https://www.youtube.com/watch?v=fKzdiuseEIw

How to Make A Sling - First Aid Training - *St John Ambulance:*
https://www.youtube.com/watch?v=PwfBGkBXkFA

How to Treat Severe Bleeding - First Aid Training - *St John Ambulance:*
https://www.youtube.com/watch?v=NxO5LvgqZe0

First Aid for Severe Bleeding:
https://www.youtube.com/watch?v=jYtJS1PtNq0

VIOLATIONS OF INSTALLATION AND OPERATION REQUIREMENTS FOR STOVES, FIREPLACES AND CHIMNEYS

Kinds of stoves

When it comes to the stoves that are used for the purposes of home heating, the consumer has a few basic options. To help the public understand their options, here are some brief descriptions of the different types of heating stoves and how they work.

Wood burning stoves

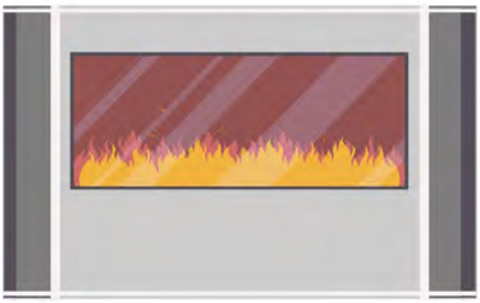
This is a stove that is primarily used for the purposes of heating in which wood is the primary fuel. Wood stoves are generally made from an all-metal construction, which would most commonly be steel or cast iron. The main components of a wood stove are the burn chamber and the flue or chimney.

Gas heating stoves

A gas stove provides heat to a house in a manner that is similar to that of a wood burner, but these models are designed to burn propane or natural gas instead of wood. With the use of gas, the stove emits less pollution and they tend to be easier to manage than their wood burning counterparts. Gas burning stoves come in the direct vent models and in the ventless models.

Electric heating stoves

The electric stoves are basically electric heaters that are designed to replicate the look and feel of traditional heating stoves. The main difference is that they use electricity as their fuel instead of gas or wood. Many of the available models are portable and capable of operating on a standard home electrical outlet. There are also models that have the option to turn off the heating feature so that the user can enjoy the look of the flames in the chamber without having the heat.



Pellet stoves

This is a type of heating stove that burns pellets of compressed wood or other biomass material rather than burning gas or chopped wood. The user puts the fuel pellets into a hopper; from the hopper the pellets are fed into a burn chamber to produce heat. Since a pellet stove uses a mechanical system to feed the pellets into the burn chamber, it will need electricity to operate.

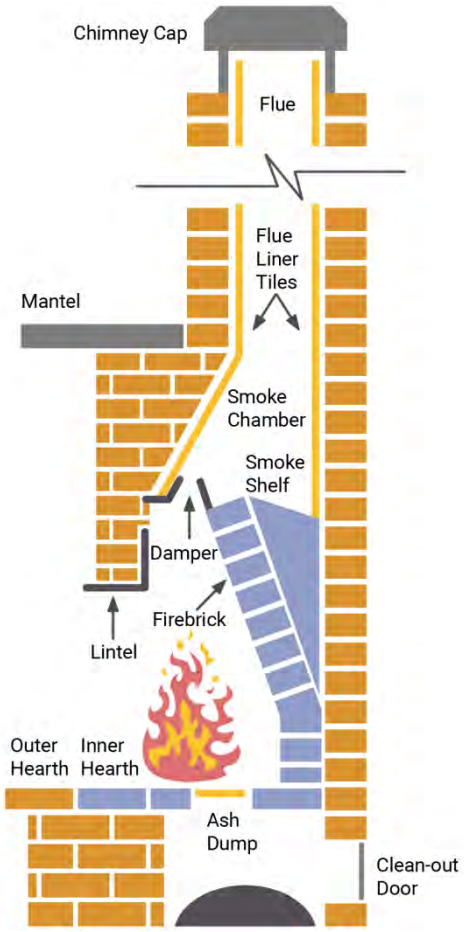
The different types of heating stoves all have their advantages and disadvantages. The type that is right for any given situation will depend on the needs, priorities and preferences of the homeowner. Understanding how the different stoves work and what they have to offer will help consumers to make a better decision.

Fireplace

A fireplace is an open area built into the structure of a home where a fire can be safely contained to generate heat and to provide a relaxing atmosphere, while allowing waste gases and smoke to leave the property via a chimney. A fireplace can also be used as focal point for a room even when it's not being used.

The word **fireplace** can be used to describe the whole range of different fireplaces available, including:

- Open fireplaces.
- Fireplace inserts.
- Gas fireplaces.
- Electric fireplaces.
- Stove fireplaces.
- Propane fireplaces.



How fireplaces work

A traditional open fireplace has two main components:

- The fireplace.
- The chimney.

Open fireplaces are designed into the structure of a building, meaning that they can be expensive to retrofit.

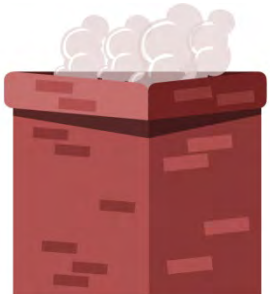
Open fireplaces also work in conjunction with chimneys to provide an environment where fires can be safely started and operated in a home.

Chimney

A chimney is a vertical channel fitted on the side of a building, which is positioned above a fireplace. The structure can be made from bricks, stainless steel or concrete. It acts to control the behaviour of smoke when a fire is set, quickly drawing the fumes away, so they do not fill the room. The upward movement of air and smoke which occurs inside a chimney is called the ‘draft’. It happens because heated gases are less dense than cold ones, so these lighter fumes travel up and out of the chimney.

Types of chimneys

MASONRY CHIMNEYS



This is believed to be 'the' standard type of chimney that is typically built using materials like bricks, cement, mortar, blocks or stone. Masonry chimneys are usually accompanied by masonry fireplaces that are simple indented walls where you create fire on logs of wood.

All the heat and smoke passes upwards through a tunnel-like channel to the roof and then out into the atmosphere. An interesting feature of this type of chimney is that often the bricks that are used in its construction have the ability to absorb heat. This comes in really handy, especially during the winter season as some of the absorbed heat radiates to other rooms and keeps them warm.

Furthermore, the fireplaces of these chimneys have amazing aesthetic value and sense which can greatly make your space look incredible. If the masonry fireplace in your house is one of those elegantly and stylishly constructed types, chances are that it will have an excellent resale value.

Masonry chimneys are really durable and can last as long as your house, given that you ensure proper maintenance, regular cleaning and use the right kind of accessories. However, masonry chimneys require a super concrete and solid foundation during construction because it typically weighs around 6 to 7 tons.

METAL CHIMNEYS

These are quite similar to masonry chimneys, except that they take up a lot of space and the bigger chimney versions may also cost more than the latter type of chimneys. Also, their aesthetic value is not as good as that of masonry chimneys.

Metal chimneys can either be double-walled or triple-walled and are often

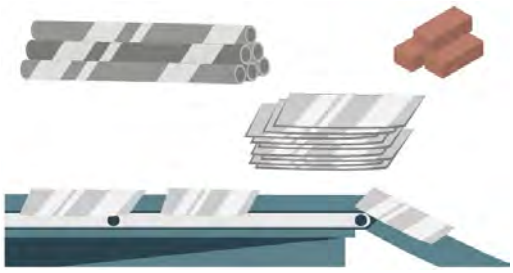
enclosed within different types of casings. They are usually encircled within a masonry chimney case, a sided frame or sometimes even in a full wooden structure in order to boost its aesthetic value and appeal.

In a double-walled metal chimney, there is insulation between the walls, whereas, in a triple walled chimney, the layers of the wall contain air between them, the purpose of which is to provide insulation and dissipate heat.

Metal chimneys are commonly constructed using bare stainless steel that often appeals to a number of homeowners because most of them really like the high-tech look of these chimneys. One downside of these chimneys is that they aren't as 'flexible' as masonry chimneys. They are generally limited to 15 and 30-degree angles. The different types of metal vents used in these chimneys are usually characterized by the kind of fuel that they exhaust.

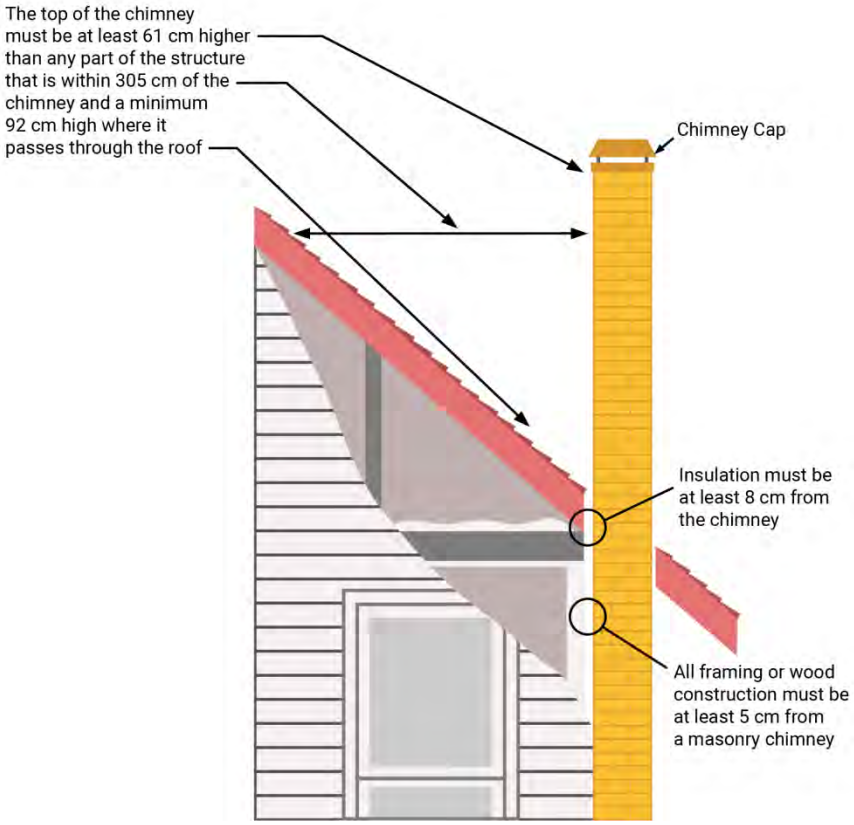
FACTORY-BUILT/ PREFABRICATED CHIMNEYS

This type of chimney is so called because of two main reasons. Firstly, the fireplace of these chimneys is a firebox that is fabricated from sheet metals and secondly, these chimneys are manufactured or constructed in factories before being delivered to the buildings or homes where they need to be installed. You can also choose from a variety of different materials to be used in the construction of the chimney, as well as, the fireplace.



How do chimneys work?

As simple as chimneys look in appearance, many people often wonder in fascination about how do chimneys really work. If you were to put it simply, your chimney plays a very key role in keeping your house warm and also ensuring that your fireplace functions properly.



The science behind the workings and the function of chimneys is also very interesting. As mentioned previously, chimneys basically help remove all the byproduct gases from the air. Every fireplace requires a chimney because there has to be an outlet for the transfer of heat, gas, and smoke. One of the biggest cornerstones for any chimney is 'airflow' without which it wouldn't exactly be functional.

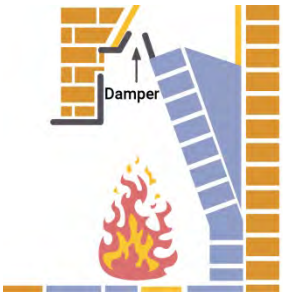
Just like warm, moist air often escapes through your attic, similarly, warm air or smoke rises up and goes out through your chimney. This is referred to as the "stack effect". The air that travels up the chimney is called the 'draft'. Any well-functioning and properly built chimney will consist of a strong draft that allows the pull of smoke and gases out into the atmosphere through the chimney.

There are 4 key factors that affect the chimney draft, including chimney height, air pressure, the flue, and obstructions & damage. These 4 key features together affect how well your chimney works and you must get them inspected if your chimney ever starts to malfunction or doesn't allow airflow as well as it should.

One of the most important things you can do to keep your fireplace or stove in peak condition is to have it inspected and cleaned annually.

Inspection tips below

- **Check the firebox for cracks and loosening joints**. In a masonry fireplace also check for damage to bricks and mortar. Make minor repairs to firebox joints and cracks using refractory cement; it's designed to handle the extreme heat conditions in a fireplace and it's readily available at fireplace stores.



- **Open the damper completely.** It should move freely and sit snugly against the throat. Make sure the metal is solid with no cracks, severe pitting, or rusted-through sections. Replacing a damper is not a do-it-yourself job; if the damper is in bad shape, hire a professional to replace it.
- **Using a high-powered flashlight or worklight,** look up the flue to check for damage. Metal flue liners should be clean and the joints well aligned. Tile or masonry flue liners should be solid and free of cracks. All repairs should be done by a certified professional.
- **Make sure the chimney is unobstructed of leaves and other debris** that may have fallen into the chimney. Chimneys are also favorite nesting places for birds and squirrels, even if it's only been a few months since the fireplace was last used.

- If you can't see the entire flue from below, you'll have to check from the roof. If you're at all uncomfortable doing this or have no experience working on a roof, hire a **professional chimney sweep** to inspect and clean the chimney.

Regular Inspection

The chimney should be swept regularly to remove soot and tar. At the very least the chimney should be swept at the start of the heating season. It is not recommended that the appliance is over fired, (allowed to burn fiercely and out of control), or chimney fires be started in an attempt to clean the

chimney. Deposits of soot and tar will be greatly increased if unseasoned wood is burnt. Should a chimney fire occur, the chimney and appliance should be checked for damage before using them again. It is also good practise to check at least every year or two the exposed parts of a chimney, flashings and terminals for signs of damage. Just like the outside of a house chimneys can suffer from the wear and tear of extreme weathering. If at any time smoke or fumes are apparent or suspected from the appliance, chimney or flue, seek advice immediately from the installer or chimney expert in case there is a blockage or failure. Do not use the appliance or chimney until they have been thoroughly checked for safety and soundness. The escape of fumes can be dangerous.

Chimney Cleaning

As a guide all flues should be swept before and during the heating season, and ideally at the end of the heating season to prevent tar and soot deposits having a corrosive effect on the chimney and appliance during the dormant period. Mechanical sweeping with brush and rods is the only method of cleaning recommended because materials other than soot can block the flue e.g. mortar, brickwork, birds' nests. For this reason cleaning a flue using just chemical chimney cleaners or vacuum cleaning cannot be recommended as an alternative for correct chimney cleaning. (Some chemical cleaners can invalidate manufactures warranties). Sweeping brushes should be made from suitable bristle and be of the same diameter or area as the flue being swept, and be fitted with a ball or free running wheel boss on the end to prevent scraping the flue walls, particularly at bends. Chimney manufacturers give instruction to which brush type to use on their systems. Use a qualified chimney sweep or member who provide an inspection and sweeping certificate.

Wood-Burning Installation and Maintenance

The way your wood-burning system (appliance, chimney, and vent) is installed and taken care of can make a big difference in terms of safety and air emissions. Errors in installation by a non-professional may not be visible, and problems may not be immediately apparent and then only by a resulting home fire.

Here are some things to look for:

- Proper clearances between the wood-burning appliance and venting system and combustible materials.
- Proper protection of combustible floors.
- Proper assembly of appliance and venting components.

Experienced professionals can also properly size and place equipment for the best heat distribution. The venting system (or chimney) is the “engine” that drives the entire burning process or causes it to perform poorly or fail.

Professional decisions about the venting system include properly determining:

- Sizing.
- Height
- Location and protection from extreme cold.
- Configuration.

A wood-burning appliance that is sized and placed properly with a venting system that delivers adequate draft will reduce wood consumption, produce more usable heat, and reduce maintenance from inefficient fires.

One of the best ways to find competent installation and maintenance professionals is to check their credentials.

Avoid chimney fires

Creosote comes from burning wood without enough air for the fire, and it is a black, shiny tar like substance that can coat the inside of stoves, smoke pipes and chimneys. Even a half inch buildup can be dangerous. Creosote is what burns in the stove system during a chimney fire. Stoves and chimney connectors may become red hot in a chimney fire. Flaming embers may also blow out the top of the chimney and potentially cause a roof fire.

To help prevent creosote, burn the stove with the draft fully open at least once a day. The chimney and chimney connector must be cleaned with stiff wire chimney brushes and scrapers at least once a year. Some systems may need to be cleaned more often.

Chimney Fires

Without regular cleaning, a highly flammable substance known as creosote may build up within the flue, making the chimney vulnerable to high-heat fires. Burning at temperatures around 2,000°F (around 1090°C) , chimney fires are capable of extending beyond the chimney itself and into other, more flammable parts of the home. Though prefabricated chimneys are built to withstand very high temperatures, they can be so damaged by chimney fires that replacement becomes necessary. Keeping the chimney clean prevents house fires. For that reason, if you frequently make use of the fireplace in your home, it's highly recommended that you employ a certified chimney sweep on an annual basis. Many homeowners remember to make an appointment when turning the clock back during mid-autumn.

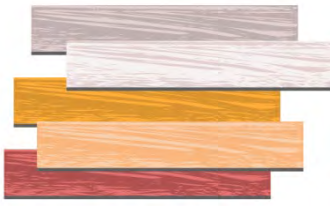
More than one-third of Americans use fireplaces, wood stoves, and other fuel-fired appliances as primary heat sources in their homes. **Unfortunately, many people are unaware of the fire risks when heating with wood and solid fuels.** Heating fires account for 36 % of residential home fires in rural areas every year. These fires are often due to creosote buildup in chimneys and stovepipes. All home heating systems require regular maintenance to function safely and efficiently.

Keep fireplaces and wood stoves clean:

- Have your chimney or wood stove inspected and cleaned annually by a certified chimney specialist.
- Keep the area around the hearth clear of debris, decorations, and flammable materials.
- Leave glass doors open while burning a fire. Leaving the doors open ensures that the fire receives enough air to complete combustion, and it keeps creosote from building up in the chimney.
- Close glass doors when the fire is out to prevent air from the chimney opening from getting into the room.
- Most glass fireplace doors have a metal mesh screen, which should be closed when the glass doors are open. This mesh screen helps keep embers from getting out of the fireplace area. Always use a metal mesh screen with fireplaces that do not have a glass fireplace door. Install a stovepipe thermometer to help monitor the flue temperature.
- Keep air inlets on wood stoves open, and never restrict the air supply to a fireplace. Otherwise, creosote may build up, which could lead to a chimney fire.
- Use fire-resistant materials on the walls around a wood stove.

What should never be burned in a fireplace

Painted wood



Paint contains heavy metals, such as lead, chromium and titanium, which are used to make the different colors. Metals, especially lead, can be toxic even in small quantities if inhaled. If you're unsure if your paint has lead, be sure to consult with your inspector during your next scheduled inspection.

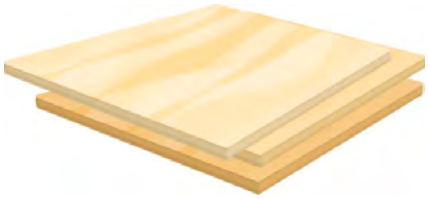
Pressure-treated wood

Wood is commonly made resistant to fungus and insects through the addition of copper, chromate and arsenic, in a process known as CCA treatment. CCA treatment places roughly 27 grams of arsenic

in every 12-foot 2x6, which is sufficient to kill about 250 adults, which is why it is illegal in the U.S. to burn pressure-treated wood. Vaporized CCA wood, known as fly ash, is extremely toxic; in one case, as reported by the American Medical Association, a family was stricken with seizures, hair loss, debilitating headaches, blackouts and nosebleeds from fly ash released when they unknowingly used CCA wood to burn in their fireplace. Even the family's houseplants and fish succumbed to the toxic fumes.

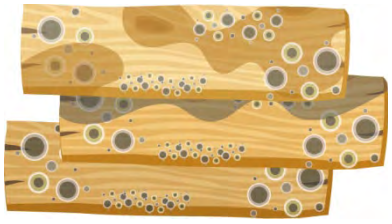
Plywood, particleboard, chipboard or OSB

When burned, these manmade woods release formaldehyde, and possibly also hydrochloric acid or dioxin. Some states have outlawed the incineration of some or all of these artificial wood products.



Rotted, diseased or moldy wood

This wood will not burn as long as other wood, may produce bad smells when burned, and could bring insects into the house.



Damp wood

Wood that has a moisture content higher than 20% will burn inefficiently and will contribute to a greater accumulation of creosote in the chimney, as well as air pollution.

Allergenic plants

Urushiol, which is the chemical that induces the typically minor allergic reaction when skin is exposed to poison ivy, poison sumac or poison oak, is far more dangerous when inhaled. Urushiol is not

destroyed by fire and can quickly cause life-threatening respiratory distress if any of these plants are burned.

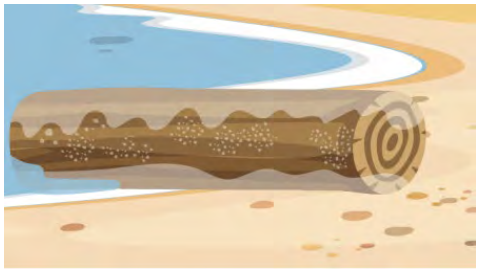
Dryer lint

While it's often used effectively as a fire-starter, lint can contain a wide array of dangerous chemicals that come from your clothes and fabric softener.

Trash

Never burn household garbage, as it contains a range of potentially hazardous materials and chemicals that react in unpredictable ways when burned together. Newspaper ink, plastics, aluminum foil, plastic baggies, and whatever else constitutes your particular trash can create a deadly chemical cocktail.

Driftwood



Wood found on the beach of an ocean or salty lake will release salt when burned, which will quickly corrode any metal and etch the glass of a wood stove or fireplace. Catalytic converters are especially vulnerable to salt corrosion. In addition to potential damage to the stove or fireplace, the EPA claims that driftwood releases toxic chemicals when burned.

SOME DO'S AND DONT'S:

- **Do** ensure that when an appliance is fitted to an existing chimney system it is inspected and tested for soundness and any defects are rectified.
- **Do** ensure that chimney or flue system is always installed and supported and that all joints are properly, securely and efficiently made strictly in accordance with the manufacturer's instructions.

- **Do** ensure that the flue pipe connection from the appliance rises vertically for at least 600 mm before any change of direction is contemplated. The reason for this is that the flue draught is crucial nearer the appliance because of the higher flue gas temperature. Any horizontal or angled runs at the bottom of the flue will create severe restriction to flue gas movement and affect appliance operation.
- **Do** try to construct the chimney vertically all the way to the terminal. Where bends are necessary, do not use more than 4 bends. Generally the maximum bend is 45° from the vertical with the exception of 90° factory made bends or tees which may be treated as being equal to two 45° bends.
- **Do** ensure that the flue diameter is not less than the diameter of the appliance outlet.
- **Do** ensure that the effective height of any chimney with bends (vertical distance between appliance and terminal) is at least twice the horizontal distance between the appliance and terminal.
- **Do** try to position the chimney inside the building to avoid excessive cooling and risk of condensation.
- **Do** ensure that the chimney is installed and located in accordance with Building Regulations and Standards, particularly where distinct distances from combustible materials are required.
- **Do** ensure that the chimney is thoroughly inspected, and that smoke tests are carried out before the appliance is used.
- **Do** remember a permanent supply of combustion air must be provided and kept clear from obstruction.
- **Do** remember that a heating appliance needs to be checked regularly and the flues expertly swept.
- **Do** ensure that the installation is carried out by a HETAS registered installer.
- **Do** ensure an approved Carbon Monoxide Alarm is installed on every installation.
- **Do** ensure the Notice/ Data Plate is correctly completed and positioned.
- **Don't** use any single wall flue system as a chimney.
- **Don't** allow clothes, furnishings or any combustible materials to come into contact with the surface of any flue pipe or prefabricated metal chimney.

- **Don't** use bends if they can be avoided.
- **Don't** run horizontal flue anywhere in the system other than a maximum 150mm horizontal length into the chimney from a back outlet appliance.
- **Don't** position the chimney externally if it can be avoided.
- **Don't** be tempted to use non BS EN certificated flue and chimney systems; they may only last for a short time and will have to be replaced by the correct product. It will then be at least twice as expensive in the long run. Use of non-approved products is also illegal.

Story

Wood stove ashes start fatal fire

An elderly man suffered fatal injuries in a house fire that began when ashes from a wood stove ignited a cardboard box in which they were being stored. A friend of the resident called 112 after stopping by the house and discovering the fire. According to news reports, flames could be seen shooting from the windows and roof of the house shortly after the fire was detected. Firefighters from at least six departments assisted in fighting the fire and were said to be at the scene for several hours. Investigators indicated that the fire started in the basement, where the wood stove was located, and spread via an open stairway to the main floor where the victim was located. The man was unable to escape due to poor health and was found in the doorway of the residence.
Source: "Firewatch," NFPA Journal, January/February 2017.

Links:

https://www.haleycomfort.com/different-kinds-of-stoves-guide-to-heating-stoves/
https://fireplaceuniverse.com/what-is-a-fireplace/
https://www.portland.gov/bds/stoves-inserts-chimneys
https://www.bobvila.com/articles/how-a-chimney-works/
https://www.epa.gov/burnwise/wood-burning-installation-and-maintenance
https://www.homestratosphere.com/types-of-chimneys/

https://education.nachi.org/coursemedia/course-153/documents/StudyGuide_%20How%20to%20Inspect%20Fireplaces%20Stoves%20and%20Chimneys.pdf

https://www.hetas.co.uk/wp-content/mediauploads/BFCMA-General-Guidance-10-12-12.pdf

Storie:

https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/US-Fire-Problem/Fire-causes/osHeating.pdf

Video:

Smart Fire Extinguisher For Chimneys (Fireplaces)

https://www.youtube.com/watch?v=v8K9n1dA-cw

Tips for Preventing Chimney Fires

https://www.youtube.com/watch?v=gobWcR9ns7U

You Need To Know How To Put Out Chimney Fires

https://www.youtube.com/watch?v=WLb4fvBnctY

BURNS

BURNS are tissue damage that results from heat, overexposure to the sun or other radiation, or chemical or electrical contact. Burns can be minor medical problems or life-threatening emergencies. The treatment of burns depends on the location and severity of the damage.

What Are the Different Types of Burns?

A burn injury usually results from an energy transfer to the body. There are many types of burns caused by thermal, radiation, chemical, or electrical contact.

- **Thermal burns**

Burns due to external heat sources which raise the temperature of the skin and tissues and cause tissue cell death or charring. Hot metals, scalding liquids, steam, and flames, when coming in contact with the skin, can cause thermal burns.

- **Radiation burns**

Burns due to prolonged exposure to ultraviolet rays of the sun, or to other sources of radiation such as x-ray.

- **Chemical burns**

Burns due to strong acids, alkalies, detergents, or solvents coming into contact with the skin and/or eyes.

- **Electrical burns**

Burns from electrical current, either alternating current (AC) or direct current (DC).

Burns are classified as first-, second-, or third-degree, depending on **how deep and severe** they penetrate the skin's surface:

- **First-degree (superficial) burns**

First-degree burns affect only the epidermis, or outer layer of skin. The burn site is red, painful, dry, and with no blisters. Mild sunburn is an example. Long-term tissue damage is rare and usually consists of an increase or decrease in the skin color.

- **Second-degree (partial thickness) burns**

Second-degree burns involve the epidermis and part of the dermis layer of skin. The burn site appears red, blistered, and may be swollen and painful.

- **Third-degree (full thickness) burns**

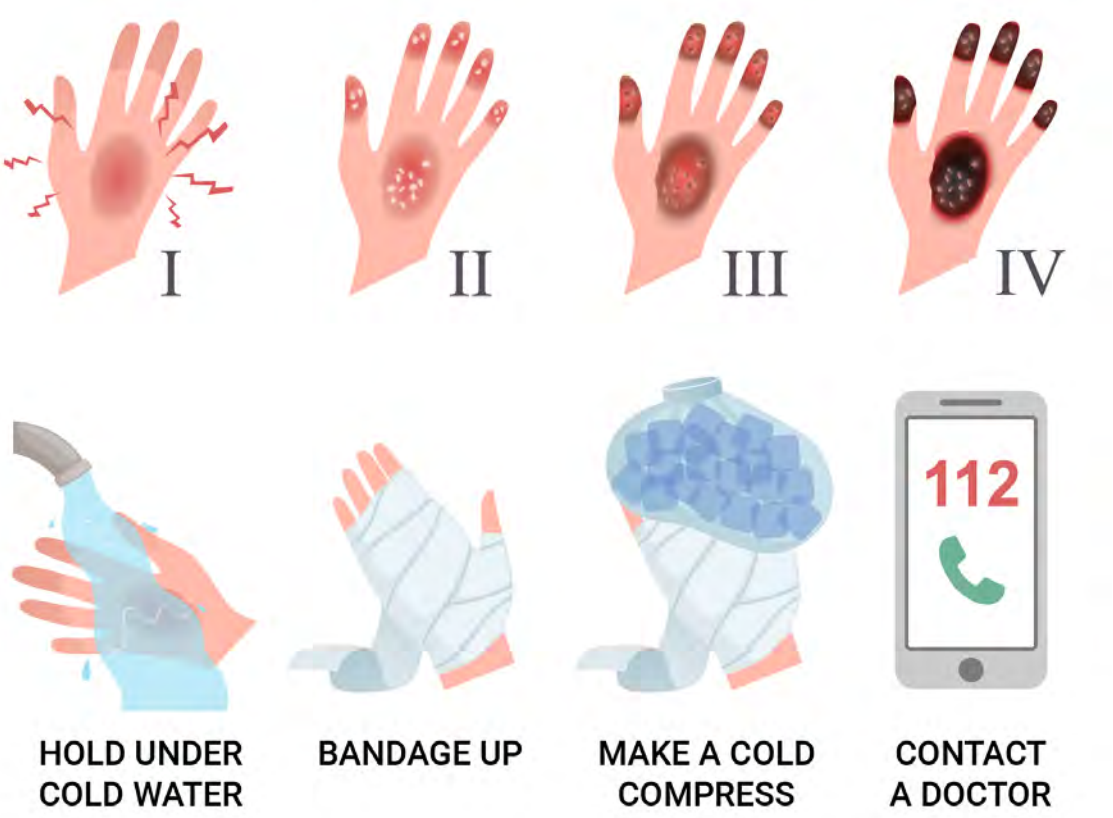
Third-degree burns destroy the epidermis and dermis. Third-degree burns may also damage the underlying bones, muscles, and tendons. The burn site appears white or charred. There is no sensation in the area since the nerve endings are destroyed.

The main threats of burns

Burns are a type of painful wound caused by thermal, electrical, chemical, or electromagnetic energy. Smoking and open flame are the leading causes of burn injury for older adults. Scalding is the leading cause of burn injury for children. Both infants and the older adults are at the greatest risk for burn injury.

Until emergency help arrives:

- Protect the burned person from further harm. If you can do so safely, make sure the person you're helping is not in contact with the source of the burn. For electrical burns, make sure the power source is off before you approach the burned person.
- Make certain that the person burned is breathing. If needed, begin rescue breathing if you know how.
- Remove jewelry, belts and other restrictive items, especially from around burned areas and the neck. Burned areas swell rapidly.
- Cover the area of the burn. Use a cool, moist bandage or a clean cloth.
- Don't immerse large severe burns in water. Doing so could cause a serious loss of body heat (hypothermia).
- Elevate the burned area. Raise the wound above heart level, if possible.
- Watch for signs of shock. Signs and symptoms include fainting, pale complexion or breathing in a notably shallow fashion.



HEATSTROKE/ SUNSTROKE

Is heatstroke the same as sunstroke?

These two terms refer to the same condition. Heatstroke (or sunstroke) happens when the body can no longer maintain a temperature of under 105° F when exposed to hot weather. People almost always have warning symptoms before heatstroke, yet sometimes they do not pay attention, or are not able to take action.

Sunstroke, also known as heatstroke, is a life-threatening condition in which the body's heat-regulating system fails due to exposure to high temperatures. It happens when the body is unable to rid itself of excess heat due to vigorous activity or a very hot environment. High temperatures can cause the body's major organs to fail.

Though anyone can get sunstroke, there are people who are more susceptible. They include the children, athletes, diabetics, alcoholics and those not used to extreme heat and sun. Certain medications can also make a person more prone to heatstroke.

What are the signs and symptoms of sunstroke?

The main sign of heatstroke is a markedly elevated body temperature (greater than 104 degree F) with changes in mental status ranging from personality changes to confusion and coma. Skin may be hot and dry - although if heatstroke is caused by exertion, the skin may be moist.

Heat stroke is caused by a failure of the body's cooling mechanisms (sweating and/or evaporative cooling, for example) when exposed to heat. Suspected heatstroke should always be regarded as an emergency, and you should dial your local emergency number to request an ambulance.

Groups more at risk of developing heatstroke are:

- Children under two.
- Very elderly people.
- People with kidney, heart or circulation problems.
- People with diabetes.

What are the risk factors of heat stroke? Anyone can develop heatstroke, but several factors increase your risk:

- Age. Your ability to cope with extreme heat depends on the strength of your central nervous system.
- Exertion in hot weather.
- Sudden exposure to hot weather.
- A lack of air conditioning.
- Certain medications.
- Certain health conditions.

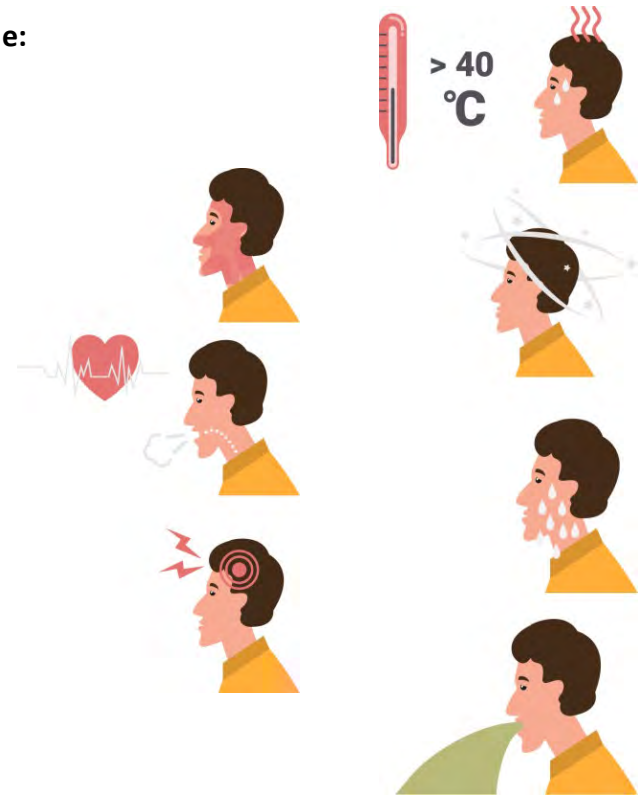
While waiting for the ambulance you should:

- Immediately move the person to a cool area.
- Increase ventilation by opening windows or using a fan.
- Give water to drink (if the person is conscious), but don't give them medication such as aspirin or paracetamol.

- Shower skin with cool, but not cold, water (15-18°C); alternatively, cover their body with cool, damp towels or sheets.
- Left untreated, heat stroke can lead to complications, such as brain damage and organ failure. It's also possible to die from heatstroke.
-

Heat stroke/sunstroke signs and symptoms include:

- High body temperature.
- Altered mental state or behavior.
- Alteration in sweating.
- Nausea and vomiting.
- Flushed skin.
- Rapid breathing.
- Racing heart rate.
- Headache.



Heat stroke/sunstroke can be prevented by:

- Drinking fluids.
- Limiting exposure to heat.
- Wearing clothing that allows evaporative cooling, and recognizing the early warning signs of heat cramps and heat exhaustion and responding to those symptoms with treatment (cooling).

Do not leave infants, children, or pets in vehicles, and do not leave vehicles unlocked so children can get in them unattended to prevent deaths from heat stroke.

Real life stories from excessive heat victims

Dana Stone, Durham, NC, mid 1970s

When I was on vacation in North Carolina's Outer Banks, I was riding my bike up the road with the sun beating down on me. The combination of the heat and the blacktop created a difficult situation for me: dizziness and fatigue. I went to see a doctor who told me I had heat exhaustion and was low in salt. He advised rest and salty foods like peanuts. I did as I was told and felt okay after a few hours. I'm careful now to avoid exercise in the hot summer sun.

Sam Johnson and Emma Johnson, 1988

In the summer of 1988, my uncle was an umpire for the Little League one Saturday he spent too much time in the sun and got severe sunburn. He decided the best plan was to moisturize his damaged skin. He chose to use Vaseline as a moisturizer. He didn’t know that Vaseline would trap in the heat. This caused his internal temperature to rise my grandmother realized what was happening she put him in a ice bath and tried to remove the Vaseline. It was clear he needed more help. The result was an emergency room trip due to heat stroke.

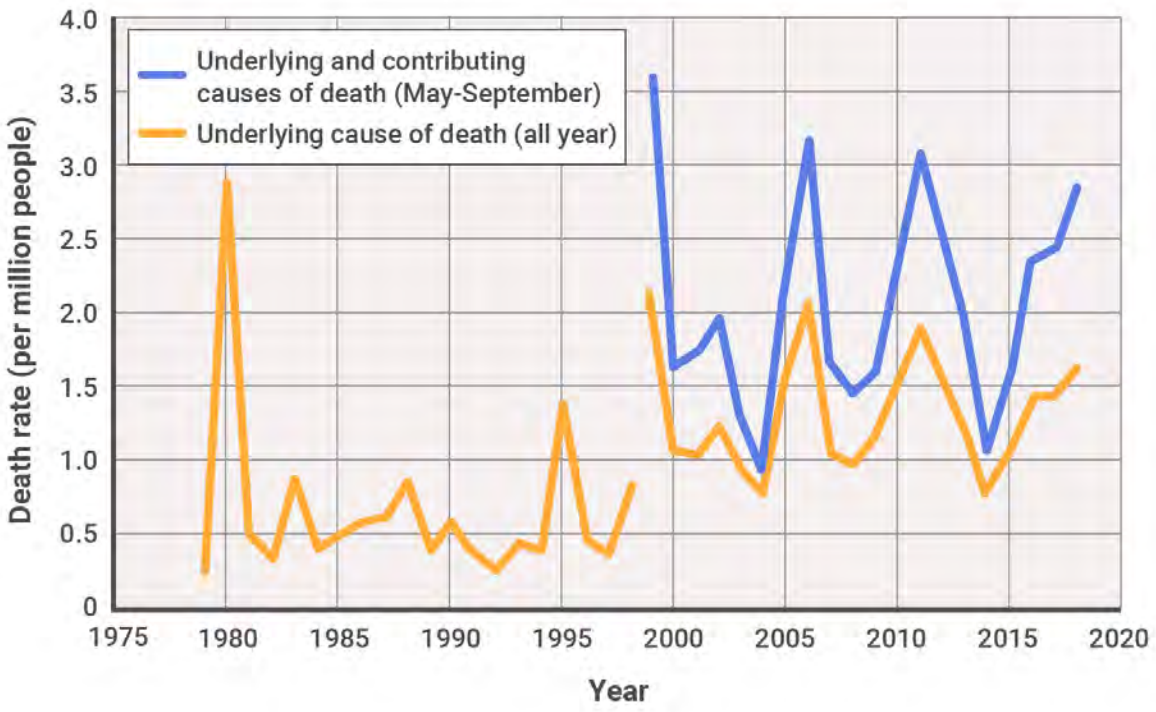
Danelle Eby Choate, Tennessee

I was mowing my yard (about an acre, on a riding lawn mower) mid morning in August in Tennessee. I was taking 5 minute breaks, sipping water, trying to cool down, but I wanted to finish, so I ignored the lack of sweat and cramping in my arms. After I finished, I took a shower. Got dizzy, passed out, busted my head open. I had to call someone to take me to the doctor to get staples.

Just because you think you are doing ok because you are drinking water doesn't mean you are. I should've listened to my body and took longer breaks.

Statistics

More people died of cold than heat in past 20 years but climate change is shifting the balance. This indicator presents data on deaths classified as “heat-related” in the United States.



This figure shows the annual rates for deaths classified as “heat-related” by medical professionals in the 50 states and the District of Columbia. The orange line shows deaths for which heat was listed as the main (underlying) cause. The blue line shows deaths for which heat was listed as either the underlying or contributing cause of death during the months from May to September, based on a broader set of data that became available in 2001.

Between 1998 and 2001, the World Health Organization revised the international codes used to classify causes of death. As a result, data from earlier than 2001 cannot easily be compared with data from 2001 and later.

DOS AND DON'TS:

- **Always** call your local emergency number and inform your parents.
- **Always** drinking fluids, use sunscreens, wear clothes that allow evaporative cooling, and learn to recognize the early warning signs of heat cramps and heat exhaustion and respond to those symptoms with treatment.

- **Always** avoid the sun between 11am and 3pm, don't wear thick clothes, wear protection, use sunscreen, take a cool shower and drink water.
- **Always** burns hold under the cold water, bandage up, make a cold compress and consult a doctor.
- **Always** apply cold compresses to your skin or take a cool bath to soothe the burn.

- **Never** immerse large severe burns in water. Doing so could cause a serious loss of body heat (hypothermia).
- **Never** leave infants, children, or pets in vehicles.

Video:

Sunburn, Causes, Signs and Symptoms, Diagnosis and Treatment:

https://www.youtube.com/watch?v=-KzTvagnpfU

Heat Stroke, Causes, Signs and Symptoms, Diagnosis and Treatment:

https://www.youtube.com/watch?v=MCizXwQx3_4

Learn first aid for burns! The information and visuals within this video are for informational purposes only. All the information provided comes from the NHS and WebMD.

https://www.youtube.com/watch?v=mi2zHvwh3MY

Links:

https://stanfordhealthcare.org/medical-conditions/skin-hair-and-nails/burns/types.html

https://www.sheffieldccg.nhs.uk/Your-Health/sunburn-and-heat-exhaustion.htm

https://www.emedicinehealth.com/heat_stroke/article_em.htm

https://www.epa.gov/climate-indicators/climate-change-indicators-heat-related-deaths

Real lifes stories from excessive heat victims:

https://www.weather.gov/safety/heat-survivors

COOKING AND HEATING

Cooking Safety

Cooking fires are the primary cause of home fires and home fire injuries. The majority of cooking equipment fires start with the ignition of common household items (i.e., wall coverings, paper or plastic bags, curtains, etc.).

Facts and figures *(National Fire Protection Association, 2020)*

Cooking fires are the number one cause of home fires and home injuries. The leading cause of fires in the kitchen is **unattended cooking**.

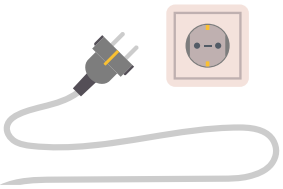
- Cooking caused more home fire deaths in 2014-2018 than in 1980-1984.
- An average of 470 home cooking fires were reported per day in 2018.
- The peak days for home cooking fires were Thanksgiving and Christmas.

Basic kitchen fire safety rules

You can do a lot to prevent kitchen fires. Although you can't remove every possible source of a kitchen fire, you can minimize fire risks by removing hazards and maintaining your kitchen.

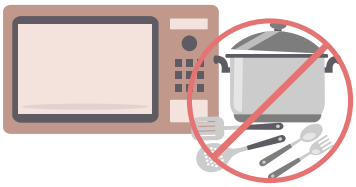
Follow these prevention tips to keep your kitchen safe:

- **Keep appliances serviced, clean, and in good repair.** Dump the crumb tray and clean out the toaster crumbs periodically from the toaster or toaster oven. Wipe out the microwave. Clean the oven. Unplug any appliances that start acting funny, then have them repaired or replace them.
- **Unplug electric appliances when not in use.** Toaster ovens, mixers, coffee makers, and so on, continue to draw electricity even when they're not turned on. So if the wiring is old or faulty, or if the

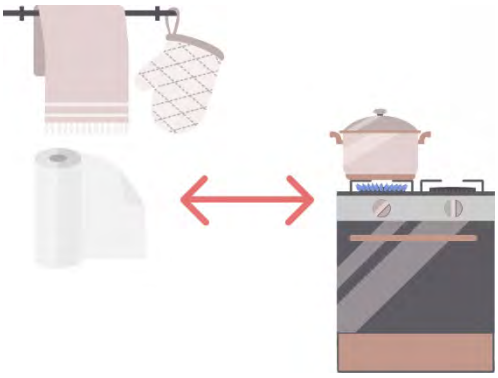


thermostat overheats, a fire could break out.

- **Install a smoke detector near, but not in the kitchen.**
- You don't want the small amount of smoke or steam that cooking sometimes generates to constantly trigger the alarm — but you do want it to sense an actual kitchen fire.
- **Use caution when lighting the pilot light or burner on a gas stove.** Follow the manufacturer's instructions.
- **Don't use metal in the microwave.** The sparks can turn into fire or can seriously damage your microwave.



- **Don't overfill pots or pans with oil or grease.** The hot oil or grease, like in this figure, can splatter and cause a fire.
- **Wipe up spills and don't cook on a dirty stove.** Grease buildup is flammable. A clean stove is a fire-free stove.
- **Always roll up long sleeves and tie back long hair when cooking.** You don't need your beautiful flowing silk sleeves trailing in the spaghetti sauce, and you certainly don't need to catch on fire!
- **Never leave cooking food unattended.** Stay in the kitchen, especially if you're cooking in grease or if the oven is at a very high heat. Turn off the burner or oven if you need to leave the house or get caught up in a phone call.
- **Keep dish towels, pot holders, and paper towels away from the stove.** You might have left a burner on by accident, and built-up heat could ignite combustibles left near or on the stove or oven.



- **Safety considerations for COOKING WITH OIL:**
  - Always stay in the kitchen when frying on the stovetop.
  - Keep an eye on what you fry. If you see wisps of smoke or the oil smells, immediately turn off the burner and/or carefully remove the pan from the burner. Smoke is a danger sign that the oil is too hot.

- Heat the oil slowly to the temperature you need for frying or sautéing.
- Add food gently to the pot or pan so the oil does not splatter.
- Always cook with a lid beside your pan. If you have a fire, slide the lid over the pan and turn off the burner. Do not remove the cover because the fire could start again. Let the pan cool for a long time. Never throw water on the fire.
- If the fire does not go out or you don't feel comfortable sliding a lid over the pan, get everyone out of your home. Call the fire department from outside.

What to do if a cooking fire flares up

By exercising caution in your kitchen, you can help reduce the risk of a kitchen fire. But if a fire does flare up, you need to be prepared.

- **Your safety comes first.** If you cannot safely extinguish the fire, leave the scene, call 112 or a local number for help, and let the fire department control the fire.
- **If a small fire flares up and you are going to try to extinguish it, call 112 for help first.** A fire may grow out of control more quickly than you anticipate. It is safer to have help already on the way.
- **Smother a grease fire – never throw water on a grease fire.** The water can be super-heated and change to steam, and can cause severe burns. Also, it can cause oil to splash up and spread the fire. If a grease fire starts in a pan, smother the flames by sliding the lid – while wearing an oven mitt – over the pan. If safe to do so, turn off the heat source. Do not move the pan; keep the lid on until the fire is out and the pan is completely cool.
- **If a fire starts in your oven, keep the door closed and turn off the heat source.** Keeping the door closed will help smother the flames. Do not open the door until the flames are completely out.
- **If a fire starts in your microwave, turn off the microwave and do not open it until the fire is completely out.** Unplug the microwave only if you can safely do so.

How do you recover from a kitchen fire at home?

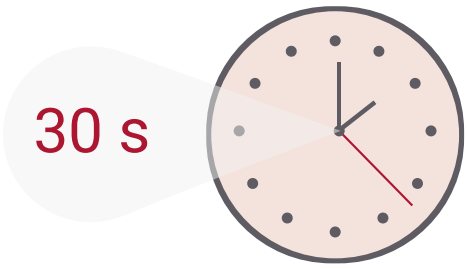
Open windows to ventilate the area and let smoke and odors escape. Remove salvageable, valuable and meaningful items first. Throw out debris and unsalvageable items. Remove kitchen cabinets and drawers to access the interior space.

What to do if a kitchen fire starts:

- If a small fire starts in a pan, do not try to move it.
- Use an oven mitt to carefully slide a lid over the burning pan. Turn off the heat and leave it there until it has completely cooled.
- Never throw water on a grease fire.
- If a fire starts in the oven, toaster oven or microwave, turn off the heat and keep the door shut.
- Replace the appliance or have it serviced before using it again.
- Call the fire department to report the fire.
- Do not try to fight large fires on your own. Get out of the house and call 112.

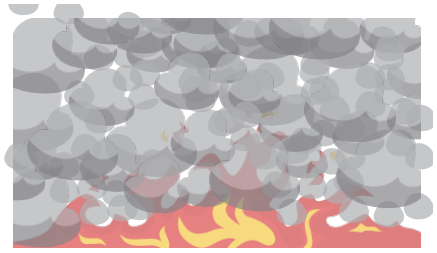
Learn about fires

- **Fire is FAST!** In less than 30 seconds a small flame can turn into a major fire. It only takes minutes for thick black smoke to fill a house or for it to be engulfed in flames.



- **Fire is HOT!** Heat is more threatening than flames. Room temperatures in a fire can be 100 degrees at floor level and rise to 600 degrees at eye level. Inhaling this super-hot air will scorch your lungs and melt clothes to your skin.

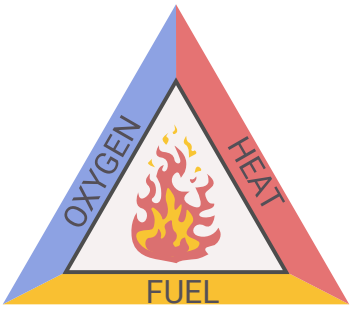
- **Fire is DARK!** Fire starts bright, but quickly produces black smoke and complete darkness.



- **Fire is DEADLY!** Smoke and toxic gases kill more people than flames do. Fire produces poisonous gases that make you disoriented and drowsy. Asphyxiation is the leading cause of fire deaths, exceeding burns by a 3-to-1 ratio.

The fire triangle and protection

The fire triangle, or combustion triangle, is the three components needed to ignite and sustain a fire. The three ingredients of a fire triangle are heat, fuel and oxygen. If just one of these components is removed, the fire triangle will collapse and the fire will be extinguished.



HEAT. A source of heat is required in order for ignition to occur, and different materials have different 'flash points' e.g. the lowest temperature at which they ignite. Unfortunately, combustion reactions also produce heat as they burn, further increasing the temperature of the fuel. For some types of fire, the heat can be cooled with the application of water.

FUEL. A fire cannot begin if there is no material to burn. Homes and businesses are full of flammable materials, such as paper, oil, wood and fabrics. Any of these can serve as a fuel for a fire. Some materials burn more easily than others. Fuels are probably the most difficult 'side' of the fire triangle to remove, so it's wise to store them appropriately to prevent them becoming a fire hazard.

OXYGEN. To sustain the combustion reaction, oxygen (or an oxidising agent) is needed, as it reacts with the burning fuel to release heat and CO2. Earth's atmosphere consists of 21% oxygen, so there is plenty available to trigger a fire if the other two components are present.

Fire blankets and certain fire extinguishers remove the oxygen side of the triangle by removing it or displacing it, causing suffocation and thereby ceasing the combustion reaction.

The 6 types and classes of fire and how to attack them

If a fire starts, it can spread quickly. Not every fire is the same. Different fires can have different hazards and risks. Using the wrong type of fire extinguisher could do more harm than good. There are 6 different types of fire, and each should be attacked in a different way.

Fire can be devastating. Burning, injuring and even killing people. Damaging buildings and equipment. Interrupting business activities. Of course, fire prevention is the best way to make sure that fire doesn't impact you or your business. But you should always have a plan in place for dealing with fires if they do happen.

If a fire does start, it can spread quickly. Knowing how to attack a fire before it grows, isn't always straightforward. Not every fire is the same. Different fires can have different hazards and risks. Use the wrong type of fire extinguisher could do more harm than good. There are 6 different classes of fire, and each should be attacked in a different way.

CLASS A (SOLIDS)

Class A fires are fires involving solids. This type of fuel could be paper and cardboard, common in offices and manufacturing. It could be furniture, or fixtures and fittings. It could even be the structure of the building.

This is one of the most common types of fire because solids are the most common type of fuel and one that is hard to eliminate. Good housekeeping should help to keep materials like packaging and waste reduced, minimising risks.

The only type of fire extinguisher you should use on a class A fire is the water extinguisher. This is the most popular type of extinguisher because it can handle most fires involving solids. But, as a conductor, it should never be used near electrical equipment.

CLASS B (LIQUIDS)

Class B fires are fires involving liquids. Many of the fluids, liquids and chemicals used in workplaces can be flammable or explosive. Like cleaning fluids, solvents, fuels, inks, adhesives and paints. According to statistics, in 2010/11 flammable liquids accounted for only 2% of fires, but a massive 21% of fatalities. These fires are rare but more deadly than other types of fire. So how can you protect yourself?

Make sure you know what flammable liquids are used in your workplace, and carry out a COSHH assessment. COSHH assessments are a legal requirement, for any hazardous substances. This about safe storage and use of these substances, keep them in labelled containers and away from sources of ignition.

Should a class B fire ignite, foam or powder extinguishers are the best types of extinguishers to attack this type of fire.

CLASS C (GASES)

Class C fires are fires involving gases. This could be natural gas, LPG or other types of gases forming a flammable or explosive atmosphere.

Work with gas is dangerous, and increases fire risk. Keep stored gases in sealed containers in a safe storage area, and ensure that gas work is carried out by competent persons.

While extinguishers can be used on class C gas fires, the only safe method to attack this type of fire is to shut off the gas supply. The best type of extinguisher to put out the fire only the supply of gas is cut off, is a dry powder extinguisher.

CLASS D (METALS)

Metals are not often thought of as a combustible material, some types of metal can be, like sodium. Metals are also good conductors, helping a fire spread. All metals will soften and melt at high temperature, which can be a big problem when metal joists and columns are present in a fire as structural elements.

Water can actually act as an accelerant on metal fires, so how would you tackle a class D fire?

There are dry powder extinguishers developed to tackle metal fires. The powder inside the extinguisher may vary depending on the type of metal risk it is designed for. Small metal fires can sometimes be smothered with dry earth or sand.

ELECTRICAL FIRES

This is not strictly a class (class E) of fire, because electricity is more or a source of ignition than a fuel. However, fires in live electrical equipment are an additional hazard. You don't want to be using water, or any other conductor as that could be fatal.

Electrical fires are not given their own full class, as they can fall into any of the classifications. After all it is not the electricity burning but surrounding material that has been set alight by the electric current.

Making sure electrical equipment and installations are installed correctly, and inspected and maintained, will help to reduce the risk of this type of fire.
While you shouldn't use water to attack an electrical fire, you can use other types of fire extinguishers. Like carbon dioxide, and dry powder in low voltage situations. Always turn off the power supply if you can.

CLASS F (COOKING FATS & OILS)

Deep fat frying and spillages of flammable oils near to heat sources in kitchens can result in a class F fire.

Never leave food or frying equipment unattended during use. The only type of fire extinguisher approved for use on cooking oils and fats is the wet chemical extinguisher. For small class F fires, you could also use a fire blanket.

Safety offers 10 tips to keep your family safe

- Cook only when you're alert - not when you're exhausted, not when you've been drinking.
- Keep an eye on what you fry. If you have to step away from the stove, turn it off.
- Keep things that can catch fire - such as dish towels, potholders and paper towels - away from the stove. And avoid cooking in your bathrobe - the loose sleeves can catch fire easily.
- Keep hot things away from the edges of tables and counters.
- Open microwaved food slowly, and keep the food away from your face.
- Have a "kid-free" zone of at least 3 feet around the stove and anything hot -- and never hold your child while you're cooking or carrying something hot.
- Teach kids to stay away from the stove and hot foods.
- Keep pets off cooking surfaces.
- Install smoke alarms in the kitchen, outside each sleeping area, inside each bedroom, and on every level of your home (including the basement).
- If you have a fire, just get outside, stay outside and call the fire department.

Before a Fire

Create and practice a fire escape plan

In the event of a fire, remember that every second counts. Escape plans help you get out of your home quickly. Twice each year, practice your home fire escape plan. Some tips to consider when preparing this plan include:

- Find two ways to get out of each room in the event the primary way is blocked by fire or smoke.

- Make sure that windows are not stuck, screens can be taken out quickly and that security bars can be properly opened.
- Practice feeling your way out of the house in the dark or with your eyes closed.
- Teach children not to hide from firefighters.

Smoke Alarms

A working smoke alarm significantly increases your chances of surviving a deadly home fire.

- Replace batteries twice a year, unless you are using 10-year lithium batteries.
- Install smoke alarms on every level of your home, including the basement.
- Replace the entire smoke alarm unit every 10 years or according to manufacturer's instructions.
- Never disable a smoke alarm while cooking – it can be a deadly mistake.

Stories

"A ball of fire exploded in my face and set my hair on fire."

I bought a take away pizza that didn't require you to preheat the oven. After 30 minutes, I looked in and realized I hadn't lit the gas. For some reason, I put my head in the oven and pushed the ignition button, and a fire ball hit me in the face and set my hair on fire.
Toria Heath, Facebook

"I caught on fire while I was boiling water."

I caught on fire while I was boiling water on an electric stove with no flame. I had just gotten home from work and was wearing a cheap cardigan that was kind of flowy. I turned on the stove top to heat up a pot of water to cook some noodles for spaghetti.
I happened to be on the phone with my boyfriend as I was adding the noodles to the pot of water. Out of the corner of my eye, I saw a flame and flung my phone across the room while simultaneously

screaming, "I'm on fire," and stripping out of my clothes and stomping the fire out. I guess my cardigan was just resting on the burner. Whoops.
Amanda Flower, Facebook

"I almost burned down the house cooking chicken."

My parents went away on vacation for the weekend, and I had the place to myself. I decided I'd cook a buttload of chicken fillets and pasta and just eat leftovers all weekend. My mom buys frozen chicken breasts, and normally I'd thaw them out in a pot of water for a couple hours, but I only gave them 30 minutes. I got my pan of olive oil nice and hot and put in the poorly defrosted chicken, and immediately the pan blew up in flames. I stood there for a millisecond just amazed at what just happened before grabbing the flaming pan and throwing it into the sink and turning on the faucet. After catching my breath, I realized all the white cabinets next to the stove, as well as the ceiling above, were covered in soot. I spent the next hour and a half scrubbing and cursing myself out for almost burning down the house when my parents weren't even on the plane yet.
Amber R Kirkwood, Facebook

Links:

Cooking safety and safety tips:
https://publicsafety.tufts.edu/firesafety/cooking-safety/
https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Top-fire-causes/Cooking

Basic kitchen fire safety rules:
https://www.dummies.com/food-drink/cooking/kitchen-safety/how-to-prevent-kitchen-fires/

What to do if a cooking fire flares up:
https://www.travelers.com/resources/home/fire-safety/cooking-fire-safety

Types of fires:
https://www.cityfire.co.uk/news/fire-extinguishers-types/

What is the Fire Triangle:

https://www.fireaction.co.uk/news/fire-triangle-explained/

Stories:

https://www.buzzfeed.com/jonmichaelpoff/kitchen-horror-stories

Video:

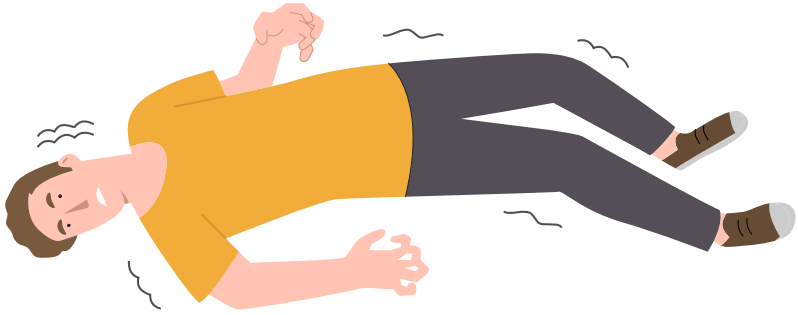
Home Heating Fire Prevention Tips: Heating equipment caused an estimated 56,000 home fires and caused 470 deaths between 2009 and 2013 according to the National Fire Protection Association (Electrical Safety Foundation International (ESFI)).

https://www.youtube.com/watch?v=946coF10rgY

SEIZURES

Imagine yourself at a party. There are lots of people. It's fun! Suddenly, one of your friends drops to the ground, their body starts shaking, and their muscles twitching. What is happening? Probably, your friend is experiencing a seizure. Do you know what you should do? Let's find out!

A seizure happens when the nerve cells in an area of the brain become especially irritant and cause abnormal electrical discharges in the brain, which leads to uncontrolled movements: spontaneous twitching and or stiffness of some body parts. The seizure starts suddenly, continues for some time, and then stops suddenly. When the neurons of the cerebral cortex are the primary link causing their occurrence, they are called **paroxysm**.



Statistics

Approx. 40 percent of the patients have at least one close relative experiencing paroxysms. An isolated paroxysm of seizures may occur in babies with a high fever. 0.4-0.6 percent of people in the world have active epilepsy, meaning that they have experienced at least one paroxysm in the last five years.

It is believed that approximately 7 out of 1000 children under 16 years old and 1 in 100 adults are experiencing recurrent seizures.

The disease may start at any age, but usually, it manifests in childhood and adolescence. Two-thirds of children experience febrile seizures only once in their lifetime. They recur for one-third of children under 5 years old in case of another acute infectious disease or fever. Sometimes they may last for more than 5 minutes, i.e., up to the state of seizures.

SYMPTOMS OF PAROXYSMS

Paroxysmal symptoms include:

- seizures
- disordered movements,
- changes in sensation, thinking, perception, emotions, and behavior.

CAUSES

If the person is ill paroxysmal symptoms can be caused by:

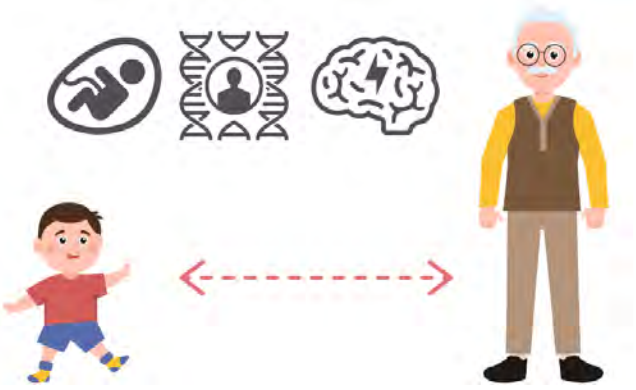
- lack of sleep;
- physical and emotional stress;
- flashing lights;
- some medicaments or excessive alcohol use, or irregular use of antiepileptic drugs.
-

Did you know?

When the cause of paroxysmal symptoms is specific, the state is called an **EPILEPTIC SYNDROME**.

Causes of seizures in different age periods:

- For children – developmental, metabolic disorders, pathology in labor, infection, trauma, genetic causes.
- The adults experience cerebral trauma, stroke, brain tumor or infection, e.g., meningitis, encephalitis, brain abscess, parasites, and other structural changes in encephalon more frequently.
- Significant disorders in the functioning of the whole organism – electrolyte disbalance, deficiency of glucose or oxygen, possible genetic causes.



- The incidence of isolated seizures is not known. Symptoms include sialorrhea, loss of consciousness, disordered orientation, stiffness of body parts, twitching of body parts, seizures in the face.
- The clinical manifestation of seizures depends on the region in the cerebral cortex from which they arise.

There are DIFFERENT TYPES of seizures

The seizures may be:

- **Tonic seizures** (body parts become stiff).
- **Clonic seizures** (body parts are twitching).

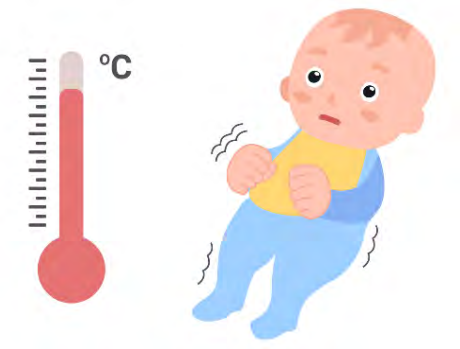
DANGERS of seizures

During seizures, respiration and heart activity may get disordered. Intensive contractions during the seizure episode may hurt muscles and result in ongoing pain. The person may get injured and may cause danger to themselves and others when orientation gets disordered.

Usually, these episodes last for several minutes – tonic-clonic, clonic, myoclonic, and atonic seizures followed by brief sleepiness. Sometimes they serve as the first symptom of acute infectious disease and fever.

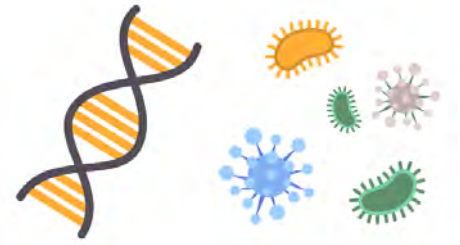
FEBRILE seizures

Febrile seizures are related to fever and experienced by children from 1-3 months old up to 5-6 years old. They are usually brief, benign, do not disturb the development, and are not related to a higher probability of epilepsy in the future. It is the most frequent type of seizure experienced by 2-5 percent of children. It is more characteristic of boys than girls. Usually, the first episode of febrile seizures occurs at 14-24 months.



What are the CAUSES of seizures?

Genetics determines if you will have seizures. 10-40 percent of the children who have had febrile seizures have close relatives who have also experienced them. Sometimes increased or increasing temperature, related to acute infectious, inflammatory, respiratory, or other diseases, cause seizures.



Have you had any paroxysmal symptoms?

Even if the episode was brief, it is necessary to notify the doctor. The doctor will evaluate your condition and advice on future treatment and actions.

First aid: how to help the child?

There is no effective prevention of recurrent seizures – if the child falls ill, he needs adequate treatment for fever and other disorders. But there are some things you can do in the middle of a seizure episode, like:

- When the seizures start, find a safe position for the child. Turn him on the left side so the child would not choke on his saliva or gastric content, and airways would become more passable.
- Do not shake the child, do not perform mouth-to-mouth resuscitation, do not stop the seizures mechanically, and do not put anything into the mouth – it will not help.
- Stay close, and observe the child, the time, and the character of the episode. Usually, it stops within 1-5 minutes.

- If the episode lasts more than 5 minutes, inject rectal Diazepam or give buccal Midazolam prescribed by the doctor. Have these medicines at home or while traveling.
- If the episode is prolonged, call an ambulance and take the child to a medical institution.
- If possible, you can video-record the child's paroxysmal symptoms so that on arrival, the doctor could understand better what was happening, what type and duration of seizures occurred.

What to do when someone is experiencing seizures?

First of all, the most important thing is to protect the person from self-injury:

- If the person falls, try to support them and remove sharp, fragile, or other items that may cause injuries.
- Do not put anything into their mouth.

- Wait till the seizure finishes. It usually lasts no more than 5 minutes.
- After the seizure, check **respiration**.
- The tongue could have fallen, so lift the chin lightly and throw the head back
- Lie the person down on the side so that it would be easier for them to breathe until they regain consciousness.
- Inject 2 ml of diazepam into muscles.
- Do not leave the person unattended.

When should I call the emergency number?

Call the emergency immediately,

- if the seizure episode occurs for the first time,
- if you do not know whether the person experiences recurring seizures,
- if the paroxysm lasts longer than usual, i.e., more than 5 minutes,
- if new symptoms appear or a person gets injured,
- if the person does not regain consciousness while seizures are repeating.

Always call the emergency immediately,

- if seizures happen to **a pregnant woman**,
- if seizures happen to **a baby** (also in case of febrile seizures).

SHOCK

What is a shock?

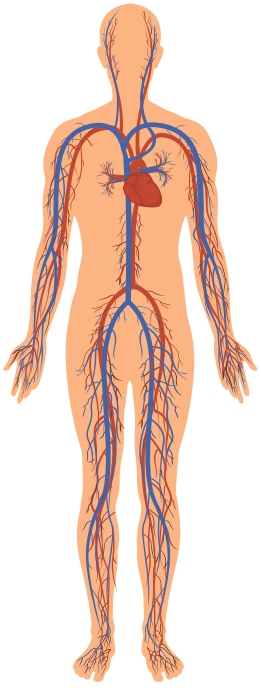
SHOCK is a state of the organism when the supply of tissues and organs with oxygen gets disordered because of disordered blood circulation.

Did you know?

There are **multiple types of shocks**, like:

- Hypovolemic.
- Cardiogenic.
- Neurogenic.
- Anaphylactic.
- Septic.

Bloodflow failure



If you want to find out more about them, read this:

https://www.healthline.com/health/shock#major-types

Hypovolemic shock

The most frequently experienced shock is called hypovolemic. Hypovolemic shock develops due to loss of liquids: bleeding, burns, vomiting, diarrhea, excessive perspiration, or insufficient consumption.

Main signs of the developed hypovolemic shock

The main signs of a hypovolemic shock are:

1. **Frequent pulse**.

   Pulse is frequent when it's:

   - Higher than 160 t/min for babies
   - Higher than140 t/min for children of pre-school age
   - Higher than 120 t/min for school-age children before puberty
   - Higher than 100 t/min – for adults

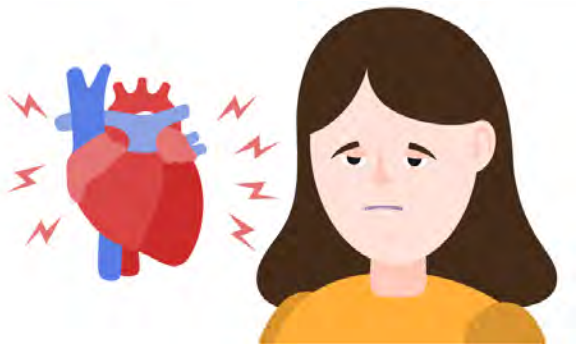
2. **Unusual respiration rate**.

   The normal respiration rate is usually 12 to 20 breaths a minute. It has to be assessed whether the respiration frequency is not affected by other factors, such as stress, diseases, or increased body temperature.

3. **The skin turns pale or whitish**.

   IMPORTANT! IF SKIN IS COLD AND PULSE IS FREQUENT, DEVELOPMENT OF SHOCK SHOULD BE ALWAYS SUSPECTED.

4. **Cold hands or feet**.
5. **Blood pressure is not normal**.



What is a normal blood pressure (BP)?

90 mmHg = felt radial pulse by the wrist.

80 mmHg = felt femoral pulse in the thoracic and dorsal region.

70 mmHg = felt carotid pulse in the neck's region.

How to treat shock?

- If the person is conscious, give them something to drink. If the person is unconscious, they may need an IV drip.
- Try to warm the person up.
- Lie the person down and raise their legs higher.

Anaphylactic shock

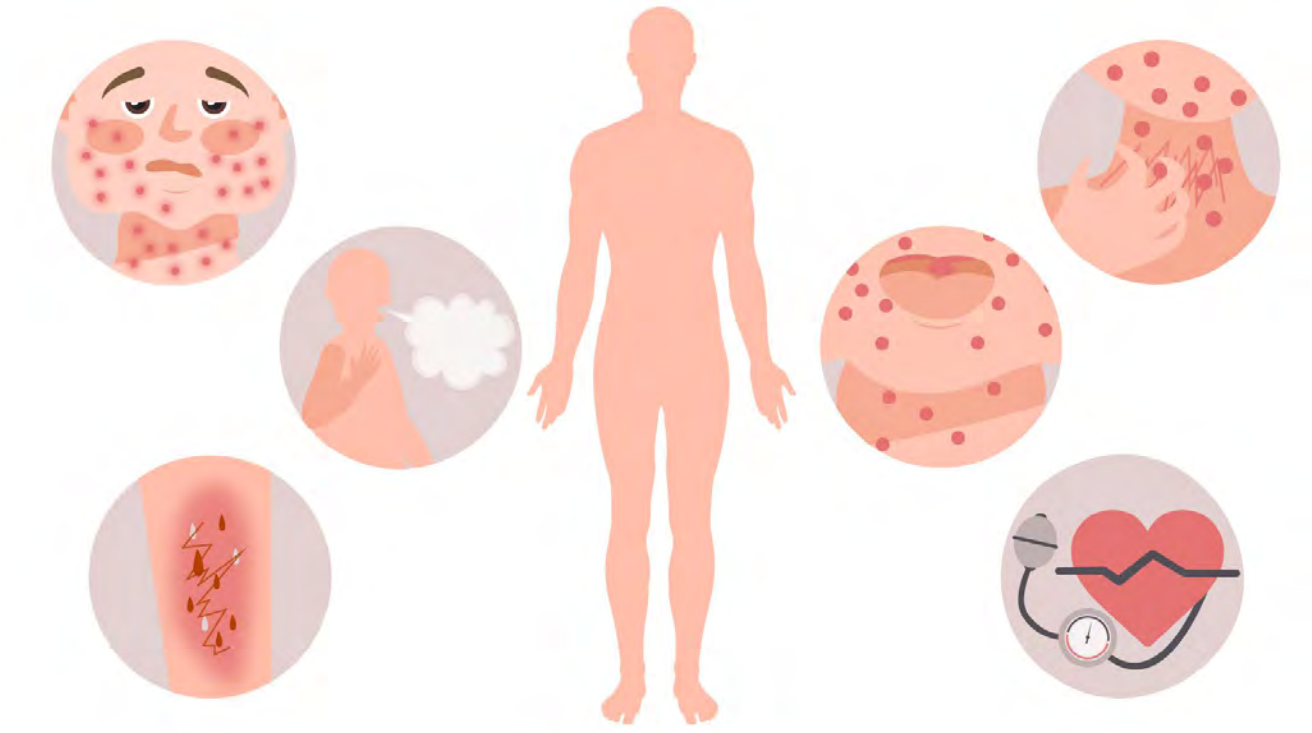
Another frequent type of shock is called anaphylactic. It is a severe systemic allergic reaction that causes lesions to two and more systems of organs: dermal, digestive, respiratory, and cardiovascular. It usually appears in persons that have severe allergies.

Anaphylactic shock **may be caused by**:

- **Medicines** containing many proteins, e.g., serums, vaccines, hormones, antibiotics, vitamins, etc.
- **Insect bites**.
- **Certain food products**, e.g., nuts, eggs, milk, fish, wheat, soy.

Symptoms of anaphylactic shock include:

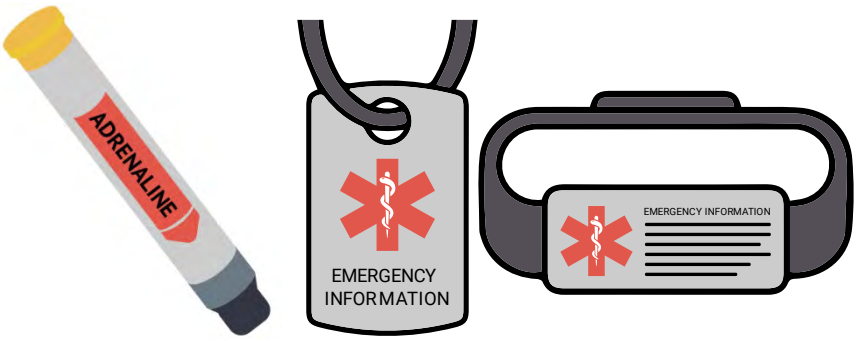
- The skin may turn red, and rashing, hives, itching, or swelling may appear. The skin may also turn blue due to insufficient respiration.
- The respiratory system may be out of order. Some symptoms may include breathing difficulty, breathlessness, wheezing, sneezing, itchy nose, sense of pressure on the chest, cough, and hoarsened voice.
- The cardiovascular system is affected. You can get pale skin, dizziness, general weakness, blackout or loss of consciousness, disordered heart rate, weak peripheral pulse, and decreased arterial blood pressure.
- Nausea, vomiting, diarrhea, and stomachache may appear because of damage to the digestive system.
- Other possible symptoms include itching and reddened eyes, tears, headache, and seizures.
- Only one or several symptoms may show up. However, in the case of anaphylactic shock, **arterial blood pressure will always decrease**.



What to do in case of anaphylactic shock?

Imagine that you see someone experiencing the symptoms of anaphylactic shock.
What should you do?

- Check if the person carries an **adrenalin autoinjector**. People with severe allergies may have them. It should be used and injected immediately if suspicion of the starting anaphylactic shock arises.



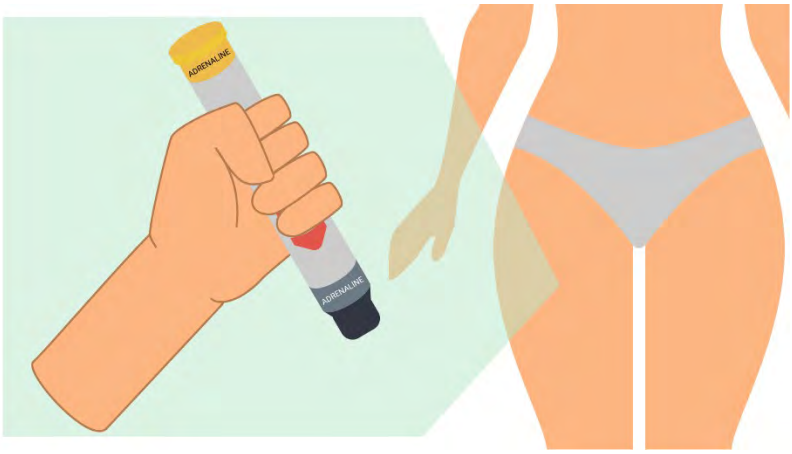
- Check whether the person does not have a **medical necklace or bracelet** containing thorough information about its holder's health state. This necklace or bracelet usually has a symbol of the Red Cross or another similar bright symbol.
- If you have a severe allergy, always have an adrenalin autoinjector with the users instruction. If you lose consciousness, other people may learn how to use an adrenalin autoinjector and help you.
- Do not use an adrenalin autoinjector for the allergic persons with heart diseases unless prescribed so by a doctor.

How to use an adrenalin autoinjector:

- Hold the adrenalin autoinjector firmly. Hold fingers as far as possible from the ends of the device. Remember that an adrenalin autoinjector is a disposable instrument. You can use it only once. After injection, you cannot use it repeatedly. How to inject it?
- First, remove a blue cover. Direct the orange tip of the adrenalin autoinjector to the outer femur and press firmly. You will hear a pressing sound once. If you managed to pierce the skin,

keep it there for several seconds.

- **Important!** Inject or help to inject an adrenalin autoinjector only to the femur. Adrenalin injection to the vein may be fatal.
- After injection, remove the autoinjector from the femur and massage the injection site for 10 seconds.
- Check the orange tip. The orange cover should cover the needle automatically.



FIRST AID IN CASE OF ANAPHYLACTIC SHOCK:

- Eliminate contact with the allergen immediately.
- Call ambulance by 112.
- If the victim feels nausea, lie the person down on the side.
- If the victim is suffocating, sit them down.
- If there is no nausea, lie the person down on the back and raise their legs.
- Ask whether the victim has an adrenalin autoinjector. If someone is unconscious, check whether they have a medical necklace or bracelet.
- Help the victim to inject adrenalin into the outer femur.

In case of clinical death, perform initial RESUSCITATION until the medical persons arrive or the victim recovers.

CARELESS SMOKING

Did you know that more fires are caused by human behaviour than technical failure? In 2009, a Dutch research group found out that smoking and unattended cigarettes were the most common cause of domestic fires. Cooking activities were second. In this course we will learn about the dangers and risks of careless smoking.

Statistics I

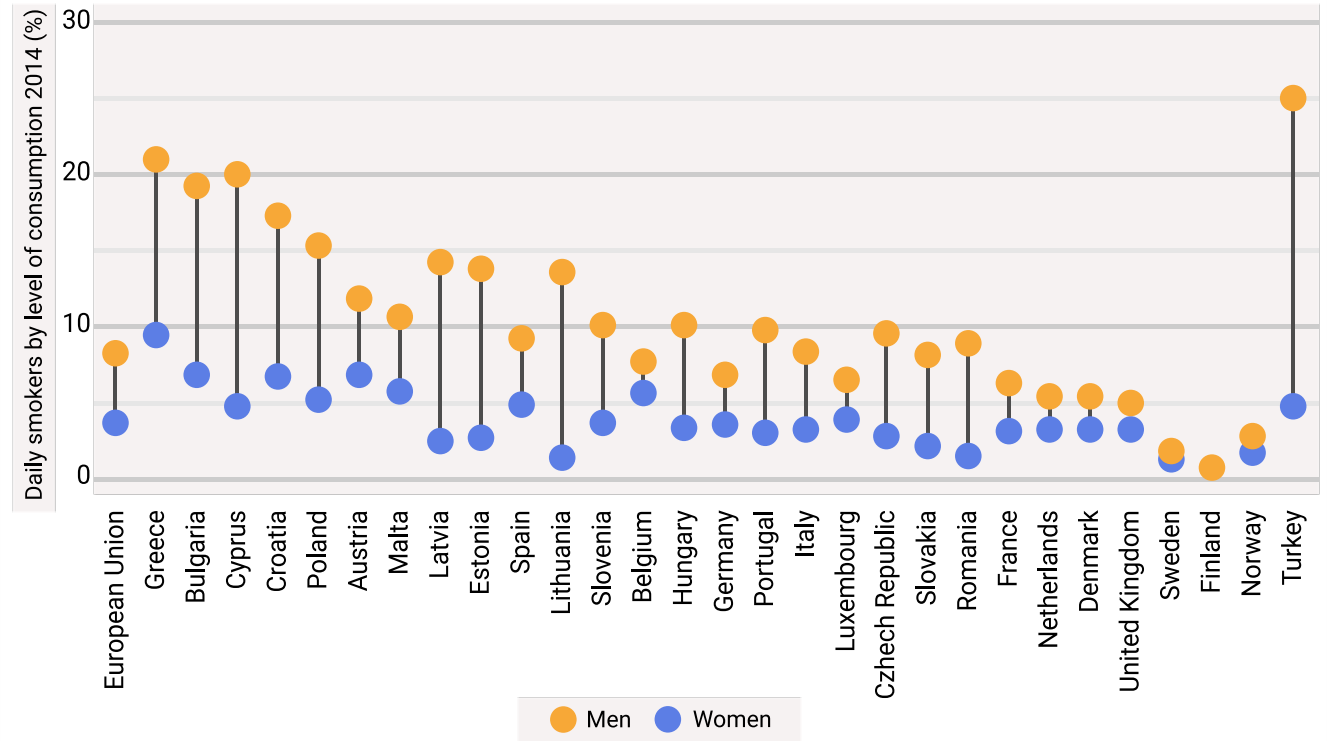
It is thought that in the EU, cigarettes cause more than 30,000 fires every year. It takes away more than 1,000 lives and injures over 4,000 people yearly. Most of domestic fires occur on the weekends and especially at night. Men, children, and the elderly are the most frequent victims of fatal fires. Research in Ireland in 2018 showed that many who fell victim to a deadly domestic fire had consumed alcohol and/or medication that affected their ability to evacuate.

Statistics II

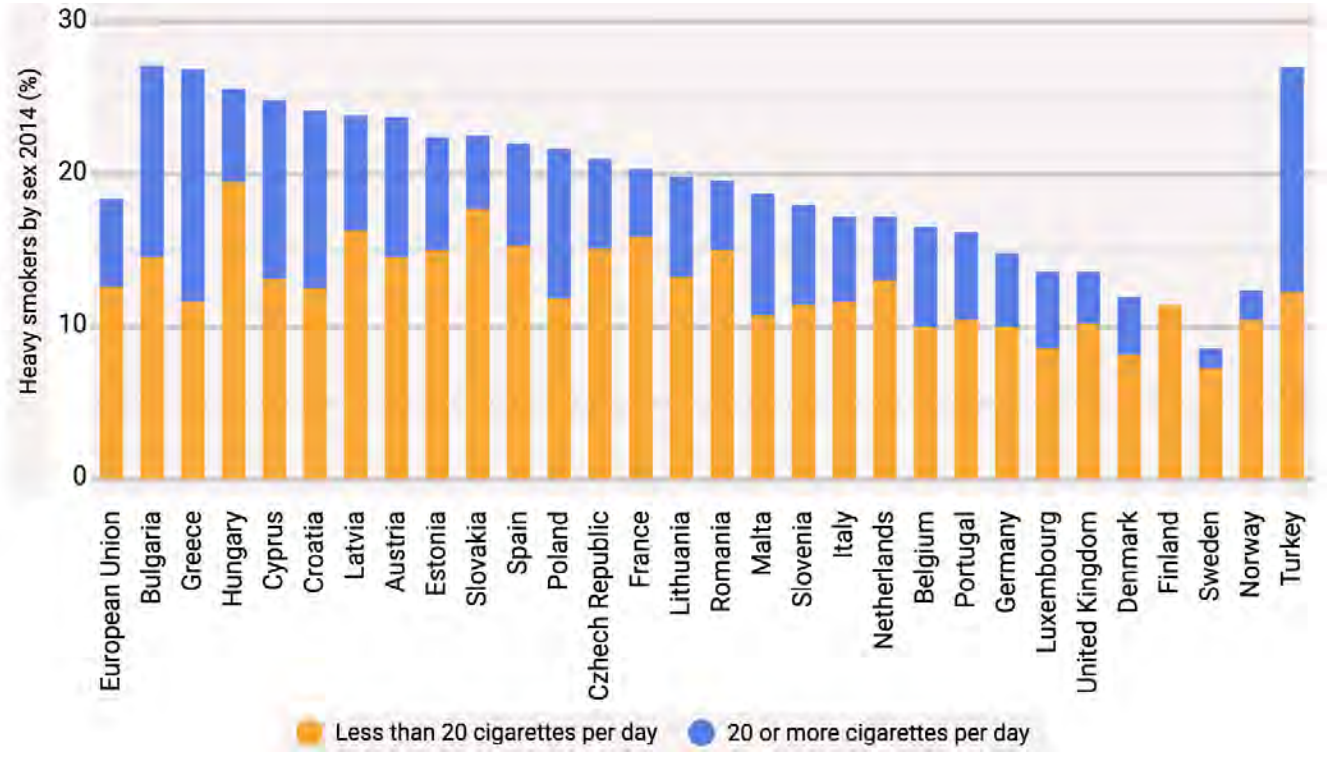
Between 2013 and 2015, a survey was done on smoking habits in the EU. It covered persons aged 15 and over. This survey provides the most accurate information on smoking habits in Europe.

It turns out that significant imbalances exist in terms of sex, age, and education of daily smokers. Also, there are differences between the EU Member States, for example:

- In the EU, in 2014, men were more likely to be daily smokers than women.
- The proportion of daily smokers in the EU in 2014 ranged from 8.7 % (Sweden) to 27 % (Greece and Bulgaria).
- In 2014, 6 % of the EU population older than 15 smoked at least 20 cigarettes per day, and around 13 % - less than 20.
- In Greece and Turkey, most daily smokers were heavy smokers. In Greece, that's almost 1 in 7 adults!

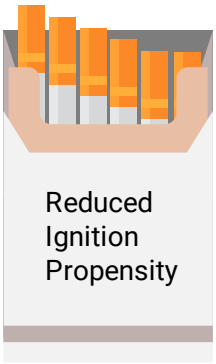


The research showed that in Europe, heavy smoking rates vary: from 1.2 % in Sweden and 3.6 % in the United Kingdom to 10.0 % in Poland, 11.8 % in Croatia, 12.1 % in Cyprus, and 12.7 % in Bulgaria, peaking at 15.1 % in Greece (The European Health Interview Survey (EHIS).



Did you know?

To reduce the number of deaths and injuries caused by cigarette-related fires, the EU sought the introduction of Reduced Ignition Propensity (RIP) cigarettes.



Do you know what those are? RIP cigarettes are self-extinguishing. That means they are less likely to cause a fire when left unwatched. These cigarettes are being sold since 2011.

Real story – Fatal housefire Mundy Street, Derby, UK 25th March 2019

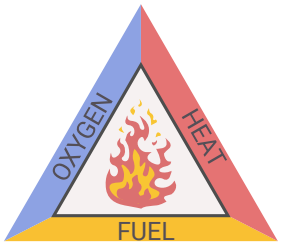
On the 25th of March 2019, a house fire killed a 78-year woman and injured an elderly man in Mundy St., Derby, UK. Derbyshire Fire and Rescue Service concluded the most likely cause of the blaze was accidental. The fire service found out that it was probably caused by a cigarette. It was not fully put out.

Firefighters managed to stop the blaze from spreading to neighbouring houses. They believed the fire started in the bedroom. Firefighters urged smokers to ensure their cigarettes were fully extinguished. Smokers were told to never smoke in bed again.

Theory I

There are three things needed for a fire to start:

- **Fuel.** First, there must be a material to burn. It can be any kind of ignitable material, including paper, oils, wood, gases, fabrics, liquids, plastics, and rubber.
- **Heat** must be present for ignition to take place.
- **Oxygen** approximately 21% of Ambient air is made up of oxygen. So, fuel reacts with oxygen to release heat and start a fire.



Generally, all three parts of the triangle are needed for a fire to start.

Theory II

Most smoking deaths and injuries occur at home. The heat source is usually an unextinguished cigarette. The furniture, fabrics, and fittings in our homes become fuel.

In examining domestic fires, Irish research conducted between 2015 and 2018 indicated that:

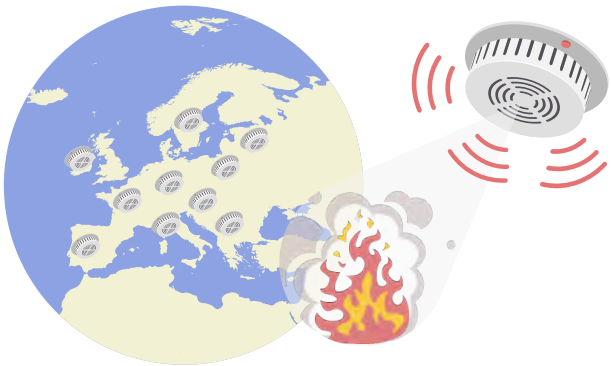
- 1/4 of all fatal fires over the previous 10 years were caused by smoking.
- Most victims were sleeping in the room where the fire originated When the fire started.

1/4 of all fatal fires over the previous 10 years were caused by smoking.

Most domestic fires originate in the bedroom and living room. 17 percent originate in the kitchen, and 9 percent has an unknown origin.

EU member states tried to reduce the risk of fires. They:

- Promoted the use of non-flammable consumer products.
- Encouraged using smoke detectors and heat detectors since most fatal fires occur at night.
- Promoted fire safety education through primary and second-level schools (for example, the bfiresafe@school initiative (www.bfiresafe@school.eu).



Environmental problems:

Cigarette butts cause pollution. From city drains, they travel to rivers, beaches, and oceans. That can be very dangerous since studies show that different parts of cigarette butts often seep into the water, becoming toxic to fish and microorganisms. Chemicals leached from a single cigarette butt (soaked for 24 hours in a liter of water) released enough toxins to kill 50 percent of the saltwater and freshwater fish in 96 hours!

Another laboratory study found that cigarette butts can be a source of heavy metal contamination in water. That's very harmful to local organisms. Cigarette butts also affect roadside soil. Cigarette butts release chemicals, which change the patterns of hydrocarbon levels.

What to do?

Most people don't realize just how easy fires can start. All it takes is a few embers of a cigarette to touch a flammable surface for it to go up in flames.

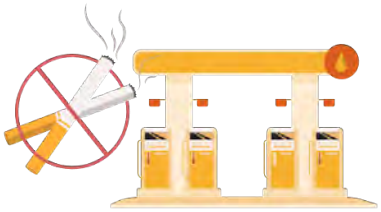
If you or someone in your home smokes, follow simple steps to prevent a fire from happening in your home:

- Never throw a cigarette butt in indoor garbage. Run it under cold water to fully extinguish it instead. In general, be very careful where you toss your cigarette after having it.

- Always use a proper ashtray when smoking your cigarette at home.
- Never ever bring cigarettes into the bedroom!

- When smoking outdoors, especially in areas with plenty of trees and wood, make sure you put out that cigarette.
- Never smoke where there may be petrol/gasoline/flammable materials. It is illegal to smoke at petrol/gasoline stations.

- Don’t smoke in the car. The car is a very enclosed space. When smoking in the car, you are constantly flicking embers out the window as you have your cigarette. What’s to stop those embers from falling on the seat and igniting the upholstery?


DO’S AND DON’TS:

- First of all, never smoke in bed! It's dangerous! You could doze off and set your bed on fire.
- Take extra care when smoking if you have been drinking alcohol or taking medication. It's easy to fall asleep while your cigarette is still burning.
- Make sure your cigarette is fully extinguished. Put it out!
- Never leave lit cigarettes, cigars, or pipes unattended.
- Use a proper ashtray that can't tip over easily and is made of a material that won't burn. Make sure your cigarette is not still burning when you are finished.
- Do not empty your ashtray into a bin because this can cause the bin to catch fire. Put a drop of water in the ashtray and then leave it to cool down fully.
- Maintain a smoke alarm. A working smoke alarm can buy
  you valuable time to get out. You can get a ten-year smoke alarm for roughly the same price as two packets
  of cigarettes. But be careful, smoke alarms often fail
  because missing, drained, or disconnected batteries!
  If you noticed a fire, stay out and dial 112.

Carefully watch these videos:

https://www.youtube.com/watch?v=cb45nx6znjo

https://www.youtube.com/watch?v=JKxEGq_u6cM

https://www.youtube.com/watch?v=7ykcbbqsjGc

Questions:

After seeing the videos, has it made you think about the potential dangers to smoking at home?

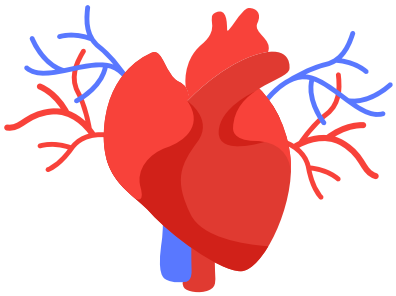
Before seeing the video, did you think about the contribution that cigarette waste makes to environmental pollution?

BASIC ALGORYTHMS OF RESUSCITATION

Cardiac arrest

The heart is one of the most vital organs of the human body. When the beating stops, the person can die within minutes. This condition is called cardiac arrest.

Most of cardiac arrests happen at home, in front of a loved one. Without proper first aid, the chance of survival can fall by 10 % per minute. Therefore, you must know how to perform resuscitation. You can save a life!



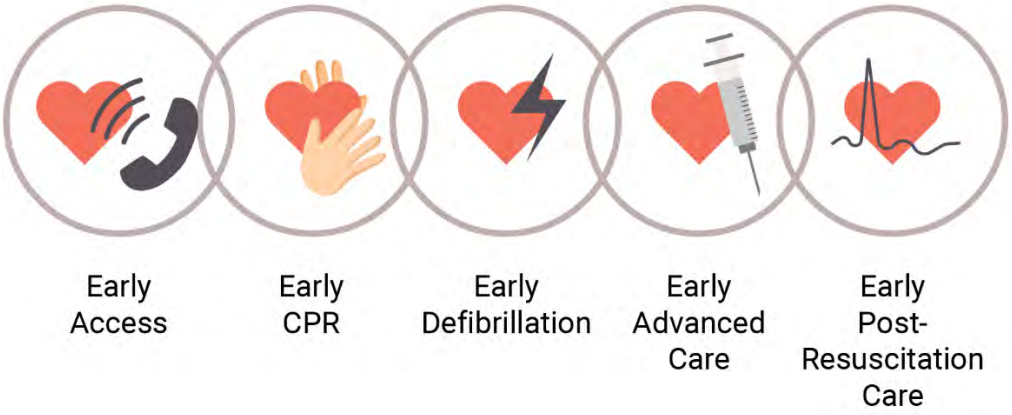
What is a CPR?

When the heart stops beating, a person very quickly will lose consciousness and stop breathing. But human lungs and brain cannot function without oxygen. Someone must push the oxygen into the body manually. Performing CPR (cardiopulmonary resuscitation) means exactly that. That‘s why as many people as possible must know how to perform CPR.

The chain of survival

The chain of survival consists of five steps of resuscitation. These steps are:

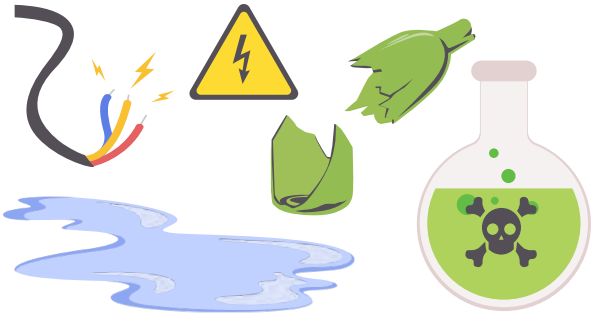
- Early access.
- Early CPR.
- Early defibrillation.
- Early advanced care.
- Post-resuscitation care.



Early Access I

Before approaching the person, you should check the environment and eliminate all possible dangers that may cause safety risks. These may be:

- Water.
- Electricity.
- Wires.
- Glass.
- Chemical Poisons.
- Sharp edges.



Early Access II

If the person appears unconscious, tap or shake their shoulder and ask loudly, "Are you OK?". If the person doesn't respond and you're with another person who can help, have one person call the local emergency number and get the AED if one is available. Have the other person begin CPR.

If you are alone and have a phone nearby, you should call your local emergency number before beginning CPR. Get the AED if one is available.

How to talk to emergency services

There are a few rules on talking with emergency rules. First of all, you should try to stay calm and rational. It's crucial professionals fully understand the situation.

You should state:

- Who you are.
- Where you are.
- Things you have nearby (for example, an AED machine).
- Things you need.

Early CPR

Performing CPR consists of three steps, abbreviated by the first three letters of the alphabet – CAB. C stands for Compressions, with which you should start doing CPR, A – for Airway, which you should clear, and B for – breathing which you should restore.

During the COVID pandemic, the public should only perform compressions, if possible.

How to do compressions?

Compressions are the most important step in CPR. Let’s learn how to do them!

First, put the person on their back on a firm surface. Kneel next to the person's neck and shoulders. Place the lower heel of your hand on the center of the person's chest. Place your other hand on top of the first hand. Keep your elbows straight and position your shoulders directly above your hands. Push straight down on the chest at least 5 centimeters, but no more than 6 centimeters. Use the entire body weight. Push down firmly 100 to 120 times a minute. Think about the rhythm in the song "Stayin' Alive."! Allow the chest to spring back (recoil) after each push.

If you know CPR, go on to opening the airway and rescue breathing. If not, continue chest compressions until the person starts to move or emergency medical personnel arrives.

How to open the airway?

If you know CPR and have performed 30 chest compressions, you should open the person's airway. That's easy – just **tilt the head, and lift the chin**.

Then, use your senses to check whether the person is breathing. You should look, listen, and feel:

Place ear close to person's nose and *listen* for air exchange.

Look at the chest – see if it's rising. Place a hand gently on the chest to **feel** any movement.

How to perform rescue breathing?

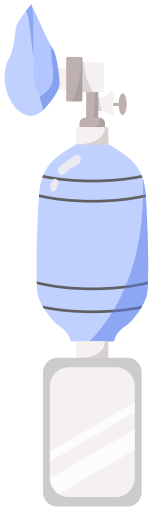
Finally, it is time to start the rescue breathing. Usually, you should perform it mouth-to-mouth. But sometimes, when the mouth is seriously injured or does not open, it can be performed mouth-to-nose.

You should follow these **steps**:

1. After opening the airway, pinch the nostrils shut for mouth-to-mouth breathing and cover the person's mouth with yours, making a seal.
2. Prepare to give two rescue breaths. Give the first rescue breath — lasting one second — and watch to see if the chest rises. Then, try a second breath. If the chest doesn't rise, try opening the airway again. Then give a second breath.

30 chest compressions followed by 2 rescue breaths is considered one cycle. Be careful not to provide too many breaths or breathe with too much force. Resume chest compressions to restore blood flow.

Current recommendations for rescue breathing



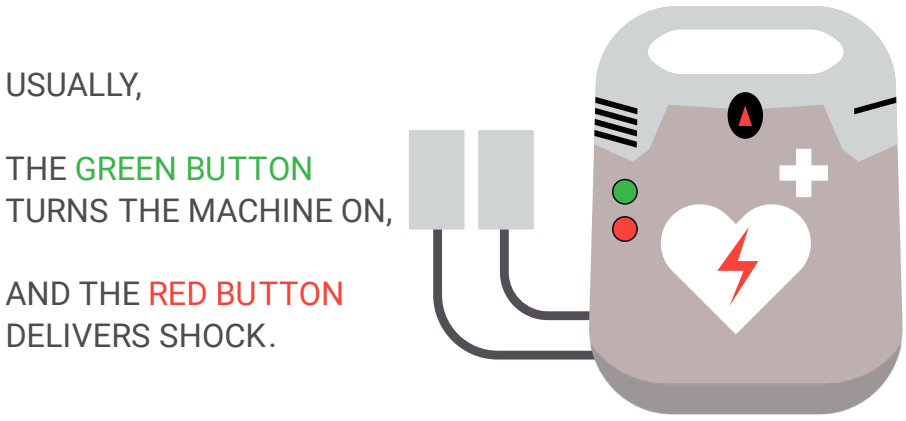
Current recommendations suggest performing rescue breathing using a bag-mask device with a high-efficiency particulate air (HEPA) filter.

Also, During the COVID Pandemic person's mouth is to be covered by a tissue throughout CPR. Also, during the pandemic, you should only perform rescue breathing using a Bag Valve Mask. It requires two persons to function adequately.

Early defibrillation

As soon as an automated external defibrillator (AED) is available:

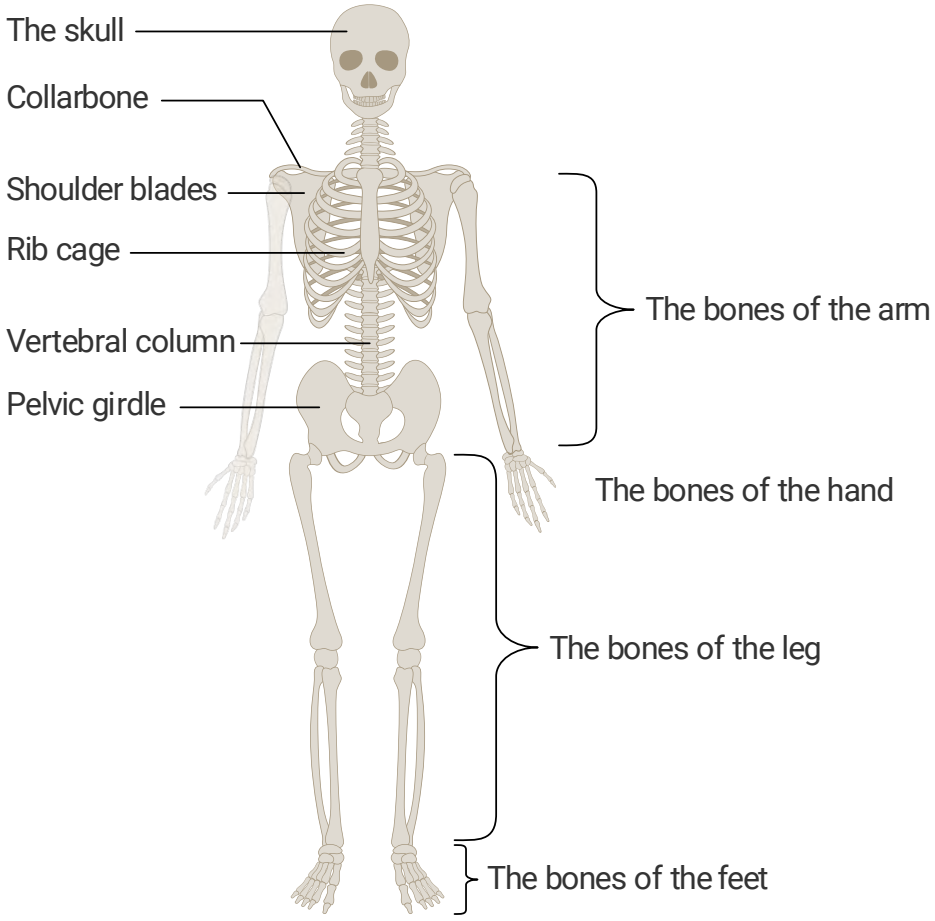
1. Turn it on.
2. Remove any clothing from the chest.
3. Check chest area for:
    - Perspiration - you should dry it off with a towel.
    - Medication patches - if there are any, remove them and wipe the area.
    - Piercings or a pacemaker - avoid placing pads over them.
    - Underwire bra - remove it.
    - Hairy chest - shave the area. You can do it with the AED pads. Just attach the pads securely and swiftly remove them. Then replace pads with a new set.
4. Apply the pads. There will be a visual aid instructing on how to do it.
5. Follow the prompts.
6. Give one shock.
7. Then resume chest compressions for two more minutes before giving a second shock.
8. Continue to follow AED prompts until the person shows any signs of movement or medical help arrives. Take responsibility for the situation.
9. If you don't know how to use an AED - don't worry! A medical operator may be able to give you instructions.



BONES FRACTURES

Skeleton

It's bony framework of the body. It includes the skull, vertebral column, collarbone, shoulder blades, rib cage, pelvic girdle and the bones of the hands, arms, feet, and legs. The skeleton supports the body and protects its internal organs. It is held together by ligaments and moved at the joints by the muscles, which are attached to it. The skeletal system includes bothbones and cartilage.



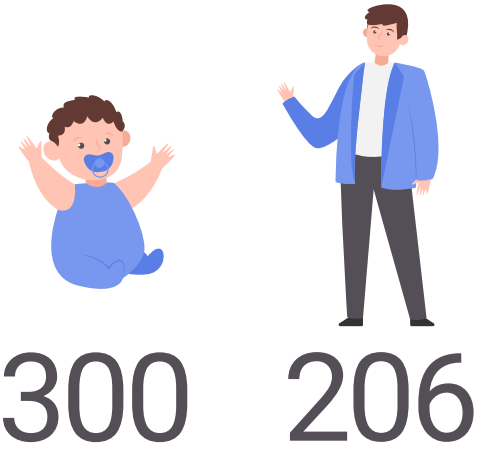
Statistics

Each year an estimated 1.5 million individuals suffer a fracture due to bone disease. The risk of a fracture increases with age and is greatest in women. Roughly 4 in 10 White women age 50 or older

will experience a hip, spine, or wrist fracture sometime during the remainder of their lives.

What percentage of bone are we?

Bones make up only 14% of our weight. At birth we have over 300 bones. As we grow up, some of the bones begin to fuse together as a result an adult has only 206 bones. The muscles of our body constitute 40% of our body weight.



How many bones does the average person break in a lifetime?

On average, every person will experience **two broken bones** over the course of a lifetime. Vertebral or spinal fractures are the most common fractures occurring in 30-50 % of people over the age of 50 and result in significantly increased morbidity and mortality.

For your information:

- **Clavicle or the collar bone**: is the softest and weakest bone in the body.
- **Arm:** Half of all the broken bones experienced by adults are in the arm.
- **Foot:** It's not surprising that so many bone breaks occur in the foot, sinceabout a quarter of all the bones in your body are found in your feet.
- **The thigh bone is called a femur** and not only is it the strongest bone in thebody, it is also the longest. Because the femur is so strong, it takes a large force to break or fracture it – usually a car accident or a fall from high up.

Fractures (Broken Bones)

A fracture is a broken bone, the same as a crack or a break. A bone may becompletely fractured or partially fractured in any number of ways (crosswise,lengthwise, in multiple pieces).

Types of Fractures

Although bones are rigid, they do bend, or give, somewhat when an outside force isapplied. However, if the force is too great, bones will break, just as a plastic ruler breaks when it is bent too far.

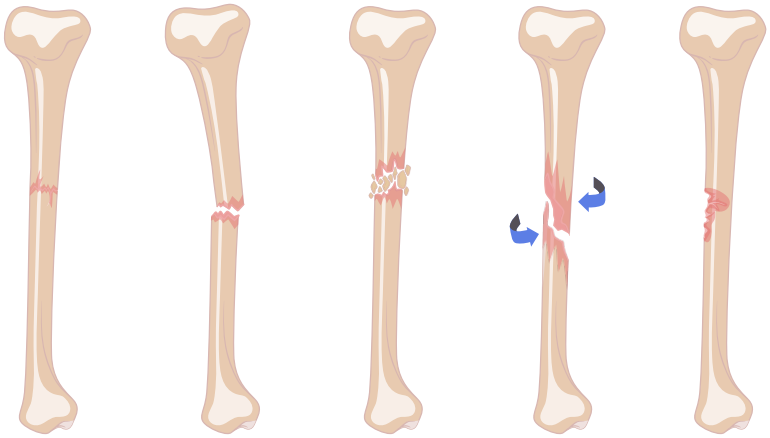
The severity of a fracture usually depends on the force that caused the break. If thebone's breaking point has been exceeded only slightly, the bone may crack rather than break all the way through. If the force is extreme, such as that caused by an automobile crash or gunshot, the bone may shatter.

If the bone breaks in such a way that bone fragments stick out through the skin, or awound penetrates down to the broken bone, the fracture is called an open fracture. This type of fracture is particularly serious because once the skin is broken, infectionin both the wound and the bone can occur.

Common types of fractures include:

- **Avulsion fracture:** A muscle or ligament pulls on the bone, fracturing it.
- **Comminuted fracture:** An impact shatters the bone into manypieces.
- **Compression, or crush, fracture:** This generally occurs in the spongy bone in the spine. For example, the front portion of a vertebrain the spine may collapse due to osteoporosis.
- **Fracture dislocation:** This occurs when a joint dislocates, and oneof the bones of the joint fractures.
- **Greenstick fracture:** The bone partly fractures on one side but doesnot break completely, because the rest of the bone can bend.
- **Hairline fracture:** This is a thin, partial fracture of the bone.
- **Impacted fracture:** When a bone fractures, a piece of the bone mayimpact another bone.
- **Intra-articular fracture:** This occurs when a fracture extends into thesurface of a joint.
- **Longitudinal fracture:** This is when the fracture extends along thelength of the bone.
- **Oblique fracture:** An oblique fracture is one that occurs opposite toa bone's long axis.
- **Pathological fracture:** This occurs when an underlying conditionweakens the bone and causes a fracture.
- **Spiral fracture:** Here, at least one part of the bone twists during abreak.
- **Stress fracture:** Repeated stress and strain can fracture a bone.This is common among athletes.
- **Transverse fracture:** This is a straight break across the bone.

A bone can fracture in different ways. Some common fracture types are shown here:

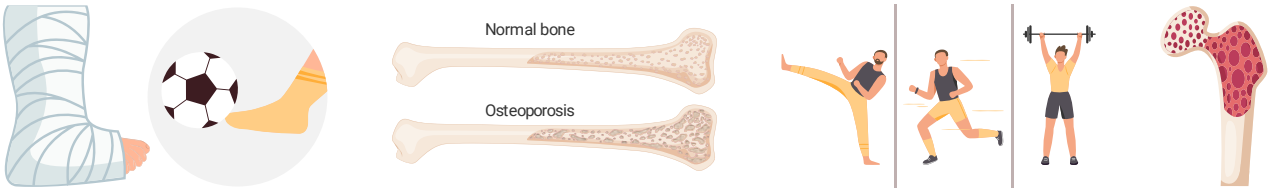


Causes

Healthy bones are extremely resilient and can withstand surprisingly powerfulimpacts. However, under enough force, they may crack or break. Physical trauma, overuse, and health conditions that weaken the bones, such asosteoporosis, are the leading causes of bone fractures. Other factors can also increase an individual's risk of sustaining fractures. A person's bones will typically weaken with age, which increases the risk of thembreaking. As a person ages, the likelihood of their developing a condition that weakens the bones is also greater.

The most common causes of fractures are:

- **Trauma**. A fall, motor vehicle accident, or tackle during a football gamecan all result in fractures.
- **Osteoporosis**. This disorder weakens bones and makes them morelikely to break.
- **Overuse**. Repetitive motion can tire muscles and place more force onbone. This can result in stress fractures. Stress fractures are more common in athletes
- **Cancer**.



Symptoms

Symptoms of a fracture vary depending on its location, a person's age and generalhealth, and the severity of the injury. However, **people with a bone fracture will typically experience some of the following**:

- Pain.
- Swelling.
- Bruising.
- Discoloured skin around the affected area.

- Protrusion of the affected area at an unusual angle.
- Inability to put weight on the injured area.
- Inability to move the affected area.
- A grating sensation in the affected bone or joint.
- Bleeding if it is an open fracture.

Signs:

Many fractures are very painful and may prevent you from moving the injured area. Common signs on examination include:

- D: Deformity
- O: Open wound
- T: Tenderness
- S: Swelling

Doctor Examination

Your doctor will do a careful examination to assess your overall condition, aswell as the extent of the injury. They will talk with you about how the injury occurred, your symptoms, and your medical history.

The most common way to evaluate a fracture is with X-rays, which provide clear images of bone. Your doctor will likely use an X-ray to verify the diagnosis. Doctors may also use CT Scans and MRI's to assist with diagnosis.

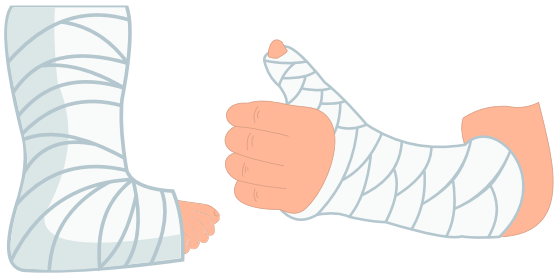
Treatment:

Bone healing is a natural process that, in most cases, will occur naturally. Therefore, treatment typically focuses on providing the injured bone with the bestcircumstances for healing and ensuring optimal future function.

For the natural healing process to begin, a doctor will reduce the fracture. This involves lining up the ends of the broken bones. In smaller fractures, a doctor can dothis by manipulating the affected area externally. However, in some instances, this may require surgery.

Once a medical professional has aligned the fracture, they will ensure it stays inplace. Methods of doing so include:

- Sling immobilization.
- Casts or braces.
- Metal plates and screws.
- Intramedullary nails, or rods, placed in bone cavities.
- External fixings.



Sling immobilization

A sling is the initial treatment given by a first aider on site to assist in immobilization of fractured limb to prevent further damage and relieve painand discomfort. First aid responders cannot and should not manipulate any dislocated / fractured limb. It is a first aiders responsibility to recognize byusing the mnemonic D.O.T.S that there is a possibility that a bone may be fractured / dislocated and immobilize it using triangular bandage or similaruntil the person is reviewed by a doctor.

Cast Immobilization

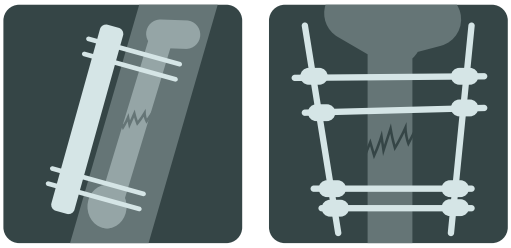
A plaster or fiberglass cast is the most common type of fracture treatment because most broken bones can heal successfully once they have been repositioned and a cast has been applied to keep the broken ends in properposition while they heal.

Traction

Traction is usually used to align a bone or bones by a gentle, steady pulling action. Itis not typically used as a definitive treatment.

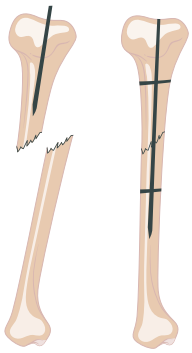
External Fixation

In this type of operation, the doctor places metal pins or screws into the broken bone above and below the fracture site. The pins or screws are connected to a metal bar outside the skin. This device is a stabilizing framethat holds the bones in the proper position while they heal



In cases where the skin and other soft tissues around the fracture are badlydamaged, an external fixator may be applied until you can tolerate surgery.

Open Reduction and Internal Fixation



During this operation, the doctor first repositions (reduces) the bone fragments into their normal alignment and holds the bones together with special screws or by attaching metal plates to the outer surface of the bone.

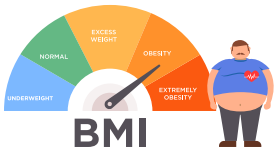
The fragments may also be held together by inserting rods down through thecenter of the bone. A specially designed metal rod, called an intramedullary nail, provides strongfixation for this thighbone fracture.

Recovery

Fractures can take several weeks to several months to heal, depending on their severity. The duration is contingent on which bone has become affected and whetherthere are any complications, such as a blood supply problem or an infection.

Other factors that can affect bone healing include:

- Smoking.
- Excessive alcohol consumption.
- A high body mass index.
- Nonsteroidal anti-inflammatory drug use.
- A person's age.



After the bone has healed, it may be necessary to restore muscle strengthand mobility to the affected area through physical therapy.

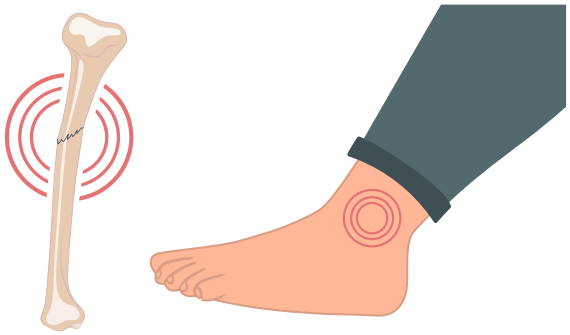
If the fracture occurs near or through a joint, there is a risk of permanent stiffness or arthritis. If this happens, a person may not be ableto bend that joint as well as before the injury.

Complications

While bone fractures typically heal well with appropriate treatment, therecan be complications, such as:

- **Bone heals in the wrong position:** A fracture may heal in the wrongposition, or the bones may shift during the healing process.

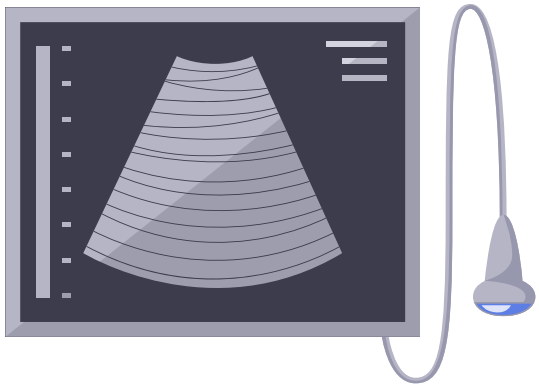
- **Disruption of bone growth:** If a childhood bone fracture becomesdisrupted during healing, this may affect the typical development ofthat bone. This can raise the risk of future deformity in the bone.
- **Bone or bone marrow infection:** In a compound fracture, bacteria can enter through a break in the skin and infect thebone or bone marrow. This can become a persistent infection.
- **Bone death (avascular necrosis):** If the bone loses its essentialsupply of blood, it may die.



Delayed unions and non-unions

Non-unions are fractures that fail to heal, while delayed unions are those that take longer to heal. Treatments for non-unions and delayed unions include:

- **Ultrasound therapy:** A medical professional will apply low intensity ultrasound to the affected area. This may help fracturesheal.
- **Bone graft:** If the fracture does not heal, a surgeon will transplant anatural or synthetic bone to stimulate the broken bone.
- **Stem cell therapy:** Stem cell-derived therapies may assist in thehealing of bone fractures.



Prevention

A person can reduce their risk of bone fractures through a number of remedies and lifestyle changes. A person's diet can affect their risk of fractures. The human body needs adequate supplies of calcium for healthy bones. Milk, cheese, yogurt, anddark green leafy vegetables are good sources of calcium. The body also requires vitamin D to absorb calcium. Exposure to sunlight and eating eggs and oily fish are good ways of getting vitamin D.

Engaging in weight-bearing exercise can help improve muscle mass and bone density. Both of these can reduce the risk of bonefractures. Research has shown that regular exercise and a balanced diet can reducethe risk of a fracture in people with osteoporosis.

Moreover, levels of estrogen, which plays a role in bone health, drop substantially during menopause. This makes calcium regulation more difficult and increases the risk of osteoporosis andfractures.

Consequently, people need to be particularly careful about the density andstrength of their bones during and after menopause. A fracture is a break in the continuity of a bone. Fractures range from smallpartial cracks to complete breaks and can occur in any bone.

Physical trauma, overuse, and conditions such as osteoporosis are the most common causes of fractures. Additionally, a person's bones typicallybecome weaker through late adulthood. This

increases their risk of fracturing a bone.

The body can repair most fractures, but medical intervention will usually benecessary to keep the broken bones in place. These interventions can range from external casts and splints to surgical screws and plates.

DO'S AND DON'T'S:

Do's	Don't's
Always remove clothing around the injured limb.	Never move the injured limb until it is splinted.
Always check for a pulse and capillaryrefill distal to the injury.	Never give anything to eat are drinkto the patient.
Always cover all open wounds with adry sterile dressing before applying The splint.	Never move the patient before splinting unless there is immediatedanger to the patient are the responder.

Video:

https://www.youtube.com/watch?v=2v8vlXgGXwE

CARELESS HUMAN BEHAVIOR

Careless human behavior covers both intentional and unintentional behavior in which people induce fires. In this chapter you will get introduced to statistics about fires, both intentional and unintentional, and how careless human behavior can lead to damage to property and people.

Statistics

Every year someone in Denmark dies because of a fire. In 2004 about 75-80 people died. In 2019 this figure was 49 people. A majority of these people are elderly.

In 2019 2,9 out of every 100000 people over the age of 66 died because of a fire, while the same figure for people between the ages of 15-66 was 0,5. 42% of the victims have physical disabilities. This means that they could be in a wheelchair or otherwise impaired in their ability to move. 23% suffer from substance abuse, most often alcohol, and 14% have a psychological diagnosis or a cognitive disability, such as dementia.

These people can be at greater risk of having a fire occur, of not discovering the fire in time to act and of not being able to handle the fire. This means that people who are already vulnerable have a higher risk of dying in a fire.

People who perish in fires are often above the age of 50. This applies to 80% of the victims. Statistics also show that men die more often than women. 62% of people who die in a fire are male.

80 % of the victims are above the age of 50

A true story

An example of a fire caused by careless human behavior can be seen above. This incident happened a warm and dry day in Risskov, Denmark, the 10th of June. Here the resident of the household decided to use a weed burner on his property, which resulted in the garage burning down and a fine for careless handling of source of ignition. Although not the worst incident this was a costly, unnecessary, and preventable affair.

Theoretical part

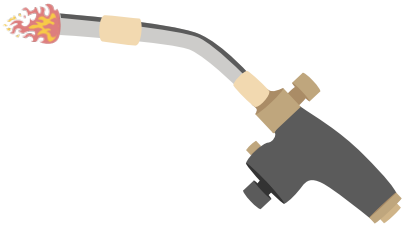
Many fires in Denmark are arson (**intentional behavior**). Most are solved, but it is believed that, there are a number of fires where arson either cannot be proved or there is no suspicion of arson.
Arson are typically started because of a connection with; insurance fraud, revenge, jealousy, conflict, etc.

In the case of deliberate arson, a flammable liquid is typically used to rapidly progress through the four stages of fire development.

Fires caused by **unintentional behavior** happens in places like nursing homes, institutions or in the homes of substance abusers where a match or a cigarette is dropped. Some fires are caused by carelessness in people. Such fires typically happen when someone forgets a lit candle, an iron, a stove or another heat sources, and then leaves it.

Risks and threats

There is a untold examples of fires where **carelessness is the cause**.



A very common cause of fires is the use of weed burners. Many fires every year are started using weed burners. This is a telltale story of carelessness. Many users of weed burners deem

themselves to be careful, but they often overlook their surroundings and forget to think about how flammable things close to the weed burner are. The use of weed burners has over time been the cause of many large and economically expensive fires.

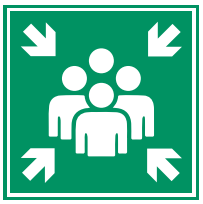
Other situations where carelessness can cause fires are the use of welding machines, burners, handheld tools that cause sparks when used or when doing work that requires a lot of heat, such as roofing. Here the cause often is that the user has not thought about their surroundings and ensured that a fire could not start while they are working.

Bad maintenance of electricity in buildings are another big contributor to the start of fires. Places where it is known that the electricity is badly kept, but nothing has been done to fix it.

When the accident happens

If a fire is detected, the following course of action should always be taken:

1. **Call 112 and let them know:**
    - Where the fire is and what is burning.
    - Where it is happening.
    - If anyone is hurt or missing.
    - If there are people in the building.
    - Access ways.
    - Any special circumstances they should be aware of.



2. **Safe/evacuate people:**
    - Get everyone out.

3. **Is there an alarm system? Use this if possible.**
    - Are there other systems to alert people?
    - Is there a megaphone available?
    - Make sure that everyone is out.

4. **Close doors and windows when leaving (but don't lock them).**

5. **Get close to the floor if the room is filled/filling with smoke.**

6. **Extinguish the fire if possible:**
    - Only if it is safe.
    - Use the firefighting tools available at the site.

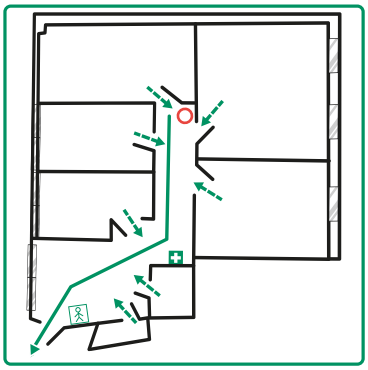
Prevention

To prevent a fire caused by careless behavior or serious bodily harm:

- Don't leave an open flame unattended.
- Don't leave flammable materials near fireplaces and other hot surfaces.
- Don't play around with fire or flammable materials.
- Have a working fire extinguisher.
- Make sure you have a working fire alarm in your private home.

DOS AND DON'TS:

- **Always** know your building's evacuation plan.
- **Never** leave candles, barbecue grills or other open flames unattended
- **Always** Evacuate calmly and quickly whenever a fire alarm or carbon monoxide alarm sounds.
- **Never** re-enter the fire affected building to collect valuables or for any other purpose.
- **Always** Before opening a door, feel it with the back of your hand. If the door is hot, do not open it.



PYROTECHNICS

Many historians believe that fireworks were developed between 600-900 AD, when a Chinese alchemist mixed potassium nitrate, sulfur and charcoal to produce a black, flaky powder – the first "gunpowder" (or "blackpowder"). Fireworks made their way to Europe in the 13th century where Italians were the first Europeans to manufacture fireworks. Nowadays we use them almost every day. Do you know how to handle fireworks safely?

TRUE STORY

A party gone wrong

There are a lot dangers involved in handling fireworks without a proper preparation. For example, on the evening of February 20, 2003, in West Warwick, Rhode Island, USA 100 people died and around 230 were injured from a little spark of fireworks.

The fire was caused by pyrotechnics set off by the tour manager of the evening's headlining band. The pyrotechnics that were used are known as "gerbs" - cylindrical devices that produce a controlled spray of sparks. Four of these gerbs were used to spray sparks 4.6m into the air for fifteen seconds. The fireworks ignited flammable acoustic foam in the walls and ceilings surrounding the stage. The resulting fire reached flashover (temperatures exceeding 1,000°C) within one minute, causing all combustible materials to burn simultaneously.

Intense black smoke engulfed the club in two minutes. Video footage of the fire shows its ignition, its rapid growth, the billowing smoke that quickly made escape impossible, and blocked egress that further hindered evacuation.

The building was completely destroyed. This fire was the fourth-deadliest at a nightclub in U.S. history and demonstrated the dangers in untrained personnel locating and firing fireworks. For additional information on this fire, please consult https://www.bfiresafeatschool.eu/.

What is pyrotechnics?

Pyrotechnics is the science and craft of creating indoor and outdoor fireworks as well as such things as hand-held sparklers.

A familiar feature of larger fireworks displays are aerial shells, which commonly appear as large spherical bursts of stars in the sky. These are fired out of mortars from the ground and have internal timing fuses that accurately and reliably position their bursts. Most fireworks displays are commonly executed to a pre-designed program using electrical wiring and ignition linked to an electronic firing system.

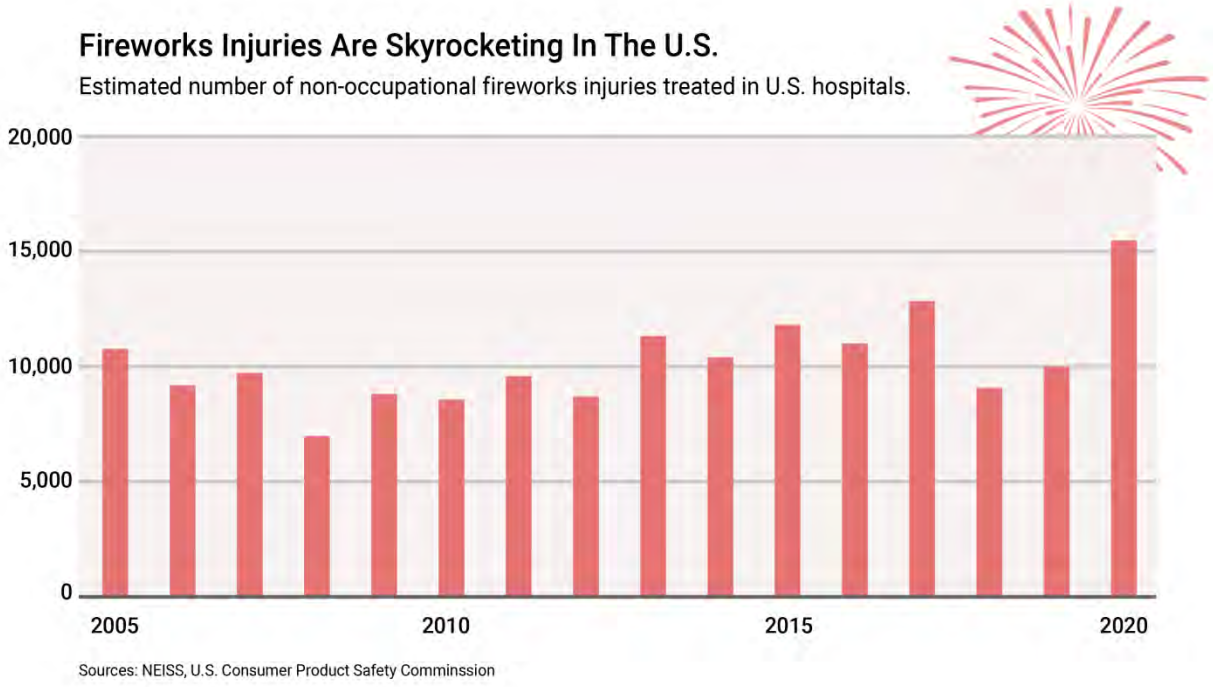
Fireworks are dangerous as they are considered as explosive material, as gunpowder is still used in their production. Because of this the people responsible for the safe storage, handling, and functioning of pyrotechnic devices are known as pyrotechnicians.

Statistics

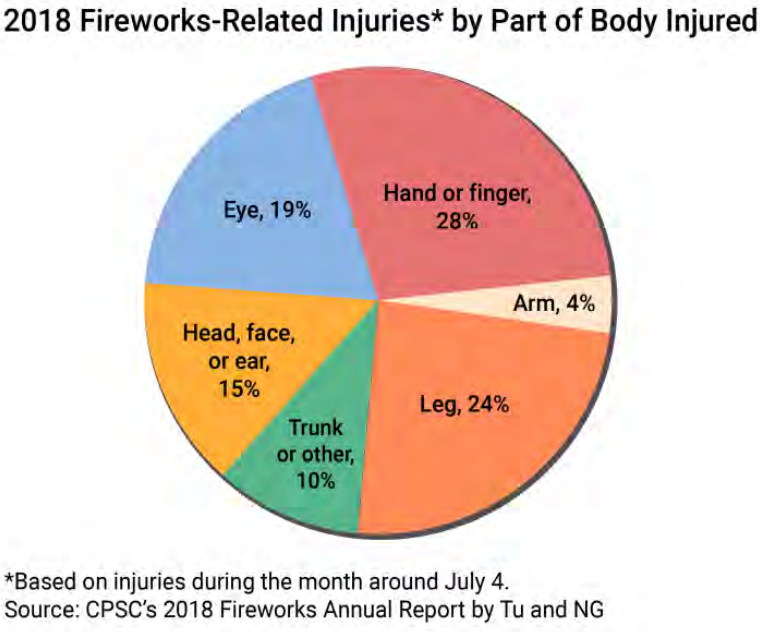
Fireworks cause hundreds of avoidable injuries every year. In the six years between 2000 and 2005, 6,637 people in the UK were hurt and required hospital treatment. In the same period there were two deaths, in 2005 there were 990 injuries.

In 2005 the highest number of injuries occurred at family or private parties, followed by incidents in the street or other public places and large public displays. The most common firework injuries in 2005 were caused by rockets (216), air bombs (111) and sparklers (104).

A recent article by Forbes (2021) presented the results of a U.S. Consumer Product Safety Commission (CPSC) analysis which showed a noticeable uptake in deaths and injuries from pyrotechnic misuse.



In 2018 the National Fire Protection Association (NFPA) in the USA published data on the injuries recorded from the mis-use of fireworks. Almost a quarter of the injuries recorded were in the hand and almost 20 % of cases involved injury to the eye.



Risks and threats

Pyrotechnics a re dangerous substances that must always be treated with the utmost care and attention. Due to the hazardous nature of these materials, precautions must always be taken to ensure the safety of all individuals in the vicinity of pyrotechnics. Despite all precautions, accidents occur from time to time, which may result in property damage, injury and in severe cases loss of life.

These incidents may be the result of:

- The use of a poorly manufactured product.
- Unexpected or unforeseen events (for example changes in weather conditions) or in many cases.
- The result of an operator error.

Main causes of injuries

Not following instructions, lighting too many fireworks at once, going back to a firework once it has been ignited, ignoring the guidelines about the safe distances are the main causes of injuries.

How to handle fireworks safely

- Never throw discarded fireworks on bonfires. Some spent fireworks still have gunpowder left in them and some fireworks which have not gone off will still contain all their explosives.
- Don’t fool around with fireworks. It’s not worth the risk. They are explosives and can be dangerous if not handled properly.
- If you are using sparklers, have a bucket of water nearby. A simple sparkler reaches a

temperature of up to 2,000°C. When sparklers have gone out they should be put hot end down in the water.

- Make sure you wear the right clothing – you should always wear gloves (especially when holding sparklers). Do not wear nylon clothing, which melts against the skin, and don't wear open neck shirts, T-shirts or shorts where bare skin is exposed to the danger of fireworks. Remember to tuck scarves in so they don't catch alight.
- Spectators should stand away from fireworks.

Did you know?

Typically, a rocket can reach in excess of 200 km an hour a shell fired from a mortar will go as high as 200 metres. Be aware of just how fast and far a firework can travel!

Prevention

Use the following tips to avoid the most common injuries when using fireworks:

- Never lean over lit fireworks when lighting the fuse. Back up to a safe distance right after lighting them.
- If you find unexploded fireworks, leave them alone. Never try to relight or handle them. Soak them with water and throw them away.
- Keep a bucket of water or a garden hose nearby the area where you're lighting fireworks.
- Never point or throw fireworks at another person.

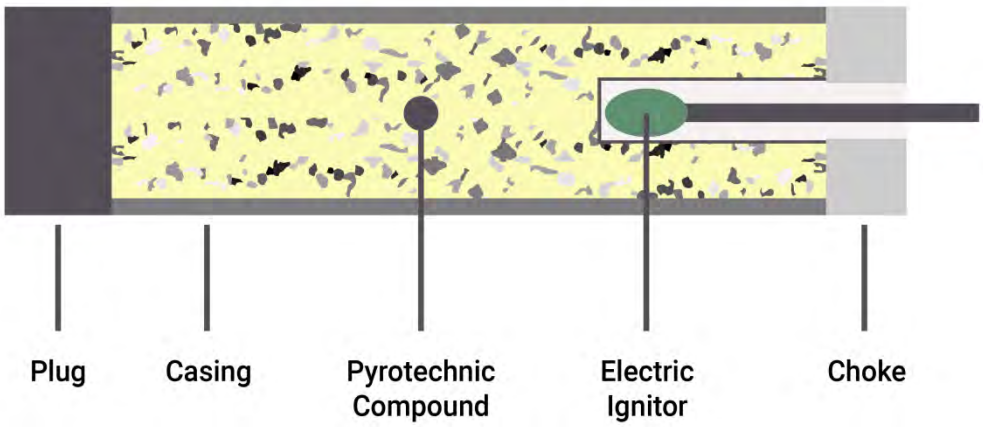
- Light fireworks one at a time, then move away from them quickly.
- After fireworks are done burning, douse them with plenty of water before throwing them away to prevent a trash fire.
- Don't try to make fireworks yourself.
- Only use fireworks outdoors.

Safety standarts

Remember: safe fireworks have CE mark. Make sure they have a number EN15947 written on them – this number means that they fit the safety standard.

Theory

The basic operation of most fireworks relies upon self-contained and self-sustained exothermic chemical reactions to make heat, light, gas, smoke and/or sound. Typical pyrotechnic formulations consist either of flammable materials such as nitrocellulose and/or black powder or a mixture of a fuel and oxidizer blended in situ.



A plug placed at one end of the container with a small orifice, called a choke, constricts the expulsion of the ignited pyrotechnic compound, increasing the size and aggressiveness of the jet.

Types of pyrotechnics

Various ingredients may be added to pyrotechnic devices to provide colour, smoke, noise or sparks for example, sandwiching layers of pyrotechnic compounds containing potassium perchlorate, sodium salicylate or sodium benzoate with layers that do not creates a fountain of sparks with an undulating whistle.

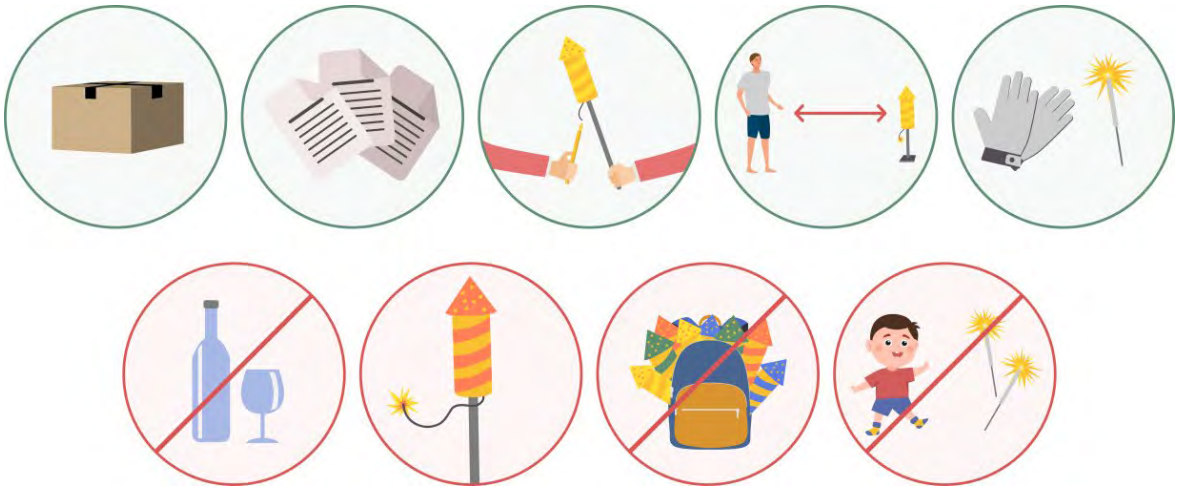
Pyrotechnics may be divided into two main categories:

- **Display pyrotechnics** (also known as commercial fireworks), are intended for use outdoors, where the audience can be further away, and smoke and fallout is less of a concern. This work is normally undertaken on temporarily secured locations by specialist companies employing teams of experienced pyrotechicians.
- **Consumer pyrotechnics** are devices readily available for purchase to the general public with little or no special licensing or training. Like all pyrotechnics, they can still be hazardous and should be stored, handled and used appropriately.

DO'S AND DON'T:

- Don't drink alcohol if setting off fireworks.
- Keep fireworks in a closed box.
- Follow the instructions on each firework.
- Light them at arm's length, using a taper.

- Stand back.
- Never go near a firework that has been lit. Even if it hasn't gone off, it could still explode.
- Never put fireworks in your pocket or throw them at other people.
- Always supervise children around fireworks. Never give sparklers to a child under five years old.
- Light sparklers one at a time and wear gloves.



Video:

This video from Dublin Fire Brigade showing the dangerous of fireworks and bonfires:

https://www.youtube.com/watch?v=DLrpC3yhcF

Video showing the injuries that may result from fireworks:

https://www.youtube.com/watch?v=6o6pvrBNLow

Links:

https://www.bfiresafeatschool.eu/

https://www.youtube.com/watch?v=N0uMUH6jta0

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/31865/10-1038-fireworks-safety-media-toolkit.pdf

https://www.nfpa.org/News-and-Research/Data-research-and-tools/US-Fire-Problem/Fireworks-fires-and-injures

https://www.americanpyro.com/history-of-fireworks

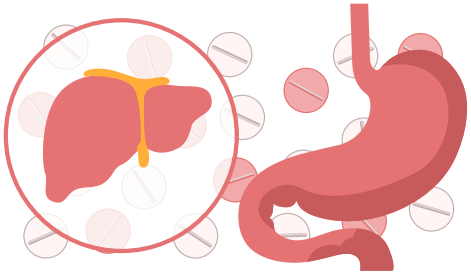
https://www.forbes.com/sites/niallmccarthy/2021/07/01/fireworks-injuries-are-skyrocketing-in-the-us-infographic/?sh=68d39f177e69

MEDICATIONS

We use medications for various purposes. It's a crucial part of our healthy lives and a brilliant invention that should not scare you. Nevertheless, incorrectly used drugs may cause harm. An incorrect dosage may be very harmful and sometimes even cause death. That's why you got to be very careful.

Dangers of medications

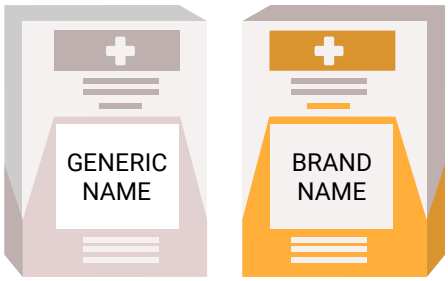
Incorrect use of medications, even when taken in small doses, may result in harmful effects. The risks of medicines are the chances that something unwanted or unexpected could happen to you or the patient when using them. Risks could be less severe, such as an upset stomach, or more severe, such as liver damage. Never use medications without an adult unless your parents or doctor told you to do so.



Naming a drug

Firstly, there is a difference between a brand name and a chemical name of a medication.

You must have heard of Aspirin, for example. But did you know that is a brand name given by the manufacturer and not a technical name of the actual drug? The chemical name of Aspirin is Acetylsalicylic Acid (ASA). If your doctor recommends you take Aspirin, you can take different brands or trades, as long as the chemical formula is the same – if it's Acetylsalicylic Acid (ASA). But make sure that you take the right amount!



Reacting to drugs

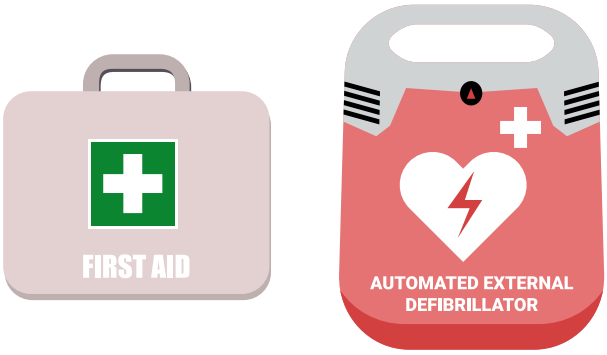
There are several terms you must know, when taking medications. Always carefully read all the labels and follow instructions precisely as suggested. In the instructions, you may find these terms:

- **Indication** means the condition for which the medication is being prescribed. For example, chest pain is an indication for Aspirin.
- **Contraindication** means a condition with which the medication can be harmful to patient. If you have a contraindication, you cannot take the drug or must be very careful with it. For example, an active bleeding disorder is a contraindication for Aspirin. You cannot take Aspirin if you have active bleeding disorder.
- **Side effects** are undesired conditions which the drug may cause upon a person. Side effects are a known response to a drug administered within usual dose range. They are always written on the labels. For example, if you take Aspirin, your stomach may get upset.
- **Adverse reactions** are side effects that are not a known response to a drug. That may happen, for example, if you have an allergy for a drug and don't know about it.

Did you know?

Until 2014, medications were a no-no in the administration of first aid. We now know, that certain medications administered to persons with life-threatening conditions would benefit from the immediate administration of medication. Just as the use of Automated External Defibrillators has been made available throughout the community and is saving many lives, certain medications also can make the difference. Once a First responder is qualified and maintains their certification through ongoing refresher courses, including medication administration, and is affiliated with a recognized

responder group through which the medications are available, they may administer the medications following their assessment of the situation at hand.



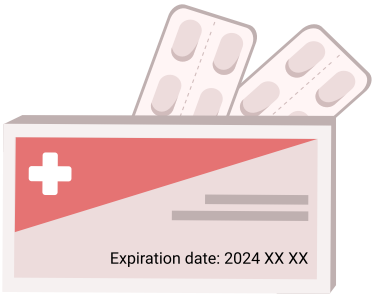
Allergies

When taking a medication (or giving it to someone), it is crucial to know whether you are allergic to the drug you are about to take.

Also, you must know that some medications that an EFR (Emergency First Responder) can administer or assist with administration can have severe consequences if administered to a patient with an allergy to them.

You should always make sure that:

- The drug is not expired.
- The drug is in the correct packaging, and the strength is correct.
- The drug has not been tampered with.



What to do?

If, for whatever reason, you've taken a medication that you don't need or you've taken an incorrect dose of medication, you must immediately **report the details** to the appropriate authority, like:

- Senior people, like a teacher or a parent.
- Your doctor.
- Arriving emergency responders.
- The hospital you are arriving at.

Summary:

- Always make sure it is the right drug.
- Never take the drug if it is out of date.
- Always check the date on the medication packaging before taking it.
- Never take medication if you've had a bad reaction to that medication before.
- Always report if you took the wrong medication.
- Never take medications if there are any counterindications to it.

EVACUATION

Evacuation is one of the primary methods of protecting the population in an emergency. People are evacuated from disaster-affected areas far more frequently than many realize. Every year, hundreds of people must flee their homes. Most people must evacuate due to devastating natural disasters such as wildfires and floods.

What is an emergency evacuation?

Emergency evacuation is transporting people to other areas by temporarily relocating them elsewhere. Institutions must evacuate people when living or working on the territory is unsafe because of an emergency.

What is an emergency?

An emergency occurs when an event severely affects or kills people, causes significant material damage, and the problems persist for an extended time and are difficult to resolve. For example, it could be an act of terrorism or a nuclear and radiation accident in which at least one person dies.

True stories

In September 2005, Hurricane Katrina forced the evacuation of the entire population of New Orleans, USA (approximately 1 million people). Hurricane urged them to leave the city, but not everyone took advantage of the opportunity. Part of the population remained, and 30,000 found shelter at the multi-purpose stadium “Superdome” and the conference center. However, as the situation deteriorated, they were evacuated forcibly.

In September 2005, police found a suspicious unattended bag in the international Warsaw Chopin Airport terminal; as a result, police evacuated an entire airport to avoid any risk of terrorist acts.

In October 2006, the two days of heavy rain in Poland led to severe flooding, due to which danger was declared in three voivodeships: Podkarpacie, Lesser Poland, and Lublin. The Vistula River's water level rose to seven metres for the first time since 1934, causing numerous problems for people. The 500 residents were evacuated only in the Lesser Poland Voivodeship.

Flooding caused by heavy rains in Northern Greece in October 2006 swept through dozens of villages, eroding roads and destroying bridges; therefore, rescuers had to use helicopters to evacuate people cut off by the natural disaster.

After hydrogen explosions and nuclear meltdowns at the Fukushima Daiichi Nuclear Power Plant, more than 170,000 people had to evacuate. At first, people within a 20-kilometre radius of the power plant got an evacuation order. However, following the advice of International Atomic Energy Agency (IAEA) controllers, the Japanese government has expanded the evacuation zone further to include residents within a 40-kilometre radius of the unsafe radioactive area. In 2013, nearly 300 people were still living in temporary shelters in the North-Eastern region, two years after the forced evacuation.

Is evacuation necessary?

The first challenge is determining whether emergency evacuation is necessary. The decision to evacuate, the number of evacuees, the beginning of the evacuation, evacuation destinations, and living conditions depend on the nature of the danger and the **following factors**:

- The extent of the risk's impact (for example, the size of the area affected).
- The severity of the risk's impact.
- The potential duration of exposure.
- The impact of the risk on human health and life.
- The impact of the risk on living conditions (destroyed houses and roads, power outages, and cut-off communication systems).

- The impact of risk on the household (the possibility of quickly restoring utility services and food supply).
- Future living conditions (accommodation in buildings or tents).
- Technical condition of evacuation routes.
- Effectiveness of protection measures.

Evacuation can be planned or urgent. The planned evacuation is carried out in the event of an emergency if the available information and situation analysis shows that people are in real danger and that it is best to protect them by transporting them to a safe area ahead of time. Urgent evacuation happens in the event of a dangerous emergency in which people must immediately evacuate from the territory.

How to organise an emergency evacuation?

The organisation of emergency evacuation is a difficult task. Evacuation of people requires organising various additional activities, like:

- People's access to vital services.
- Assurance of public order and health.
- Provision of necessary medical aid.
- Provision of psychological and social support.
- The organisation of the convoy and protection of passenger vehicles.
- Public dissemination of information on emergency evacuation.
- Keeping records on residents and vehicles.
- The organisation of resident assembly points and the establishment and operation of their reception points.
- Establishment of intermediate evacuation points for people and organisation of their activities.

When the nature of the emergency requires dosimetric control or de-contamination procedures?

After chemical or radiological exposure, residents should evacuate in the following ways:

- Directly from their place of residence or workplace, or through resident assembly points by transporting them to intermediate evacuation points by using means of transportation provided by the municipalities performing evacuation.
- People should be transported from intermediate evacuation points to reception points (temporary residential premises) using transportation provided by municipalities performing evacuation.
- Residents who evacuate by car must also travel through intermediate evacuation points

What information should I get?

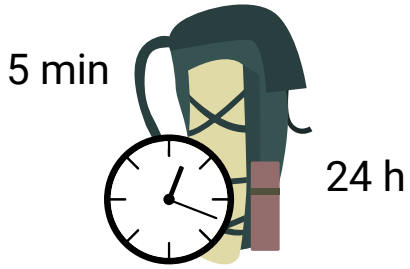
Once the government makes a decision to evacuate the population to safe areas, you should get the following information:

- The fact that evacuation is mandated.
- The time limit within which you must leave the unsafe territory.
- Evacuation methods for people who do not own vehicles.
- Locations of evacuation (assembly) points.
- Locations of intermediate reception points (if necessary).
- Evacuation destinations and locations of reception points (for people who evacuate by personal vehicles).

- Items you should bring.
- What precautions you should take before leaving their homes.
- Roads (routes) for evacuation.

Emergency supplies

Disaster can happen anywhere and at any time. The time it takes to leave the house and depart depends on the nature of the emergency situation. In the event of a radiation emergency, it will be possible to pack all items and evacuate within a 24-hour period.



However, in the event of catastrophic flooding, every minute will count. If you pack all of your basic items ahead of time, you can protect both your health and life. Many items may be required not only during an emergency evacuation, but also while staying at home in case of emergency. Therefore, it is best to keep them packed so that you can access them quickly, if necessary. In addition, all family members must be aware of their exact location.

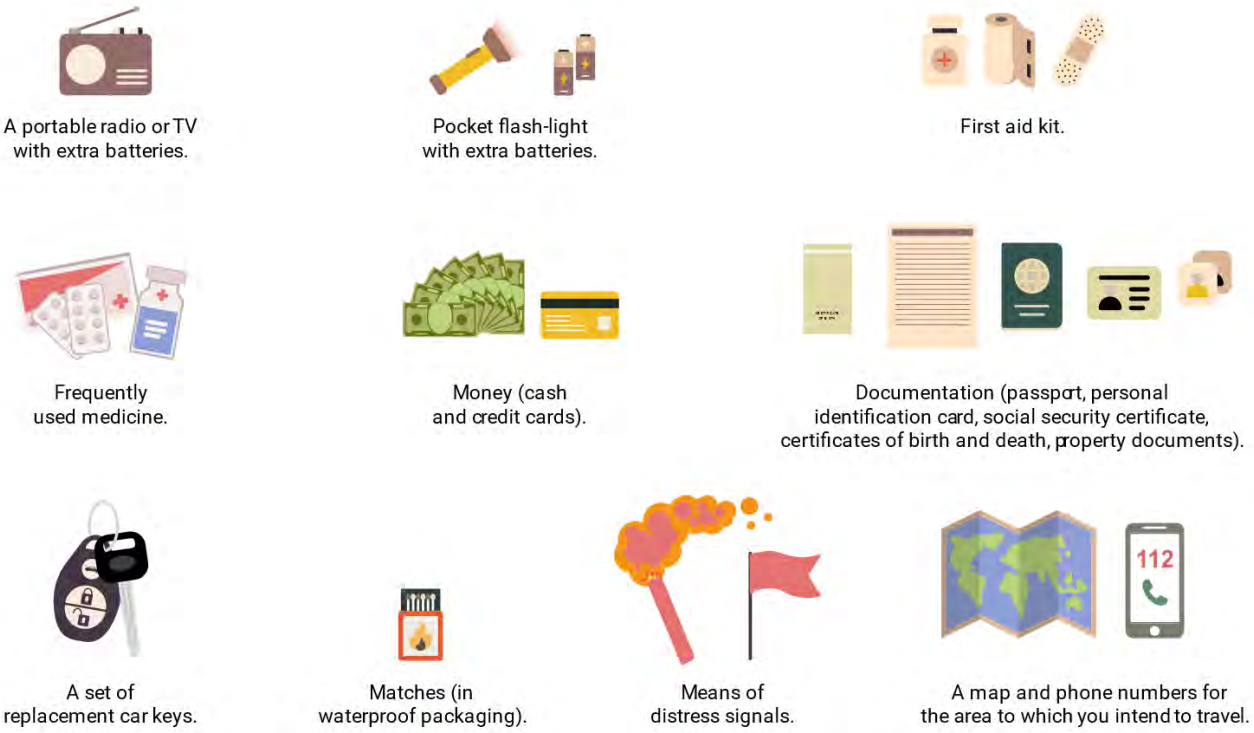
The basic survival kit:

- A portable radio or TV with extra batteries.
- A portable lantern with extra batteries.
- First aid kit.
- Medicines that are frequently used.
- Money (cash and credit cards).

- Documentation (passport, personal identification card, social security certificate, certificates of birth and death, property documents).
- A set of replacement car keys.
- Matches (in waterproof packaging).
- Means of distress signals.
- A map and phone numbers for the area to which you intend to travel.
- Individual precautions (e.g., cotton wool and gauze bandages, prescriptions or copies of frequently used medications, spare batteries for the hearing aid or a wheelchair, spare glasses, etc.).

In addition to these necessities, keep in mind the additional items that will be required for evacuation. It is necessary to consider the needs of all family members, particularly babies, the elderly, and the disabled, who will require specific supplies, such as:

- Water (at least 12 litres of water per family member).
- Non-perishable food supplies for three days.
- Kitchen utensils (cans opener, disposable glasses, plates, Swiss Army knife, garbage bags).
- A set of spare clothes for each family member (footwear, waterproof jackets, caps and gloves, warm clothing and glasses).
- Blankets or sleeping bags for each family member.
- Other items, such as paper, pen, thread and needle, handheld shovel, pliers, wrench, whistle, tent, compass, rope, adhesive tape, etc.
- Sanitary and hygiene products (toilet paper, disposable napkins, towels, soap, disinfectants, shampoo, deodorant, toothpaste and toothbrush, comb, lip balm, etc.).
- Measures to pass the time while waiting (books, games).



Water

Water should be stored in plastic bottles. They do not break, are lightweight and transparent, allowing you to see the quality of water. The average active person consumes approximately 2.5 litres of water per day, which increases to twice that amount during hot seasons or during sports. Children, breastfeeding mothers and sick people consume more water. Therefore, when preparing water supplies for each family member, an average of 4 litres of water is required per day (2 litres for drinking and 2 litres for cooking). It is recommended that you have enough water for three days.

Food

Food supplies must include non-perishable food products that are lightweight, compact, do not need to be refrigerated and require very little or no water to prepare. It can be ready-made canned meat, fish, vegetables or fruits, canned juice, milk, soups, cured and dried food. It is important to include sugar, salt, pepper and calorie-rich foods (pasta, groats, nuts, jam, crackers). In addition, it is necessary to bring food for babies, the elderly and people on special diets. Stress-relieving products

that provide a sense of cosiness, such as biscuits, lollipops, chocolate, coffee and tea, are also necessary. When storing food supplies, it is best to keep in mind the recommended daily intake rates for the necessary food products that are set by the Ministry of Health.

What is evacuation?

Evacuation is an urgent eviction of residents from an area where a danger to human health and life has occurred.

Significant peacetime mass evacuations include:

- The evacuation of 335 thousand people from the Chornobyl area in 1986 after an electrical accident.
- The evacuation of 218 thousand people from Mississauga (Canada) in 1979 after the leakage of chemical pollutants following a train accident.
- The evacuation of 14 million people from China's central and northern regions in 1998 was due to heavy rains, floods, and landslides.
- The evacuation of 484 thousand people from New Orleans in 2005 in August due to Hurricane Katrina.
- The evacuation of 2.4 million people in Texas and Louisiana in 2005 due to Hurricane Rita.
- The largest peacetime evacuation in Lithuania (~5,000 residents of Jonava and Ukmergė districts) occurred on 1989 March 20, after an accident at the "Azoto" factory spreading dangerous chemical substances.

Why is it important to know about evacuation, its principles, and its behavior during evacuation?

Knowing the evacuation rules may help you to:

- Behave safer indoors.
- Be better at finding your way.
- Save your life and those around you when needed.

You can plan and prepare for an evacuation in advance. You can schedule an evacuation plan for your apartment or house, a school classroom, or an entire school, just like any other building. Usually, you can find the evacuation plan in the building drawing where the evacuation route is marked. A green line usually means a route.

Fire safety education: www.bfiresafe@school.eu

You can feel calm if you have drawn a plan for your living room or house and performed exercises according to your planned actions. Don't forget to check it periodically.

What about buildings or spaces you are in for the first time?

Sometimes, we spend our free time in after-school classes held in various buildings, not necessarily school, where the school administration and teachers take care of us. We spend our time in stores, shopping centers, theaters, cinemas, concert halls, hospitals, stadiums, or other facilities. The more complex the structure is, the more we should pay attention to the possibility of safe evacuation from the building.

Evacuation plans usually hang on the wall, with the movement route depicted. It is necessary to look at them because you will know where the nearest exit route is during the evacuation announced during the fire. Evacuation signs mark the evacuation road.

Always remember evacuation plans because you may have to evacuate from buildings and vehicles such as the parents' cars, buses, trolleybuses, trains, ships, or even planes.

To act precisely in the event of a fire, you must plan your actions:

- Discuss evacuation routes with teachers and your relatives.
- Determine the meeting place and emergency call phones.

Basic principles to follow when evacuating:

- Do not panic.
- Don't hide.
- Rush straight outside.
- Do not walk through the smoke.
- Do not use elevators.
- Close the door when leaving, but do not lock it.
- Close the windows.
- Do not return to a burning building.
- After leaving the event, stay in the agreed place.
- Leave the building when the sound alarm calls for evacuation.
- Go towards the nearest evacuation exit marked with an "evacuation exit" sign.
- If the way out is full of smoke, but the staircase is nearby, cover your face and hurry towards the exit.
- If you must go through a smoke-filled room - crawl!

Calling the general emergency number

If heat, smoke, or flames have blocked the exits, close the doors and report your hiding place by

calling the general emergency number.

Tell them:

- What's going on.
- Where you are.
- How many of you are there.
- Which way the windows face
- or what you see through the windows.
- Also, try waving through the windows or hanging a bright garment.

Evacuation signs

Sign	Name	Where to find?
	Emergency exit to the left	Above the emergency exit door
	Emergency exit to the right	Above the emergency exit door
	Evacuation route (turn every 90°)	On evacuation routes

	Evacuation route (turn every 90°)	On evacuation routes
	Emergency exit to the left	Above the emergency exit door, on evacuation routes
 	Emergency exit going up the stairs to the left	Above the emergency exit door in front of the stairs
	Emergency exit going down the stairs to the left	Above the emergency exit door in front of the stairs
	Emergency exit to the right	Above the emergency exit door, on evacuation routes
	Emergency exit going up the stairs to the right	Above the emergency exit door in front of the stairs
	Emergency exit going down the stairs to the right	Above the emergency exit door in front of the stairs

	Emergency exit straight ahead	Above the emergency exit door, on evacuation routes
	Emergency exit straight ahead	Above the emergency exit door
	Emergency assembly point	At assembly points or above the emergency exit door

An assembly point

An assembly point is a place where employees and visitors must gather during the evacuation from the building.

Why there?

In case of emergency, we must all gather at the assembly point. That's the only way to know whether everybody in the building safely left the premises.

What to do?

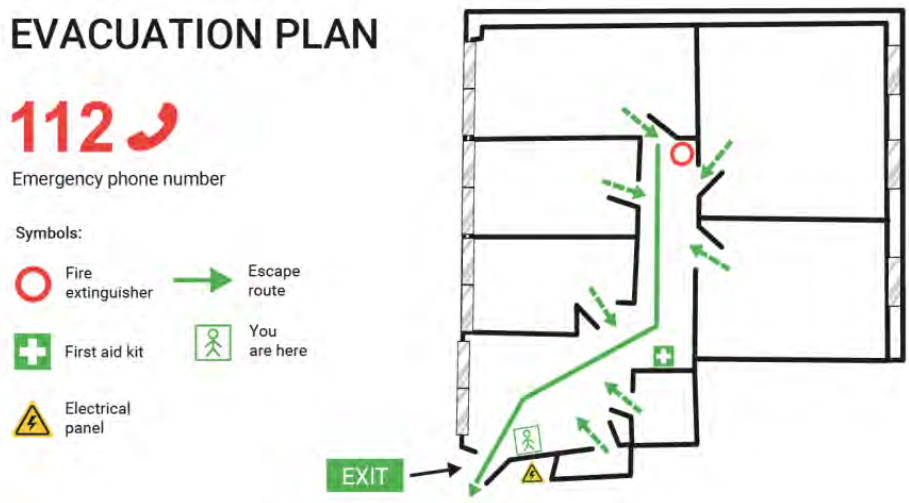
How to prepare for an evacuation?

You should get to know the evacuation plans in the building and the fire action plan. Have the phone number of your teacher or responsible person registered on your mobile phone.

What is an evacuation plan?

An evacuation plan is a drawing of a building, plane, train, or ship, which clearly shows:

- Building walls, doors to each room, and exits.
- Evacuation routes.
- Exit signs.
- Fire alarm button locations.
- Fire extinguishers.
- "You are staying here" sign and exits.



Evacuation sound alarm

When you hear the evacuation sound alarm, always leave the building immediately.

But suppose no sound alarm announces the danger of fire. What should you do then? In that case, the school may have an agreed signal or staff (ask the teachers who these people are) to notify you and other students.

Homework exercise. Find the evacuation plan in the building you spend most of your time. Try to memorize it. Now try retelling the details you learned to the class.

How to prepare and carry out evacuation drills

Evacuation drills help evaluate the effectiveness of the actions of classes, teachers, school administration, and fire response procedures. It also improves the readiness of students and teachers to respond to a possible fire in the school.

These activities have levels and types. They differ in the complexity of preparation, the number of questions, and goals, but the stages of their organization are the same:

- Exercise planning.
- Preparation for exercises.
- Course of exercises.
- Assessment of exercises.

For a maximum result, it is necessary to devote proper attention, time, and resources to all stages. Do not miss any steps, and you will ensure successful school preparation.

Planning of evacuation drills

It would be best if you held the drills at least once a year.

When planning, consider:

- The most realistic dangers and consequences for the health and life of students and teachers, property, and the environment.

- Secondary dangers and probable problems (disruptions in the communication system, panic of students and parents, lack of experience of new members of the school community, etc.).
- The positive and negative experiences of previous exercises.

Preparation for evacuation drills

First, when preparing for the exercises, the school administration decides, which usually states the activities:

- Topic, type.
- Execution time.
- Purpose.
- Exercise guide.
- Participants.
- Preparation group.
- Assessors.

The administration must formulate the goal of the exercise. It must be simple, achievable, realistic, measurable, and focused on the result. Goals should not be many (one or two) but feasible.

Formulating the goal(s) should answer:

- Are the participants ready to implement the goal.
- Will there be enough time to achieve this goal.
- Whether it is possible to evaluate the participant's activities in implementing the goal.

The leader of the exercise manages all stages of the organization of the activity: preparation for the training, its progress, evaluation, and practice of the report. The leader of the exercise must be a person who has leadership skills. The leader must also be well-versed in resolving issues during the training and can devote sufficient time to the organization of the exercise. The leader of the activity cannot be a participant simultaneously.

Evaluators are persons appointed in advance to evaluate the exercise participants' abilities to achieve the exercise's intended goal. The number of assessors must correspond to the number of assessed areas.

Representatives of other schools, municipalities, or the fire service may observe the exercises. They are called observers. During the training, the observers stay in the places designated for them and behave so as not to interfere with the exercise participants performing their functions.

Instructions

It is advisable to prepare instructions for participants. The leader of the drill signs administrative instructions.

The content of administrative instructions consists of:

- The general situation of the activities (a brief description of the situation without detailing the event. The participants will have to react to this situation during the exercise).
- Tasks set to achieve the goal of the organized exercises.
- Tasks for exercise participants before and during the exercise.
- Communication tools used during exercises.
- Other exercise organization issues.

When organizing evacuation exercises, the organizer must prepare the conditions for the exercises in advance.

Conditions may include:

- Initial data – an event or situation in response to which the exercise participants must take countermeasures.
- Additional events – events that supplement, clarify the initial data, and ensure the activities of the participants during all exercises to achieve the goal of the exercise.
- Additional data. Those conditions complicate the participants' actions and reactions. For example, whether there should be rain or not.

When preparing the conditions, it is necessary to take into account the time required to perform the expected actions of the participants of the exercise or to make the necessary decisions in response to the presented event.

Organizers use simulation tools if the participants perform practical tasks during the exercises. When preparing for the activities, it is necessary to plan what tools will be needed, their number, arrangement, etc.

If the exercise leader decides, organizers can prepare a specific exercise plan before the exercise.

Process of the drill

As the school usually holds the drills in different school spaces, the participants are informed about the start of the training.

An essential part of the drill is communicating the requirements appropriately and at the right time.
Coordinators who give the requirements directly to participants cannot discuss them.

Suppose the participants, because of the conditions, act much faster or slower than planned. In that case, the leader must normalize the course of the drill.

But if the participants act quickly and the pace of the drill slows down, additional requirements are presented to the participants (if organizers did not provide them beforehand, they must be created during the training);
Also, suppose the drill participants don't have time to react according to the requirements. In that case, organizers should reduce the number of conditions and not provide additional data.

The exercise leader announces the end of the exercise. All exercise participants must be informed about the end of the training.

At the end of the drill, the leader immediately organizes a discussion in which everybody should participate. Participants should discuss their first impressions, problems, and benefits of the activities. Organizers can use these ideas in preparing the exercise report.

How to evaluate the drill?

Evaluation means monitoring, recording, analyzing the collected information, and determining whether the activities of the participants meet the requirements for the implementation of the goal(s) and tasks of the exercises. For correctly evaluating, it is important to pay enough attention to the preparation to assess the activities.

The level and type of drill specify the size and composition of the assessment team, the number of participants and the areas assessed. Organizers must appoint at least one evaluator for each area. Suppose the activities occur in different locations. In that case, the evaluators must be at each site during the drill.

Assessed activities are specific actions and procedures that participants must perform to adequately respond to the conditions presented and implement the exercise tasks. The person responsible for the evaluation prepares an evaluation report based on the evaluation findings and submits it to the exercise manager.

Based on the evaluation report, the provided exercise evaluation questionnaires, and his observations, the exercise leader performs the final evaluation of the exercise and records the conclusions in the exercise report.

The exercise leader and the exercise preparation group prepare the exercise report. The exercise report must describe the goals of the exercise, the progress of the training, the evaluation of the activity, and recommendations for improving preparation.