ПЕРМСКИЙ
ГОСУДАРСТВЕННЫЙ
НАЦИОНАЛЬНЫЙ
ИССЛЕДОВАТЕЛЬСКИЙ
УНИВЕРСИТЕТ

П. В. Косарева, Р. Р. Махмудов

LIFE SAFETY

Perm University Press

МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ
РОССИЙСКОЙ ФЕДЕРАЦИИ

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НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ»

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LIFE SAFETY

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В учебном пособии рассмотрены основы безопасного взаимодействия человека со средой обитания (производственной, бытовой, городской) и основы защиты от негативных факторов в опасных и чрезвычайно опасных ситуациях. Изложены приемы первой помощи в соответствии с современными стандартами и нормативами, а также наглядно представлены действия при ЧС техногенного и природного характера. Предназначено для иностранных студентов, обучающихся на английском языке.

The textbook examines the basics of safe interaction of a person with the environment (industrial, domestic, urban) and the basics of protection from negative factors in extremely dangerous situations. The book describes in detail the techniques of first aid in accordance with modern standards and regulations, and also clearly presents actions in case of man-made and natural emergencies. Intended for foreign students studying in English

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THEORETICAL BASES OF LIFE SAFETY

The subject, purpose and objectives of the discipline

Life safety is a knowledge system that ensures the safety of human habitat in the production and non-production environment and the development of safety activities in the future, taking into account the anthropogenic impact on the habitat.

The objective is to achieve safety in habitats.

The tasks of life safety as a discipline are:

1. achieving a trouble-free situation and preparedness for natural disasters and other manifestations of the natural environment;
2. injury prevention;
3. health preservation;
4. maintaining performance;
5. maintaining the quality of useful work.

Scientific task of life safety is obtaining new, fundamentally non-standard knowledge in the form of identified laws or a theoretical description of the technological process, a mathematical description of phenomena, etc., helping to solve practical problems.

Practical task of life safety is development of specific practical measures to ensure human habitation without injuries, accidents while maintaining his health and working capacity with high quality work.

The object of study is human environment (or conditions). According to the genesis (origin), this habitat can be classified into production and non-production.

There are three components to the habitat: natural environment, industrial environment, social habitat.

All the elements that make up the human environment, in action, become factors that affect the safety of life.

The subject of life safety is a person. In this case, a person is considered as an object of protection. There are other objects of protection: material values and natural resources. All three objects of protection are considered together.

Hazards are one of the key concepts of life safety. This concept reflects the negative impacts in the "man – environment" system. Danger is the probability (possibility) of the occurrence of some negative event. That is, it is only a probability.

Hazards may affect on: all protected objects at once; mainly one object of protection. For example, all objects. It will be any natural disaster. People are dying, economic objects are being destroyed, the natural environment is degrading. For example, only one protected object is failing. This will be the flu or COVID epidemic.

But at the same time, the rest of the protection objects will be involved indirectly. If we are dealing with a COVID epidemic, people will be affected, first of all. But at the same time, the economy will also suffer due to the colossal growth of insurance cases. If it is an environmental (ecological) disaster, then the natural environment will suffer, then the man himself and the economy will suffer as well.

Hazard classification

By types of sources of occurrence, natural, technological and social hazards are distinguished. Natural hazards are natural disasters and environmental hazards. Technological hazards are created by technical means. Social dangers arise from unauthorized actions of groups of people (terrorism, interethnic conflicts and crime).

At the time of occurrence of danger are divided into predictable and spontaneous. The primary objects of protection distinguish between dangers that affect humans, the natural environment and material resources. According to the types of impact zones, the hazards are divided into industrial, domestic, urban (transport, etc.), and emergency situations.

The hazards according to the probability of impact on the object of protection are divided into potential, real and realized. A ***potential hazard*** is a threat of a general nature, not related to the space and time of exposure. For example, a person is mortal.

The real danger is always associated with a specific threat, it is coordinated in space and in time. For example, you are driving on a highway. Uncontrolled tank truck "propane-butane" moves down the hill towards you. In case of real danger, you have to do something.

Realized danger is the fact of the impact of real danger on the object of protection. Realized danger may be in the form of an accident or emergency.

An incident is an event of a negative nature with damage. An emergency is an event that occurs briefly and has a high level of negative impact on people, natural and material resources. Emergencies include major accidents, catastrophes, and natural disasters.

An accident is an accident in a technical system that is not accompanied by loss of life, in which restoration of technical means is impossible or economically inexpedient.

A catastrophe is an accident accompanied by the death or loss of people.

A natural disaster is a dangerous natural phenomenon, a manifestation of natural processes that has great destructive power.

An emergency is a situation in an object, territory or water area after an emergency.

The risk

The concept of "risk" is used to quantify hazard. Risk is the frequency of occurrence of a hazard. There are the difference between individual and social risks. Individual risk characterizes any danger to an individual. This is an occupation for the individual himself. Social (group) risk is a risk for a group of people or society. That is, social risk is the concern of the State.

Risk determination methods are:

1) engineering (statistics);

2) model (building models);

3) expert (survey of experts);

4) sociological, based on a survey of the population.

It is impossible to provide zero risk. The modern world has rejected the concept of absolute security. There is a concept of acceptable risk. Acceptable risk is a compromise between the level of security and the possibilities to achieve it.

The maximum acceptable level of individual risk of death is usually considered 10^{-6} per year. An unacceptable risk has a probability of realization of more than 10^{-3}. For risk values from 10^{-3} to 10^{-6} (ten to the sixth power), it is customary to distinguish between the transitional range of risk values.

Federal Centers for Health Risk Management

These institutions are in each regional center. These are hospitals for children and adults. In addition, these are engineering, statistical, medical, environmental, and occupational hazard analysis laboratories. In Perm, such a center is located on Ekaterininskaya Street, 224 b.

What for?

Analysis of the health of people living in different areas of the city and territory.

Connection with the environment, with occupational hazards.

Example

In the Perm Territory, iodine deficiency in water and soil was revealed. This leads to pathology of the thyroid gland in adults and mental retardation in children.

Events are the sale of iodized salt to the public. Screening of pregnant women at different stages of gestation and newborns for the level of thyroid-stimulating hormone.

The problem is resolved.

LIFE SAFETY IN EMERGENCIES: GENERAL CONCEPTS

Emergency is the condition of object, territory or water area, as a rule, after an emergency, in which there is a threat to life and health for a group of people, material damage is caused to the population and the economy, and the natural environment is degrading.

The Source of emergency is dangerous natural phenomenon, accident, widespread infectious disease of people, farm animals and plants, as well as the use of modern means of destruction, as a result of which an emergency occurred or may occur.

The Lesion focus is the territory affected by emergency hazards, with the population located on it, animals, buildings and structures, utilities and communications.

The Lesion focusses

A simple lesion focus is called a lesion that occurred under the influence of one damaging factor, for example, destruction from an explosion.

Complicated lesion focus occurs as a result of the action of several damaging factors of emergency. For example, an explosion at a chemical plant entails destruction, fires, and chemical contamination of the surrounding area.

Stages of emergency development:

1) nucleation stage – there are conditions, prerequisites for a future emergency;

2) initiation stage – the emergency starts its, with the most significant impact of the human factor;

3) culmination stage – characterized by the release of energy or substances that adversely affect the population and the environment;

4) emergency decay stage. It covers the period from the limitation of the source of danger to the complete elimination of its direct and indirect consequences. This period is colas “emergency localization”. The duration of this stage can be years, decades.

Emergency Classification

1. By nature of origin:

Natural disaster is dangerous natural phenomena or processes that are extraordinary in nature and leading to disruption of the daily life style of more or less significant groups of the population, human casualties, destruction of material values.

Technological disaster is breakdown in the technical system during its operation, accompanied by death of people, degradation of the natural environment and great material damage.

Ecological disaster is a qualitative change in the biosphere caused by irrational human activity and having a harmful effect on people, the animal and plant world, and the environment as a whole.

Social Emergencies are socio-political conflicts are an extremely acute form of resolving contradictions between states using modern means of destruction, as well as ethnic crises, terrorism, crime.

2. According to the speed of distribution, the following dangers are distinguished:

sudden (earthquakes, explosions, traffic accidents, etc.);

rapid (fires, hydrodynamic accidents with the formation of a wave, accidents with the release of toxic substances);

moderate (floods, volcanic eruptions, accidents with the release of radioactive substances);

smooth – with slowly spreading danger (epidemics, soil pollution).

3. Based on scale, impact and resource mobilization, hazards are classified into the following categories:

1. local (including object) emergencies – the consequences are limited by the boundaries of the object of the economy and can be eliminated due to its forces and resources. Affected up to 10 people, living conditions of up to 100 people were violated, material damage – up to 1000 minimum wages for an emergency day.
2. Local emergencies have a distribution scale within the settlement, will be eliminated by the forces and resources of the region. Affected up to 50 people, living conditions of up to 300 people were violated, material damage is up to 5000 minimum wages for an emergency day.
3. Regional emergencies limited to several areas or an economic region. Affected up to 500 people, living conditions of up to 500 people were violated, material damage – up to 5000000 minimum wages for an emergency day.
4. National emergencies have consequences covering several economic regions, but not extending outside the country; liquidation is carried out by state forces or with the assistance of foreign aid. Affected up to 500 people,

living conditions of up to 1000 people were violated, material damage – more then 5000000 minimum wages for an emergency day.

5. Global emergencies go beyond the country and affect other states, the consequences are eliminated by the forces of each state and by the international community.

Preparing for emergency ahead of time

1. Background activities based on a long-term forecast include:

- construction and installation work taking into account safety requirements;
- creation of a reliable public hazard warning system;
- accumulation of the protective structures fund;
- organization of radiation, chemical and bacteriological surveillance;
- holding regime, sanitary-hygienic and anti-epidemic measures;
- refusal to build nuclear power plants and other dangerous objects;
- repurposing these objects.

2. Emergency protective measures include:

- deployment of surveillance and intelligence;
- alerting alert systems;
- introduction of special rules for the functioning of the economy up to the state of emergency;
- neutralization and dismantling of sources of increased danger;
- alerting emergency services;
- start of evacuation.

Population Protection in Emergencies includes three ways to protect:

1) sheltering people in protective structures;

2) dispersal and evacuation;

3) provision of personal protective equipment.

Civil Defense are:

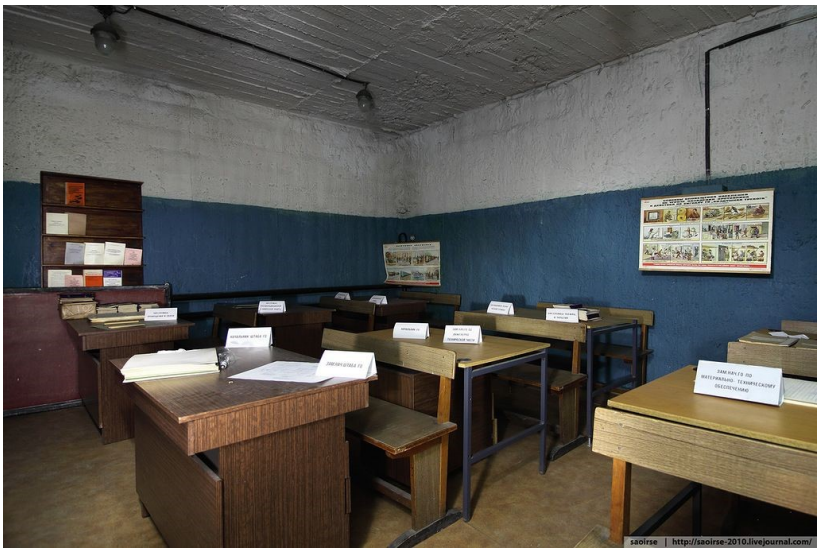
- shelters;
- anti-radiation shelters.

Shelters are the structures designed to protect people from weapons of mass destruction.

They have to protect people from damaging factors, built on terrain not subject to flooding, have emergency exits; free approaches where there should be no combustible or strongly smoking materials.

http://www.krasfun.ru/2011/11/ubezhishhe-1/#comments

Double use of shelters is possible. The use of shelters for industrial and domestic needs should not violate their protective properties.



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Evacuation

Dispersion is the organized removal and placement in the suburban area of staff of enterprises and organizations that continue to work in cities, this category of the population leaves for the city to work and returns to the suburban area after work.

A suburban area is an area outside the areas of potential destruction. The boundary of the zones of possible destruction is determined depending on the value of the city and its population.

Evacuation is the organized export of the population from a dangerous territory.

Methods of evacuation are: on foot, road, combined.

For the resettlement of people they use the houses of local residents, and for the placement of institutions – tourist and sports bases, schools, clubs. On a city scale, dispersal and evacuation are planned by the city's civil defense headquarters.

Initial data for evacuation planning are:

1) total population;
2) number of enterprises, institutions, educational institutions;
3) the number of workers and employees to be evacuated, and their family members;
4) number of rural settlements and premises in them;
5) availability of message paths and their throughput.

For the preparation and conduct of evacuation, evacuation commissions are created, and in rural areas – evacuation commissions.

The population is notified about the beginning of the evacuation. Upon receiving the notice, citizens must arrive at the collection point at exactly the specified time.

Everyone should take with them a passport, military ID, educational documents, work book or pension certificate, birth certificates of children, food stock (for 2 to 3 days), personal belongings, taking into account a long stay in a suburban area. Preschool children need to put notes in their pockets or sew on clothes indicating the surname, name, patronymic and place of residence or work of parents. Before leaving the apartment, you must turn off the electricity and gas, and then close the apartment.

At the assembly point, evacuees are registered, grouped by car and at the appointed time they are displayed at the boarding points for transport. Citizens evacuated on foot are registered, after which they are reduced to foot columns of 500-1000 people. The speed is 3-4 km / h, every 1-1.5 hours there is a small halt for up to 15 minutes, there is one large halt for 1 to 2 hours. The daily transition ends with the arrival at an intermediate evacuation point.

Moral and psychological preparation for emergency response

The impact of emergencies on the human psyche has 2 levels:

- individual reaction when a person develops a state of fear, anxiety. Special treatment can be used – after eliminating the sources of danger;
- group reaction when panic forms. Panic is the reaction of people to an imaginary or real danger, while losing the ability to rationally assess the situation, take protective measures.

The main causes of panic are:

1) lack of information on possible rescue methods;
2) the presence of panic initiators;
3) rumor;
4) distrust of governing bodies.

Panic Prevention Measures are:

1) bring danger information only to those to whom it directly threatens;
2) break the crowd into smaller but manageable groups;
3) panic initiator isolation;
4) governing bodies must demonstrate their competence, which will increase confidence in them.

Disaster management

Stages:

1. ***Three groups*** of events are being carried out simultaneously: ***emergency public protection***: hazard warning, use of protective equipment, ***evacuation, first aid***; accident localization, disconnection of communications; ***preparation for rescue*** and other urgent work, including reconnaissance of the lesion focus.

2. ***Rescue and other urgent work search for victims***, removing them from rubble, burning buildings, evacuation, first aid, localization and extinguishing fires, dismantling rubble, strengthening structures, restoring utility networks, roads, sanitizing people, etc. Rescue operations are ongoing. At the third stage, tasks to ensure the livelihoods of the population are solved, work begins on the restoration of economic facilities.

MAN-MADE EMERGENCY (TECHNOLOGICAL DISASTERS)

Technological disasters is a situation in which, as a result of an accident or catastrophe at an object, a certain territory or water area, the normal conditions of life and activity of people are violated, their life and health are threatened, property of the population, the national economy and the environment are damaged.

Technogenic emergencies are distinguished by two parameters: the place of emergency and the nature of the main damaging factors of the source of the emergency.

Emergency alert. Emergency prevention is a set of measures taken in advance and aimed at minimizing the risk of an emergency, as well as preserving people's health, reducing damage to the natural environment and material losses in case of their occurrence.

Emergency response is the conduct by rescue units of rescue and other urgent operations in the event of emergencies aimed at saving lives and preserving people's health, reducing environmental damage and material losses, as well as localizing emergency zones, terminating the operation of them dangerous factors.

Transport accidents and disasters can be of two types: those occurring at production facilities and those occurring during their movement.

Accidents in road transport

A feature of car accidents is that 80% of the wounded die in the first 3 hours due to heavy blood loss. According to statistics, traffic accidents most often occur during rush hours, on holidays, on the first and last days of vacation. The road is especially dangerous in winter. The winter months account for 60% of accidents throughout the year. Rain and fog also complicate the traffic situation and often become the cause of a road traffic accident.

Responsibilities of road users

– The driver must follow the rules of the road; ensure the correct technical condition of the vehicle; be wearing a seat belt; do not transport passengers who are not wearing seat belts; assess the traffic situation and take into account how other drivers and pedestrians may behave.

– Passenger must wear a seat belt; to make landing and disembarking from the sidewalk or roadside after a complete stop; do not distract the driver from driving; do not open doors while driving.

– Pedestrian must follow the rules of the road; move along the sidewalk, footpath, roadside; outside settlements to go towards the movement of vehicles; cross the carriageway at pedestrian crossings; do not linger on the roadway and do not stop unnecessarily; wait for route vehicles at the landing sites.

Accidents in the subway

Emergencies and dangerous situations at stations, in tunnels, subway cars arise as a result of collisions and derailments of trains, fires and explosions, destruction of the supporting structures of escalators, detection of foreign objects in cars and stations that can be classified as explosive, spontaneously igniting and toxic substances, as well as falling passengers and their belongings on the station tracks.

Rules for using the subway

In case of falling people and objects on the subway path, smoke, fire and other dangerous situations, contact the station attendant or the train driver using the "passenger-driver" system.

If you find forgotten, ownerless and suspicious things and objects in the subway or train carriage, immediately inform the police officers, subway workers or the train driver.

For safety reasons, it is prohibited to transport: flammable, poisonous, poisonous, explosive and malodorous substances; firearms; piercing and easily breaking objects and things without cases and proper packaging; animals and birds without cages and special containers (bags); long and bulky luggage.

Railway accidents

The main causes of accidents and disasters in railway transport are malfunctions of the track, rolling stock, signaling, centralization and blocking, dispatcher errors, inattention and negligence of drivers. Most often, rolling stock derails, collisions, collisions with obstacles at crossings, fires and explosions directly in the cars occur.

Please observe the following rules while traveling:

– when the train is moving, do not open the outer doors, do not stand on the steps and do not lean out of the windows;

– carefully stow your luggage in the overhead bins and do not overload them with things or secure them so that you do not become a victim of your own suitcases or boxes during sudden braking;

– do not pluck the stopcock unless absolutely necessary; remember that even in case of fire, you cannot stop the train on the bridge, in the tunnel and in other places where evacuation will be complicated;

– do not carry flammable, chemically and explosive substances with you;

– do not plug household appliances into the electric network of the car;

– if you smell burning rubber or smoke, contact the conductor immediately;

– in case of a real threat, immediately leave the car through the vestibule doors and emergency exits; in extreme cases, knock out window panes with improvised objects (ladders – stepladders, hard briefcases – diplomats, tables torn from nests and clothes shelves).

Air transport accidents

Aviation accidents and catastrophes are possible for many reasons and lead to serious consequences. Takeoff and landing accidents are among those where there is hope for rescue, since they usually occur when the aircraft is still on the ground or not high above it, and its speed is relatively low. Moreover, they tend to happen in the airport area. Where there are rescue teams and the necessary equipment.

Unlike a car, an airplane, flying into a stationary structure or some kind of vehicle, usually does not stop, but rushes on. Therefore, passengers are not subjected to sudden impacts. An exception to this would be when the plane collides with a mountain. In this case, the chances of salvation are scanty.

To reduce or even avoid possible injuries during takeoff and landing accidents:

– try to wear a coat or jacket made of slow-burning and hard-to-melt materials;

– think about what shoes to wear; avoid high-heeled shoes, but if you put them on and you have to use an inflatable escape slide during the evacuation, then take them off when you leave the plane;

– at each takeoff and landing, make sure that the seat belt is pulled tight around your hips;

Know where the exits are on the plane and how they open.

Water transport accidents

Most major accidents and catastrophes on ships occur under the influence of hurricanes, storms, fogs, ice, and also through the fault of people – captains, pilots and crew members.

Abandonment of the ship in case of an accident or shipwreck is carried out only on the instructions of the captain. He gives such an order in the following cases:

– there are clear signs of the impending death of the vessel (dangerous list, entry into the water of the deck, stern, bow);

– the vessel remains afloat, but the spread of water over the vessel leads to its flooding, and the crew does not have sufficient means to deal with water;

– cargo shifting or icing occurs, which will eventually lead to its capsizing, and the crew does not have the means to deal with cargo shifting or icing;

– a fire is spreading throughout the ship, and the crew does not have the means to localize and eliminate it;

– under the influence of wind, waves or currents, the ship drifts on reefs, where it can be broken or capsized; at the same time, the ship does not move or is deprived of the ability to be controlled and cannot counteract the force of nature, etc.

Fires and explosions and their consequences

Fires occur everywhere: at industrial enterprises, agricultural facilities, educational institutions, preschool institutions, in residential buildings. They arise during the transportation of fuel by all modes of transport. Chemicals such as turpentine, camphor, naphthalene ignite spontaneously.

Every 4–5 minutes a fire breaks out in Russia. Every year, billions of rubles worth of valuables turn into smoke and ashes. Every hour, 1 person is killed in a fire and about 20 are burned and injured.

A fire is an uncontrolled burning that causes material damage, harm to the life and health of citizens, the interests of society and the state

The main damaging factors include:

- direct exposure to fire (burning);
- high temperature and heat radiation;
- gas environment (smoke);
- gas contamination of premises and territory with toxic combustion products;
- falling parts of building structures, units and installations.

Causes of a fire:

- malfunction of the electrical network and electrical appliances;
- gas leak;
- ignition of electrical appliances left energized unattended;
- careless handling and prank of children with fire;
- the use of faulty or home-made heating devices;
- left open doors of furnaces (furnaces, fireplaces);
- release of burning ash near buildings;
- carelessness and negligence in handling fire.

At public enterprises, the causes of fires are

– Failure to comply with elementary fire safety measures and careless handling of fire;

– violation of fire safety rules of a technological nature during the operation of an industrial enterprise (welding work), as well as during the operation of electrical equipment and electrical installations;

– involvement in the production process of faulty equipment.

Contributes to the spread of fire

In residential and public buildings – the supply of fresh air, which gives an additional supply of oxygen.

At industrial enterprises: the accumulation of a significant amount of combustible substances and materials in production and storage areas; the presence of paths that create the possibility of the spread of flame and combustion products; the appearance in the process of fire of factors accelerating its development; belated detection of a fire and reporting it to the fire department; lack of primary means of extinguishing a fire; improper actions of people when extinguishing a fire.

Measures to prevent fires and explosions

- elimination of the causes that can cause a fire (explosion);
- limiting the spread of fires;
- creation of conditions for the evacuation of people and property in case of fire;
- timely fire detection and notification;
- fire extinguishing;
- maintaining fire extinguishing forces in constant readiness.

How to act in case of fire and explosion

Use all available means to extinguish the fire (sand, water, fire extinguishers).

If it is impossible to put out the fire in the shortest possible time, call the fire brigade.

When evacuating burning rooms and smoky places, pass quickly, holding your breath, protecting your nose and mouth with a damp dense cloth.

In a heavily smoky room, move by crawling or crouching – in the space adjacent to the floor, clean air lasts longer.

If a person's clothes catch fire, help throw them off or throw any blanket over the burning one and press it tightly. Don't let the burning person run.

If a building is damaged by fire or explosion, enter it carefully, making sure that there are no significant damages to ceilings, walls, electric, gas and water supply lines, gas leaks, or fires.

If there is a threat of an explosion, lie down on your stomach, protecting your head with your hands, away from windows, glazed doors, passages, stairs. If an explosion occurs, take measures to prevent fire and panic, provide first aid to the victims.

Explosion

It is combustion, accompanied by the release of a large amount of energy in a limited volume in a short period of time.

Most often, explosions occur at enterprises that use large quantities of hydrocarbon gases (methane, ethane, propane). Boilers in boiler houses, gas equipment, products and semi-finished products of chemical plants, vapors of gasoline and other components, flour in mills, dust in elevators, powdered sugar in sugar factories, wood dust in woodworking enterprises explode. Explosions on gas pipelines occur with poor control over their condition and compliance with safety requirements during their operation. Firedamp explosions in mines lead to serious consequences, causing fires, landslides, flooding with groundwater.

Explosions are possible in residential areas when people forget to turn off the gas.

Causes of explosions

At explosive enterprises, most often the causes of explosions include: destruction and damage to production tanks, equipment and pipelines; deviation from the established technological regime; lack of constant monitoring of the health of the equipment.

Explosions in residential and public buildings, as well as in public places, pose a great danger to human life and health. The main reason for such explosions is the unreasonable behavior of citizens. The most common occurrence is a gas explosion.

Recent years – terrorist attacks as a reason.

Signs by which one can judge the possibility of an explosion

– Unknown bundle or part in the car or outside;

– stretched wire, cord; wires or electrical tape hanging from under the car;

– in the country – prominent areas of freshly dug or dried land;

– near the apartment – traces of repair work, areas with broken color, the surface of which differs from the general background;

– someone else's bag, briefcase, box, any object that happened to be near your car, in a store, at a bus stop or in another crowded place.

If you notice a thing without an owner, contact a police officer or other official, do not touch the find and do not allow other people to access it, avoiding panic.

When a suspicious item is found, it is prohibited:

– touch and (or) move a suspicious object, open and inspect, as well as shake it;

– fill a suspicious object with liquids, cover it with soil, cover it with something;

– provide temperature, mechanical, sound, electromagnetic effects on a suspicious object;

– use radio equipment near this object;

– cut, cut off wires, strings or threads.

Upon detection of suspicious objects, explosive devices, it is necessary to

– require others to turn off cell phones, pagers and maintain radio silence.

– immediately, without panic, report the situation to any nearby guard.

– notify people when a suspicious item is found.

– record everything related to this incident – suspicious persons, witnesses, etc.

– remain in place until the arrival of specialists.

The effect of the explosion on buildings, structures, equipment

Buildings and structures of large dimensions and light load-bearing structures, which rise significantly above the earth's surface, are subjected to the greatest destruction by explosion products and a shock wave.

Underground and underground structures with rigid structures have significant resistance to destruction.

The effect of an explosion on a person

The products of the explosion and the air shock wave formed as a result of their action are capable of causing various injuries to a person, including fatal ones.

With the direct impact of a shock wave, the main cause of injury in humans is an instantaneous increase in air pressure, which is perceived by a person as a sharp blow.

In this case, damage to internal organs, rupture of blood vessels, eardrums, concussion, and various fractures are possible.

The high-speed pressure of air can throw a person a considerable distance and cause damage to him when he hits the ground (or an obstacle).

The defeat of people who are at the time of the explosion in buildings and structures depends on the degree of their destruction. So, with the complete destruction of buildings, one should expect the complete death of the people in them; with strong and medium, about half of the people can survive, while the rest receive injuries of varying severity.

You can find yourself under the rubble of structures, as well as in rooms with littered or destroyed escape routes.

The indirect impact of the shock wave is to hit people with flying debris of buildings and structures, stones, broken glass and other objects entrained by it.

With weak destruction of buildings, the death of people is unlikely, but some of them may receive various injuries.

The main damaging factors of the explosion are

Air shock wave and fragmentation fields formed by flying fragments of various kinds of objects, technological equipment, explosive devices.

Actions of the population during the explosion

If there is a threat of an explosion in the room, beware of falling plaster, fittings, cabinets, shelves. Stay away from windows, mirrors, lamps.

Being on the street, run back to its middle, square, wasteland, i.e. away from buildings and structures, poles and power lines.

If you have been notified in advance of the threat, before leaving your home or workplace, turn off the electricity, gas. Take the necessary things and documents, a supply of food and medicine.

If there is an explosion in your or a neighbor's apartment, and you are conscious and able to move, try to act. See which people around you need help.

If the telephone is working, report the incident by calling "112" or "101", "102" and "103". Do not try to use the stairs, and even more so the elevator, to leave the building; they can be damaged (destroyed). It is necessary to leave the building only in the event of a fire that has begun and in case of a threat of collapse of structures.

If you are overwhelmed with a fallen partition, furniture, try to help yourself and those who come to the rescue; give signals (knock on metal objects, ceilings) to be heard and detected. Do this when the life-saving equipment is stopped (during “minutes of silence”).

Help yourself if you get hurt. Get comfortable, remove sharp, hard and piercing objects, take cover. If a heavy object presses down on any part of the body, massage it to maintain blood circulation. Wait for the rescuers; you will definitely be found.

If a building is damaged by an explosion, before entering it, it is necessary to make sure that there are no significant destructions of ceilings, walls, electric, gas and water supply lines, as well as gas leaks, fires.

The following types of explosions are possible at the facilities:

Formation of clouds of fuel-air mixtures or other chemical gaseous and dusty substances (DHW – gas-air mixtures) capable of explosion (volumetric explosion).

Explosions of pipelines, vessels under high pressure or with superheated liquid, primarily tanks with liquefied petroleum gas.

The main damaging factors of the explosion are:

Air shock wave generated by nuclear explosions, explosions of initiating and detonating substances, explosions of clouds of fuel-air mixtures, explosions of superheated liquid tanks and pressure tanks.

Fragment fields created by flying fragments of various kinds of objects of technological equipment, building parts, etc.

Explosion protection methods are:

– design of solid enclosing structures;

– creation in explosive zones of an inert environment in which the oxygen content would be less than necessary to maintain combustion;

– isolation of the explosive zone with solid walls;

– the location of explosive production in places where, in the event of an explosion, no harm to the environment will be caused;

– installation of special safety valves to relieve pressure arising from an explosion;

– explosion suppression.

ACCIDENTS WITH THE RELEASE OF HAZARDOUS CHEMICAL SUBSTANCES

Chemically hazardous objects:

– plants (complexes) for the processing of oil and gas raw materials;

– plants and combines of chemical industries;

– individual installations (aggregates) and workshops producing and consuming emergency chemically hazardous substances (CHS);

– production of other industries using (CHS);

– vehicles carrying (CHS);

– railway stations, ports, terminals and warehouses at the final (intermediate) points of movement of (CHS).

Radiation hazardous objects

– Nuclear fuel cycle enterprises intended for the extraction and processing of uranium ore, processing and disposal of radioactive waste; enterprises of the uranium industry, radiochemical industry, places of processing and disposal of radioactive waste;

– nuclear power plants, nuclear power plants, nuclear heat and power plants, nuclear heat supply stations;

– facilities with nuclear power plants;

– nuclear weapons and warehouses for their storage.

Accidents at chemically hazardous facilities

Emergency chemical hazardous substance are a substance used in industry and agriculture, in the event of an accidental release of which environmental contamination may occur in concentrations that affect a living organism.

The largest consumers of chemicals: industrial and food industries; Agriculture. Large reserves of chlorine, ammonia, phosgene, nitric, hydrofluoric, hydrochloric acids are located in chemical, processing enterprises, cold storage plants, breweries, confectionery factories, vegetable warehouses, and pumping and filtering and water stations. Thousands of tons of substances are daily transported by various means of transport, pumped through pipelines. All of these objects of the economy are chemically hazardous.

Chemically hazardous facility

A chemically hazardous facility is an facility where hazardous chemicals are stored, processed, used or transported, in the event of an accident or destruction of which, death or chemical contamination of people, farm animals and plants, as well as chemical contamination of the natural environment can occur.

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Accidents at chemically hazardous facilities

Chemically hazardous objects may be following:

- plants for the production of chlorine, ammonia and other hazardous chemicals;
- petrochemical plants;
- metallurgical plants;
- pulp and paper mills;
- textile factories;
- communal facilities;
- agricultural fertilizer plants;
- vehicles and pipelines.

Chemical accident

This is an accident at a chemically hazardous facility, accompanied by a spill or release of hazardous chemical substances, which can lead to death or chemical contamination of people, food, food raw materials and feed, farm animals, plants, or chemical contamination of the natural environment.

Focus of a chemical accident

This is the territory within which the release (leakage) of hazardous chemicals occurred and, as a result of the impact of damaging factors, mass death and damage to people, animals and plants occurred, and environmental damage was also caused.

Accidents can occur as a result of a violation of production technology at a chemical plant, in violation of safety regulations at chemical storage facilities or chemical weapons destruction facilities.

According to statistics, in 58% of cases such accidents are caused by equipment malfunction, 38% – by operator errors, 6% – by errors in production design.

From an organizational point of view, accidents are local (private and facility) and large-scale (from local to transregional). In case of local accidents, the depth of distribution of contamination zones does not go beyond the production premises or the territory of the facility.

In large-scale accidents, the affected area can extend far beyond the industrial site. In this case, it is possible to damage the population not only of the nearby settlement, but also of more distant cities.

When evaluating the site of a chemical accident, it is necessary to take into account the physicochemical properties of substances that determine the stability of the site, the degree of danger of chemical pollution and the possibility of secondary damage.

Depending on the duration of the contamination of the area and the speed of action of the toxic agent on the body, the centers of chemical accidents are divided into 4 types:

1. Unstable lesion. These are fast-acting substances (chlorine, ammonia, benzene).

2. Persistent lesion. These are also fast-acting substances (acetic and formic acids).

3. Unstable lesion with slow-acting substances (phosgene, methanol).

4. Persistent lesion with slow-acting substances (nitric acid and nitrogen oxides, metals).

Contamination zone and affected zone

The contamination zone is the area to which the toxic substance has spread during the accident.

The affected area is the area where people and animals can be affected. This is part of the pollution zone.

Other lesions in the focus

It is known that during the largest accidents at chemical plants or storages of highly toxic substances, other factors (mechanical, thermal, fires, destruction) are often added to the main damaging factor (chemical). In this case, combined lesions are formed.

In addition to the toxic effects of chemicals through inhalation and oral intake, there may also be specific lesions of the skin and mucous membranes.

The severity of such lesions depends on the type of chemical, its quantity, as well as on the timing and quality of the special treatment of the population, the use of protective equipment.

In the presence of gas masks, losses among the population are sharply reduced. If 50% of the population in this area will have gas masks, then the losses will also be approximately 50%. If the entire population is provided with gas masks, then the losses will amount to 10-12% (due to malfunction of gas masks, untimely putting them on).

Chemical environment

These are conditions that have arisen as a result of accidents at enterprises producing chemicals, or in wartime when the enemy uses chemical weapons.

Assessment of the chemical situation conducted by the Disaster Medicine Service. To do this, you need to have the following data.

Assessment of the chemical situation:

1. Type of poison and time of accident;
2. Accident area – area, settlements;
3. Wind speed and direction;
4. Air and soil temperature;
5. Accident area size;
6. Number of affected people;
7. Persistence of the poison in the external environment;
8. Permissible time for people to stay in protective equipment;
9. Contamination of water supply systems, food.

Focus of a chemical accident

The forecast of the chemical situation is determined taking into account the probability of the consequences of a chemical accident, calculations are carried out that are used in the subsequent liquidation of the accident. In this case, many methods for assessing the chemical situation are used.

Operational clarification of the chemical situation in the event of an accident allows you to make the necessary adjustments to the calculations in a timely manner. Actual chemical survey data is used in the evaluation of a chemical shutdown.

Means of evaluation:

– a map (scheme) with the location of a chemical object indicated on it, the zone of distribution of a chemical;

– calculation tables, reference books, formulas;

– chemical control devices.

Specialists involved in exploration:

– hygienist;

– toxicologist;

– analytical chemist.

Methods for assessing the situation:

– rapid analysis of toxic substances using portable devices and mobile laboratories;

– sampling and subsequent analysis of samples of air, water, soil, food products and washouts from the surfaces of walls, floors, glass of buildings.

The result of the assessment of the situation:

– number of people affected;

– expedient actions of the personnel of the facility and the liquidators of the accident, as well as the population;

– features of medical and sanitary provision of the population in this situation;

– additional protection measures for various contingents of people in the accident zone.

Main activities

They are carried out on the basis of a plan and taking into account the available forces and means.

Help the injured as soon as possible.

Evacuation of people from the affected area.

Special treatment for affected people.

The approach of doctors to the lesion.

Organization of qualified medical care for the affected.

First aid in this causes:

– respiratory, eye and skin protection from toxins;

– introduction to the body of antidotes;

– prompt removal of victims from the lesion;

– abundant drinking and gastric lavage with a tubeless method;

– partial sanitization of exposed parts of the body with 2% soda solution and soap.

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The main types of emergencies as a result of accidents at a chemically hazardous enterprise:

Almost instantly, a primary cloud of toxic chemical is formed, spreading over a long distance.

A primary cloud of a poisonous substance appears almost instantly, as well as a chemical spill and the formation of a secondary cloud as the spill evaporates.

A strait of a poisonous agent occurs and a secondary cloud of the poisonous substance forms as it evaporates.

A spill of poisonous chemical agent is formed.

Poison contamination zone

This is the territory in which the concentration of hazardous substances reaches values that are dangerous for human life.

Classification of toxic chemicals by physical properties:

- solid and bulk substances, volatile at temperatures up to 40°c;
- solid and free-flowing substances, non-volatile at normal storage temperature;
- liquid volatile substances stored under pressure, compressed and liquefied gases;
- liquid volatiles stored in unpressurized containers;
- fuming acids.

Classification of poisonous substances according to clinical signs:

- substances with a predominantly suffocating effect: chlorine, phosgene, fluorine, etc.;
- substances of predominantly general toxic action: carbon monoxide, cyanides, etc.;
- substances that have a suffocating and general poisonous effect: hydrogen sulfide, nitric acid, etc.;
- nerve agents: organophosphorus compounds;
- substances with asphyxiant and neurotropic action: ammonia;
- metabolic poisons: carbon disulfide, etc.

Classification of toxic substances according to the rate of development of pathological disorders:

- Fast-acting substances: the development of symptoms of intoxication occurs within a few minutes. The substances of this group include hydrogen cyanide, hydrogen sulfide, nitrogen oxides, chlorine, ammonia, etc.
- Substances of delayed action with the development of symptoms of intoxication within a few hours (dinitrophenol, dimethyl sulfate, etc.).

Classification of toxic chemicals according to the degree of toxic hazard:

- extremely dangerous (1st class) – mercury, hydrogen cyanide;

- highly hazardous (2nd class) – chlorine, phosgene, formaldehyde;
- moderately dangerous (3rd class) – fiberglass, hydrogen sulfide;
- low-hazard (4th class) – gasoline, ammonia, acetone.

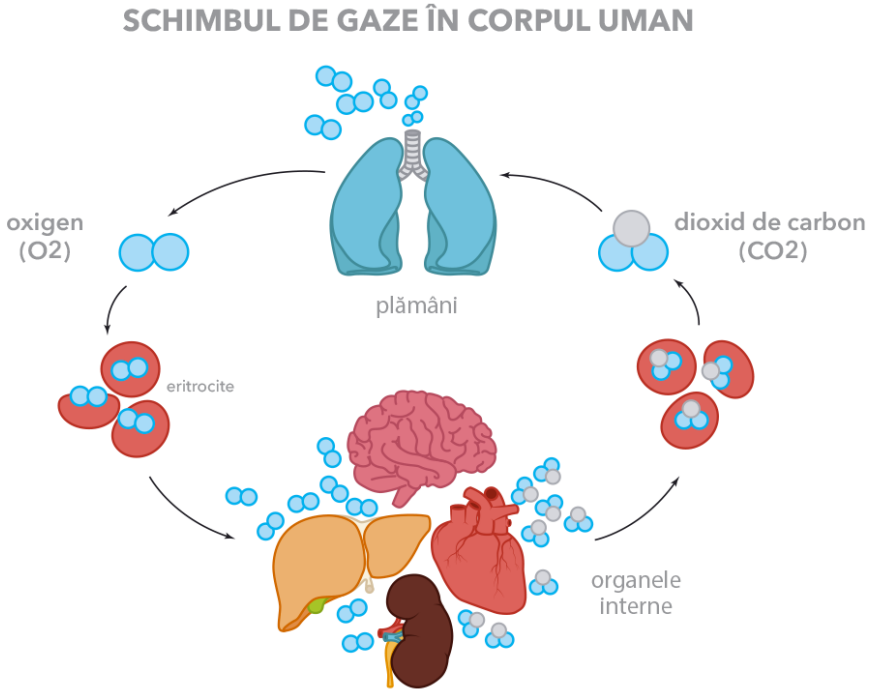
The ways of entry of toxic substances into the human body:

– through the respiratory tract;

– through the skin;

– through the gastrointestinal tract;

– parenteral.



The nature of human poisoning is affected by the state of the environment:

– temperature;

– humidity;

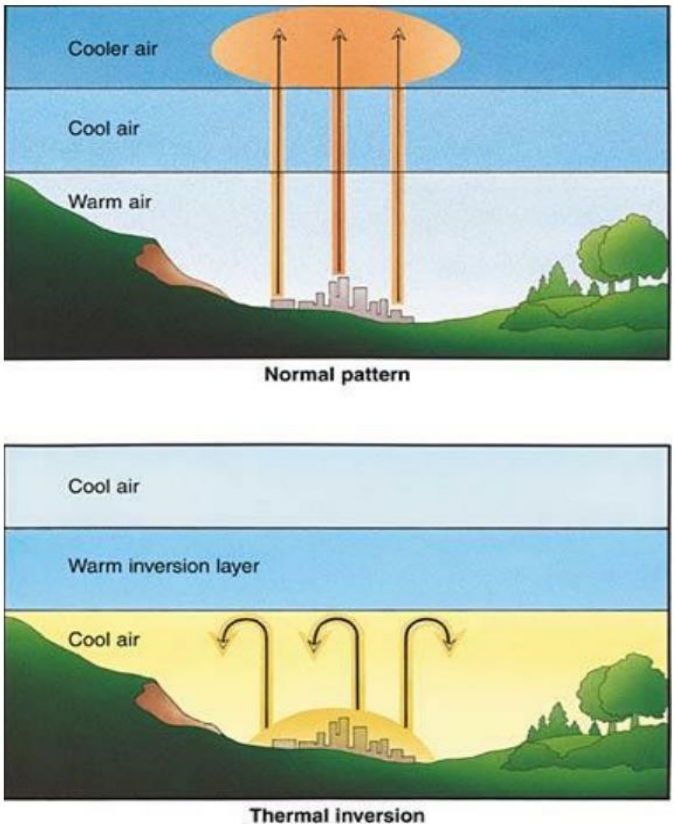
– pressure;

– degree of vertical stability of the atmosphere:

a) isotherm;

b) inversion;

c) convection.



- Normally, the temperature in the atmosphere decreases with altitude
- Thermal inversion occurs when a warm layer is trapped between cold layers

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Toxicity of toxic substances

Concentration → This is the content of a toxic substance per unit volume or mass of the environment where it is located.

Toxic dose → This is a value equal to the product of the concentration of a toxic substance by the time a person stays in a given place without protective equipment, during which the toxic effect of a toxic substance on a person is manifested.

Maximum Permissible Concentration

This is such a concentration of a substance in the atmosphere, water, soil, food products, the impact of which cannot cause diseases or deviations in the state of health detected by modern research methods in the process of work or in the long term of this and subsequent generations.

Toxicity of a toxic substance

Threshold toxic dose → This is the amount of a substance that, when it enters the body, causes the initial signs of damage with a certain probability.

Lethal toxic dose → This is the amount of a substance that, when ingested, causes death with a certain probability.

Main hazardous chemicals

Chlorine

Sharp chest pain, pain in the eyes, watery eyes, cough, vomiting, incoordination, shortness of breath.

In the focus: put on a gas mask (cotton-gauze bandage moistened with 2% soda solution), remove from the infection zone.

Outside the focus: remove the gas mask, wash the face and eyes with a 2% soda solution.

Ammonia

The symptoms are the same as for chlorine poisoning, and also muscle weakness, lacrimation, with skin lesions – a chemical burn; eye burns.

In the focus: rinse the eyes and face of the victim with plenty of water; put on a gas mask; wash exposed areas of the body; endure from the area of infection.

Outside the focus: remove the gas mask, rinse the skin and eyes with plenty of water.

Events

The chemical situation in the zone of a chemical accident is detected.

The direction and speed of the cloud movement is determined.

The territory covered by the consequences of the accident is determined.

If necessary, evacuation of the population is organized.

Providing personal protective equipment.

Use of antidotes and skin treatments.

Sanitization of the population, personnel and participants in the liquidation of the consequences of accidents.

Degassing of an emergency facility, territory.

Evacuation in the event of a chemical accident

Signal: "Attention everyone!"

keep a course perpendicular to the direction of the wind

avoid crossing tunnels, ravines, hollows

when evacuating by transport, specify the time and place of landing; do not be late and do not arrive earlier than the appointed time

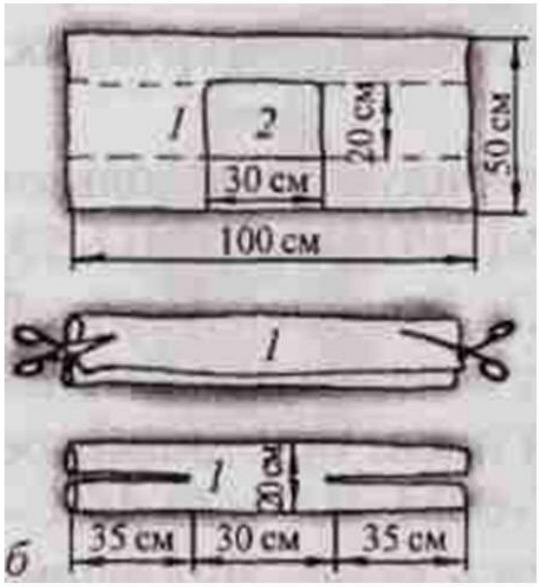
Rules for driving in contaminated areas

- Move fast but don't run;
- do not lean against buildings and do not touch surrounding objects;
- do not step on powdery placers of unknown substances;
- do not remove personal protective equipment.

Measures in the absence of the possibility to leave the area of the accident:

- room sealing;
- close doors, windows;
- seal the ventilation holes with thick material or paper;
- seal the doors with damp materials (wet sheets).

Scheme of a cotton-gauze bandage



INDIVIDUAL FIRST-AID KIT “AI-4” («АИ-4») AND OTHER PERSONAL PROTECTION

The purpose and composition of the individual AI-4 first-aid kit according to recommendations of the Ministry of Health of the Russian Federation (Order No. 70n dated February 15, 2013).

Complete set and appointment of means of the First-aid kit individual AI-4.

Section No. Name Quantity	Compound	Purpose	Application	No.1	No.2	No.3	No.4
Section 1: Tablets in a colorless case	Ketorolac	Pain reliever It is used in conditions of accompaniment. Severe pain syndrome: injuries, wounds, burns, etc.	One tablet every 4–6 hours	Yes	Yes	Yes	Yes
Section 2: Capsules in a yellow case	Acizol	Remedy for carbon monoxide poisoning	It is taken one hour before entering the smoke zone. Drink 1 capsule every 2 hours, but not more than 4 capsules per day	Yes	Yes	Yes	Yes
Section 3: Syringe with red cap	Peliksim AL-85	In case of poisoning with phosphorus-organic substances	It is used intramuscularly at the first symptoms of poisoning, 1 ml. In case of bronchospasm, 1–2 therapeutic doses are administered	Yes	No	No	Yes

Section 4: One pencil case with raspberry cap	Medicine B (B-190)	Radioprotective agent No. 1	Take the contents of the entire pencil case 20 minutes before possible exposure	Yes	Yes	No	Yes
Section 5: One pencil case with white cap	Potassium iodide	Radioprotective agent No. 2	1 tablet is taken once a day for 10 days	Yes	Yes	Yes	Yes
Section 6: Tablets in a case with a clear cap	Drug D Doxycycline	Antibacterial agent No. 1 Prevention of infection in case of wounds or burns	Take 100–200 mg, 1–2 times a day, children 8–12 years old – 100 mg	Yes	Yes	Yes	Yes
Section 7: Tablets in a case with a clear cap	Ciprofloxacin	Antibacterial agent number 2. prevention of indigestion of an infectious nature, incl. after irradiation	Take 1 tablet 2 times a day at regular intervals	Yes	Yes	Yes	Yes
Section 8: Tablets in a pencil case with a red cap	Antioxidant, composition unknown	Reserve antidote of phosphorus-organic substances	Adults take the contents of the entire pencil case, children from 5 to 12 years old – 1 tab.	Yes	Yes	Yes	No
Section 8 (option 2): Tablets in a case with a blue cap	Etaperazine	Antiemetic	With uncontrollable vomiting after contusion – 1 tablet every 4 hours	Yes	Yes	Yes	Yes

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Types of gas masks, device and purpose

Gas masks:

Gas mask – a device designed to protect human life and health during work where respiratory and vision protection is necessary, as well as in emergency, emergency situations, or during military conflicts with the use of chemical warfare agents to protect the human respiratory system, eyes and face from poisonous, radioactive substances, bacterial agents and other harmful impurities in the air in the form of vapors, gases or aerosols. Like many other things that are used in everyday life, a gas mask was invented initially for military purposes. Any gas mask has an insulating front part (mask) – panoramic or with a spectacle unit.

Gas masks according to the principle of action are divided into:

Filtering gas masks (civilian filtering gas masks and children's filtering gas masks) – with a filtering and absorbing box (gas filter) of various grades, the principle of operation is the absorption by a catalyst (charge) and an aerosol filter of harmful or poisonous substances, aerosols, etc.

Insulating gas masks are divided into: Hose gas masks (according to GOST 12.4.252-2009 correct name – hose breathing apparatus) – operating principle – supply of clean air through the hose. It is applied if work is carried out in rooms, tanks, wells from which from 10 to 40 meters to clean air. Gas masks on compressed air with compressed air cylinders – principle of operation – air supply from the cylinder through a pressure limiter – pressure reducer.

ELECTRICAL SAFETY

The effect of electric current on the human body:

- touching live parts;
- step voltage zone;
- touching non-live parts that are energized;
- electric arc;
- electromagnetic field.

The flow of current through the human body causes effects:

- thermal;
- chemical (electrolytic);
- mechanical (explosive vaporization);
- electrodynamic effect;
- biological.

Consequences of exposure to electric current:

Local:

- burns (current, arc);
- metallization of the skin;
- electrical signs;
- mechanical damage (ruptures, dislocations);
- electrophthalmia.

General (electrical shock):

- Grade 1 – convulsive, barely noticeable muscle contraction.
- Grade 2 – convulsive muscle contraction with barely tolerable pain. Electric shock – severe weakness, depression of body functions.

- Grade 3 – convulsive muscle contraction with loss of consciousness while maintaining breathing and cardiac activity.
- Coma – lack of consciousness.
- 4, 5 degrees – respiratory arrest and impaired heart activity. Clinical death – lack of breathing and / or cardiac activity. Exchange processes are saved for 4–6 minutes.
- Biological death.

Ways to release the victim from the action of electric current:

1) turning off an electrical installation or part of it;
2) separating the victim from the electrical installation;
3) separation of live parts from the victim;
4) mechanical impact on live parts;
5) separating the victim from the ground 6.Calling an artificial short circuit to disconnect the electrical installation.

Occupational Safety standards system (System of labor safety standards)

- System code No. 12
- State Standard No. 12 1.006-84
- Subsystem codes are:
  - 0 – general provisions and structure of the entire system;
  - 1 – permissible values of hazardous, harmful production factors;
  - 2 – standards of safety requirements for production equipment;
  - 3 – standards of safety requirements for production processes;
  - 4 – standards of safety requirements for protective equipment;
  - 5 – standards of safety requirements for buildings and structures;
  - 6–9 – reserve.

Factors affecting the outcome of a person's electric shock

1. Duration of current flow (burns of body tissues, heating of internal organs, changes in blood composition, dysfunction of the central nervous system, the likelihood of coincidence of the time of the flow of electric current with the T phase of the cardiocycle)

2. Path of current flow

3. Amount of current

4. Gender and frequency of current (maximum pain sensation: 22 V AC and 100 V DC)

5. Individual properties of a person (psychological readiness, physical condition, age and gender)

Terminology

- Fully earthed neutral – The neutral of a transformer or generator connected directly to an earthing device.
- Insulated neutral – neutral of a transformer or generator, not connected to the grounding device or connected to it through a large resistance.
- Neutral is the common point of the equipment windings (elements) connected to a star.
- Grounding device – a set of grounding conductors and grounding conductors.
- Earthing switch – a conductive part or a set of interconnected conductive parts that are in electrical contact with the ground.

The following can be used as natural ground electrodes:

- metal and reinforced concrete structures of buildings and structures in contact with the ground;
- metal water pipes laid in the ground rail tracks of main non-electrified railways in the presence of deliberate bridging between the rails;
- metal structures or structures buried in the ground;
- metal sheaths of armored cables laid in the ground.

Artificial earthing switches can be made of black or galvanized steel or copper. Artificial earthing switches should not be painted. Protective grounding is grounding for electrical safety purposes.

1. Protective measures against direct contact:

- basic insulation;
- fences and shells;
- installation of barriers;
- location out of reach;
- application of low voltage.

For additional protection against direct contact in electrical installations with voltages up to 1 kV, a residual current device (RCD) should be used. The operation of the RCD is based on the principle of limiting the duration of current flow through the human body when it inadvertently touches the elements of an electrical installation that are energized.

2. Citizens have the right to:

a) protection of life and health, and personal property in the event of an emergency;

b) use the means of collective and individual protection designed to protect the population from emergencies;

c) be informed about the risk that they may be exposed to in certain places on the territory of the country and the necessary security measures;

Protective measures against indirect contact:

- protective grounding;
- automatic shutdown;
- potential equalization;
- double or reinforced insulation.

Step voltage

- Step voltage – voltage between two points on the earth's surface at a distance of 1 m from one another, which is taken equal to the length of a person's step.

- In case of electric shock, the victim must be removed from the step voltage zone at a distance of at least 8 m from the place where the current flows to the ground.

Protective equipment used in electrical installations

Electrical protective equipment:

- insulating (insulating rods, insulating pliers, voltage indicators, dielectric gloves, galoshes and boots, hand insulating tools, dielectric carpets and insulating stands, ladders and ladders;
- insulating fiberglass, flexible insulating coatings and linings for work in electrical installations up to 1 kV, devices and accessories to ensure the safety of work during measurements and tests, special protective equipment, insulating devices and devices for working under voltage in installations under voltage 110 kV and above);
- the main;
- additional;
- non-insulating (posters and safety signs, portable earthing, protective fences, voltage signaling devices).

Means of protection against electric fields of increased intensity (330 kV and above):

- collective protective equipment (removable and portable screens and safety posters);
- personal protective equipment (individual shielding kits).

Individual protection means:

- head protection;
- eye and face protection;
- respiratory protection;
- hand protection;
- fall protection equipment;
- special protective clothing.

Safety Posters and Signs:

- prohibiting (do not turn on – people work, do not turn on – work on the line, do not open – people work, work under voltage – do not turn on again);
- warning ("lightning", the test is life-threatening, do not climb in, kill, stand voltage, dangerous electric field without protective equipment, the passage is prohibited);
- prescriptive (work here, get in here);
- pointing (grounded).

General rules for the use of protective equipment

The head of the consumer and the person responsible for the electrical equipment must control the compliance of working conditions at workplaces with the requirements of safety and industrial sanitation, and if it is impossible to eliminate the impact on personnel of harmful and dangerous factors, executive officials must provide personnel with personal protective equipment.

When working, use only protective equipment that is marked with the manufacturer's name, product type name and year of manufacture, as well as a test stamp.

If the protective equipment is found to be unsuitable, they are subject to withdrawal. An entry should be made on the withdrawal of unsuitable protective equipment in the log book and the content of protective equipment or in operational documentation.

Before each use of the protective equipment, the personnel must check its serviceability, the absence of external damage and contamination, and also check the expiration date using the stamp. The use of expired protective equipment is not allowed suitability. When using basic insulating means, one additional one is sufficient.

If it is necessary to protect the person working from step voltage, dielectric boots or galoshes can be used without basic protective equipment.

Maintenance and storage of protective equipment

Protective equipment must be stored in closed rooms. Protective equipment, isolating devices and devices for work under voltage should be kept in a dry, ventilated area.

Protective equipment made of rubber and polymeric materials that are in use should be stored in cabinets, racks, shelves separately from tools and other protective equipment. They must be protected from acids, alkalis, oils, gasoline and other destructive substances, as well as from direct sunlight and heat from heating devices.

Respiratory protection should be stored in dry rooms in special bags.

Accounting for protective equipment and monitoring their condition

All protective equipment in use must be numbered (except for helmets, carpets, stands, posters). Numbering is set separately for each type of protective equipment, taking into account the adopted system of organization of operation and local conditions. The use of serial numbers is allowed.

The inventory number is applied directly to the protective paint or embossed on metal parts. Can be applied to a tag attached to the protective equipment.

In subdivisions of enterprises / organizations, it is necessary to keep logs of accounting and content of protective equipment.

Protective equipment issued for individual use must also be registered in the journal.

The presence and condition of protective equipment is checked by periodic inspection at least once every 6 months.

The tested protective equipment, the use of which depends on the voltage, is stamped.

The stamp must be clearly visible and must be applied with indelible paint or glued to insulating parts near the stop ring of insulating and energized devices.

On protective equipment that did not pass the test, the stamp must be crossed out with red paint.

Employer's actions in the event of an industrial accident

The employer or his representative must:

1. Immediately provide first aid and, if necessary, delivery to a medical institution (ambulance, medical institution).

2. Take urgent measures to prevent the development of an emergency and impact on others.

3. To preserve the situation as it was at the time of the incident, and in case of impossibility – to fix.

4. Inform the relatives of the victim immediately.

5. Create a commission to investigate the accident and issue an order to start its work.

6. Send a message about the accident to the authorities specified in Article 227 of the Labor Code within 24 hours by phone, fax and other means of communication State Fire Service; Federal Agency for Construction and some others.

The employee is obliged to immediately notify the immediate or superior manager of every accident or deterioration of his health in the course of work.

Investigation of the circumstances and causes of a minor accident is carried out within 3 days.

Commission (at least 3 people), created by order of the head. It includes a representative of labor protection, workers and the employer.

The chairman of the commission is the chief inspector of the city's labor inspectorate. If the employer was not informed in a timely manner or the incapacity for work did not occur immediately, it is investigated within 1 month from the date of receipt of the information.

NATURAL EMERGENCIES

Natural emergencies have accompanied humanity since the inception of civilization.

Karl Bryullov "The Last Day of Pompeii", 1833

Emergency of nature (or Natural disasters) can be as an earthquakes, floods, volcanic eruptions. Emergency of nature leads to human sacrifice, damage to human health, material losses; violation of human conditions, environmental damage.

The patterns of natural emergencies are following: each type of emergency is characterized by a certain spatial confinement, each emergency is preceded by specific signs (precursors), the greater the power of a natural hazard, the less often it happens, emergencies can be predicted, in many cases passive and active protective measures against natural hazards may be provided.

Geophysical Emergencies

Geophysical emergencies are such phenomena that occur in the depths of the Earth and are associated with its structure. An earthquake is understood as tremors and vibrations of the earth's surface, resulting from displacements and ruptures in the earth's crust or in the upper part of the mantle and transmitted over long distances in the form of elastic wave vibrations. That is, an earthquake is vibrations of the earth's surface, seismic waves.

The focus of an earthquake is a certain volume in the thickness of the Earth, within which energy is released. The center of the focus is a conditional point

called the hypocenter, or focus. The projection of the hypocenter onto the Earth's surface is called the epicenter. Around him there is the greatest destruction. The number of earthquakes recorded annually on the globe is measured in hundreds of thousands. But the vast majority of them are weak earthquakes that we simply do not notice. The strength of an earthquake is estimated by the intensity of destruction on the surface of the Earth. At present, the 12-point Richter scale and the international earthquake scale are widely used.

For example, 1 point – is noted only by seismic instruments; 2 points – felt by individuals. 4 points – rattling of objects, starting from 5 points – a strong earthquake, 11-12 points – is classified as a disaster. Earthquakes are distributed over the earth's surface very unevenly. The analysis of seismic data makes it possible to outline the areas where an earthquake should be expected in the future.

So, ***earthquake*** are tremors and vibrations of the earth's surface transmitted over long distances, displacements and breaks in the earth's crust or in the upper part of the mantle.

The causes of earthquakes are:

– in the case of natural causes, they are collision of tectonic plates, volcanic eruptions, severe landslides, meteorites fall;

– in the case of anthropogenic causes, they are explosions, collapse of underground engineering structures.

Thus, due to the occurrence of an earthquake, they are divided into natural and anthropogenic.

Earthquakes of a natural nature occur as a result of tectonic processes in the Earth's crust, during volcanic eruptions, strong landslides, landslides, collapse of karst voids, falling meteorites, collision of the Earth with space objects.

Anthropogenic earthquakes occur as a result of human activity and are the result of high-power explosions, the collapse of underground engineering structures, the pushing of the upper layer of the earth's surface during the construction of artificial reservoirs with a large volume of water content, the construction of cities with a high density of buildings with multistorey buildings.

Anthropogenic earthquakes resulting from an imbalance in the earth's crust during the extraction of minerals (oil, gas, artesian water).

Site photo: https://www.newsru.com/world/18mar2019/lombok.html

On March 17, an earthquake of magnitude 5.4 hit the northeastern part of the Indonesian island of Lombok. It resulted in casualties and destruction. Tremors brought down a landslide and stones on Malaysian tourists who were at the Thiu Kelep waterfall. As a result, two people were killed and 8 Malaysian citizens were injured.

On August 5, an earthquake of magnitude 6.6 hit the island of Lombok in Indonesia. According to eyewitnesses, the tremors were felt on the popular tourist island of Bali. According to the US Geological Survey (USGS), the magnitude of the earthquake was 7.0. This was followed by aftershocks of magnitude 5.4 and 4.3. Their victims were 436 people. The death toll from two earthquakes (August 5 and 19) on the island of Lombok reached 555 people, about 1.5 thousand were injured and tens of thousands of people were forced to leave their homes.

The focus of destruction during an earthquake is the territory within which massive destruction and damage to buildings occurred, accompanied by damage and death of people, animals, plants.

The center of an earthquake is called the hypocenter, and its projection on the earth's surface is called the epicenter. The epicenter and the area adjacent to it are called the pleistoseismic zone. It is characterized by the greatest impact of an earthquake and the greatest destruction.

The main damaging factor of an earthquake is seismic waves that radiate from the source in all directions.

The source of an earthquake can be located at different depths: from several to tens, and sometimes even hundreds of kilometers. The most dangerous are earthquakes with a focus depth of 10-100 km.

One of the main characteristics of an earthquake is its energy. Seismic wave energy (or magnitude) can range from a few megawatts per hour to hundreds of thousands of million kilowatts per hour.

Seaquake is a simultaneous fluctuation of the entire mass of water of the seas, lakes and rivers. Causes: – Collision of tectonic plates under the bottom. – fall of cosmic bodies into water; Consequence: a destructive wave occurs – a tsunami (and 70% of humanity lives in the coastal zone).

Tsunami means "high wave in the bay" in Japanese. Unusually high waves of surf suddenly appear on the coast when the ocean floor sinks, rises or changes. Such disturbances of the bottom surface occur simultaneously over a large area as a result of tectonic movements of the soil, eruptions of underwater volcanoes, collapses of large areas of land into the ocean.

https://steemitimages.com/DQmY7PvnRfjujuxTJdmke
FdjMUjLfR2EBkCevJCJjZExZHe/image.png

An undersea earthquake in the Indian Ocean on December 26, 2004 at 00:58:53 UTC (07:58:53 local time) triggered the deadliest tsunami in modern history. The magnitude of the earthquake was, according to various estimates, from 9.1 to 9.3. This earthquake is one of the three strongest earthquakes in the history of observation.

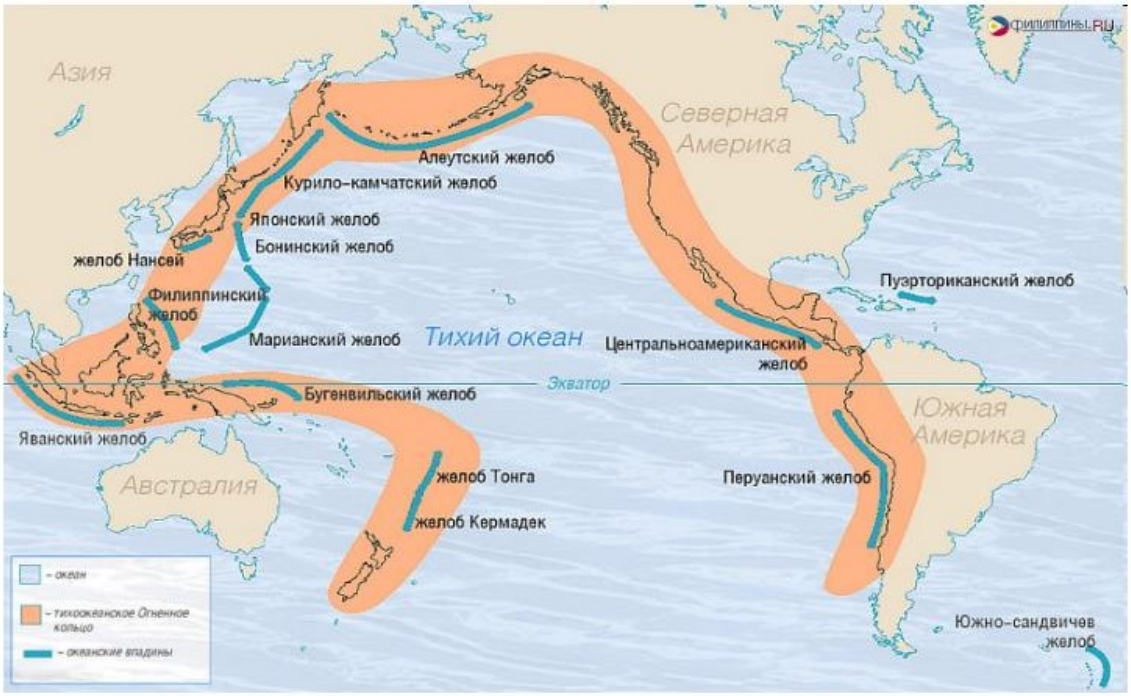
The epicenter of the earthquake was in the Indian Ocean, to the north of Simeulue Island, located near the northwestern coast of the island of Sumatra (Indonesia). The tsunami reached the shores of Indonesia, Sri Lanka, southern India, Thailand and other countries. The height of the waves exceeded 15 meters. The tsunami caused enormous destruction and a huge number of deaths, even in Port Elizabeth, South Africa, 6900 km from the epicenter.

Died, according to various estimates, from 225 thousand to 300 thousand people. The exact death toll is unknown, as many people were swept into the ocean by water.

Despite a delay of up to several hours between the earthquake and the tsunami strike, for almost all the victims this same strike came as a complete surprise; there was no system for detecting the tsunami in the Indian Ocean and, most importantly, a general warning system for the population of coastal areas. It was after this earthquake that the UN decided to establish the Indian Ocean Tsunami Warning System, which began its work in 2006.

Many wild animals and birds tend to leave the danger area in advance. The approach of a tsunami in the next 15-20 minutes can also be judged by the coastline. At this moment, the water quickly recedes, the noise of the surf subsides, the normal regime of ebbs and flows is disturbed. In some cases, the drift of unusual objects is also observed: fragments of ice or, for example, coastal debris raised from the bottom by the movement of water.

Earthquakes do not occur everywhere on Earth. They are concentrated in relatively narrow belts, confined mainly to high mountains or deep oceanic trenches. The first of them – the Pacific – frames the Pacific Ocean.



So-called "Pacific Ring of Fire"

Implications of earthquakes are: tsunami, change of terrain, collapse, volcanic eruptions: toxic gases, lava, ash, fires.

Most earthquakes start with ground tremors, increasing noise, small first shocks (foreshocks), a powerful shock or a few shocks, fading shocks (aftershocks). The duration of one push is on average a few seconds. During an earthquake, patches of land can rise or fall, forming cracks.

Earthquake: Rules of Conduct

Situation at home: in the event of an earthquake warning or signs of an earthquake, you must act quickly, but calmly without panic. stay away from windows, electrical appliances, pots on fire, which must be immediately extinguished; immediately extinguish any source of fire; wake up and dress children, help take them and the elderly to a safe place.

It is necessary to use the telephone only in exceptional cases to call for help, to convey a message to law enforcement agencies, firefighters, civil defense, constantly listen to information on the radio; open the doors in order to secure an exit if necessary; do not go out to the balconies; do not use the elevator; do not use matches as there may be a risk of gas leakage.

With early warning of the threat of an earthquake. Before leaving the apartment, it is necessary to turn off the heaters and gas, if the stove was heated, put it

out; then you need to get dressed, take the necessary things, a small supply of food, medicines and documents and go outside.

If an earthquake started unexpectedly, as soon as the first series of shocks is over, you must leave the house, take cover under strong tables, near the main walls or columns, because the main danger may come from the fall of internal walls, ceilings, chandeliers.

In this situation, you need to leave the dwelling, pressing your back against the wall, especially if you have to go down the stairs; close the door of the house; avoid narrow and cluttered streets. On the street, move away from buildings and structures as quickly as possible in the direction of squares, wide streets, sports grounds, undeveloped areas, strictly observing the established procedure. Watch carefully for eaves or walls that may fall, stay away from towers, reservoirs. Watch out for dangerous objects that may be on the ground (live wires, glass, broken boards, etc.); do not come close to the place of fire; do not hide near dams, river valleys, on sea beaches and lake shores: a wave from underwater shocks can cover you; provide yourself with drinking water; follow the instructions of local authorities only; participate in immediate assistance to others.

At enterprises and institutions during earthquakes, all work stops, production and process equipment stops, measures are taken to turn off the current, reduce the pressure of air, water, steam, etc.; workers and employees who are in the G.O. formations are immediately sent to their assembly areas, the rest of the people occupy safe places. If, according to the conditions of production, it is impossible to stop the unit, furnace, turbine, etc., in a short time, then they are transferred to a sparing mode of operation.

If you are outside your apartment or place of work during an earthquake, for example, in a store, theater or on the street, you should not rush home, you should calmly listen to the instructions of the relevant officials in the current situation and act according to their instructions.

While in the car, you should: do not allow passengers to panic; do not stop under bridges, overpasses, power lines; when parking a car, do not block the roads of other vehicles; drive and stop the car away from balconies, cornices and trees; if possible, it is better not to use a car, but to move on foot; the best solution, if taken in time, is to leave the city.

If you are in public transport, you should not leave it on the go, you need to wait until the transport stops completely and get out of it calmly, letting children, the disabled, and the elderly go ahead.

Earthquake: the helping the injured

During large earthquakes, people can be in the rubble. In conditions of prolonged compression of the soft tissues of individual parts of the body, lower or upper limbs, a very severe lesion can develop, called the syndrome of prolonged compression of the limbs or traumatic toxicosis. It is caused by the absorption of toxic substances into the blood, which are the decay products of multiplied soft tissues. Affected with traumatic toxicosis complain of pain in the damaged part of the body, nausea, headache, thirst. On the damaged part, abrasions and dents are visible, repeating the outline of the protruding parts of the crushed objects. The skin is pale in places cyanotic, cold to the touch. The damaged limb 30-40 minutes after its release begins to swell rapidly.

The periods of traumatic toxicosis

In the early period, immediately after the injury and within 2 hours, the consciousness of the affected person is preserved, he is excited, tries to free himself from the blockage, asks for help. After staying in the rubble for two hours, an intermediate period begins. In the body, toxic phenomena are growing. Excitation passes, the affected person becomes relatively calm, gives signals about himself, answers questions, can periodically fall into a drowsy state, he has dry mouth, thirst, and general weakness.

In the later period, the general condition of the victim deteriorates sharply: agitation appears, an inadequate reaction to the environment, consciousness is disturbed, delirium, chills, vomiting occur, the pupils first strongly constrict and then expand, the pulse is weak and frequent. In severe cases, death occurs.

If you are buried under the rubble you need to: breathe deeply, do not let fear conquer you and do not lose heart, try to survive at all costs; remember that a person is able to endure thirst and especially hunger for a fairly long time if he does not waste energy; believe that help will surely come; look in pockets or nearby for objects that could help give light or sound signals (any object that can bang on pipes or walls to attract attention), adapt to the situation, look around and look for a way out: if there is not enough air, do not light candles that consume oxygen. If the only way out is a narrow hole, try to squeeze through it. To do this, it is necessary, after relaxing the muscles, to gradually squeeze through, pressing the elbows to the sides and moving the legs forward, like a turtle.

Earthquake: helping the injured

Having found a person in the rubble, first of all, you need to inspect this place and take measures to release the victim.

The blockage is disassembled carefully so that it does not fall.

A person can be removed from the blockage only after full release from squeezing.

A sterile dressing is applied to wounds and abrasions.

If the victim has cold, bluish-colored, severely damaged limbs, a tourniquet is placed on them above the compression site.

The tourniquet should not be applied very tight so as not to completely disrupt the blood flow to the damaged limbs.

From the first minutes, first aid to the victim is shown hot tea, heavy drinking with the addition of drinking soda 2-4 grams per reception (up to 20-40 grams per day) This is acidosis prevention meagers.

Those affected with traumatic toxicosis are taken to a medical facility as quickly and carefully as possible on a stretcher.

Earthquake events. The main rules:

- earthquake behavior training;
- layout of settlements and earthquake resistance of buildings;
- preparation of the tent fund;
- food stocks;
- civil defense training for earthquake operations;
- preparation of technical equipment that will be used when dismantling the rubble.

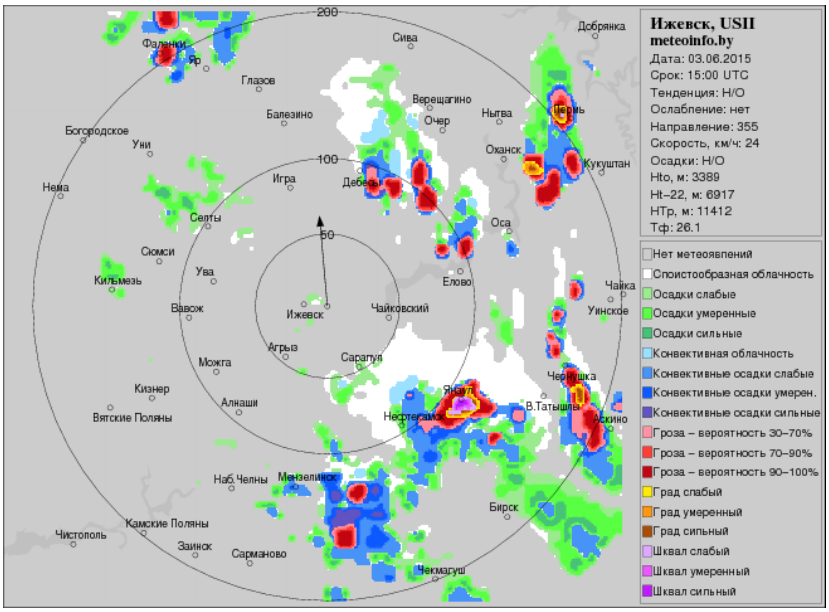
Emergencies of a hydrological and hydrogeological nature

Flooding is the temporary flooding of a vast area as a result of a rise in the water level in a river, lake, or sea.

Floods occur as a result of intensive melting of snow (glaciers), heavy rainfall, traffic jams and ice dams, destruction of hydraulic structures.

Man, despite significant technological progress, has not fully learned to control natural phenomena. It is one thing to try to disperse small clouds, another thing is to prevent natural disasters. Such situations include rain floods. This phenomenon can be both seasonal and spontaneous. A flood is a relatively short-term and non-periodic rise in the water level. Floods following one after the other can form a flood (annually repeated rises in the water level), and the last – a flood.

The consequences of heavy rain in Perm 06/03/2015 on the street Tchaikovsky, http://meteoweb.ru/2016/metamat20151230.php



Meteorological phenomena according to the meteorological service in Perm June 3, 2015, 15:00, http://meteoweb.ru/2016/metamat20151230.php

Rain flood in the village of Bashkultaevo,
http://meteoweb.ru/2016/met amat20151230.php

Rain flood in Perm / http://meteoweb.ru/2016/metamat20151230.php

Wind surge is a rise in the water level in the sea mouths of large rivers and on windy sections of the coast of the seas, large lakes, reservoirs, caused by the impact of a strong wind on the water surface. They are characterized by the absence of periodicity, rarity and a significant rise in the water level, as well as, as a rule, short duration.

Surge floods often occur in St. Petersburg, Holland, England.

The main condition for the occurrence of surges is a strong and prolonged wind, which is typical for deep cyclones. The main characteristic by which one can judge the magnitude of the surge is the surge rise in the water level, usually expressed in meters. Other indicators are the depth of surge wave propagation, the area and duration of flooding. The magnitude of the surge level is affected by the speed and direction of the wind.

A surge is a natural disaster if the water level is so high that cities and towns are flooded, industrial and transport facilities are damaged, and crops are planted.

Strong winds during the passage of cyclones cause an increased wave-like movement of water towards the coast, the water level rises near the coast; a long wave is formed in the center of the cyclone, its length is many times greater than the depth of the water area where it moves. That. the level rise can reach 1m, rarely 2.5 m; long waves due to the surge itself can reach 8–12 m, short waves – up to 2.5 m.

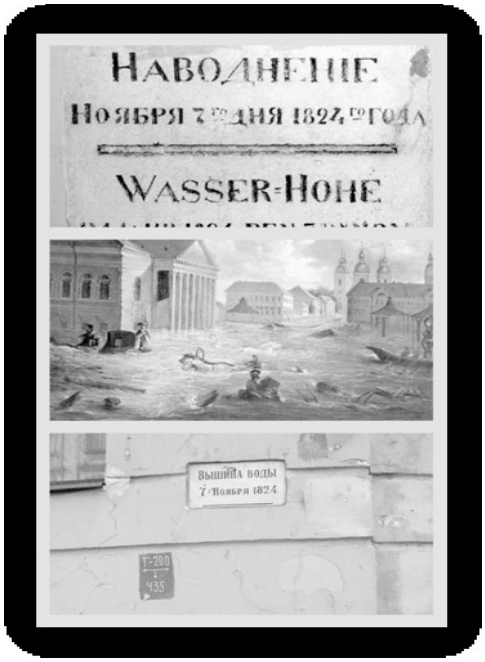
Surge floods at the mouth of the Neva River within St. Petersburg occupy the first place in Russia in terms of level rise, frequency and material damage. Floods occur here in all seasons, including winter, but the most dangerous are in autumn. They account for 70%, including catastrophic ones.

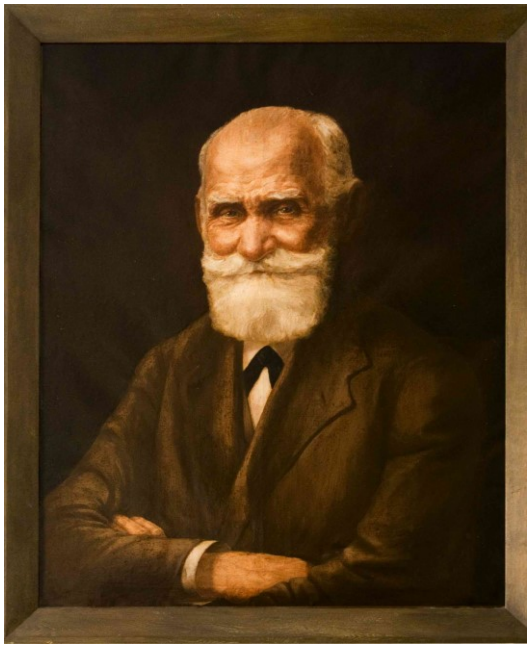
Petersburg flood of 1824

The most significant and destructive flood in the history of St. Petersburg was the St. Petersburg flood of 1824. It was a surge flood, formed as a result of a wind surge from the Gulf of Finland. The water in the Neva River and its numerous channels (sleeves) rose 4.14-4.21 meters above the ordinary. It is estimated that 462 houses were destroyed during the flood, 3681 were damaged, 3600 heads of livestock were killed, 200 to 600 people drowned, many were missing, as the corpses were carried away by water into the Gulf of Finland.

On the walls of the houses of the city there are commemorative plaques marking the water level during the flood of 1824. One of them is located at the intersection of the Kadetskaya Line and Big Prospect of Vasilyevsky Island.

Ivan Petrovich Pavlov was a famous Russian scientist and physiologist. He is known for dividing the entire set of physiological reflexes into conditioned and unconditioned reflexes, and also studied the psychophysiology of temperament types and the properties of nervous systems that underlie behavioral individual differences. It was he who, observing the behavior of experimental animals (dogs) in his laboratory during this flood, came to the idea that animals have conditioned reflexes.





During floods (rain floods and wind surges), ***the main damaging factors*** are: mechanical (drowning, mechanical injuries when hit by a wave and secondary projectiles – objects in or on water) and thermal (general and local hypothermia).

Rescue and urgent emergency recovery work in case of flooding:

- reconnaissance of the flooded territory;
- search and evacuation of people, rescue of farm animals, material assets and equipment;
- providing first aid to the injured;
- patrolling rescue teams in the flood zone;
- carrying out engineering and other works to limit the area of flooding, increasing the stability of hydraulic structures, eliminating congestion.

Those who live in areas prone to frequent flooding should:

- build houses on high foundations;
- have a floating facility (boat, raft);
- store documents and valuables in an accessible and safe place;
- stock up on food and medicine.

The administration notifies the population about the start and procedure for evacuation via radio broadcasting networks, local television and through housing and communal services.

The population is informed about the places of deployment of prefabricated evacuation points, the timing of their turnout, evacuation routes by transport or on foot, the expected scale and time of the emergency.

Before leaving the house, everything that water can spoil should be transferred to the upper floors or other non-flooded places; turn off gas and electricity. Then, taking with you the documents, the most necessary things, a small supply of food and water, arrive at the collection point. In areas of possible flooding, schools and preschool institutions stop their work, children are transported to schools and preschool institutions in safe areas. Evacuation is carried out to the nearest unflooded settlements. Alert all floating facilities.

Flood Actions

- Don't panic;
- turn off gas and electricity;
- taking with you documents, the most necessary things, a small supply of food and water, arrive at the gathering place;
- evacuation is carried out to the nearest non-flooded settlements.

About the sudden onset of flooding, for example, during the destruction of a hydraulic structure, the population is warned by all available technical means. You should go up to the upper floors, and if the house is one-story, take the attic or go to the roof.

The evacuation of the population in this case will be carried out on boats, boats, rafts and other floating facilities. During landing on them, strict discipline must be observed. One should go down into the boat one at a time, stepping on the middle of the flooring, and sit down only at the direction of the elder. During the movement of the boat, you can not change places, get on board; The bow of the boat should be kept perpendicular to the wave. After mooring, one of the passengers must go ashore and hold the boat until all people are on land.

In case of a catastrophic rise in water, use improvised means: boards, logs, floats, cameras, etc. Outside the settlement, when the water rises quickly, climb to an elevated place, a tree or use floating objects.

Remember: the search for people in the flooded area is organized immediately. A drowning person is approached in a boat against the current, and lifted from the stern.

With a sudden rise in water:

- Don't panic;
- quickly rise to the upper floors (if the house is one-story – to the attic or to the roof);
- the evacuation of the population in this case will be carried out by boats, rafts;
- one should go down into the boat one by one; during the movement of the boat you can not change places, board;
- after landing, one of the passengers should go ashore and hold the boat until all people are on land;
- Once in water: throw off your outer clothing, find floating objects or towering land around you and use them until help arrives;
- Search for victims and rescue of people in the flood zone (removal from roofs, structures, etc.) is carried out using floating equipment and helicopters;
- Do not overfill floating equipment;
- First of all, children, women and the elderly are evacuated.

Post flood action

- Avoid torn and sagging electrical wires, damaged gas lines;
- before entering the house make sure of its strength; dry it – pump out water from cellars and cellars, open all windows and doors;
- use gas, electricity, sewage is possible only after obtaining permission from utilities;
- do not eat foods that have been in contact with water.

Emergencies of a hydrological and hydrogeological nature

Mudflow (mudflow) is a rapid stream of great destructive power, consisting of a mixture of water, sand and stones, which suddenly appears in mountain river basins as a result of intense rains or rapid snowmelt.

Mudflow is characterized by a sharp rise in the water level in mountain rivers and a short duration of action (on average, from one to three hours).

The word "sel" (in Russian) comes from the Arabic "sayl", which means "turbulent stream."

According to the composition of these materials, mudflows can be: water-stone – water with large stones and rock fragments, mud – a mixture of water with fine earth and small stones, mud-stone – a mixture of water, fine earth, gravel, pebbles, small stones; there are few large stones, they either fall out of the stream, or again move along with it. The passage of the mudflow is accompanied by significant reformations of the channel.

On their way, the streams cut deep channels, which are usually dry or contain small streams. Mudflow material is deposited on foothill plains.

Mudflow rushes from the mountains at the speed of a running person, and sometimes faster (up to 40 km / h), so the impact of a mudflow is tantamount to hitting a moving bus. After the impact, the object sinks in the rushing mud and stone mass and floats downstream in the thickness of a multi-meter stream. A person who has fallen into a mudflow manages to escape in rare cases, when the speed and depth of the stream are significantly reduced at gentle turns and there are no large stones that cause fatal injuries. The direct impetus for the occurrence of mudflows can be: intense and prolonged showers; rapid melting of snow and glaciers; collapse of a large amount of soil into the riverbed; breakthrough of reservoirs, including artificial ones. Mudflows pose a threat to settlements, railways and roads and other structures located on their way.

Having a large mass and high speed of movement, mudflows destroy buildings, roads, hydraulic and other structures, disable communication and power lines, destroy gardens, flood arable land, and lead to the death of people and animals. All this lasts 1-3 hours. The time from the occurrence of a mudflow in the mountains to the moment it reaches the foothills is often estimated at 20-30 minutes.

In recent years, technogenic factors have been added to the natural causes of the formation of mudflows: violation of the rules and norms of the work of mining enterprises; explosions during the laying of roads and the construction of other structures; mismanagement of agricultural work, deforestation and violation of the soil and vegetation cover.

Sergey Bodrov (Jr.) is a Soviet and Russian film actor, film director, screenwriter and TV presenter. Ph.D. in History of Arts. He tragically died on September 20, 2002, Karmadon Gorge, North Ossetia, during the filming of the movie. The cause of the death of the film crew was mudflow.

https://avatars.mds.yandex.net/get-pdb/1848399/c8e08e40-c2db-400a-ae59-65fa54ecb614

http://www.morediva.su/wp-content/uploads/2017/09/11601_photo_w980-700x459.jpg

Anti-mudflow measures

strengthen by planting forests, especially in places where mudflows occur, periodically drain water from mountain reservoirs, arrange anti-mudflow dams, dams, ramparts, ditches, etc.

Protective and retaining walls, dams and other protective structures are built along the riverbeds. On warm sunny days, you can reduce the rate of snow melting by placing smoke screens (screens) using smoke bombs. In 15-20 minutes after smoke, the temperature of the surface layer of air decreases and the runoff of the oxen decreases by half.

The water accumulated in moraine, dammed lakes and mud storages is pumped out by pumps. An effective way to fight is to trap mudflows in special pits located in riverbeds or in the initial part of the alluvial fan.

Mudflow occurs only in the mountains.

For the timely adoption of measures, the organization of reliable protection of the population, a well-organized warning and warning system is of paramount importance.

In areas threatened by mudflow, an anti-mudflow service is being created. Its tasks include forecasting the occurrence of mudflows, and informing the population about the time of its occurrence. At the same time, routes are foreseen in advance along which the population is evacuated to higher places. There, if time permits, cattle are driven away and equipment is brought out.

In most cases, the population about the danger of a mudflow can be warned in just tens of minutes and less often in 1-2 hours or more. The approach of such a stream can be heard by the characteristic sound of boulders and stone fragments rolling and colliding with each other, resembling the roar of a train approaching at high speed.

Geological Emergencies

Geological emergencies are phenomena that occur on the surface of the Earth.

A collapse is a rapid separation (separation) and fall of a mass of rocks (earth, sand, stones, clay) on a steep slope due to loss of slope stability, weakening of connectivity, integrity of rocks. Landslides are sliding displacements of masses of rock (or other) rocks down a slope under the influence of gravity. Landslides can descend from all slopes with a steepness of 19°, and with clay soils – from 5–7°.

So, ***a collapse*** is a separation and fall of a rock mass (fragments of buildings). Reason: loss of stability. Its formation is promoted by: earthquakes; explosions; precipitation; wind; temperature fluctuations.

Consequences: loss of life and property damage.

Thus, the causes of the collapse: Natural factors

The collapse occurs under the influence of weathering processes, the movement of underground and surface waters, the washing away or dissolution of rock, and soil vibrations.

Weathering is a set of processes of physical and chemical destruction of rocks and their constituent minerals at their place of occurrence: under the influence of temperature fluctuations, freezing cycles and chemical effects of water, atmospheric gases and organisms.

Anthropogenic factors (Greek anthropos – man, genesisum – origin, lat. factor – business) – environmental factors.

Most often, collapses occur during the period of blasting and construction work.

The striking factor of the collapse is the fall of heavy masses of rocks that can damage, break, crush even solid structures or cover them with soil, blocking access to them. Another danger of landslides is the possible damming of rivers and the collapse of the banks of lakes, the waters of which, in the event of a breakthrough, can cause floods or, even more dangerous, mudflows.

A landslide is a separation and sliding displacement of a mass of earthen, rocks downwards under the action of its own weight. Landslides occur most often along the banks of rivers, reservoirs and on mountain slopes.

Landslides can occur on all slopes, but on clay soils they occur much more often, for this, excessive moisture of the rocks is sufficient, so they mostly disappear in the spring and summer.

The natural cause of the formation of landslides is an increase in the steepness of the slopes, washing away their bases with river waters, excessive moisture of various rocks, seismic shocks and a number of other factors. The artificial cause is the destruction of the slopes by road cuts, excessive removal of soil, deforestation, unreasonable farming on the slopes.

Landslides can be caused by the following factors:

Natural factors are:

- earthquakes;
- waterlogging of slopes by precipitation;
- Increasing the steepness of the slope as a result of water washing;
- weakening of hard rock strength by weathering, washing out or leaching;
- presence of softened clays, quicksands, fossil ice in the soil;
- alternation of water-resistant (argillaceous) and water-bearing rocks (sand-gravel, fractured, calcareous);
- arrangement of soil layers with an inclination towards the slope;
- intersection of rocks by cracks.

Anthropogenic factors are:

- clearing of forests and bushes on slopes. Moreover, cutting can occur much higher than the place of the future landslide, but the water will not be retained by the plants at the top, as a result of which the soils will be waterlogged far below;
- blasting, which is, in fact, a local earthquake and contributes to the development of cracks in the rocks;
- plowing of slopes, excessive watering of orchards and orchards on slopes;
- destruction of slopes by pits, trenches, road cuts that undercut slopes;
- clogging, clogging, blockage of groundwater outlets;
- construction of housing and industrial facilities on slopes, which leads to the destruction of the slopes, an increase in the force of gravity directed down the slope.

The damaging factor of landslides is heavy masses of soil, falling asleep or destroying everything in its path.

The consequences are the destruction of the banks of rivers and roads, the swamping of rivers, the loss of navigability of rivers, the destruction of coastal structures (bridges, dams, locks).

Protective work includes:

- leveling of slopes, leveling of hillocks and patching of cracks;
- implementation of planned, strictly dosed explosions that are safe for people, causing controlled collapses and landslides;
- reduction of steepness of slopes with the help of equipment and directed explosions (cutting off the upper part of the slopes and laying soil at the foot);
- construction of roads, overpasses, viaducts diverting traffic flows from hazardous areas;
- construction of retaining walls, counter-banquets, pile rows in places where roads undercut slopes, at the foot of potential landslides to create a stop;
- installation of guide walls to change the movement of landslide rocks;
- interception of groundwater with the help of the drainage system, regulation of surface runoff with the installation of trays, ditches, and other drains;
- protection of slopes by draining, sowing grasses, planting shrubs and trees. In addition to binding the soil with their root system, trees actively absorb precipitation (coniferous about 60%, deciduous about 30% of precipitation).

In dangerous, landslide areas, constant monitoring of the movement of soils, the water level in wells, drainage structures, wastewater disposal systems, boreholes, rivers, reservoirs, precipitation and runoff is organized.

In the event of a landslide, it is necessary, firstly, to warn the population, and, secondly, as the situation worsens, organize the evacuation of the population to safe areas.

Natural fires

Forest fires are uncontrolled burning of vegetation, spontaneously spreading through the forest area. Forest fires, depending on the levels of the forest in which the fire spreads, are divided into grassroots, riding and underground.

A ground fire is a forest fire that spreads through the lower tiers of forest vegetation, forest litter.

A type of ground fire is a deadwood fire, the combustible material for which are dead trees lying on the ground. It is more stable and the more dangerous as the cause of the crown fire.

Underground fires burn peat under forests. Peat burns either partially, to wet layers, in which combustion cannot continue, or completely, to the entire depth to the mineral soil layer. This exposes and burns the roots of trees.

Crown fires are characterized by the spread of fire along the ground cover and along the crowns of trees, while needles, leaves, small, and sometimes large branches are burned. The transition from a ground fire to a crown fire occurs in plantations with low crowns, in forests of different ages, as well as with abundant coniferous undergrowth.

That is, ground fires – the grass cover, mosses and lichens, undergrowth burn out, and the trees remain unaffected; riding – cover the crowns of trees, but can burn out the undergrowth and grass cover; soil – the subsoil layer burns out.

Ground fires, in turn, are divided into runaway and persistent fires; fugitive ground fires are characterized by a rapidly moving edge of the flame and light gray smoke, uneven advancement; stable ground fires completely burn the ground cover, the height of the flame is higher than that of runaway fires, but the speed is lower.

Large crown fires are accompanied by the throwing of the flame over considerable distances with the formation of swirls.

Steppe (field) fires occur in open steppe areas with dry vegetation. The damaging factors of forest fires are high temperatures, which cause ignition of objects that can burn, and damage to people; smoke in large areas, which irritates people, makes it difficult to fight a fire and limits visibility; negative psychological effect on people. Peat fires, in addition, are characterized by the formation of voids in burnt peat, where people and equipment can fall through.

Ground fire

http://gov.cap.ru/home/203/foto/2010/lesnoy_pozhar_24.04.2010/pages/image/imagepage2.html

In the summer of 2010, a state of emergency was introduced on the territory of 20 regions of Russia. A special fire regime was introduced in 55 constituent entities of the Russian Federation.

Riding forest fire

https://fireman.club/inseklodepia/verxovoj-pozhar/ Burning tree crowns

According to statistics, the main causes of forest fires in Russia are violation of fire safety rules by the local population – 70% and lightning – 12.4% (in Canada, every fourth forest fire occurs due to lightning). The rest is agricultural burning.

Preventive measures to prevent forest and peat fires are

1) organization of monitoring of forest areas;

2) assessment of the amount of combustible substances on the territory (fallen leaves, dry trees);

3) development and creation of fire warning systems;

4) identification of water sources that can be used to extinguish fires;

5) identification of natural barriers to the spread of fire (ravines, clearing, roads, etc.);

6) creation of new clearings to limit the spread of fire;

7) felling – forest care;

8) organization of hydrometeorological monitoring;

9) creation and training of a fire fighting unit;

10) accumulation of fire extinguishing and technical means of extinguishing.

Forest fire events

1) increased control over the state of the forest;

2) alerting formations and technical means of fire extinguishing;

3) a ban on the access of vacationers to forests, etc.

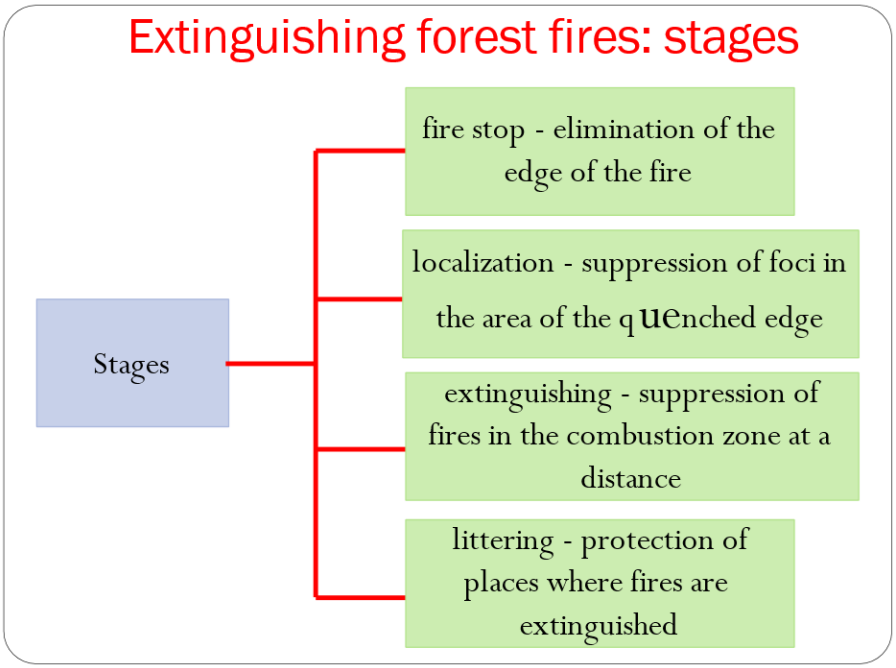
Activities carried out during forest fires: first of all, fire reconnaissance is organized, which establishes the location, size and boundaries of fires, the direction, degree of their danger and the possibility of spread, as well as the presence and condition of water sources and the route to the fire site.

Forest fires can be fought in one of three ways: active, passive, and a combination of active and passive.

1. An active method of fighting a fire is used if there are sufficient forces and means to fight fires. With the active method, to localize a forest fire, you must first stop the front of the fire; then, concentrating efforts on the flanks, to prevent the expansion of the front of fire; after that, concentrating efforts on the rear edge of the fire, strive to eliminate combustion.

2. The passive method consists in retreating to a previously prepared or natural line and fighting a fire with a lack of strength.

3. A combination of active and passive methods is used to extinguish several or large fires.



Extinguishing forest fires includes the following stages:

- stopping the fire – eliminating the edge of the fire, i.e. stop the spread of fire;
- localization – suppression of foci, as a rule, flameless combustion (smoldering) in the area of the extinguished edge;
- extinguishing – suppression of fires in the combustion zone at a distance that excludes the possibility of repeated fires;
- guarding – protection of places where fires have been extinguished to prevent the occurrence of repeated fires.

Fire safety rules for a campfire

Don't light a fire unnecessarily.

Choose the right place for a fire: in a clearing, away from trees; the best place on a sandy or pebbly spit of a river, lake; do not build a fire near trees, massifs of bread, wooden houses and buildings; danger is represented by old stumps and deadwood.

Dig around the area around the fire or surround it with stones.

Do not use dry fuel when making a fire, it is dangerous.

Do not throw very dry branches, needles, paper, birch bark, etc. into the fire, the fire that flared up high at the same time can spread to your clothes and hair in a strong wind.

Do not make the fire very high, it can start a forest fire, especially in windy hot weather.

Be sure to put out the fire when you leave the forest. To do this, fill the fire with water, if it is not there, then throw the fire with earth, sand, or simply trample it.

Remember, when re-building a fire, you should not make a new fire, this destroys the soil.

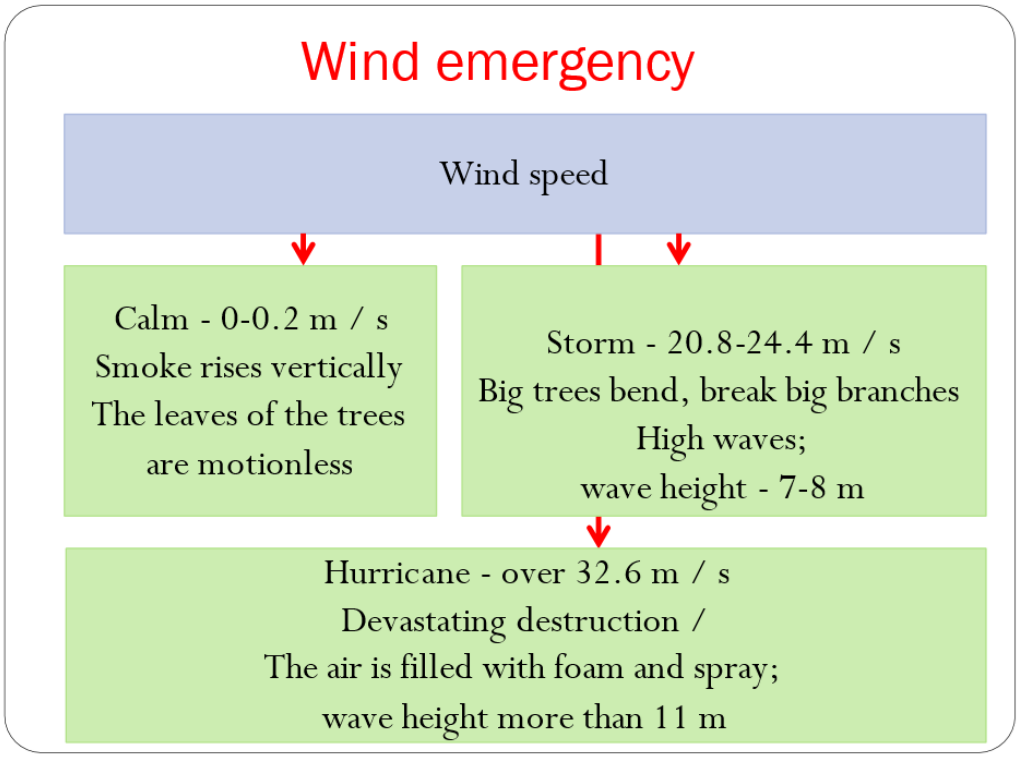
If you notice a small fire from a fire, you should try to put it out, inform adults and call the fire department by phone 101.

Wind emergency

Wind is the movement of air parallel to the earth's surface, resulting from the uneven distribution of heat and atmospheric pressure and directed from a high pressure zone to a low pressure zone.

These natural phenomena, in addition to tornadoes, hail and squalls, lead to natural disasters, as a rule, in three cases: when they occur in one third of the territory of the region (krai, republic), cover several administrative regions and last at least 6 hours.

The wind is characterized by speed (strength) and direction. The direction is determined by the sides of the horizon from which it blows, and is measured in degrees. Wind speed is measured in meters per second and kilometers per hour. The strength of the wind is measured in points.



Many words are used to indicate the movement of the wind: calm, breeze, storm, hurricane, tornado, storm, typhoon, cyclone and many local names.

To systematize them, the Beaufort scale is used all over the world, which allows you to very accurately assess the strength of the wind in points (from 0 to 12) by its effect on ground objects or by waves at sea.

The Beaufort scale is a conditional scale for visual assessment and recording of wind strength (speed) in points. Initially, it was developed by the English admiral Francis Beaufort in 1806 to determine the strength of the wind by the nature of its manifestation at sea. Since 1874, this classification has been accepted for widespread (on land and sea) use in international synoptic practice. In subsequent years, it was changed and refined (Table 2). The state of complete calm at sea was taken as zero points. Initially, the system was thirteen-point (0–12 bft, on the Beaufort scale). In 1946 the scale was increased to seventeen (0–17). The strength of the wind in the scale is determined by the interaction of the wind with various objects. In recent years, the strength of the wind is more often estimated by the speed, measured in meters per second – at the earth's surface, at a height of about 10 m above an open, flat surface.

On the slide for an example. Calm – on land – The complete absence of wind. The smoke rises vertically, the leaves of the trees are motionless; on the sea – a mirror-smooth sea. Storm – on land – Large trees bend, breaks large branches. The wind rips the tiles off the roofs; on the sea – High waves. Foam in wide dense stripes lays down in the wind. The crests of the waves begin to capsize and crumble into spray, which impair visibility. The height of the waves is 7-8 m, the length is 150 m. A storm can, in turn, be just a storm, a strong storm, etc. Hurricane – on land – Devastating destruction. Separate gusts of wind reach speeds of 50–60 ms. A hurricane can occur before a major thunderstorm; at sea – The air is filled with foam and spray. The sea is covered with strips of foam. Very poor visibility. Wave height >11m, length – 300 m.

A tornado is a strong atmospheric vortex that occurs in thunderclouds and descends towards land in the form of a dark sleeve with a vertical curved axis and a funnel-shaped expansion in the upper and lower parts.

http://review-planet.ru/2013/05/smerch-foto

Tornadoes can be white, gray, black, red, dark blue, etc. Tornadoes acquire the most beautiful color at sunset, when the air funnel is filled with various bright colors. But a tornado can also be absolutely transparent, this is in the event that debris and dust do not get into it. For the most part, tornadoes are transparent, and become visible already at the moment when they have reached their maximum power. Of course, tornadoes can be short-lived, and most of them do not exist for even an hour, but there are also those that are capable of destroying everything in their path, circling for up to 4 hours, and thereby only gaining power. In the upper part, the tornado has a funnel-shaped extension that merges with the clouds. When a tornado descends to the earth's surface, its lower part sometimes expands and resembles an overturned funnel. The height of the tornado can reach 800-1500 m.

The air in the tornado rotates and at the same time spirals upward, drawing in dust or water. Let me give you some typical figures.

The rotation speed can reach 330 m/s. Due to the fact that inside the vortex the pressure decreases, water vapor condenses. Dust and water make the tornado visible.

The height of the sleeve can reach 1000-1500 meters. The diameter of a tornado over the sea is measured in tens of meters, over land – hundreds of meters. A tornado usually occurs in the warm sector of a cyclone and moves along with the cyclone. It travels a path from 1 to 60 km long, is accompanied by thunderstorms, rain, hail, and if it reaches the surface of the earth, it almost always causes great destruction, sucks in water and objects encountered on its path, lifts them high up and carries them over long distances. A tornado at sea is a danger to ships.

The speed of the tornado is 50–60 km/h.

Tornado

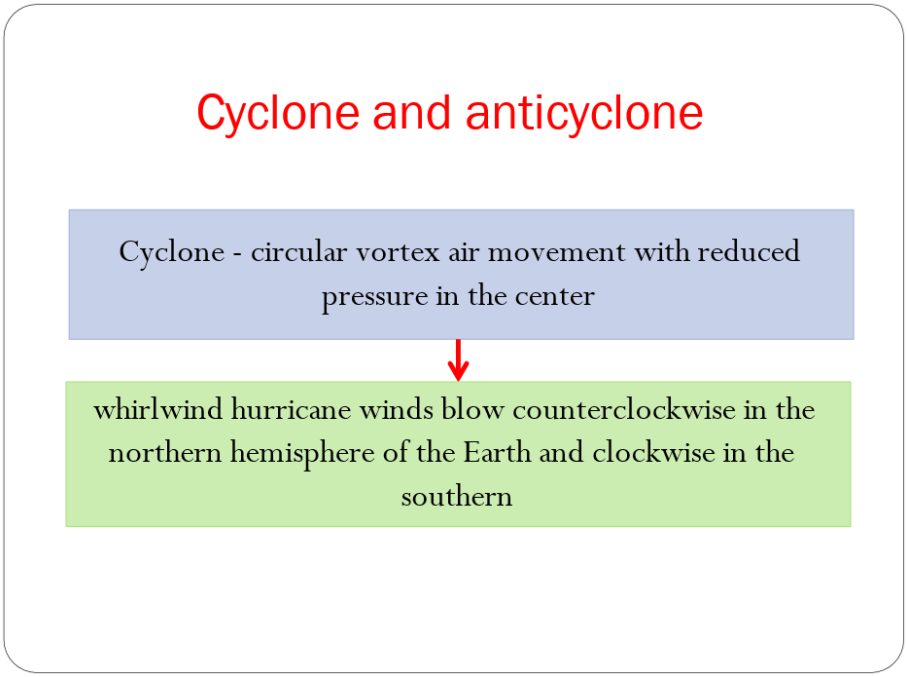
- Air in a tornado rotates and at the same time rises in a spiral up
- Rotational speed can reach 330 m / s
- Tornado air pressure lowered
- The height of the tornado can reach 1000 -1500 meters
- Sleeve diameter - from several tens to hundreds of meters
- The length of the tornado's path is from several hundred meters to tens of kilometers
- The speed of the tornado is 50 -60 km / h

http://review-planet.ru/2013/05/smerch-foto/

Tornadoes are identified from weather satellites. In Russia, tornadoes most often occur in the Central regions, the Volga region, the Urals, Siberia, on the coast and water areas of the Black, Azov, Caspian and Baltic Seas. Statistics registered tornadoes near the cities of Arzamas, Murom, Kursk, Vyatka and Yaroslavl. It is extremely difficult to predict the place and time of the appearance of a tornado, therefore, for the most part, they arise suddenly for people, and it is all the more impossible to predict their consequences.

A tornado can lift a fragment of a building high into the air, or even the building itself, a car, a person. Which is extremely dangerous because it always ends in injury or death.

The photo shows a tornado from space.



The Earth's atmosphere is not uniform. The composition of the atmosphere near the surface of the Earth "is 78.1% nitrogen, 21% oxygen, 0.9% argon, in small fractions of a percent carbon dioxide, hydrogen, helium, neon and other gases.

In the lower layers of the atmosphere at a level of 20 km contains water vapor. At an altitude of 20-25 km there is an ozone layer that protects living organisms from harmful short-wave radiation.

Above 100 km, gas molecules decompose into atoms and ions, forming the ionosphere.

From the distribution of temperature, the atmosphere is divided into the troposphere, stratosphere, mesosphere, thermosphere, exosphere. Uneven heating contributes to the general circulation of the atmosphere, which affects the weather and climate of the Earth.

A cyclone (from Greek – whirling, rotating) is a strong atmospheric disturbance, a circular vortex movement of air with reduced pressure in the center. The diameter of the cyclone reaches from 100 to 2000–3000 km. In cyclones, whirling hurricane winds blow counterclockwise in the northern hemisphere of the Earth and clockwise in the southern hemisphere. Tropical cyclones (typhoons) move somewhat faster. But inside the cyclone, the speed of wind eddies can be both storm and hurricane, that is, more than the speed of movement of the cyclone (typhoon) itself. The weather during the cyclone is overcast, with strong winds.

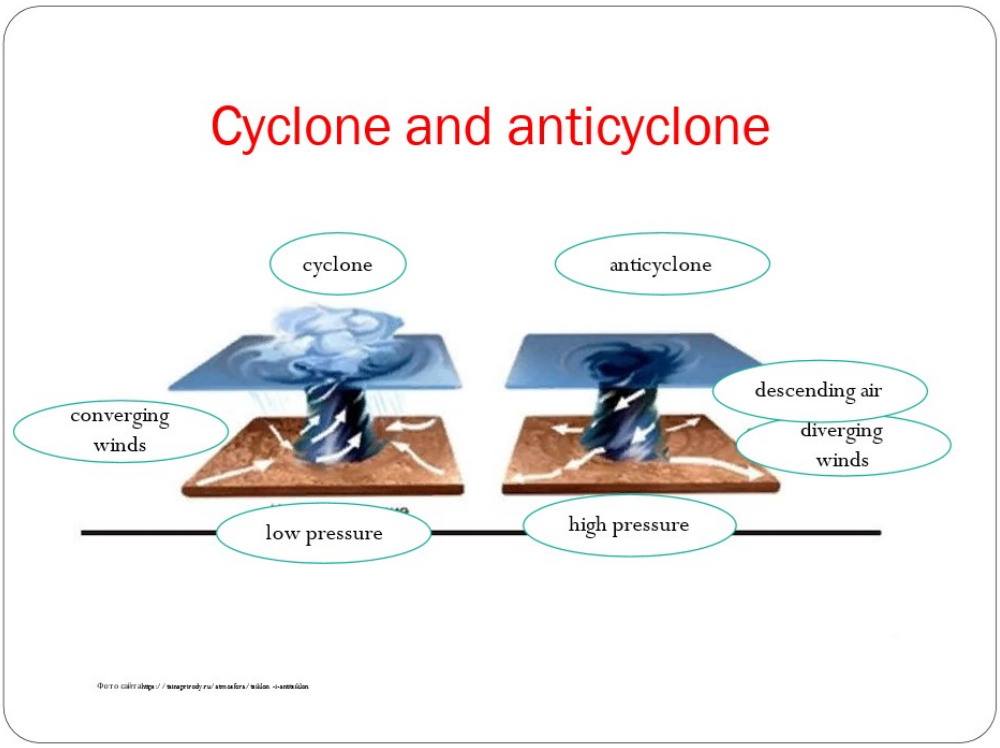
In ***an anticyclone***, the opposite is true, its speed is lower and the weather is better.

A cyclone is a vast atmospheric vortex, reaching from hundreds to many thousands of kilometers in diameter, associated with the movement of a warm front (the advance of a warm air mass onto a cold one). The winds are directed from the edges to the center, moving in the Northern Hemisphere counterclockwise, in the Southern – clockwise. In the central zone, low pressure is formed, air flows are directed upwards.

According to the area of occurrence, types of cyclones are distinguished: arctic; arising in temperate zones; tropical; southern, arising outside tropical latitudes. The most dangerous are powerful tropical cyclones that form at latitudes of 5–25° above the warm sea.

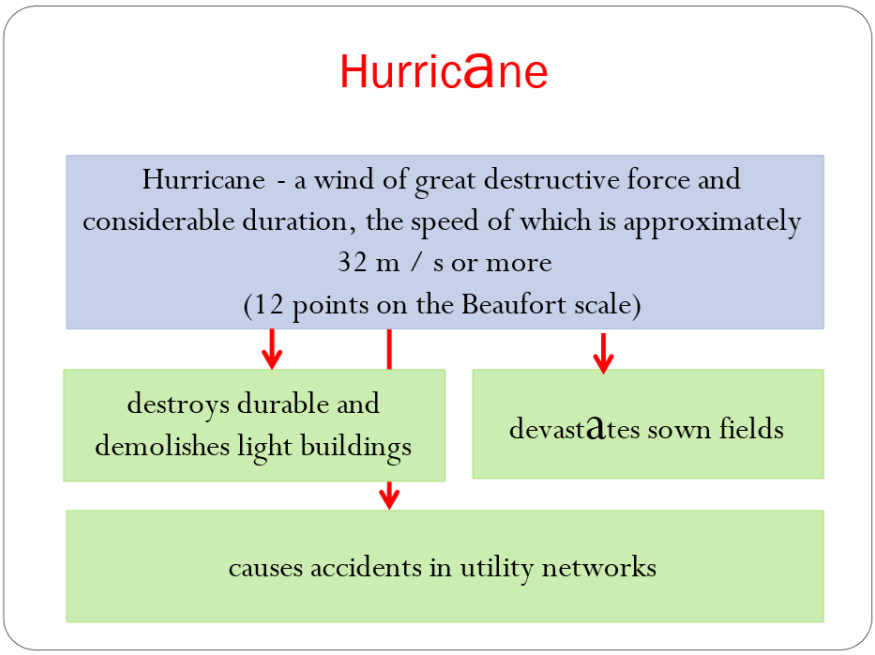
An anticyclone is an air flow characterized by high pressure, a certain wind direction (clockwise in the Northern Hemisphere, counter-clockwise in the Southern Hemisphere). It is formed in the subtropics and subpolar belts in the lower atmospheric layers during the formation of a cold front (the invasion of a cold air mass into a warm one).

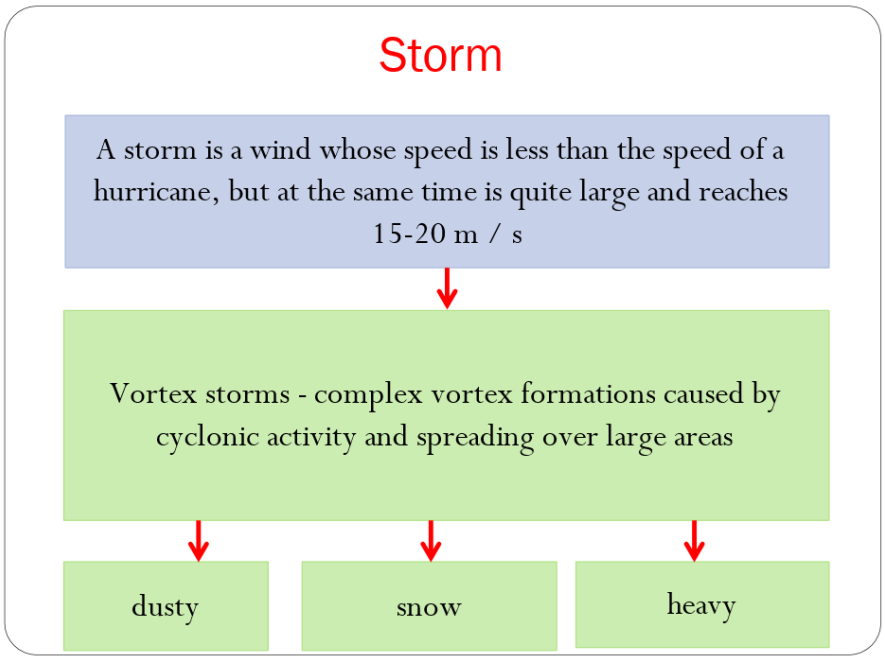
Thus, a cyclone: pressure: central – low, rises to the edge; overcast, strong wind, precipitation. Anticyclone – pressure: central – high, decreases towards the edge; low cloud cover, no wind, no precipitation.



A hurricane is a wind of great destructive power and considerable duration, with a speed of approximately 32 m/s or more (12 on the Beaufort scale). Hurricanes are usually divided into tropical and extratropical. Tropical hurricanes are

often classified as hurricanes that originate over the Atlantic and Pacific oceans. Hurricanes that originate over the Pacific Ocean are called typhoons. Hurricanes are one of the most powerful forces of the elements, as they carry colossal energy. The hurricane wind destroys strong and demolishes light structures, devastates sown fields, breaks wires and knocks down power transmission and communication poles, damages highways and bridges, breaks and uproots trees, damages and sinks ships, causes accidents in utility and energy networks, in production. There are cases when hurricane winds destroyed dams and dams, which led to floods; threw trains off the rails. Hurricanes are often accompanied by heavy rainfall. Downpours are the cause of natural disasters such as mudflows and landslides.





A storm is a wind whose speed is less than the speed of a hurricane, but it is quite large and reaches 15-20 m/s. Losses and destruction from storms are significantly less than from hurricanes. A violent storm is sometimes called a storm. Short-term increases in wind speeds up to 20-30 m/s are called squalls. Storms are divided into vortex and stream storms. Vortex storms are dusty, snowy and squall. In winter they turn into snow. In Russia, such storms are often called blizzard, snowstorm, snowstorm.

Dust (sand) storms are an atmospheric phenomenon in which a large amount of dust rises into the air, transported over considerable distances. Dust storms cause suffocation and lead to illness, equipment suffers greatly from them, and they can spread dangerous parasites. Dust storms affect several areas of the Earth, mostly deserts. As a rule, dust storms take place during unstable weather, during the passage of atmospheric fronts.

Dust Storm: Arizona, USA 2011,
https://www.liveinternet.ru/users/5049923/post274653478/

In Russia, dust storms are most often observed in the Astrakhan region, in the east of the Volgograd region, in Kalmykia, in Tyva, in the Altai Territory and in the Trans-Baikal Territory, in the Chita Region, Buryatia, Tuva, Altai Territory, Omsk, Kurgan, Chelyabinsk, Orenburg regions, Bashkiria, Samara, Saratov, Voronezh, Rostov regions, Krasnodar and Stavropol regions. For more details, visit Znanija.com – https://znanija.com/task/4035879#readmore

Causes of dust storms: It's all about the terrible heat, due to which the soil dries out a lot and then breaks up into microparticles in the surface layer, picked up by a strong wind. But dust storms begin at certain critical values of wind speeds, depending on the terrain and soil structure. For the most part, they begin at wind speeds in the range of 10–12 m/s. After the disappearance of the causes of the described phenomenon, the dust raised from the surface of the earth remains in the air

in suspension for several hours, possibly even days. In these cases, its huge masses are carried by air currents for hundreds and even thousands of kilometers. Dust storms have a wide variety of colors, which depend on the structure of the soil and their color. There are storms of the following colors: black (chernozem soils of the southern and southeastern regions of the European part of Russia, the Orenburg region and Bashkiria); yellow and brown (typical of the USA and Central Asia – loam and sandy loam); red (red-colored, iron oxide-colored soils of the desert areas of Afghanistan and Iran; white (salt marshes of some regions of Kalmykia, Turkmenistan and the Volga region). Dust storms often occur in the Balkhash region and in the Aral Sea region (south of Kazakhstan), in the western part of Kazakhstan, on the Caspian coast, in Karakalpakstan and Turkmenistan.

https://tengrinews

Dust storm in the former capital of Kazakhstan, Almaty. Due to increased wind and dry weather, the dust rose up. Visibility in the city deteriorated sharply. "It's normal when the weather is dry and the wind picks up before the rain".

But still, the most dangerous dust (sand) storms are formed in the desert.

Snow storms in Russia are a blizzard, a snowstorm, a blizzard.

Stream storms are local phenomena of small distribution. Stream storms – characterized by the movement of air in the form of a stream, a jet. Stream storms are divided into katabatic and jet. With stock, the air flow moves down the slope from top to bottom. Jets are characterized by the fact that the air flow moves horizontally or up the slope. They pass most often between the chains of mountains connecting the valleys.

Storm, tornado, hurricane: rules of conduct

If you are warned about a hurricane in advance. Remove from balconies, window sills and loggias things that can be captured by the air flow. The same applies to objects in the yard or on the roof. Close all windows and window sashes, lower the blinds and curtain the windows. Remove vases and flowerpots from windowsills first.

If a hurricane finds you in a building, move away from windows and take a safe place against interior walls, closets, hallways, bathrooms, pantries, closets, sturdy cabinets, under tables. Put out the fire in the stoves, turn off the electricity, close the taps on the gas networks.

At night, use lamps, lanterns, candles; turn on the radio to receive information from the Department of Emergency Situations and Civil Defense and the Commission for Emergency Situations.

You can't take cover in elevators: if the building is de-energized, you will remain locked.

Storm, tornado, hurricane: rules of conduct on the street

If a storm, hurricane or tornado caught you on the streets of a settlement, stay as far away as possible from light buildings, bridges, buildings, overpasses, power lines.

Try to quickly take cover in basements, cellars and anti-radiation shelters that are in settlements. Do not enter damaged buildings, as they can collapse with new gusts of wind. During a storm, tornado or hurricane, you should not:

1. Use gas stoves or any electrical appliances in the house.

2. Go inside dilapidated, damaged buildings.

3. Take shelter from the wind behind billboards, trees, fences and dilapidated buildings.

4. Be near poles, as well as objects with flammable and poisonous substances.

5. Touch the pipes of gas supply, water supply, central heating, as well as broken wires of power lines. 6. Stay on bridges, high places, and near power lines and pipelines.

Try to quickly take cover in solid buildings, metro stations, basements, underground passages.

if you are outside the city, use roadside ditches, beams, hollows and ditches as shelters. Find any recess in your path, lie face down on its bottom, try to snuggle as close to the ground as possible.

The actions after the storm, tornado, hurricane

Beware of fallen trees, as well as swinging banners, signs, billboards, shutters. Be careful when walking around broken power lines, as they may be live. Beware of gas leaks in homes, disturbances in the electrical network. It is only allowed to use any electrical appliances after they have been checked and thoroughly dried.

In cases where a storm is accompanied by a thunderstorm, beware of electric shock (lightning).

Other meteorological emergencies are:

- heavy rain (with rainfall of 50 cm or more for 12 hours or more, and in mountainous, mudflow and rain hazardous areas – 30 cm or more in 12 hours);
- large hail (with a hailstone diameter of 20 mm or more);
- heavy snowfall (with a rainfall of 20 cm or more in 12 hours);
- heavy blizzards (wind speed 15 m / s and more);
- dust storms;
- frosts (with a decrease in air temperature during the growing season on the soil surface below 0 ° C);
- severe frosts or extreme heat.

https://zen.yandex.ru

Space emergencies. Space is one of the elements that influence earthly life. "Cosmos" (Greek) – order, device. The philosophers of Ancient Greece understood the word "cosmos" as the Universe, considering it as an ordered harmonious system. In the modern sense, the cosmos is everything that is outside the Earth and its atmosphere.

The nearest and most accessible area of outer space for research is near-Earth space. It was from this area that human space exploration began, the first rockets visited it. The flights of spaceships with crews on board and the astronauts going directly into outer space have significantly expanded the possibilities for exploring "near space". At present, space research also includes the study of "deep space" and a number of new phenomena associated with the influence of weightlessness and other cosmic factors on physical, chemical and biological processes on Earth.

The gases that form the upper layers of the earth's atmosphere are ionized by the UV radiation of the Sun, i.e., they are in the state of plasma. The plasma interacts with the Earth's magnetic field in such a way that the magnetic field exerts pressure on the plasma.

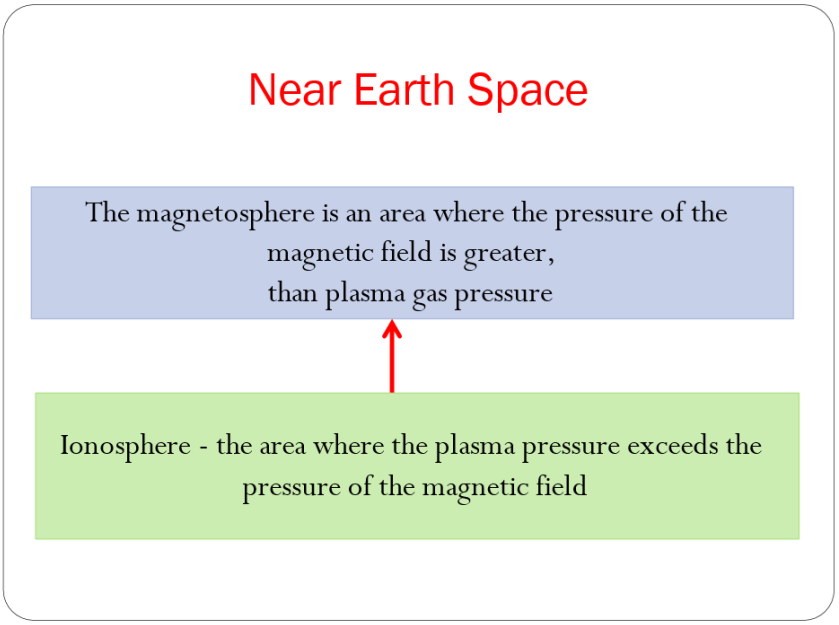
With distance from the Earth, the pressure of the plasma itself falls faster than the pressure exerted on it by the terrestrial magnetic field. As a result, the plasma shell of the Earth can be divided into two parts.

The lower part, where the plasma pressure exceeds the magnetic field pressure, is the ionosphere. Above lies the magnetosphere – the region where the pressure of the magnetic field is greater than the gaseous pressure of the plasma.

The behavior of plasma in the magnetosphere is determined and regulated primarily by the magnetic field and is fundamentally different from the behavior of an ordinary gas.

Therefore, unlike the ionosphere, which is referred to the upper atmosphere of the Earth, the magnetosphere is usually referred to as outer space.

By physical nature, near-Earth space, or near space, is the magnetosphere. In the magnetosphere, the phenomenon of the capture of charged particles by the Earth's magnetic field becomes possible, which acts as a natural magnetic trap. This is how the Earth's radiation belts are formed.



The space between the planets is filled with very low density plasma carried by the solar wind. The nature of the interaction of the solar wind plasma with the planets depends on whether or not the planets have a magnetic field.

The sun: One of the many stars that make up the giant star system, the Galaxy. And this system, in turn, is just one of many other galaxies. Our Galaxy contains 150-200 billion stars. They are arranged so that the Galaxy looks like a flat disk. The sun is located on the periphery of the disk, practically in its plane of symmetry. Therefore, when we look at the sky in the plane of the disk, we see a luminous band in the night sky – the Milky Way, consisting of stars belonging to the disk.

The very name "Galaxy" comes from the Greek word galaktikos – milky, milky and means the system of the Milky Way.

Comets move in elongated orbits around the sun. Comet nuclei are composed of individual rocks and dust particles frozen into a block of ice.

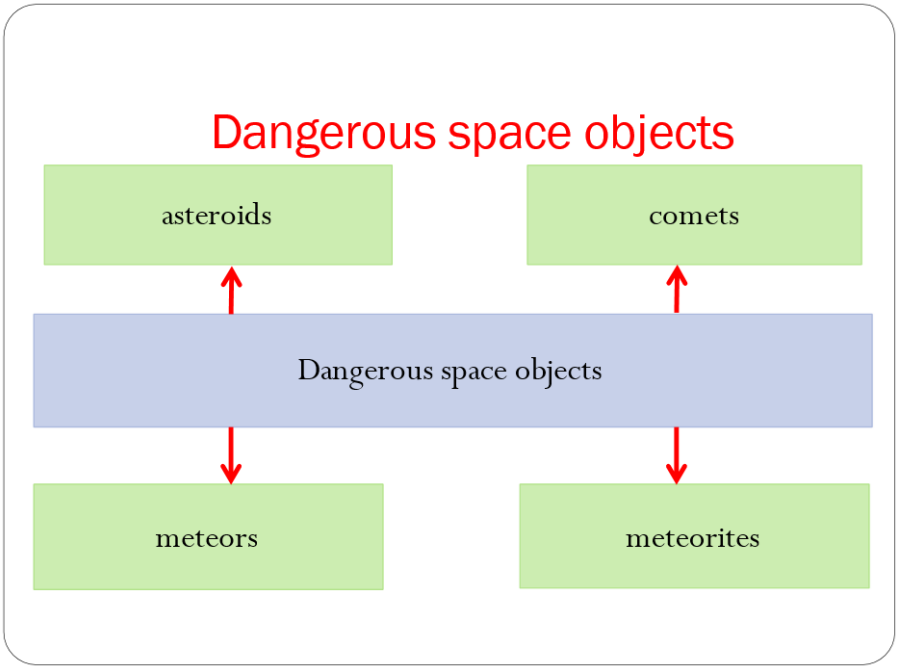
This ice, in addition to water, contains ammonia and methane. Its chemical composition resembles that of the planet Jupiter. As the comet approaches the Sun, the ice partially evaporates, forming the comet's gigantic gaseous tail. Comet tails are turned away from the Sun, because they are constantly exposed to radiation pressure and the solar wind.

The slide shows Halley's Comet, which was last observed by amateur astronomers in 1986. The period of revolution of a celestial body is 75–76 years. Its next appearance in the inner solar system is expected in 2061. Halley's comet is the only short-period celestial body (orbital period less than 200 years) that can be

seen with the naked eye. The comet was discovered by Edmund Halley in 1705, after whom it is named.

https://zen.yandex.ru

Space emergencies are dangers that threaten a person from space. First of all, these are dangerous space objects and cosmic radiation.



Hazardous space objects include:

1) Asteroids;

2) Comets;

3) Meteors;

4) Meteorites.

Asteroids are small space objects, the diameter of which varies between 1–1000 km. The meeting of our planet with celestial bodies is a serious threat to the entire biosphere. A comet is a small celestial body that has a hazy appearance, revolving around the Sun, usually in elongated orbits. ***Meteors*** are phenomena in the upper atmosphere that occur when solid particles – meteoroids – invade it. Meteorites, iron or stone bodies falling to Earth from interplanetary space; are the remnants of meteoroids that have not completely collapsed when moving through the atmosphere.

Classification of meteorites by composition:

1) stony;

2) iron-stone;

3) iron;

Classification of meteorites according to the detection method:

1. Falls (when a meteorite is found after observing its fall in the atmosphere);

2. Finds (when the meteorite origin of the material is determined only by analysis). Calculations show that the impact of an asteroid with a diameter of about 1 km is accompanied by the release of energy ten times greater than the entire nuclear potential available on Earth.

Although the probability of a collision of our planet with cosmic bodies is small (108–105), it is still not zero. According to one hypothesis, the collision of the Earth with an asteroid 65 million years ago led to the death of dinosaurs.

Among natural disasters, a special place belongs to cosmogenic disasters, given their large scale and the possibility of severe environmental consequences.

There are two types of space disasters:

impact-collisional, when parts of a celestial body not destroyed in the atmosphere collide with the Earth's surface, forming craters on it,

air-explosive, in which the object is completely destroyed in the atmosphere. Combined catastrophes are also possible.

An example of an impact-collision catastrophe is the Arizona meteorite crater with a diameter of 1.2 km, formed about 50 thousand years ago as a result of the fall of an iron meteorite weighing 10 thousand tons, and an air-explosive catas-

trophe is the Tunguska catastrophe (a meteorite with a diameter of 50 m was completely dispersed in the atmosphere).

http://irkutsk.abc-watch.ru/articles/krater-v-arizone/images/

Crater in Arizona

http://visokie-belie-prishelci.ru

Tunguska meteorite

In the basin of the Podkamennaya Tunguska River in the summer of 1908, at an altitude of 5–10 km, a space object was destroyed, which went down in history under the conditional name "Tunguska meteorite". The air wave caused by the explosion circled the entire globe, the taiga in an area of more than 2000 square meters. km was knocked down and burned.

The most resonant event relates to the chronicle of 2013: the Chelyabinsk meteorite made clear the reality of such a threat.

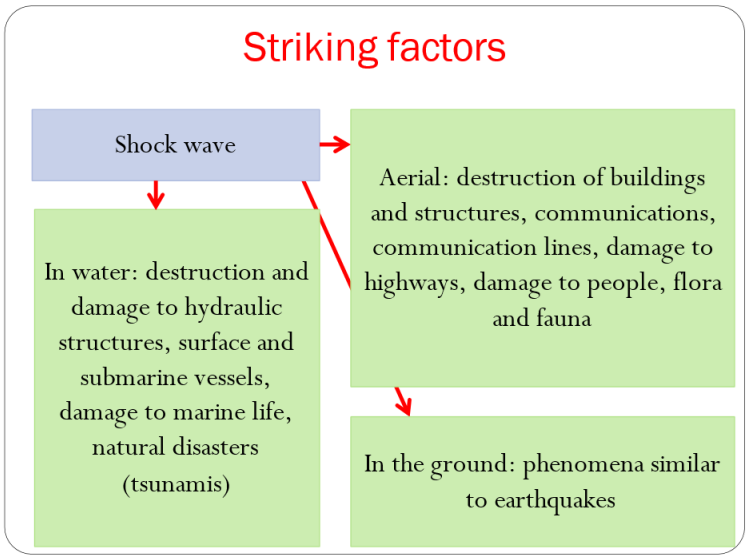
The consequences of catastrophes arising from the impact of space objects on the Earth can be the following:

natural and climatic – the occurrence of the effect of nuclear winter, disruption of the climatic and ecological balance, soil erosion, irreversible and reversible impacts on flora and fauna, atmospheric pollution with nitrogen oxides, abundant acid rains, destruction of the ozone layer of the atmosphere, massive fires; death and destruction of people.

economic – the destruction of economic facilities, engineering structures and communications, including the destruction and damage to transport routes;

cultural and historical – the destruction of cultural and historical values;

political – a possible complication of the international situation associated with the migration of the population from the places of the disaster, and the weakening of individual states.



The damaging factors and their energy in each specific case depend on the type of catastrophe, as well as on the place where the space object fell.

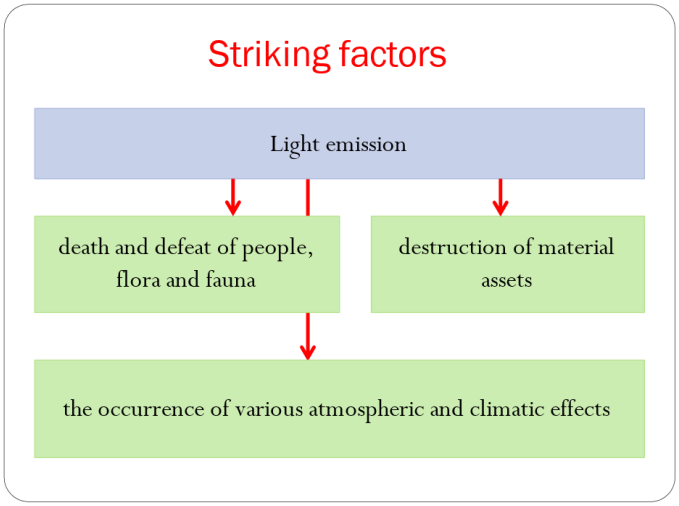
They are largely similar to the damaging factors characteristic of nuclear weapons.

Shock wave:

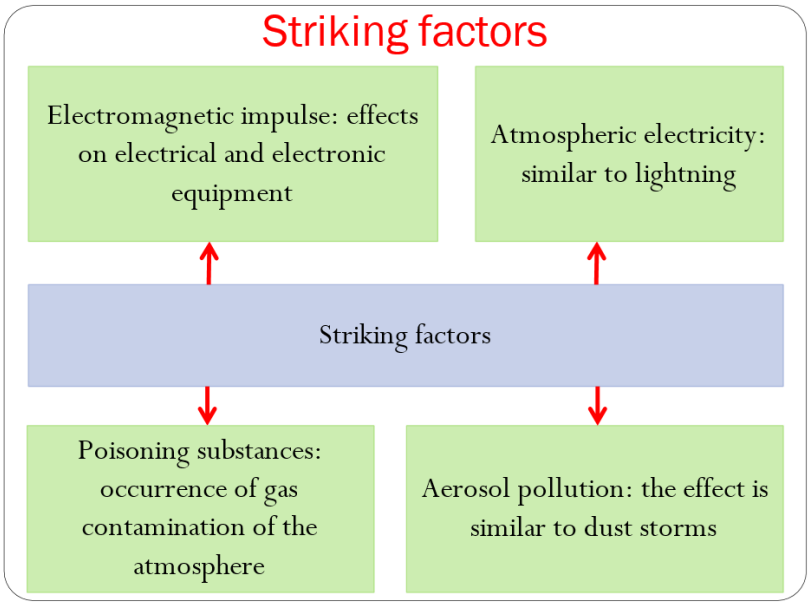
– in air – causes destruction of buildings and structures, communications, communication lines, damage to highways, damage to people, flora and fauna;

– ***in water*** – destruction and damage to hydraulic structures, surface and underwater vessels, partial damage to marine flora and fauna (at the disaster site), as well as natural disasters (tsunamis) leading to destruction in coastal areas;

– ***in the ground*** – phenomena similar to earthquakes (destruction of buildings and structures, engineering communications, communication lines, highways, death and injury of people, flora and fauna).



Light radiation leads to the destruction of material values, the emergence of various atmospheric and climatic effects, the death and injury of people, flora and fauna.



Damaging factors:

An electromagnetic pulse affects electrical and electronic equipment, damages communication systems, television and radio broadcasting.

Atmospheric electricity – the consequences of the damaging factor are similar to the effects of lightning.

Poisonous substances are the occurrence of gas contamination of the atmosphere in the disaster area, mainly nitrogen oxides and its toxic compounds.

Aerosol pollution of the atmosphere – the effect of this is similar to dust storms, and with a large scale catastrophe, it can lead to a change in climatic conditions on Earth.

Secondary damaging factors appear as a result of the destruction of nuclear power plants, dams, chemical plants, warehouses for various purposes, storage facilities for radioactive waste, etc.

Thus, the Danger for the planet Earth is represented by such cosmic "guests" and phenomena, such as: asteroids (small planets), comets, meteorites, viruses brought by space bodies from space, disturbances in the sun, black holes, the birth of supernovae.

The means of combating near-Earth asteroids and comets is nuclear-rocket technology.

It is supposed to develop a system of planetary protection against asteroids and comets, which is based on two principles of protection, namely, changing their trajectory and destruction into several parts.

The Russian Federation has developed the Citadel planetary defense system: a satellite with a nuclear gun on board is launched into low Earth orbit. The weapon is kept in constant readiness and is capable of disarming or pushing a dangerous celestial body out of orbit.

It is necessary to detect objects about 1 km in size a year or two before it approaches the Earth. Then you should calculate its trajectory and analyze the possibility of a collision with the Earth. If the probability of such an event is high, a decision will be made to destroy or change the trajectory of a dangerous celestial body. For this, it is planned to use intercontinental ballistic missiles with a nuclear warhead. The current level of space technology makes it possible to create such interception systems.

One of the possible options for such a SPZ could be the Citadel international planetary defense system project, developed over the course of two decades by the Center for Planetary Defense in cooperation with Russian and foreign organizations.

Solar radiation

Solar radiation is a powerful health-improving and preventive factor; the distribution of solar radiation at different latitudes is an important indicator characterizing various climatic and geographical zones. The totality of biochemical and physiological reactions occurring with the participation of light energy is called photobiological processes. Photobiological processes according to their functional role can be conditionally divided into three groups. The first group provides the synthesis of biologically important compounds (for example, photosynthesis).

The second group includes photobiological processes that serve to obtain information and allow one to navigate in the environment (vision, phototaxis, photoperiodism).

The third group includes processes that are accompanied by harmful consequences for the body (for example, the destruction of proteins, vitamins, enzymes, the appearance of harmful mutations, an oncogenic effect).

The most biologically active is the ultraviolet part of the solar spectrum, which at the Earth's surface is represented by a stream of waves in the range from 290 to 400 nm.

The bactericidal effect of artificial UV radiation is used to disinfect drinking water.

However, the effect of UV radiation on the body and the environment is not limited to a beneficial effect.

It is known that excessive solar exposure leads to the development of severe erythema with swelling of the skin and deterioration of health. Photophthalmia is a common eye lesion when exposed to UV rays. Hyperemia, conjunctivitis, lacrimation and photophobia occur. Similar lesions occur due to the reflection of the sun's rays from the snow surface in the Arctic and high mountain regions ("snow blindness").

Prevention – dosed exposure to direct sunlight, the use of protective equipment.

The number of dangers increases with distance into space: for example, supernovae, which emit enough radiation to break through the protective ozone layer of the Earth.

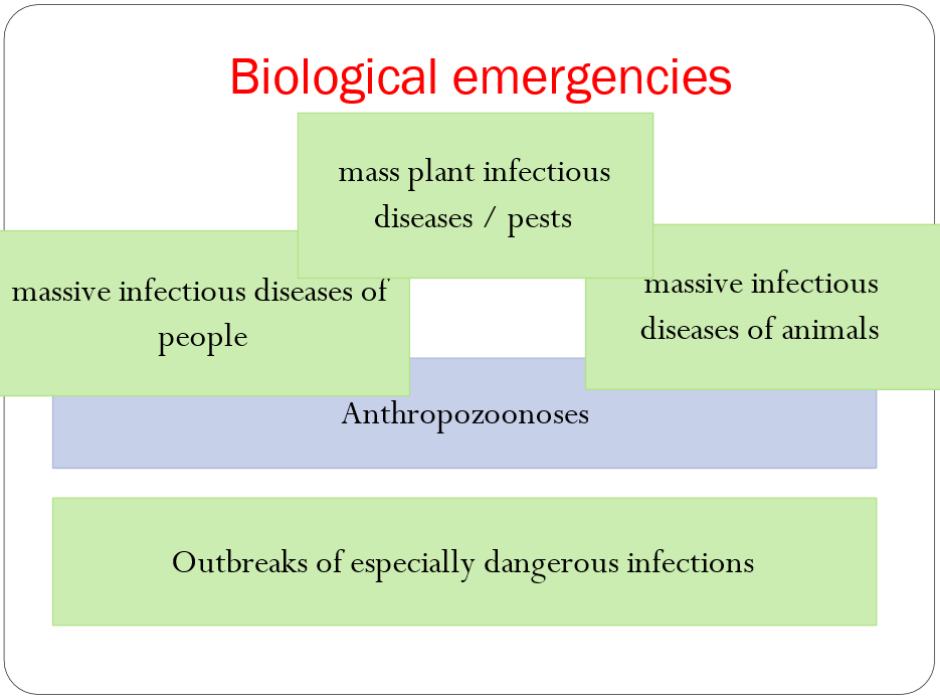
A new study has shown that for this to happen, the former star must be 25 light-years from Earth – so close that this can only happen once or twice in a billion years. Previously, this risk was thought to be much higher.

Protecting the population from space emergencies

Protection of the population from emergencies of a space nature Observation of hazardous objects using modern means. monitoring dangerous objects with the help of modern means, powerful telescopes, entering them into catalogs, sending probes sent into outer space to track dangerous objects.

Timely notification of people about an impending threat from space. Evacuation of the population to safe areas, shelters, underground bunkers. Protecting people from the dangerous consequences of space disasters (informing about the methods of protection, personal protective equipment, deploying hospitals, helping the victims). development of methods and weapons for the destruction of dangerous space objects, or at least shifting the orbit of these objects, to remove them from the Earth.

Biological emergencies



THE FIRST AID

The first aid is a set of urgent measures aimed at saving a person's life.

First aid is the ability to provide first aid to the victim by any person, including those without a medical education.

Legislation

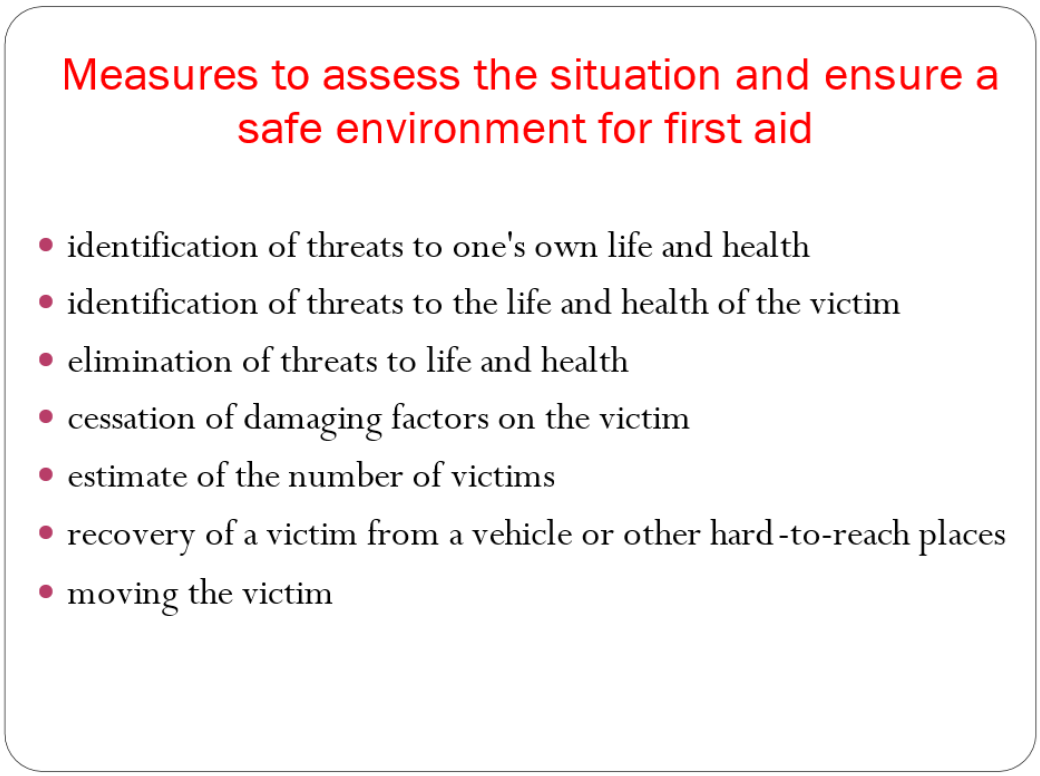
- Federal Law "On the fundamentals of protecting the health of citizens in the Russian Federation" dated November 21, 2011 N 323-FZ (last edition)
- Decree of the Government of the Russian Federation of 10.23.1993 N 1090 (as amended on 12.21.2019) "On the Rules of the Road"

Order of the Ministry of Health and Social Development of Russia dated 05/04/2012 N 477n (as amended on 11/07/2012) "On approval of the list of conditions in which first aid is provided and the list of first aid measures" (Registered in the Ministry of Justice of Russia on 05/16/2012 N 24183)

This document is included in the list of legal acts that are not subject to the requirement to cancel from 01/01/2021, established by the Federal Law of 07/31/2020 N 247-FL.

List of conditions in which first aid is provided

- Lack of consciousness
- Respiratory and circulatory arrest
- External bleeding
- Foreign bodies of the upper respiratory tract
- Injuries to various areas of the body
- Burns, effects of high temperatures, thermal radiation
- Frostbite and other effects of exposure to low temperatures
- Poisoning



The main activities:

- Call ambulance, other special services whose employees are required to provide first aid in accordance with federal law or with a special rule.
- Determination of the presence of consciousness in the victim.

The measures to restore the airway and determine the signs of life in the victim:

- head tilt with chin lift;
- jaw extension;
- determination of breathing through hearing, vision and touch;
- determining the presence of blood circulation, checking the pulse on the main arteries.

Cardiopulmonary resuscitation measures before signs of life

- hand pressure on the sternum of the victim;
- artificial respiration "Mouth to mouth";
- artificial respiration "Mouth to nose";

- artificial respiration using a device for artificial respiration (in accordance with the approved requirements for completing medical products of first-aid kits (packs, sets, kits) for first aid).

Respiratory Support

- steady lateral position;
- head tilt with chin lift;
- jaw extension.

The activities for a survey of the victim and a temporary stop of external bleeding

- overview examination of the victim for bleeding;
- digital artery pressure;
- tourniquet;
- maximum limb flexion in the joint;
- direct pressure on the wound;
- pressure dressing.

Arrangements for a detailed examination of the victim in order to identify signs of injury, poisoning and other conditions that threaten his life and health, and to provide first aid in case of detection of these conditions

- examination: head, neck, chest, back, abdomen and pelvis, limbs;
- bandaging for injuries of various areas of the body;
- immobilization: using improvised means, autoimmobilization, using medical devices;
- fixation of the cervical spine: manually, improvised means, using medical devices;
- cessation of exposure to hazardous chemicals on the affected person: washing the stomach with water and inducing vomiting, removing from the damaged surface and washing the damaged surface with running water;
- local cooling due to injuries, thermal burns and other exposure to high temperatures or thermal radiation;
- thermal insulation for frostbite and other effects of low temperatures.

Main activities:

- Giving the victim an optimal body position;
- Monitoring the condition of the victim (consciousness, breathing, blood circulation) and providing psychological support;
- Transfer of the injured ambulance crew to other special services whose employees are required to provide first aid in accordance with federal law or with a special rule.

Methods for extracting and moving the victim

The victim is conscious: the hands of the first aid participant are held under the armpits of the victim, his forearm is fixed, after which the victim is removed.

L.I. Dezgurniy Yu.S. Shoigu, S.A.Gumenyuk, G.V. Neudakhin, A.Yu.Zakurdaeva, A.AKolodkin, O.L. Kurov, L.Yu. Kichanova. YU. ZakurdaevaA.A.EmkeFirst Aid. Textbook for teachers of teaching persons required and (or) entitled to give first aid- M.: FSBI TsNIIOIZbf the Ministry of Health of Russia, 2018.p3Bs Russian

The main signs of life in the victim

The main signs of life

- the presence of consciousness
- spontaneous breathing
- circulation

Methods for extracting and moving the victim

The victim is unconscious or suspected of injuring the cervical spine: fix the head and neck; while one of the hands of the first aid participant fixes the victim's head in the lower jaw, and the second holds his opposite forearm.

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Terminal states

Clinical death is a reversible extinction of body functions that precedes biological death.

Predagonal state

The main signs are:

- Consciousness is sharply oppressed or absent;
- The skin is pale or cyanotic;
- Blood pressure decreases progressively;
- The pulse in the peripheral arteries is absent, but preserved in the carotid and femoral arteries;
- Respiratory rate increases first, then decreases.

Terminal pause

This is a state characterized by respiratory arrest and transient periods of asystole (cardiac arrest from 1-2 to 10-15 sec).

Agony

The main signs are:

- Consciousness is absent (sometimes briefly clarified);

- eye reflexes disappear;
- rare, short and deep convulsive breathing movements;
- slight short-term increase in blood pressure;
- sphincter relaxation: involuntary excretion of feces and urine.

Clinical death

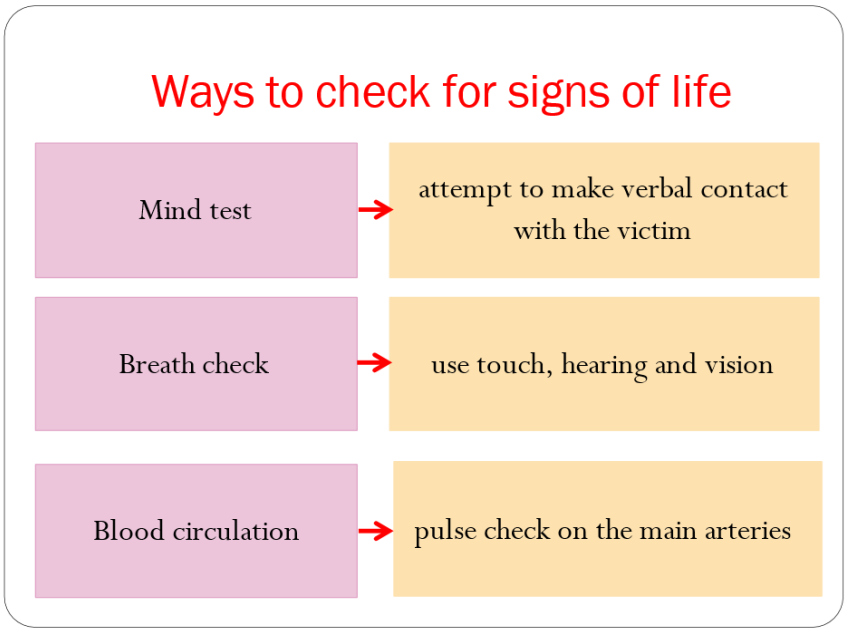
The main signs are:

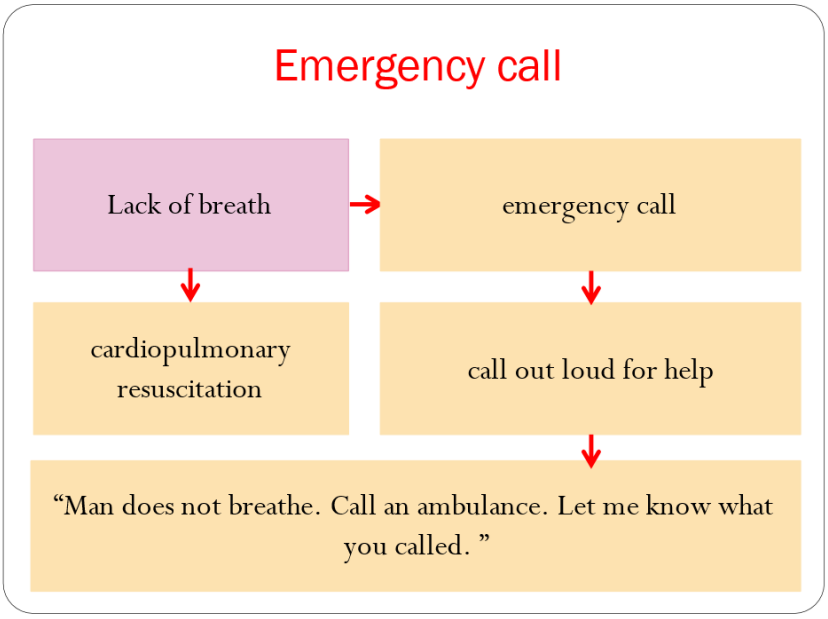
- External signs of life (consciousness, reflexes, breathing, heartbeats) are absent;
- continues until the onset of irreversible changes in the higher parts of the central nervous system.

Biological death

The main signs are:

- Irreversible cessation of the body;
- "Eye signs": "cat's eye" (when the eye is squeezed, the pupil takes the form of a slit) and corneal opacity (drying);
- Cadaveric cooling, the appearance of cadaveric stains on the skin, rigor mortis.





Basic rules for calling an ambulance

1. Inform the dispatcher of the following information.
2. The scene of the incident, what happened, the number of victims and the severity of their condition, what assistance is provided.

The purpose of resuscitation is restoration of cardiac and respiratory activity.

The rule ABC Safar (1960)

- A-airway (airway management);
- B-breathing (artificial respiration);
- C-circulation (indirect cardiac massage).

Artificial respiration

- Artificial ventilation is the introduction of air (or oxygen) into the respiratory tract of a person in order to restore natural ventilation;
- ventilation methods: mouth-to-mouth artificial respiration and nose-to-mouth respiration.

Infectious Disease Prevention Measures

- Medical gloves: for hand protection;
- Protective devices for conducting artificial respiration "mouth-device-mouth" (located in first-aid kits);
- Medical 3-layer masks.

Ensuring patency of the upper respiratory tract

Turn the victim's head to the side and use your finger to remove mucus, blood, foreign objects from the oral cavity.

Check the nasal passages of the victim, clean them if necessary.

Do not change the position of the head of the victim with a spinal injury!

Mouth-to-mouth artificial respiration

Pinch the victim's nose with two fingers, take two breaths of artificial respiration.

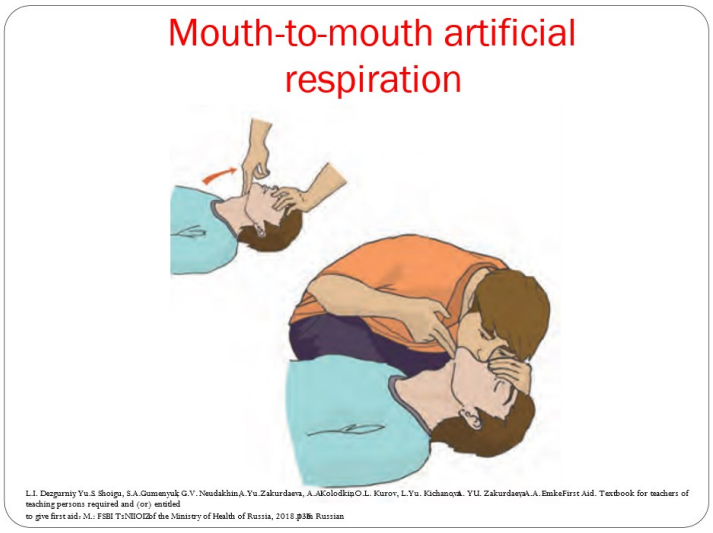
You need to take your normal breath, tightly grip your lips with the lips of the victim.

Perform a uniform exhalation into his airways for 1 second, observing the movement of his chest.

No more than 10 seconds should be spent on 2 breaths of artificial respiration.

Do not make more than two attempts to inhale artificial respiration in the intervals between pressure on the sternum of the victim.

It is recommended to use a device for conducting artificial respiration from a medicine cabinet or laying.



Mouth-to-nose artificial respiration

In case of impossibility of performing artificial respiration by the method of "mouth-to-mouth".

First aid participant closes the victim's mouth while throwing back his head and wraps his lips around the victim's nose.

Indirect heart massage

Compression of the muscles of the heart between the sternum and the spine in order to maintain the blood circulation of a person with cardiac arrest.

It is performed in the absence of a pulse on central arteries.

Do not use a closed heart massage in the presence of a pulse in central arteries!

Place the victim on a flat hard surface.

Determine the location of the affected xiphoid process: the xiphoid process is the shortest and narrowest part of the sternum, its end.

The compression point is the central part of the chest or low part of sternum. Put the base of the palm on the compression point.

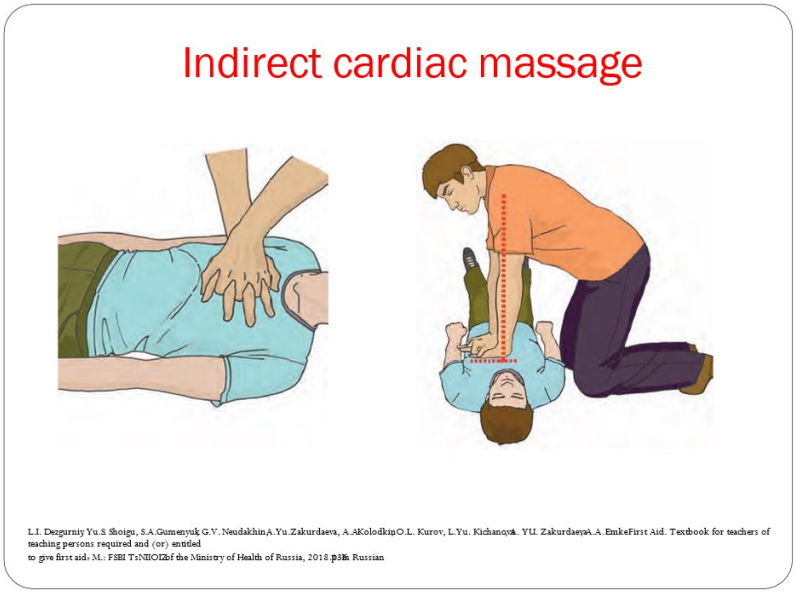
Put your other hand on top of one hand, put your fingers in the semi-lock.

Pressure is carried out strictly by the base of the palm – your fingers should not touch the sternum of the victim.

Exercise rhythmic thrusts of the chest strongly, smoothly, strictly upright, with the weight of the upper half of your body.

The frequency is 100–120 presses per minute.

In this case, the chest should bend 5–6 cm in adult.



Resuscitation measures

Alternate 30 pressure on the sternum with 2 breaths of artificial respiration.

The errors in performing resuscitation measures

- violation of the sequence of measures of cardiopulmonary resuscitation;
- improper technique for applying pressure on the sternum of the victim with his hands;
- improper artificial respiration technique;
- improper ratio of pressure on the sternum and breaths of artificial respiration;
- the time between pressing the victim's sternum with his hands exceeds 10 seconds.

In the era of Covid, it is even recommended to refuse altogether in adults (given that in adults the most common cause of clinical death is cardiac arrest) to be limited to chest compressions. During manipulations, apply a hygienic mask to the mouth and nose of the victim. In children, both receptions are carried out, starting resuscitation with five breaths.

The activities performed after cessation of cardiopulmonary resuscitation

Steady lateral position:

- in case of spontaneous breathing in a person with a lack of consciousness;
- if the victim who suddenly lost consciousness initially had breathing.

Steady lateral position

- Position the victim's near arm at right angles to his body
- Put the far arm of the victim with the back of your hand to the opposite cheek of the victim, holding it with your hand

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Complications of resuscitation

Excessive pressure on the sternum

↓

Chest Fracture

↑ Increased bone fragility

↑ Wrong hand position

Indications for the termination of cardiopulmonary resuscitation

Resuscitation continues

↓ before the ambulance arrives

↓ until there are obvious signs of life in the victim

Steady lateral position

- Bend the distant leg of the injured knee
- put it resting on the foot
- put pressure on the knee of this leg
- turn the victim

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Steady lateral position

- After turning the victim to one side, slightly tilt his head back to open the airways and pull the leg lying on top, closer to the stomach

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Cardiopulmonary resuscitation in children

- The frequency of chest compressions and respiratory movements in children is 15:2.
- Pressure on the sternum is performed to a depth of approximately 4 cm in children under 1 year old and 5 cm in older children.
- Pressure on the sternum is made with two fingers (for children up to 1 year), with one or two hands for older children.

The effectiveness of resuscitation:

- The appearance of sinus rhythm;
- Restoration of blood circulation with registration of blood pressure not lower than 70 mm Hg;

- Narrowing of the pupils and the appearance of a reaction to light;
- Restoring the color of the skin;
- Resuming spontaneous breathing.

The effectiveness of resuscitation events

- Respiratory and circulatory efficacy;
- Resuscitation measures have not yet led to the revitalization of the body (independent blood circulation and respiration are absent);
- But the measures taken artificially support metabolic processes in the tissues and thereby lengthen the duration of clinical death.

The indicators for assessing the effectiveness of artificial respiration and blood circulation

- pupil constriction;
- the appearance of transfer pulsation on the carotid (femoral) arteries;
- discoloration of the skin: a decrease in cyanosis and pallor.

Lack of consciousness

Fainting – sudden short-term (sec-min) loss of consciousness due to a sudden circulatory disturbance in the brain.

Fainting: causes

- unexpected sharp pain or strong emotion;
- instant reduction in blood pressure; decrease in blood flow;
- Staying in a room with insufficient oxygen;
- long standing without moving;
- stagnation of blood in the legs, a decrease in its flow;
- to the brain;
- hunger, constant excitement, nervous exhaustion;
- general weakness of the body;
- lowering blood pressure.

External signs of fainting:

- dizziness, tinnitus, severe weakness, nausea;

- profuse sweat, cold extremities, blanching of the skin, visible mucous membranes;
- the victim slowly settles, falls;
- breathing – rare, superficial, blood circulation – the pulse is weak and rare.

Fainting: First Aid

- to give a horizontal position, raise your legs;
- to ensure the influx of fresh air from the outside into the room; unfasten collar, belt, tie;
- put a wet towel on the forehead of the victim (with cold water);
- when vomiting – turn your head to the side;
- when a person comes to his senses, give a drink of hot tea.

Fainting: Important Information

- fainting may be a manifestation of a serious illness requiring emergency care;
- the victim always needs to be examined by a doctor;
- Do not rush to actively return the victim to an upright position after consciousness has returned to him;
- If the victim is unconscious for several minutes, most likely this is not a swoon. Qualified medical assistance needed.

The shock: reasons

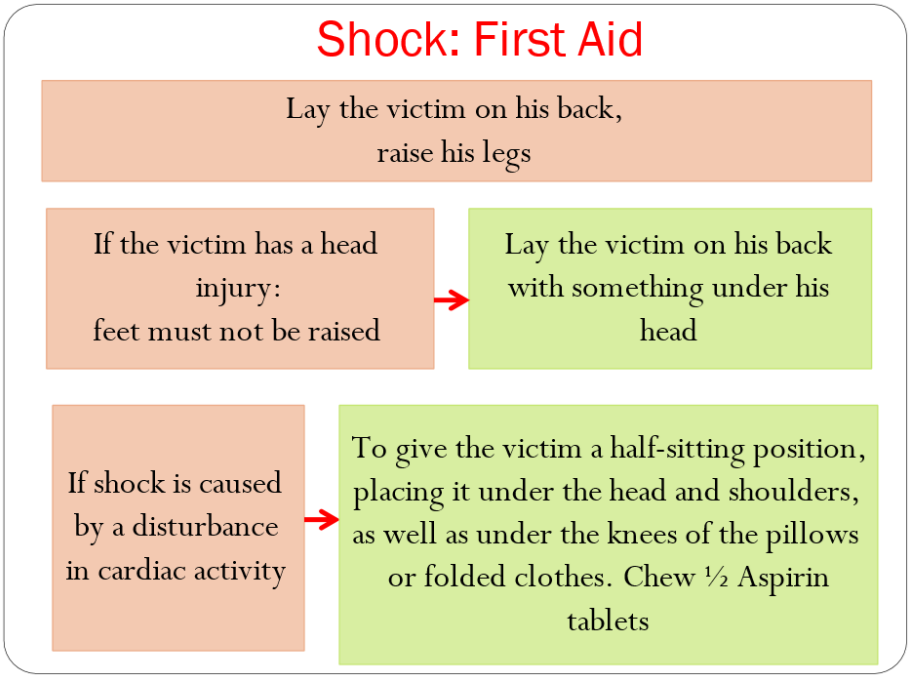
Shock is a condition that threatens the life of the victim. It is characterized by insufficient blood supply to tissues and internal organs. In a person in shock, we see the following signs:

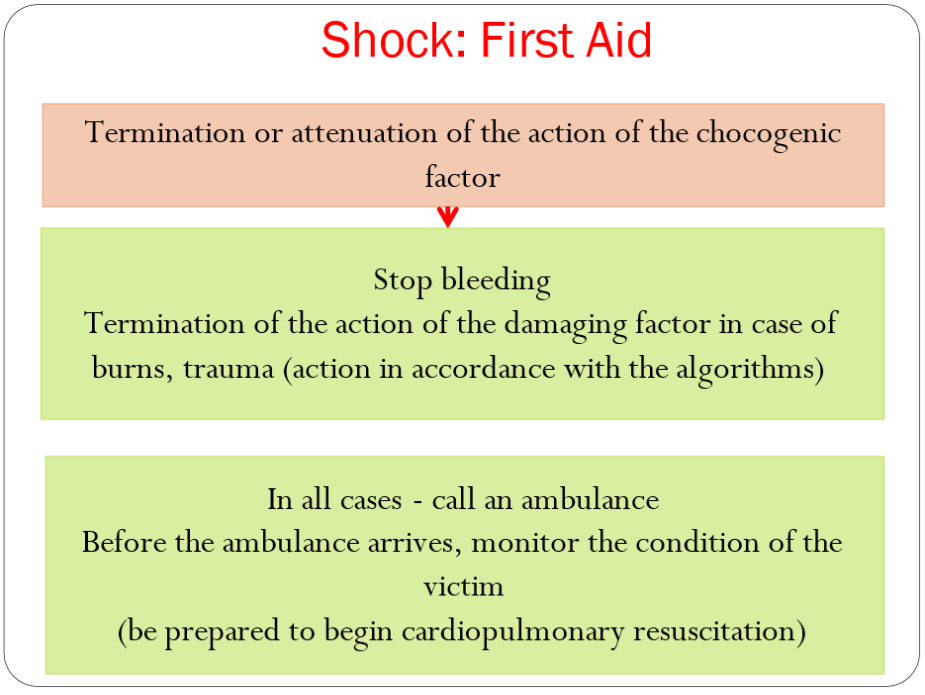
- decrease in circulating blood volume;
- body fluid loss;
- heart failure.

All these things are interconnected.

During the shock we can see consciousness saved or missing, in respiration system – frequent, superficial breathing, pulse is weak and frequent, a decrease in blood volume leads to a drop in blood pressure. The skin is pale, especially around

the lips and earlobes, cool and clammy; muscle weakness, thirsty. There may be nausea, vomiting, chills.





When assisting the victim in shock, DO NOT:

- move the victim, unless necessary;
- give the victim food, drink, smoke;
- leave the injured one;
- warm the victim with a heating pad or some other heat source.

Anaphylactic shock

Ingestion of an allergen: allergens with insect bites, medicinal or food allergens.

General allergic reaction of immediate type. Develops in a few seconds. This is an emergency requiring immediate assistance. Anxiety, a sense of fear, as shock develops, loss of consciousness is possible. Shortness of breath, chest tightness, coughing Short breath, shortness of breath, may stop completely. The pulse is weak, rapid, may not be felt on the radial artery; lowering blood pressure. Swelling of the face and neck, swelling around the eyes, redness of the skin, rash, red spots on the face.

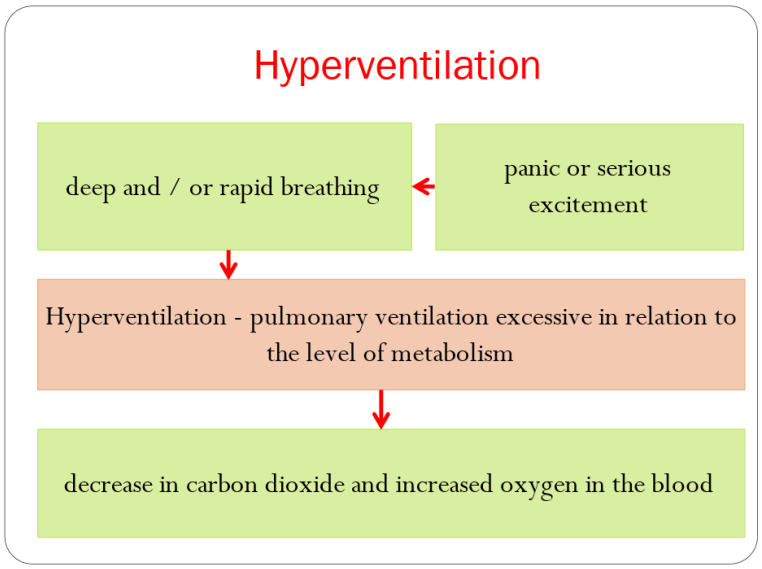
Anaphylactic shock: first aid

Give the victim a horizontal position, raise the lower limbs, turn his head to the side.

Call an ambulance!!!

Monitor breathing and blood circulation and be prepared to proceed cardiopulmonary resuscitation.

Hyperventilation



Characteristic signs:

- Anxiety, confusion;
- Respiratory tract: open, free;
- Breath: deep and frequent (subjectively suffocates);

- Dizziness, sore throat, tingling in the hands, feet, or mouth, possibly a heartbeat, loss of consciousness may occur.

First aid for hyperventilation:

- Bring a paper bag to the victim's nose and mouth and ask him to breathe the air that he exhales into this bag.
- In this case, the victim exhales air saturated with carbon dioxide in the bag, and again inhales it.

Epileptic seizure

Epilepsy is a chronic disease of the brain. It manifested by repeated convulsive or other seizures.

The reasons: overly intense brain stimulation, imbalance in the human bioelectric system.

- Temporary loss of consciousness (from a few seconds to a minute);
- Breathing: normal;
- Blood circulation: normal heart rate;
- Invisible gaze, repetitive or twitching movements of individual muscles (head, lips, arms, etc.).

First aid for an epileptic seizure

- Eliminate danger, seat the victim and calm him down;
- When consciousness returns: tell the victim about a seizure, as maybe this is his first seizure and the victim does not know about the disease;
- To insist on visiting a doctor, at least – to inform about the need.

Major epileptic seizure is sudden loss of consciousness, accompanied by convulsions of the body and limbs. The status epilepticus is the convulsive seizure lasting more than 30 minutes, recurring seizures without full recovery of consciousness between seizures.

Major epileptic seizure

- Loss of consciousness, falling to the floor;
- Cramps, rhythmic twitching of arms and legs;
- Respiratory tract: free. Heart rate is normal;

- Possible respiratory arrest and circulation;
- In some cases, involuntary urination and excrement.

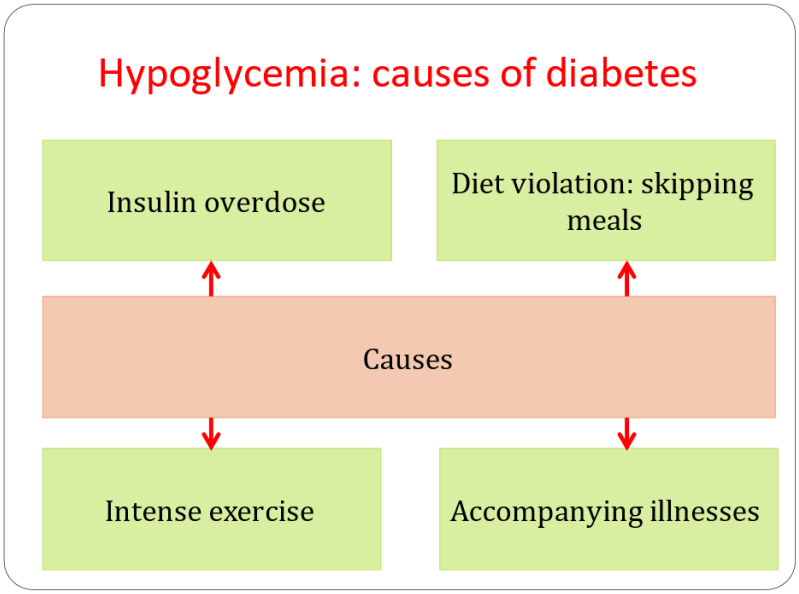
Major epileptic seizure. First aid:

- Free up space around the victim.
- Provide him peace, comfortable to lay down, put something soft under his head.
- Open the collar and waistband to ease breathing.
- Do not try to restrain the victim. If his teeth are clenched: do not try to open your jaw; do not try to put something into the victim's mouth (this can lead to tooth injury and blockage of the airways by fragments).
- Treat all injuries sustained during the seizure.
- After stopping the seizure of the victim, you must call an ambulance if: the seizure happened for the first time, there was a series of seizures, there is damage, the victim was unconscious more than 10 minutes.

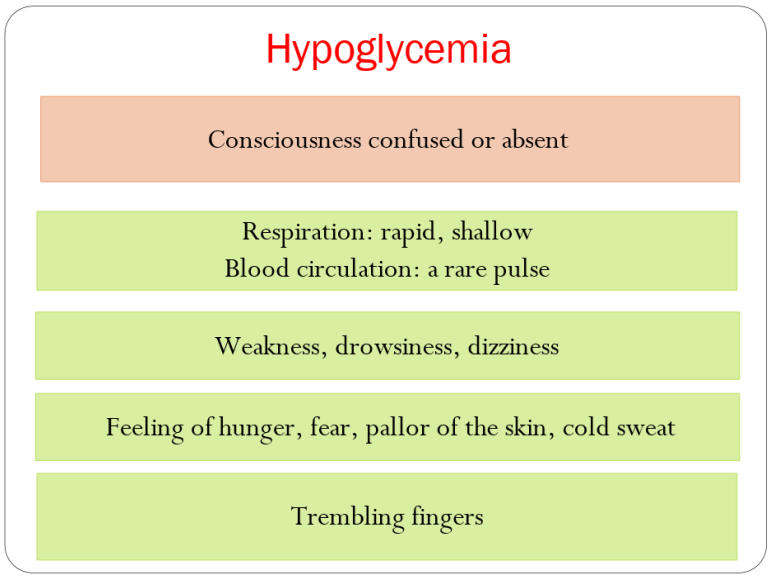
Hypoglycemia

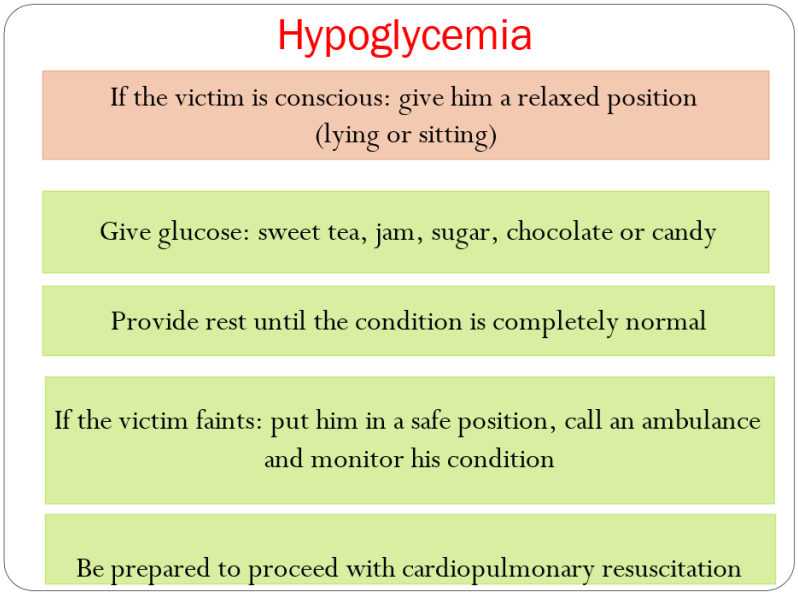
Hypoglycemia is a low blood glucose.

Diabetes mellitus as a cause of hypoglycemia: the body does not produce enough insulin hormone to regulate blood glucose.



Another reason is fasting in a healthy person.





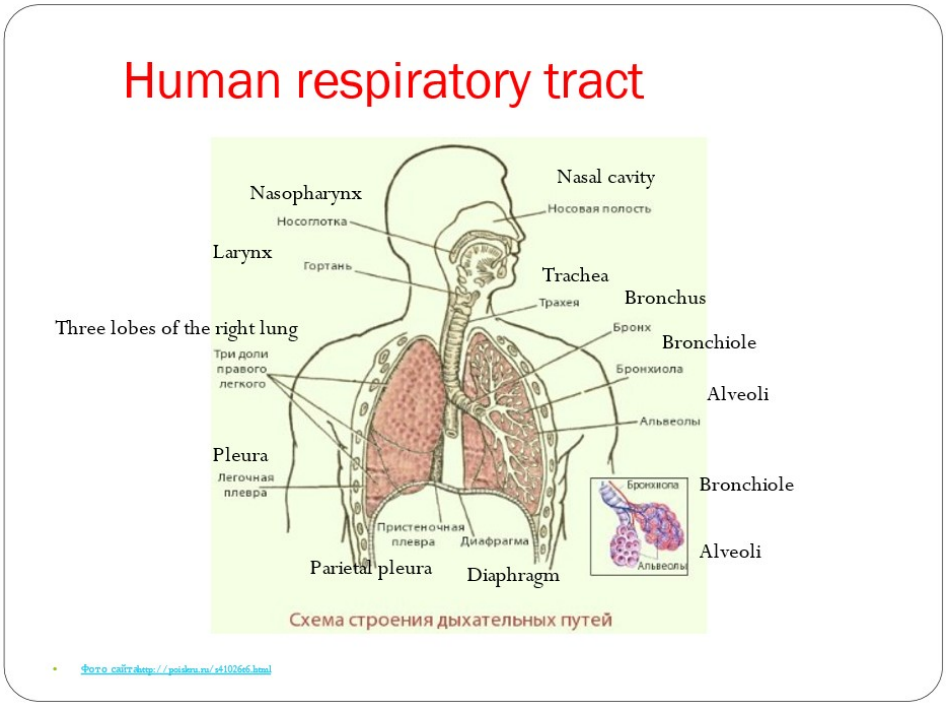
Foreign bodies of the upper respiratory tract

The causes of conditioner are:

- Laughing, coughing with food;
- Bulbar Disorders in the Elderly;
- Ingestion of vomit in case of poisoning, including – with alcohol intoxication.

The sings of conditioner are:

- Suffocation (reduction or disappearance of the airway);
- Cough (reflex attempt of an organism to remove a source of irritation).



Level: Larynx

- shortness of breath;
- cyanosis around the nose and mouth;
- strong coughing;
- in children – vomiting, lacrimation;
- possible: shortness of breath with a noisy breath, retraction of the areas under the clavicle and above them, the gaps between the ribs.

If: the bluish color of the skin during movement extends to the trunk and extremities, frequent breathing in a calm state, lethargy or motor excitement!

Danger to life!

Without assistance: loss of consciousness, cramps, respiratory arrest!

Level: Trachea

- Paroxysmal cough, vomiting;
- When coughing – often clapping sounds are heard when a foreign object is displaced;
- Choking: when the trachea is completely obstructed or a foreign object is stuck in the area of the vocal cords;
- Cyanosis of the face.

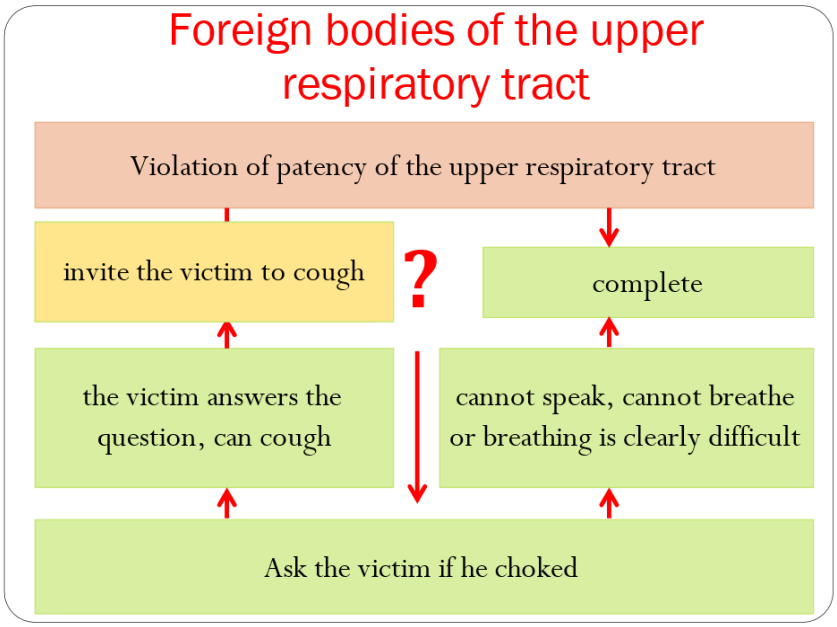
Level: Bronchi

- At first, the victim may not make any complaints;
- Then a purulent process develops in the bronchi: chronic inflammation of the bronchi.

Foreign bodies of the upper respiratory tract

- for a foreign body to come out with a stream of air;
- the victim needs to exhale sharply.

First aid:



With a complete violation of patency of the upper respiratory tract

Check after each hit if patency violation has been resolved

If after 5 strokes the foreign body is not removed

↓

stand behind the victim and clasp him with both hands at the level of the upper abdomen

↓

clench a fist of one of the hands and place it over the navel with your thumb towards you

With a complete violation of patency of the upper respiratory tract

Grasp and slightly tilt the victim forward, sharply press on his stomach in the direction of inward and upward

if necessary, repeat pressure up to 5 times

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With a complete violation of patency of the upper respiratory tract

If it was not possible to remove the foreign body: alternate five hits on the back with five pressure on the stomach

If a foreign body has impaired obesity

↓

first aid also begins, as described above, with 5 strokes between the shoulder blades

↓

There is no pressure on the stomach.
Instead, pressure is applied to the lower chest.

If the foreign body has blocked the airways of the child

- Help is similar.
- Keep in mind the need for dosing efforts: strikes and pressure are applied with less force.
- For children older than 1 year, you can perform pressure on the stomach above the navel, dosing the effort according to age.

If the foreign body has blocked the airways of the child

- Children under 1 year of age should not be forced on the stomach.
- Instead, they push into the lower chest with two fingers.
- When performing strokes and jerks, infants should place them on the forearm of the person assisting, head down; it is necessary to hold the child's head.

Foreign bodies of the upper respiratory tract: self-help

- Squeeze one hand into the fist and the side where the thumb is, put it on the stomach at a level between the navel and costal arches.
- The palm of the other hand is placed on top of the fist, with a quick push up the fist is pressed into the stomach.
- Repeat several times until the airways are clear.

Unconscious

- Start cardiopulmonary resuscitation: pressure on the sternum and artificial respiration.
- Monitor the possible appearance of a foreign body in the mouth in order to remove it in a timely manner.
- Call an ambulance immediately.

Overheating (heat stroke)

Long-term human exposure to elevated ambient temperatures (especially in combination with high humidity).

Heat stroke – develops with violations of the heat transfer of the body.

Increased sweating: significant loss of water and salts by the body.

The greatest load falls on the cardiovascular system: the development of heart failure.

Damage to the central nervous system: cerebral edema.

The body is unable to provide body cooling.

Perspiration stops; thermoregulation is disturbed.

A sharp increase in body temperature to a level at which the brain and other vital organs cannot function normally.

Fever. Headache, nausea and vomiting. Dizziness, weakness. Loss of consciousness, cramps. Cardiopalmus, rapid surface breathing. Possible respiratory and circulatory arrest.

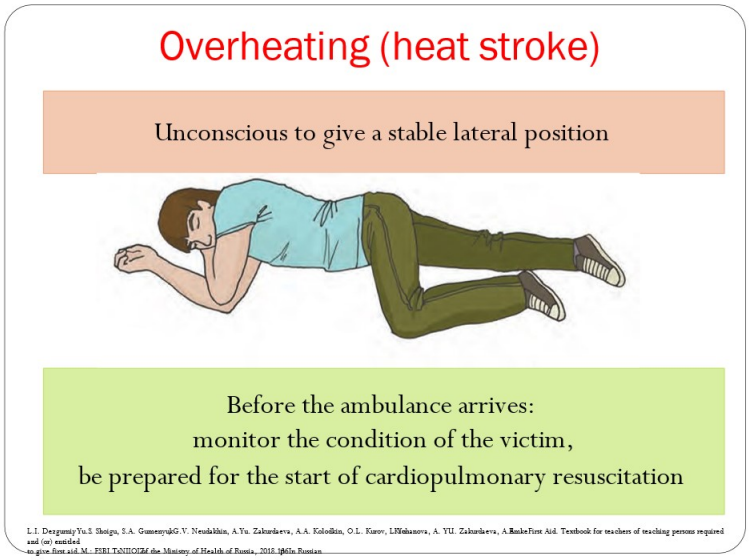
The first aid:

Move victim to a cool place.

If conscious, give chilled water to drink.

Ensure free breathing of the victim: unfasten the collar of the shirt, untie the tie, etc.

Put a cold compress on your head.



Prevention

Choose clothes from well-ventilated, natural fabrics (cotton, linen), preferably light colors.

Ventilate the room regularly.

Protect your head from direct sunlight with a light panama or light umbrella.

Move slowly, try to be in the shade more often.

Try to drink more fluids (drinking water).

Take a cool (but not cold) shower several times a day.

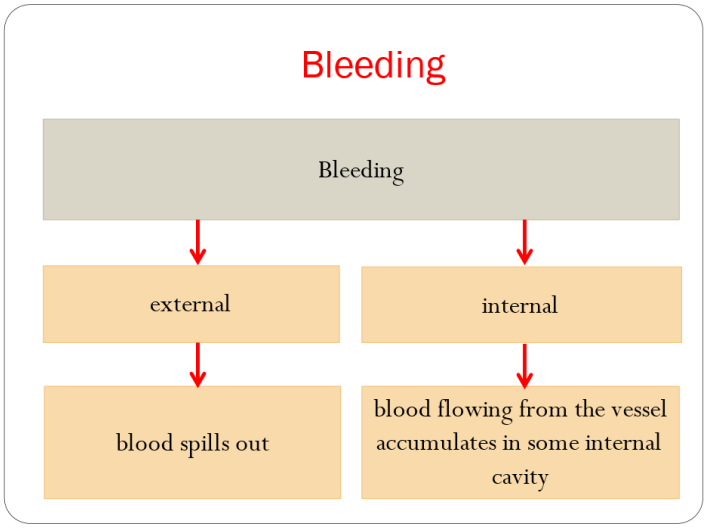
Eat easily digestible foods (vegetables, fruits).

Do not exercise in hot weather.

Use sunscreen to prevent sunburn.

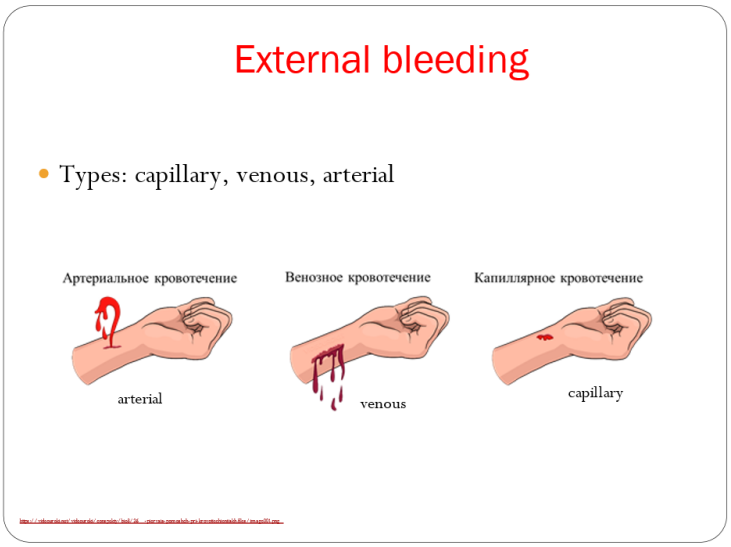
BLEEDING

Bleeding is the exit of blood beyond the boundaries of blood vessels into the environment, into the tissue, body cavity or lumen of a hollow organ due to a violation of the integrity of the vascular wall.



The main signs of acute blood loss:

- sharp general weakness;
- thirsty;
- dizziness, flickering of "flies" before the eyes, fainting (more often when trying to get up);
- pale, damp and cold skin;
- cardiopalmus;
- frequent breathing.



Capillary bleeding

The sings: surface wound, small amount of blood, blood flow is slow, uniform, the pulsation is not visualized, dark red color (mixture of venous and arterial blood).

Capillary bleeding: first aid

- sanitize a wound;
- bandage a cut;
- apply cold to the wound.

Venous bleeding

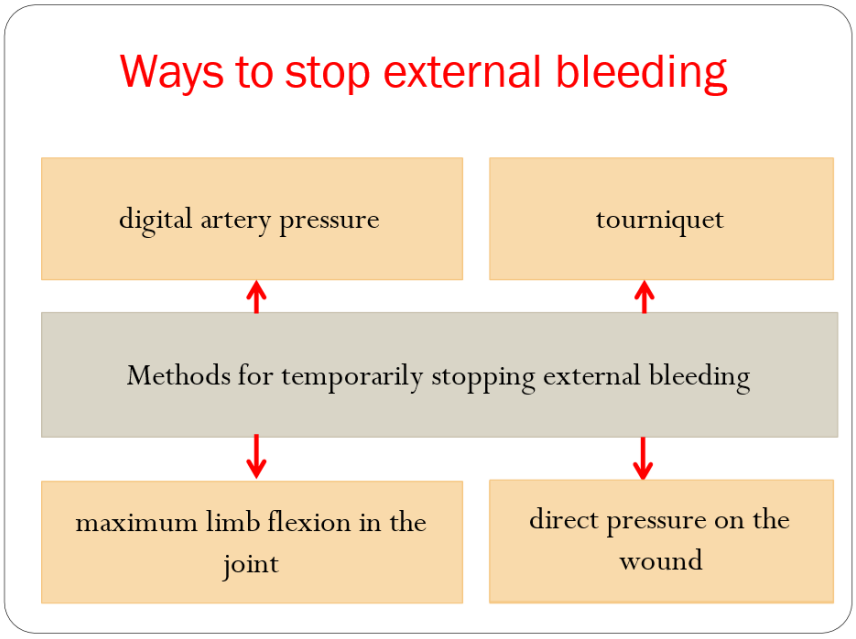
- blood is dark red;
- intensive flow, flowing "stream";
- clots may be present.

Arterial bleeding

- pulsating scarlet blood stream;
- crimson Blood Pool;
- blood-soaking fast victim's clothes.

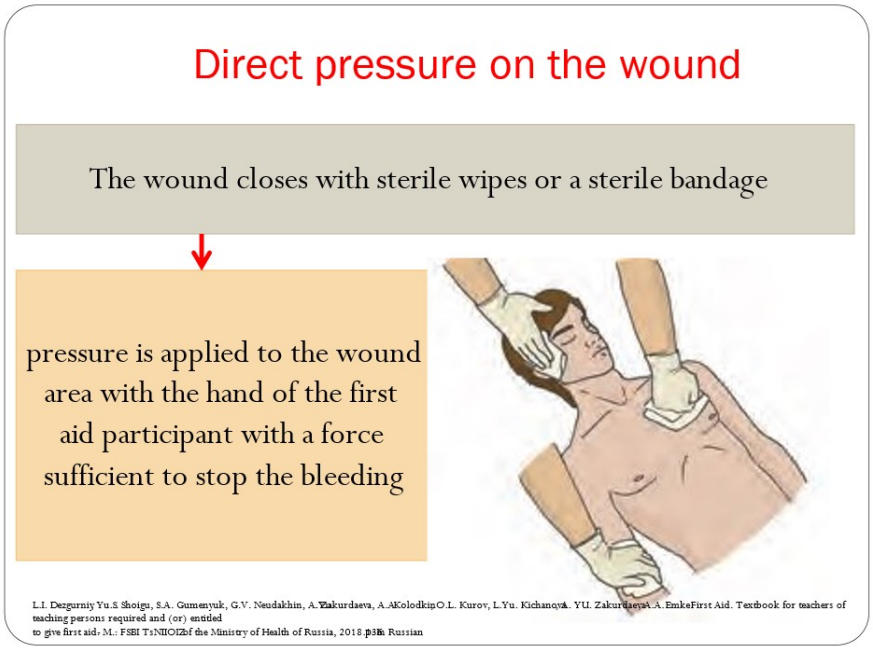
Measures in case the injured person is injured

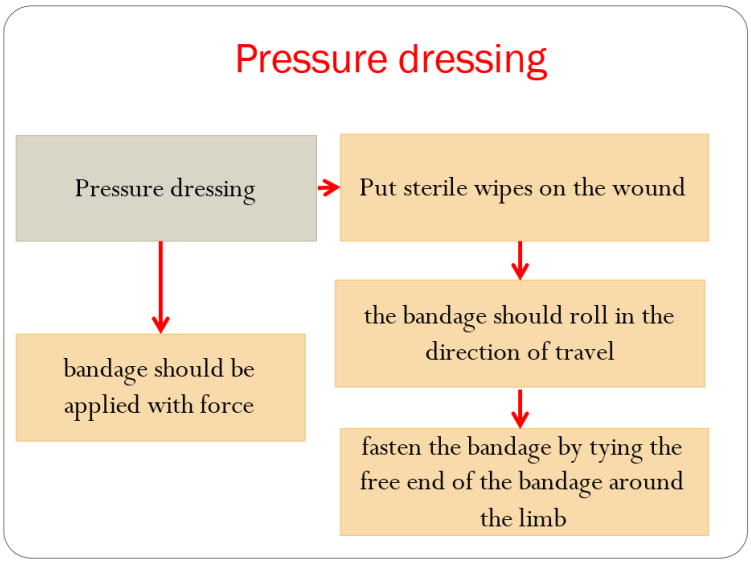
- provide a safe environment for first aid;
- make sure the victim has signs of life;
- conduct a survey to determine the presence of bleeding;
- determine the type of bleeding;
- stop bleeding in the most appropriate way.

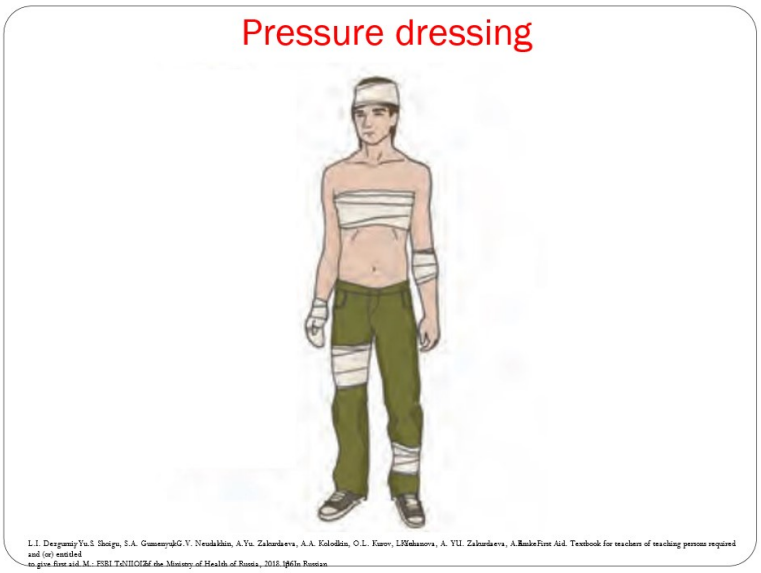


First aid for external bleeding

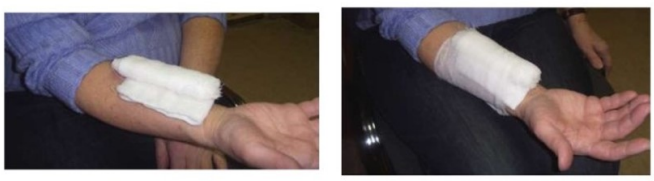
- External bleeding always requires disinfection and dressing.
- Applying a cold compress is relevant only for capillary and venous types.
- The stopping of external bleeding can also be accelerated by changing the position: if possible, the damaged part should be higher or at the level of the heart.







Pressure dressing



Digital artery pressure

- Pressure is applied at specific points between the wound and the heart.
- The choice of points is due to the possibility of pressing the artery to the bone.
- Result: cessation of blood flow to the damaged area of the vessel and stopping or significant weakening of bleeding.

Digital artery pressure

Common carotid artery

↓

pressed against the front of the neck outside the larynx on the damage side

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Digital artery pressure

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Digital artery pressure

Subclavian artery

↓

presses in the hole above the collarbone to the first rib

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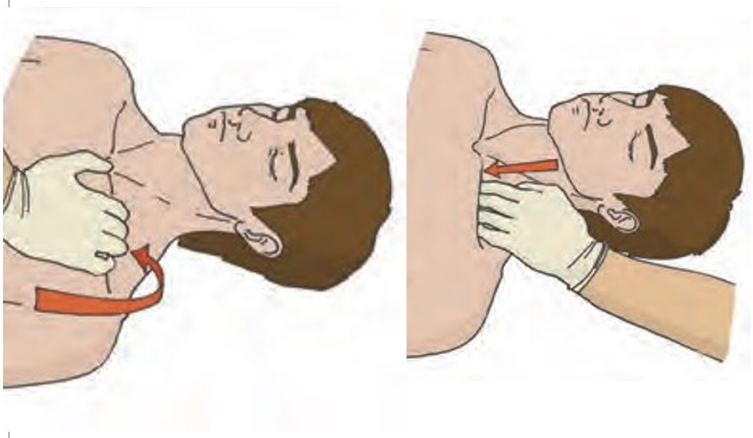
Digital artery pressure



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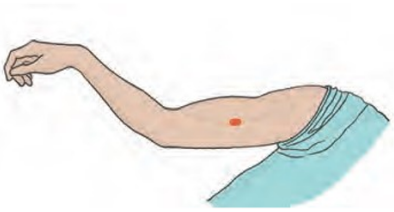
Digital artery pressure

Brachial artery



pressed against the humerus from the inside between the biceps and triceps in the middle third of the shoulder

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Digital artery pressure

Brachial artery

The pressure on the pressure point is carried out with the help of four fingers of the brush, grasping the victim's shoulder from above or below

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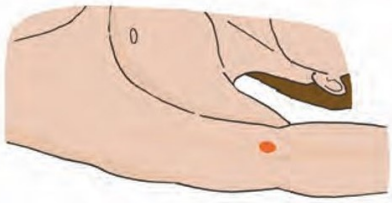
Digital artery pressure

Axillary artery



pressed against the humerus in the armpit

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Digital artery pressure

Axillary artery

Pressure to the pressure point is made with straight, rigidly fixed fingers with sufficient force in the direction of the shoulder joint

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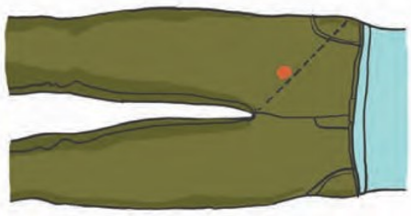
Digital artery pressure

Femoral artery



pressed below the inguinal fold

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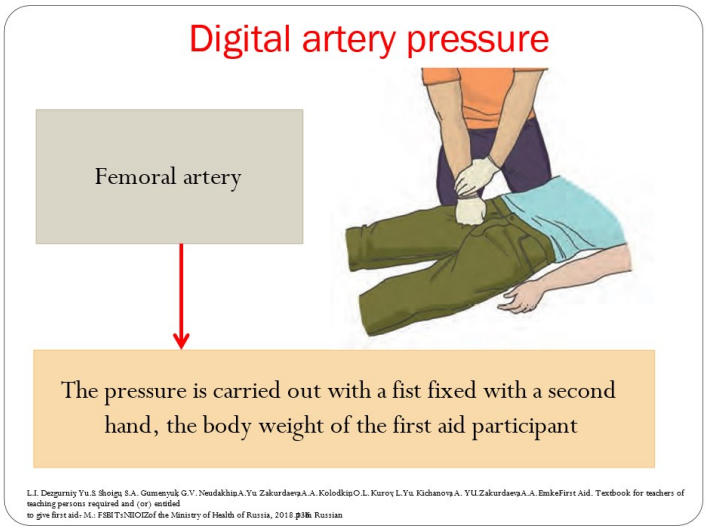
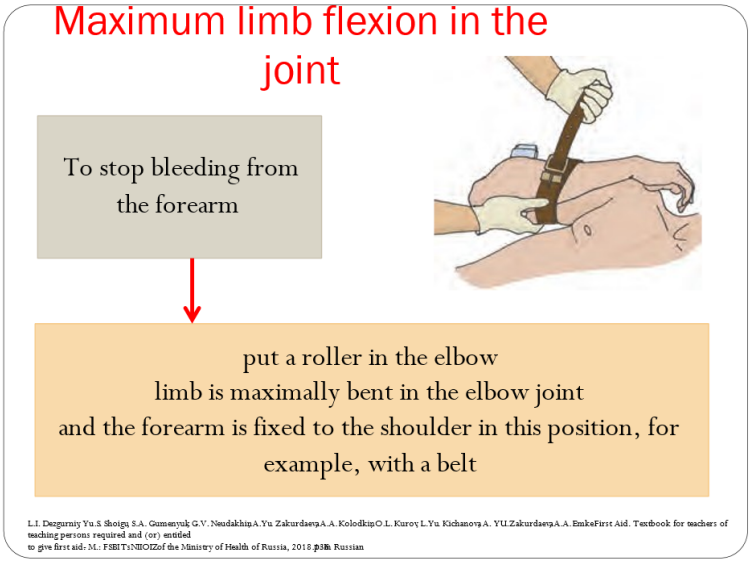
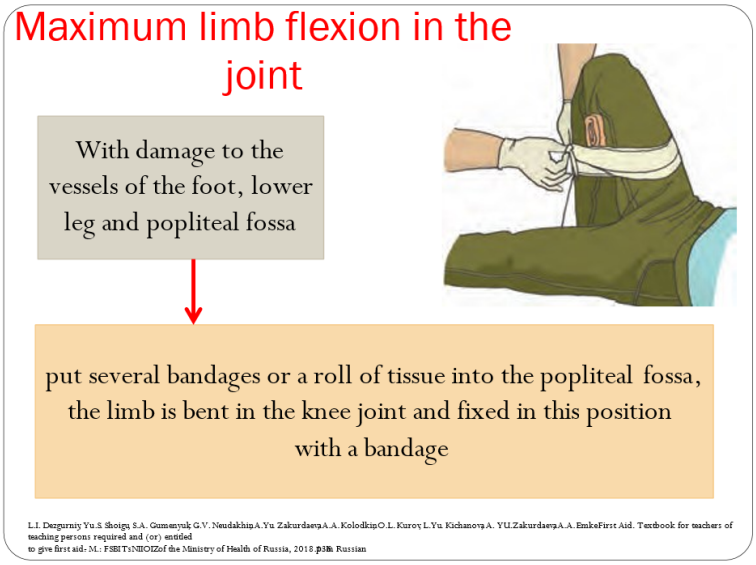
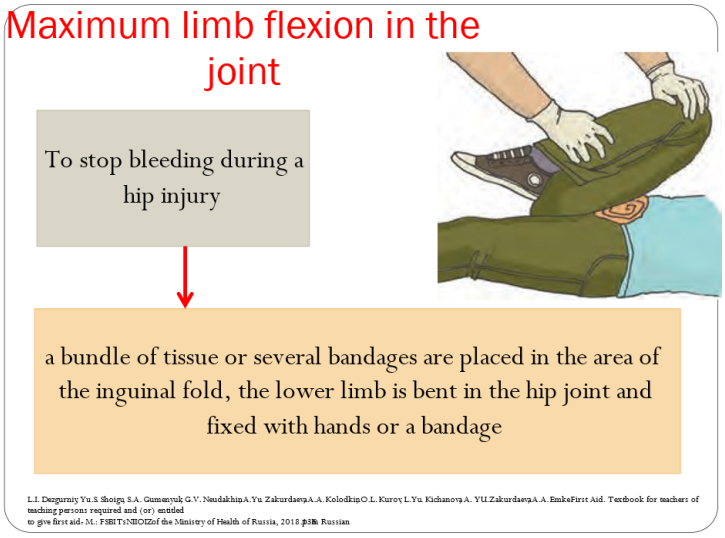


Maximum limb flexion in the joint: leads to kinking and squeezing of a blood vessel, which helps to stop bleeding... After bending, the limb is fixed with hands, several rounds of bandage or improvised means.

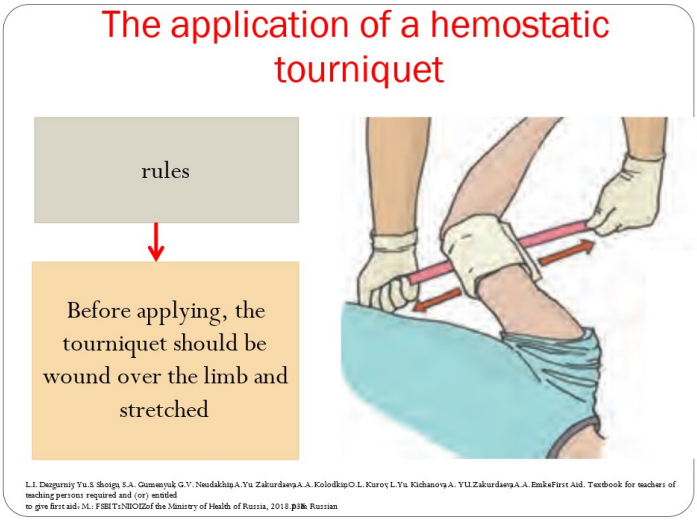


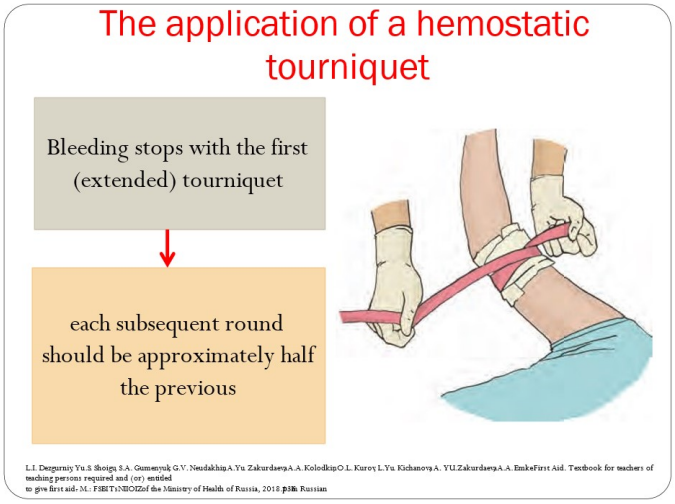


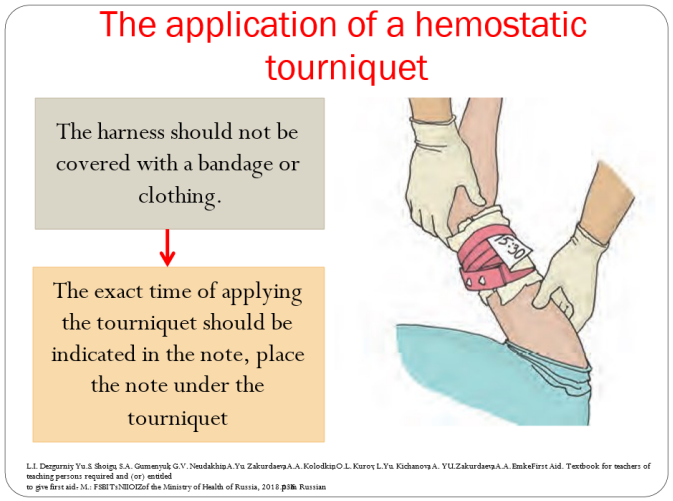


The application of a hemostatic tourniquet: the rules

- A tourniquet should be applied only with arterial bleeding in case of a shoulder and hip injury.
- A tourniquet must be applied between the wound and the heart, as close to the wound as possible. If the place for applying the tourniquet falls on the middle third of the shoulder and on the lower third of the thigh, apply a tourniquet higher.
- A harness on a naked body should not be applied, only on top of clothing or a fabric pad.



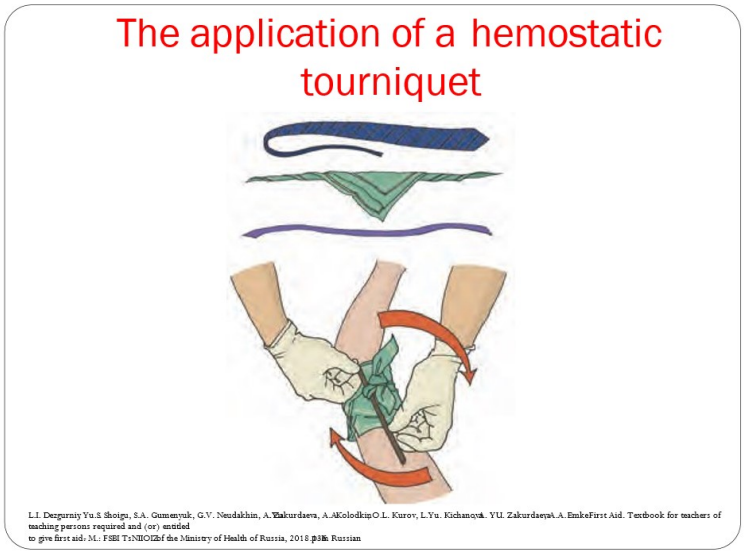


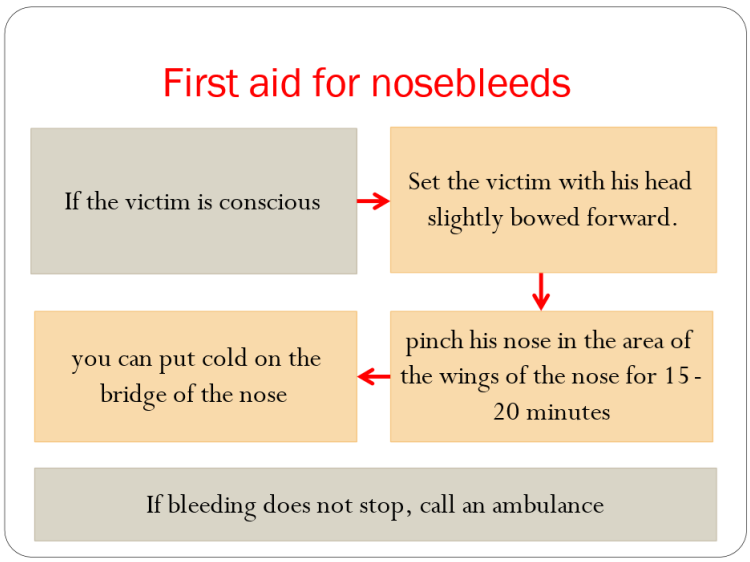


The application of a hemostatic tourniquet: the rules

- The maximum time spent on the limb tourniquet should not exceed 60 minutes in the warm season and 30 minutes in the cold.
- After applying the tourniquet, the limb should be immobilized (immobilized) and thermally insulated (wrapped) in accessible ways.
- If the maximum tourniquet time has expired and medical assistance is not available.
- Implement finger pressing of the artery above the harness.
- Remove harness for 15 minutes.
- If possible, perform a light massage of the limb on which the tourniquet was applied.
- Apply a tourniquet just above the previous overlay.
- Maximum reapplication time: 15 minutes.

- As an improvised tourniquet, you can use: braid, scarf, tie.
- A loop is made from these materials, twisting until a stop or significant weakening of arterial bleeding with any durable object (metal or wooden rod).
- Upon reaching the stop of bleeding: the rod is bandaged to a limb. Improvised harnesses are superimposed according to the rules described above.





If the victim is unconscious, to give him a stable lateral position, controlling the airway patency. Call an ambulance.

Traumatic shock

Traumatic shock is a serious condition, accompanied by severe violations in the work of all body systems: severe injuries and heavy bleeding.

Signs of traumatic shock

- severe injury and severe bleeding;
- respiratory and circulatory disorders: rapid breathing and palpitations;
- Pale cold wet skin;
- Arousal, then apathy.

Measures to prevent the development of traumatic shock

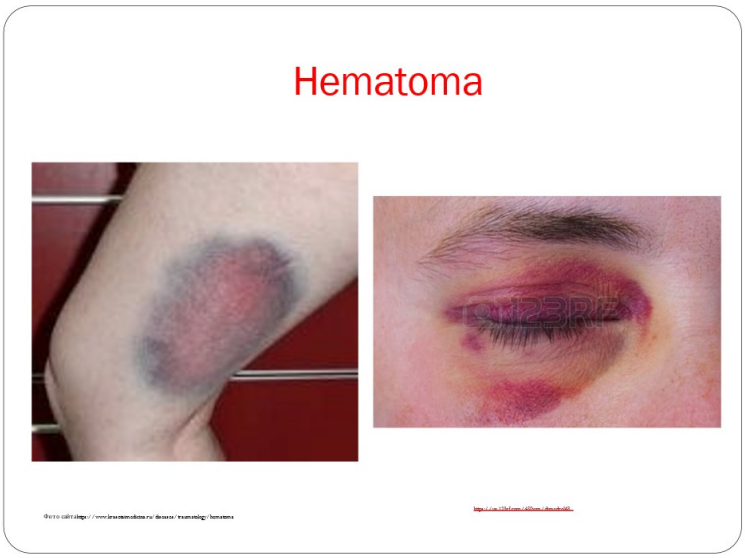
- bleeding stop;
- giving the victim optimal body position;
- immobilization of injured limbs;
- protection from hypothermia: wrap.

Internal bleeding

The integrity of the skin is not broken. Blood accumulates in the intercellular space and body cavities, not communicating with the environment.

Hematoma

- Rupture of the vessel.
- Accumulation of coagulated or liquid blood in soft tissues.
- It can be located superficially (under the skin or external mucous membranes) or in the depths of the muscles. Perhaps the formation of hematomas in the brain or in the wall of internal organs.



Soft tissue hematoma: first aid

- The limbs give an elevated position.
- Apply cold: a heating pad with cold water, ice packs wrapped in a towel.
- Apply a pressure dressing to reduce bleeding.

Intracranial hematomas

- Injury or result of rupture of a vessel (without prior injury).
- Loss of consciousness while receiving an injury in combination with a bright interval (the period of well-being after an injury), vomiting, headache, psychomotor agitation.
- Bradycardia: a decrease in heart rate. Increased blood pressure, the difference in readings when measuring of blood pressure on the right and left hand.
- Anisocoria: different sizes of the right and left pupil.
- Possible epileptic seizures.
- So could «Lucid interval»: May be absent in severe injury and in children. It can last from several hours to 3–4 weeks (depending on the severity and location of the injury).

Internal bleeding of other locations

Internal bleeding – the flow of blood into the cavity of the body or organs of a person and into interstitial lumens: Injury or chronic illness

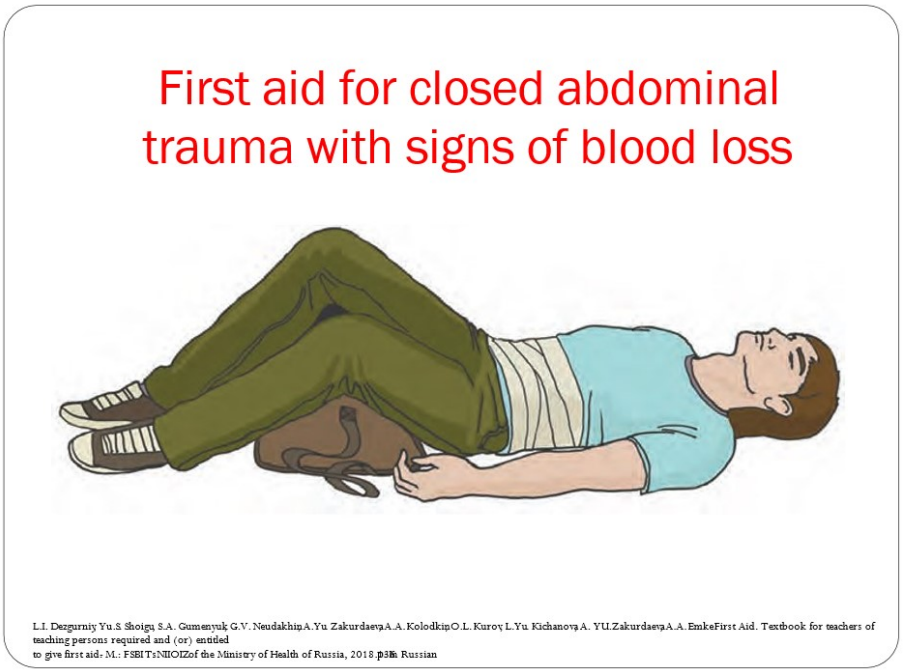
Internal bleeding: signs

- pallor of the skin and visible mucous membranes, sticky cold sweat;
- shallow breathing, shortness of breath, frequent weak pulse (more than 100 beats / min), low blood pressure;
- insatiable thirst, hand tremor, limb cooling;
- fainting.

Internal bleeding: first aid

- Call an ambulance immediately.

- The victim is laid or given a semi-sitting position (pulmonary bleeding), provide complete peace.
- To the alleged bleeding area (e.g. stomach, chest, or head): apply an ice bag or a bottle of cold water.



POISONING

Poison is a substance that, when introduced into the body from the outside in minimal doses, causes health problems or death.

Signs of poisoning are determined by the specific exposure to a specific toxic substance.

Classification of poisons

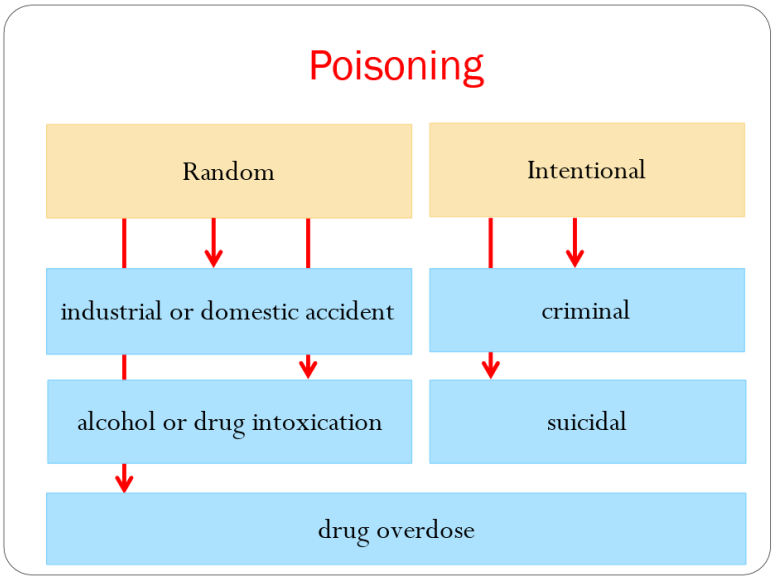
For practical use:

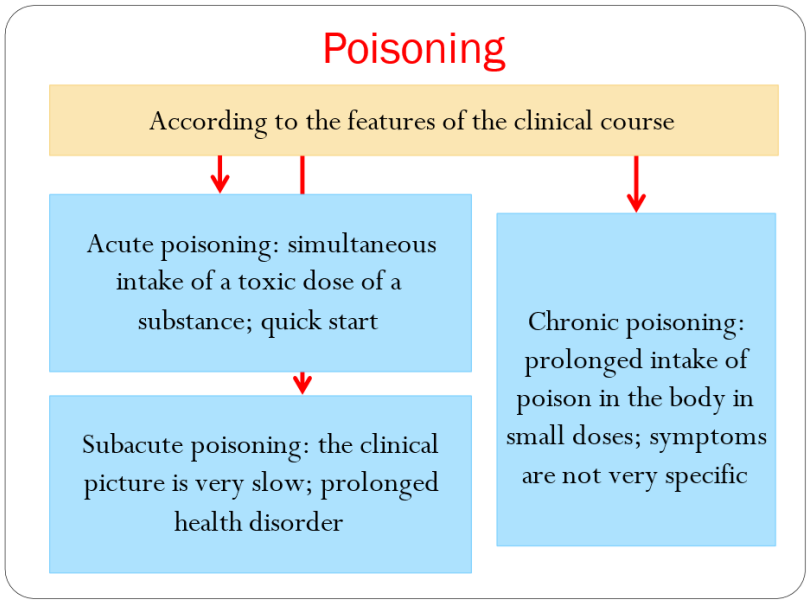
- Industrial poisons;
- Household chemicals;
- Medicines;
- Pesticides: for pest control;
- Chemical warfare agents.

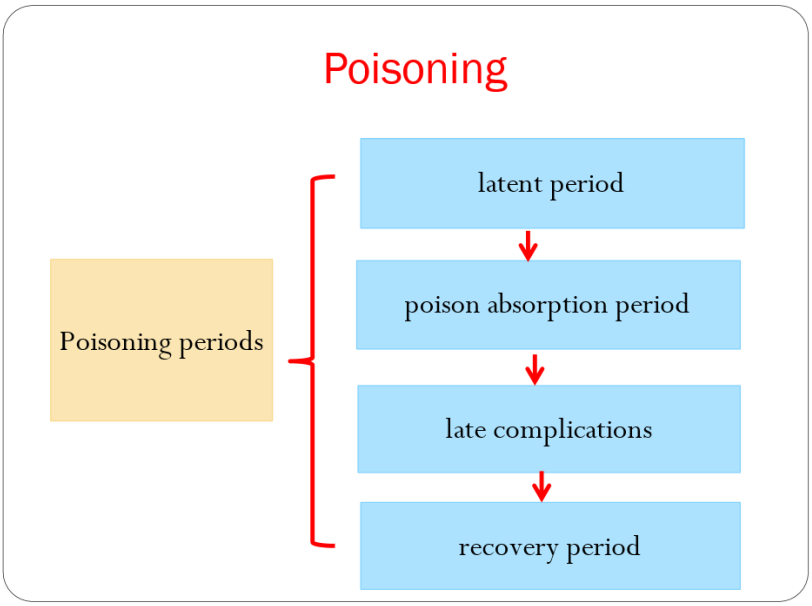
Toxicological classification of poisons

General toxicity

- Nerve action;
- Resorbent skin action;
- Asphyxiating effect;
- General toxic effect;
- Tear and irritant effect;
- Psychotropic effect.







Routes of entry of poisons into the body

- Through the digestive tract (through the mouth): drugs, detergents, mushrooms, plants, etc.
- Through the respiratory tract (when inhaling): gases and vapors, e.g. carbon monoxide, chlorine.
- Through the skin and mucous membranes: some plants, solvents and insect repellents.
- As a result of injection: when bitten or stung by insects, animals and snakes, with the introduction of poison, drugs with a syringe.

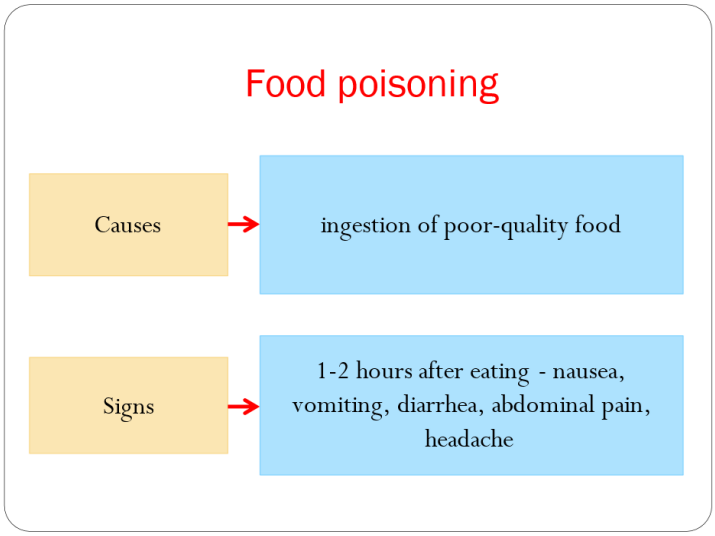
Signs of Acute Poisoning

Features of the scene: unusual smell, open or tipped containers with chemicals, open first aid kit with scattered tablets.

Signs and symptoms of a sudden attack of the disease: nausea, vomiting, diarrhea, chest or abdominal pain that suddenly developed, shortness of breath, sweating, salivation, loss of consciousness, muscle twitching and cramps, burns around the lips, on the skin, unnatural skin color, wounds on it.

General principles of first aid for poisoning

- Stop the entry of poison into the body of the victim.
- Try to find out: what type of poisonous substance was taken, in what quantity and for how long.
- Try to remove the poison: provoke vomiting, wipe or rinse the toxic substance off the skin, etc.
- If necessary: to carry out resuscitation measures (closed heart massage, mouth-to-mouth breathing, mouth-to-nose breathing).



First aid for food poisoning

Induce vomiting: give a drink a large amount of water (5-6 glasses) and press with two fingers on the root of the tongue.

Vomiting cannot be caused if the victim is unconscious.

Give the victim a sorbent. Activated carbon – at the rate of 1 tablet per 10 kg of the victim's weight.

Warm the victim.

Before the arrival of an ambulance, monitor the condition.

Drug poisoning

- The effect of drugs is determined primarily by their dose.
- Violation of the dosage of the drug and the frequency of its administration leads to an overdose.
- Symptoms of an overdose depend not only on the drug itself, but also on the individual characteristics of the human body – body weight, age, sensitivity to the components of the drug.

Factors affecting the severity of symptoms of poisoning:

- method, type and rate of intake of the substance that caused the poisoning;
- the ability of the poisonous substance to cumulate (accumulation in the body);
- individual characteristics of the body (gender, age, etc.);
- human addiction to drugs;
- joint action with other toxic substances and drugs;
- climatic conditions.

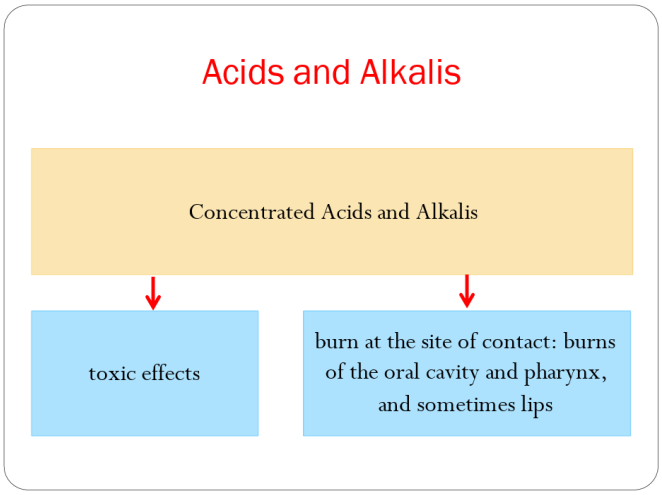
Drug poisoning

- Urgently call an ambulance.
- It is advisable to find out: what the victim accepted and how much.
- Signs of drug poisoning manifest themselves in different ways: depending on the effect of the drug.
- Most often: inhibited or unconscious state, vomiting, lethargy, salivation, chills, pallor of the skin, convulsions, strange behavior.
- Before the arrival of the doctor – the same measures as with food poisoning, in an unconscious state – turn on its side.

Drug poisoning prevention measures

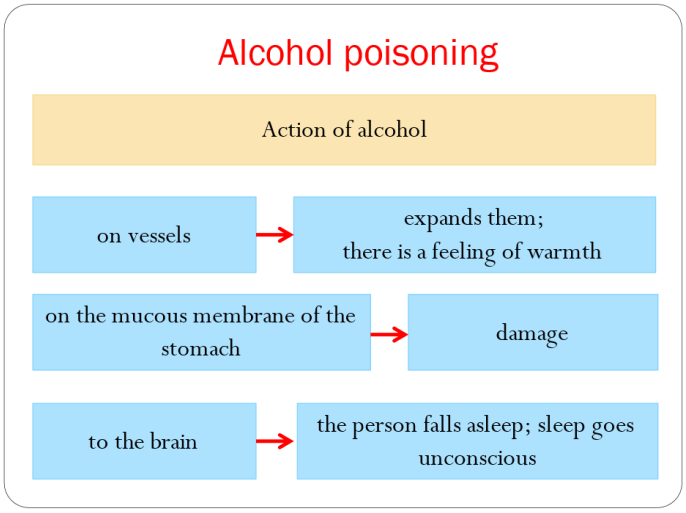
- carefully read the instructions for the drug;
- in no case do not increase the dose of the drug yourself, be sure to consult a doctor;
- observe storage conditions, keep all medicines in their original packaging;

- do not take medicines whose name is unknown, as well as expired, discolored or started to crumble and crumble.



First aid

- Call resuscitation!
- Do not attempt to inactivate acid with alkali.
- Do not induce vomiting.
- Doctors use the probe method.



Alcohol Poisoning: Symptoms

- redness of the face, then a sharp pallor. the skin is covered with cold sweat;
- agitation, which is then replaced by a drowsy state;
- slow breathing, rapid heart rate, low blood pressure;
- increased salivation, vomiting with the smell of alcohol.

Alcohol poisoning: heart failure, asphyxiation, respiratory arrest, hypothermia, cerebral edema.

Alcohol Poisoning: First Aid

- The victim should be laid to one side, provide fresh air.
- Induce vomiting.
- If respiratory activity stops, perform artificial respiration.

Nicotine poisoning: signs

- sharp pallor, cold sweat;
- nausea, loose stools; then increased salivation, vomiting;
- impaired consciousness, loss of orientation, cramps, respiratory paralysis;
- heart palpitations, increased blood pressure, arrhythmias, which can lead to circulatory arrest. Pressure increase gives way to collapse.

Nicotine poisoning: first aid

- Provide fresh air.
- Induce vomiting.
- Rinse the stomach.
- In case of respiratory depression, artificial lung ventilation is performed.

Drug Poisoning: Symptoms

Drugs – substances of different chemical nature; able to provide a stimulating, inhibitory, hallucinogenic effect on the central nervous system.

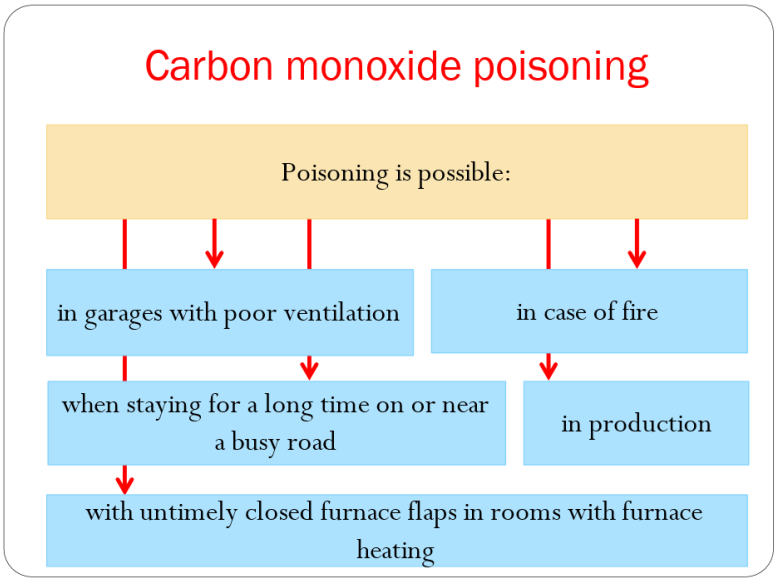
Acute drug poisoning manifests itself either immediately or after 30–40 minutes, depending on the route of administration (intravenously, subcutaneously, orally).

Breathing slows down, the rhythm of breathing becomes irregular, with large pauses. Cyanosis of the skin and mucous membranes is observed, the temperature decreases. Pulse slows down.

Drug Poisoning: First Aid

Put the victim on the side, monitor the function of the heart and lungs.

Call a doctor and do not hide the fact of drug poisoning.

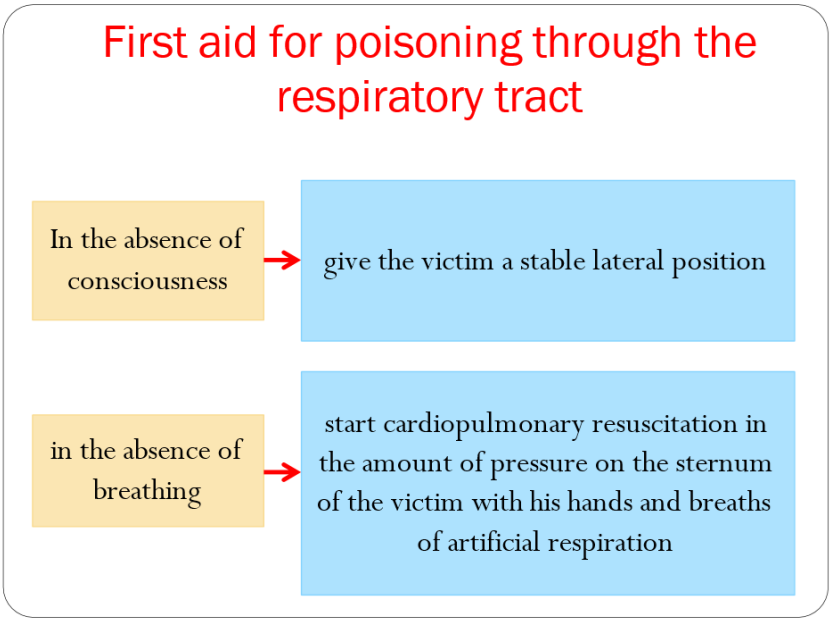


Carbon Monoxide Poisoning: Symptoms

- headache dizziness, chest pain, dry cough, lacrimation, nausea, vomiting, possibly redness of the skin, tachycardia, increased blood pressure;
- loss of consciousness, convulsions, respiratory failure, dilated pupils, sharp cyanosis (cyanosis) of the mucous membranes and facial skin.

First aid for poisoning through the respiratory tract

- Make sure that the scene is not dangerous; if necessary, use personal protective equipment.
- Isolate the victim from gas or vapor.
- Remove (remove) the victim to fresh air.



Carbon Monoxide Poisoning Prevention

- work in well-ventilated areas;
- check the opening of the dampers when used in stoves and fireplaces in homes.

Errors in first aid for poisoning

DO NOT:

- Give drink sparkling water.
- Induce vomiting in pregnant women, in unconscious patients, in the presence of seizures.
- Try to give an antidote on your own (for example, neutralize acid with alkali).
- Give laxatives in case of poisoning with acids, alkalis, household chemicals and oil products.

EMERGENCY SITUATIONS OF A LOCAL NATURE IN NATURAL CONDITIONS

Forced autonomous human survival

Autonomous existence is a person's finding in certain, often difficult, conditions of isolation, when the likelihood of help and the possibility of using technical and other achievements is limited or excluded.

Forced autonomous existence

Voluntary autonomous existence

Forced autonomous survival of a person can occur in the following cases:

- loss of orientation;
- deprivation of transport;
- conductor loss;
- natural disasters, unfavorable weather conditions;
- emergency situations in transport (shipwreck, plane crash);
- inability to navigate the terrain;
- carelessness;
- excessive self-confidence.

The main condition that determines the success of survival or death is a person's disposition to get out of this situation, his desire to return home, moral obligations to loved ones and society, the consciousness that he still has a lot to do.

Survival factors:

1) psychophysical qualities of a person (mental stability, physical fitness, training in survival actions);

2) clothing, water and food supply, improvised means used for various purposes, rescue equipment, alarm and communication devices.

Rules of Conduct in Conditions of Forced Autonomy

1) eliminate an immediate threat to life (leave the vehicle, get out of the fire, etc.);

2) if necessary, provide yourself with first aid;

3) give an assessment of the current situation;

4) develop a plan for further action:

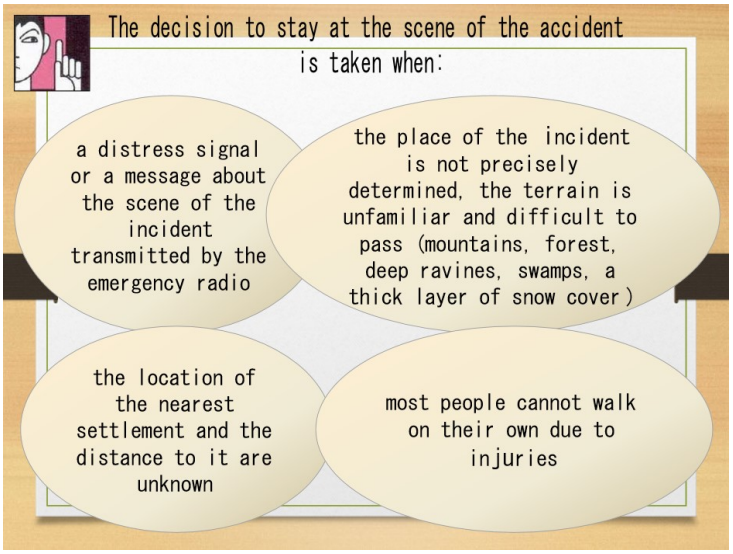
a) navigate the terrain;

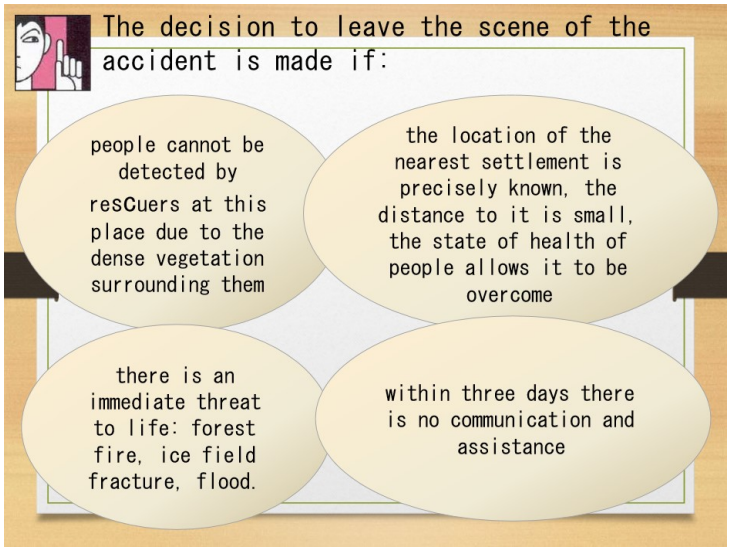
b) decide to stay in place or move in search of housing;

c) build a temporary shelter;

d) take measures to provide food and water;

e) take action to send distress signals.





The main skills and abilities that a person should have in a situation of autonomous survival in nature:

1) the ability to calculate the required minimum amount of food and water;

2) possession of methods of extraction and purification of drinking water in nature;

3) the ability to navigate the terrain using a map, compass, GPS navigators, and other devices and without them;

4) first aid skills;

5) skills of hunting for wild animals, fishing, tracking prey;

6) the ability to make a fire with the help of improvised means;

7) knowledge of the technology of construction of temporary shelters;

8) the ability to signal their location using intercom radio stations, tables, visual and gesture code signals.

Maximum wearable emergency stock

First aid kit (recommended "minimum" equipment):

- ketan pills, acetylsalicylic acid, nitroglycerin, methyl isovalerate, activated carbon, sodium sulfacil, ammonia solution;
- hypothermic bag, tourniquet, sterile, non-sterile and elastic bandages, bactericidal adhesive plaster, styptic napkins, miramistin, adhesive plaster, cotton wool.

Maximum wearable emergency stock

- Dehydrated dry foods and vitamins;
- Water supply;
- Bowler hat;
- Toiletries;
- Petrol and gas lighters, waterproof matches;
- 2 lights with extra batteries and bulbs;
- Strong long rope;

- Small ax;
- Tent or raincoat tent;
- Rain coats, canvas suit, socks, hats, gloves, high boots (preferably rubber);
- Candles, dry fuel;
- Needles, threads;
- Fishing rods and line.

Suppressive factors of human survival in the wild. Hunger.

Hunger as a cause of human death in the practice of emergency situations is extremely rare.

Hunger is terrible in that it intensifies the action of other factors affecting a person. He undermines the strength of a person from the inside, after which a host of others, no less dangerous than hunger, ailments fall on him, which complete the job.

A hungry person freezes several times faster than a full one. He gets sick more often and is more difficult to suffer diseases. With prolonged fasting, reactions slow down, intellectual activity weakens. Performance drops sharply.

Therefore, in the absence of food supplies, if it is impossible to provide for oneself by hunting, fishing, collecting wild-growing edible plants, one should adhere to a passive survival tactic, that is, expect help in the immediate vicinity of the accident site. In order to save energy resources without extreme need, you should not leave the shelter, you need to lie more, sleep, any active activity – work inside the camp, the transition, etc. – to be minimized, to do only the most necessary work.

The duty, and the duties of the duty officer include the preparation of firewood, maintaining the fire, repairing the shelter, observing the terrain, obtaining water, should be carried out alternately, dividing the day and night into short 1–2 hour watches.

Only wounded, sick and young children can be released from duty. All other members of the emergency team must be involved in watchkeeping without fail. With a large number of people, you can assign two attendants at the same time. This order is primarily necessary to prevent outbreaks of apathy, despondency, pessimistic moods that may arise as a result of prolonged fasting.

At the slightest opportunity to provide yourself with food on the spot, every effort should be made to this.

Organization of food in conditions of autonomous survival all available products and distribute them into small portions of 500 kcal. If we take the daily energy consumption of the human body at rest for 1800 kcal, tissue reserves should be enough for 30-40 days of complete starvation.

Inviolable food supply. Emergency stock: chocolate, stew, condensed milk and coffee with milk, walnuts, crackers, biscuits, honey, sugar; in winter, bacon and smoked sausage are added.

Food of animal origin

- Grasshoppers (locusts), hairless caterpillars, larvae and pupae of forest beetles, spiders and termites are rich in protein.
- Frogs, newts and salamanders.
- Shellfish. These include invertebrates living in fresh and salt water – snails, shells, mussels, bivalve molluscs. Many of them are edible.
- Make sure they are fresh and cooked. You cannot eat them raw, as you risk introducing parasites into your body.
- Crustaceans. This variety includes sea and river crabs, crayfish, lobsters, shrimps. Most of them are edible, but they quickly deteriorate, and some can become carriers of dangerous parasites. Cook (boil) those that you catch in the rivers, sea varieties can be eaten raw.
- Reptiles, snakes, lizards and turtles.

General information on plant poisoning

I. Plants causing primary damage to the nervous system:

- aconite (wrestler, blue buttercup, Issyk-Kul root);
- henbane;
- belladonna (belladonna);
- spotted hemlock;
- milestone poisonous;

- dope;
- hemp is Indian;
- poppy sleeping pills;
- tobacco;
- sowing rank;
- celandine,
- chilibukha (vomit).

II. Plants causing primary damage to the gastrointestinal tract:

- colchicum;
- wolf's bast;
- castor oil plant (Turkish hemp);
- buckthorn;
- spurge;
- nightshade.

III. Plants that primarily cause heart damage:

- lily of the valley;
- digitalis;
- hellebore.

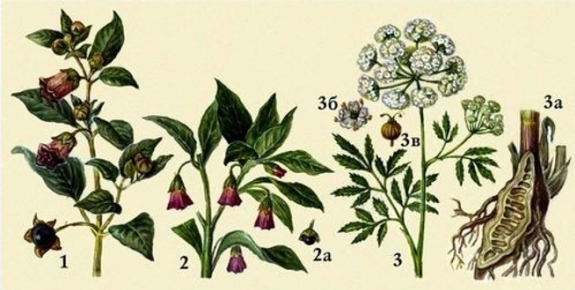
IV. Plants causing predominant liver damage:

- heliotrope;
- bitterness pink;
- ragwort.

V. Plants causing predominant skin lesions:

- hogweed;
- nettle.

Poisonous plants: 1 -Karakol aconite (1a- tubers); 2- Greek yarn (2a - piece of bark); 3 -black henbane (3a- fruit, 3б - seed); 4 - stinking dope (4a -fruit, 4б - seed); 5 -spotted hemlock (5a- stem section, 5б - umbrella with fruits, 5в -fruit); 6- arum spotted (6а - tuber, 6б - fruits); 7- white overgrowth (7a- fruits, 7б - roots, 7в - flower).



Poisonous plants: 1- belladonna belladonna; 2- carnioli scopolia (2a - fruit); 3 - poisonous milestone (3a - cutaway rhizome, 3б- flower, 3в - fruit).

Poisonous plants:
1 - poisonous milestone;
2 - milestone rhizome in section;
3 - poisonous sumac;
4 - sumach fruits;
5 - wolf's bast with fruits;
6 - flowers of a wolf bast;
7 - raven eye;
8 - fruit of the raven's eye;
9 - hemlock;
10 - hemlock root;
11 - arum; 12- arum fruits;

Thirst

Loss of up to 5% of fluid occurs without any consequences for a person. But dehydration of the body, exceeding 15%, can lead to serious consequences and to the death of a person.

The human body's need for water in favorable climatic conditions does not exceed 2–3 liters per day.

Natural sources can be conditionally divided into several groups: open (rivers, lakes, streams) and groundwater (springs, springs, accumulations of water in underground reservoirs) reservoirs, biological water sources (water-bearing plants − rabala, bamboo, cactus), atmospheric water (rain, snow, dew, desalinated ice).

For disinfection, special preparations are used: pantocid, aquasept, neo-aquasept, iodine, holzon, etc.

For 1 liter of water, 2–3 tablets of pantocid are needed, the water should be allowed to stand for 15–20 minutes.

In the absence of tablets, use a tincture of iodine (8–10 drops per 1 liter of water).

However, the most reliable way to disinfect water is boiling.

Cold

Use of multi-layer clothing from different fabrics. 4–5 layers of clothing keep warm the best. For example, a good combination is a tight cotton suit, several thin, not tight-fitting woolen pants and sweaters (2–3 thin sweaters warm much

better than one thick one, as there is an air gap between them) and a suit or overalls made of synthetic fabric.

Footwear. 8 out of 10 of all frostbite occur in the lower extremities. Therefore, a person who has suffered an accident in the winter period should first of all pay attention to the condition of his legs.

By all means available, you need to keep your socks and shoes dry. To do this, shoe covers are made from the material at hand, the legs are wrapped with a piece of loose fabric, etc. All the material remaining after this is used to warm clothes, protect the face from the wind.

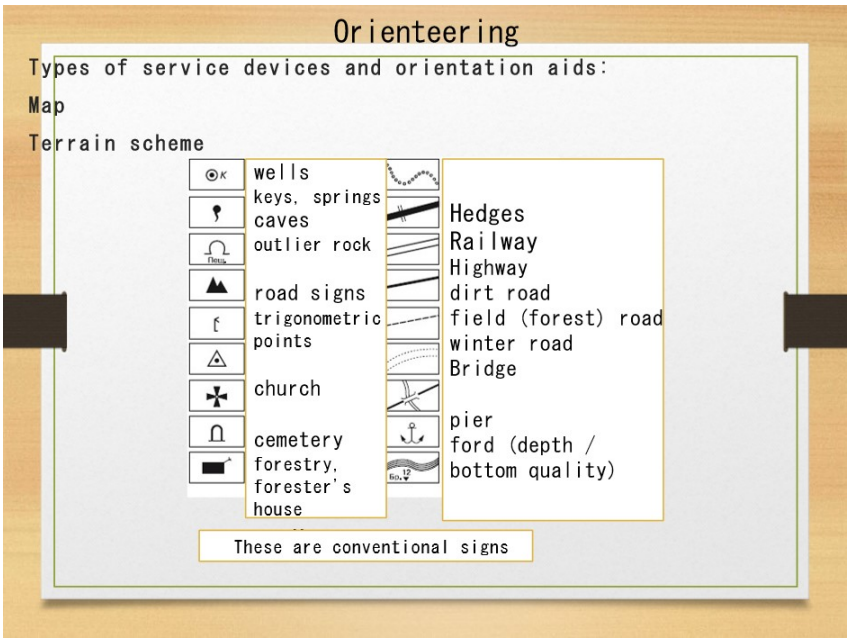
It is important to constantly remember that clothes, no matter how warm they are, can protect a person from the cold only for a very short period – hours, rarely days. And if you do not use this time effectively for the construction of a warm shelter or for the search for the nearest settlement, no clothing will save a person from death.

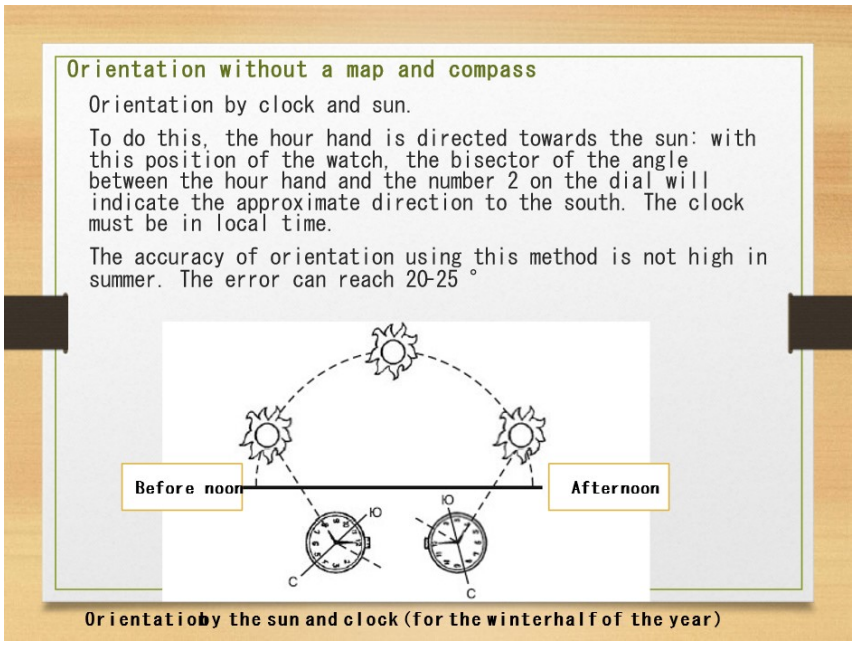
Snow shelters – igloos, caves, houses, dens, erected in one and a half to two hours, reliably protect a person from the effects of low temperatures and wind, and in the presence of fuel, provide thermal comfort. In a properly built snow shelter, the air temperature, only due to the heat emitted by a person, rises to –5 ... – 10° C with 30–40-degree frost outside the shelter. Using a candle, the temperature in the shelter can be raised from 0 to + 4 ... + 5° C and more. Many polar researchers, having installed a pair of stoves inside, heated the air to +30° C.

Very often, spending the night in a snowy shelter is preferable to spending the night near a fire. The construction of a cave or a house requires less effort and time than harvesting a large amount of firewood, breeding and maintaining a hot fire for many hours.

The confidence that the presence of deep snow or crust guarantees a safe overnight stay, makes it possible, even in an emergency, to organize a transition, to overcome considerable distances. The duration of vigorous activity with a normal supply of food can be 8–12 hours a day, respectively, 10 hours will be spent on sleep and rest, 1–3 hours – for setting up a bivouac.

However, it should be borne in mind that "passive" survival (waiting for help) at low air temperatures, especially in high latitudes, is always preferable to "active" (independent access to people).

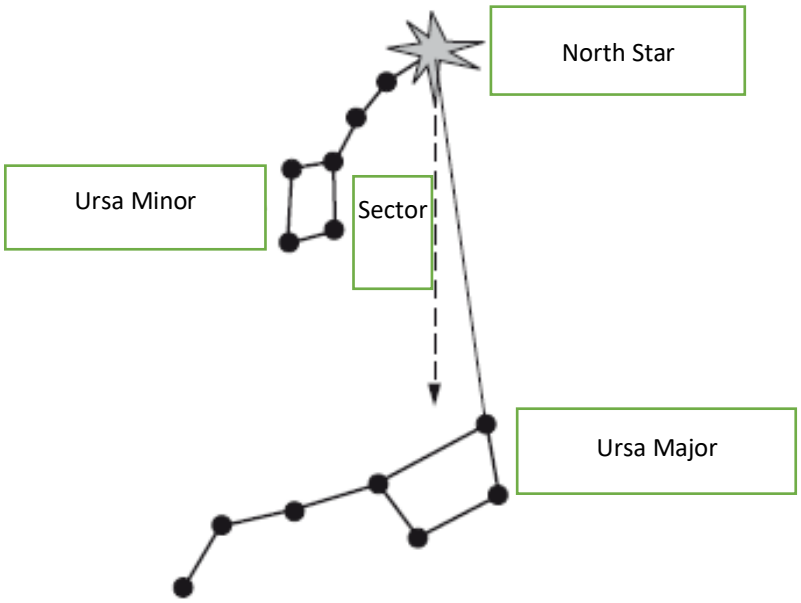




Orientation along the Polar Star

The direction to the North Star is determined as follows.

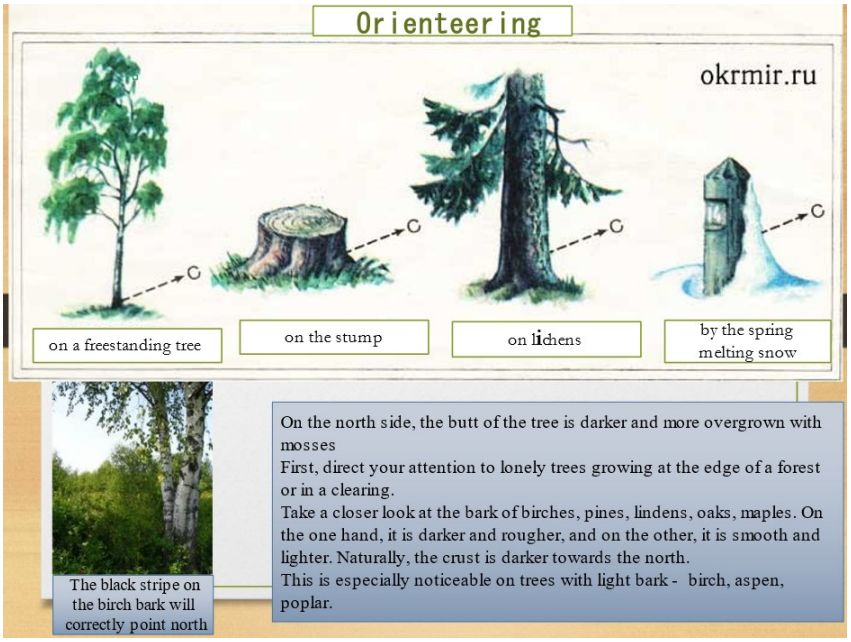
Through the two extreme stars of the "bucket" of the Big Dipper, a straight line is drawn mentally, on which is deposited five times the distance between these stars. At the end of the fifth segment is the North Star, pointing accurately (errors less than 2 °) to the north.



Orientation in local subjects

- It is known, for example, that mosses and lichens cover the northern side of trees and stones, resin protrudes more on the southern half of the trunk of a coniferous tree, ants arrange their dwellings south of the nearest trees or bushes and make the southern slope of the anthill more gentle than the northern one, the Orthodox altar churches are in the east.

- It is not recommended to be guided by such incorrect, albeit to all known signs, such as the density and splendor of the crown on one side or another of a tree that is detached or in the thick of the forest, according to annual growth rings of wood on the stumps of cut trees. Both the density of the crown and the width of the growth rings depend on a number of factors, among which the sun exposure may not be the main one.

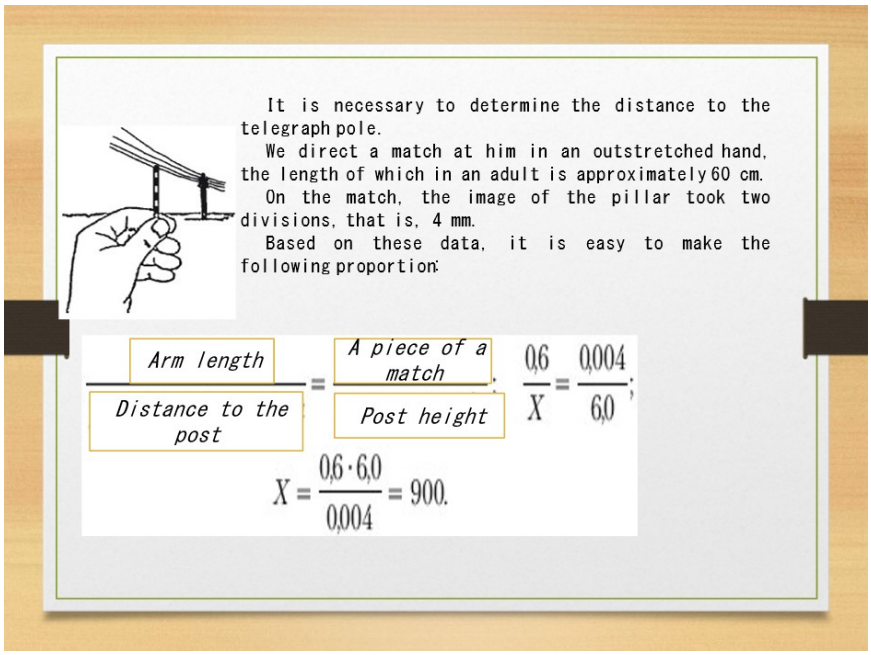


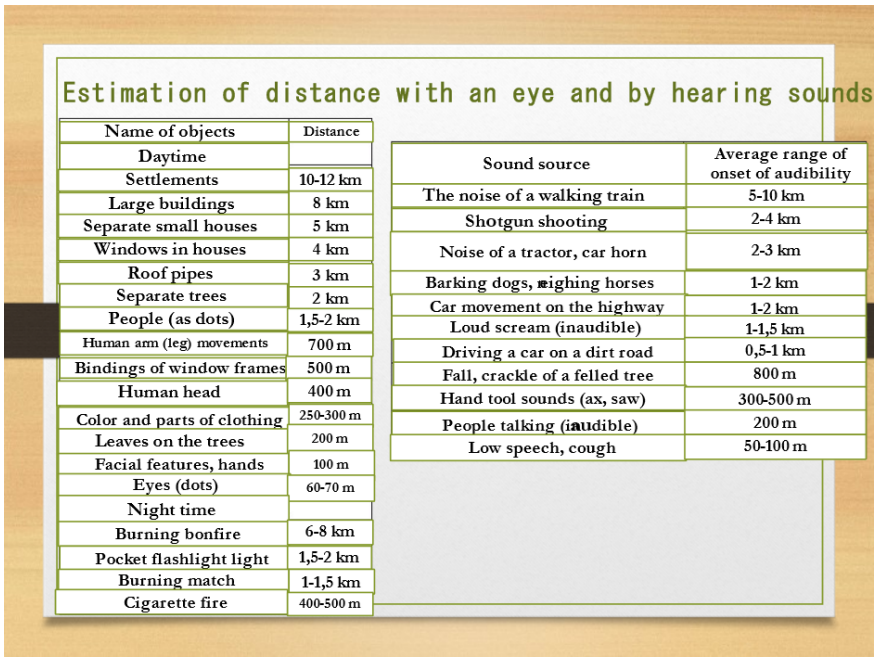
Using visual and auditory markers of orientation

- Determining the distance in steps. To determine the distance by your steps, you need to know their length. The average length of a pair of steps can be conventionally taken equal to 1.5 m. The steps can be counted in threes, counting threes alternately under the right and left legs. If the distance is measured by running, then the count is five steps. When measuring long distances, every hundred counted pairs or triplets of steps are marked by recording, bending fingers or in another way. It is more convenient to use a special device – a pedometer.

- Determining the distance with a match.

- A match is the simplest rangefinder. Previously, two-millimeter divisions must be applied on it with ink or a pencil. It is also necessary to know the approximate height of the object to which the distance is determined. So, a person's height in meters is 1.7, a bicycle wheel has a height of 0.75, a rider's height is 2.2, a telegraph pole is 6, a one-story house without a roof is 2.5–4 m.





Name of objects	Distance
Daytime	
Settlements	10-12 km
Large buildings	8 km
Separate small houses	5 km
Windows in houses	4 km
Roof pipes	3 km
Separate trees	2 km
People (as dots)	1,5-2 km
Human arm (leg) movements	700 m
Bindings of window frames	500 m
Human head	400 m
Color and parts of clothing	250-300 m
Leaves on the trees	200 m
Facial features, hands	100 m
Eyes (dots)	60-70 m
Night time	
Burning bonfire	6-8 km
Pocket flashlight light	1,5-2 km
Burning match	1-1,5 km
Cigarette fire	400-500 m

Sound source	Average range of onset of audibility
The noise of a walking train	5-10 km
Shotgun shooting	2-4 km
Noise of a tractor, car horn	2-3 km
Barking dogs, neighing horses	1-2 km
Car movement on the highway	1-2 km
Loud scream (inaudible)	1-1,5 km
Driving a car on a dirt road	0,5-1 km
Fall, crackle of a felled tree	800 m
Hand tool sounds (ax, saw)	300-500 m
People talking (inaudible)	200 m
Low speech, cough	50-100 m

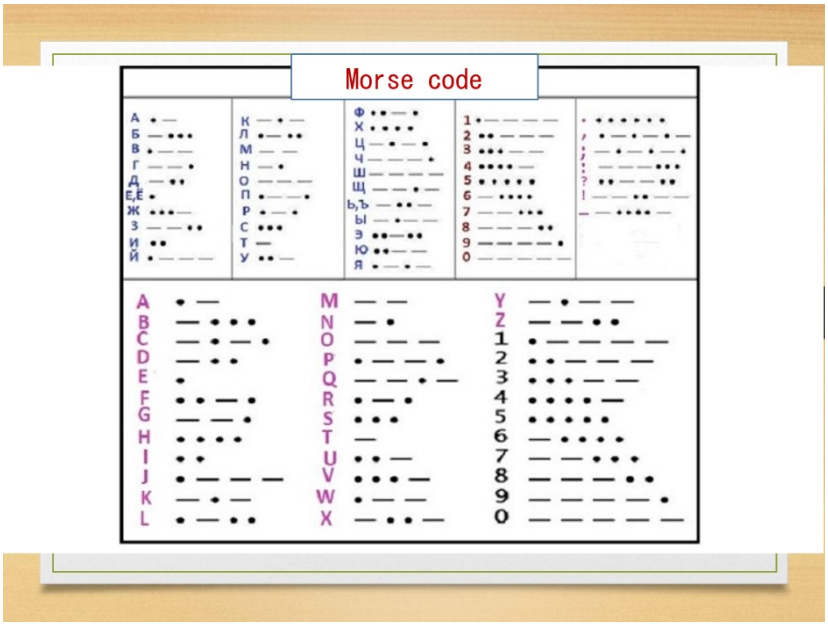
Types of means and methods of sending distress signals

- All means of giving distress signals are divided into service and improvised (type of means), into sound, visual and radio signals (the principle of signal transmission).

Distress signal (SOS)

- The SOS distress signal (save our souls): …–…
- Was adopted by the International Convention in Berlin on November 3, 1906, for its unimpeded reception every hour for 6 minutes (from 15th to 18th and from 45th to 48th) at the "distress frequencies" – 500 and

2182 kHz – all radio stations in the world go silent; there is silence on the air, so that everyone who is in trouble can freely go on the air and send a distress signal, indicating the square of their location, or give the opportunity to track themselves.



What is Morse Code?

- The encoding system for text characters (letters, numbers and punctuation marks) is named after its founder – Samuel Morse, artist and founder of the National Academy of Drawing in New York.
- To record the information sent and received, the inventor developed a series of code combinations consisting of dots and dashes. This system was later called Morse code.
- The duration of the signal sounding dash (short or long) corresponds to 3–4 dots or 3 intervals. The number of pauses between words is set more than between letters and is equal to the transmission time interval of 7 points.

SOS

One-two-free-

[One-two-free]-

One-two-free

Not a hand, but a brush!

Visual alarms

Pyrotechnic alarms:

- signal flares;
- signal checkers;
- signal mortars.

Signal mirror

- It is a polished metal plate with a hole in the middle (5–7 mm) through which you can follow the object.
- The “sunbeam” launched by your mirror is detected even from an airplane flying at an altitude of 2 km at a distance of 20–25 km from your location. The mirror is effective even at night.

Signaling tools at hand

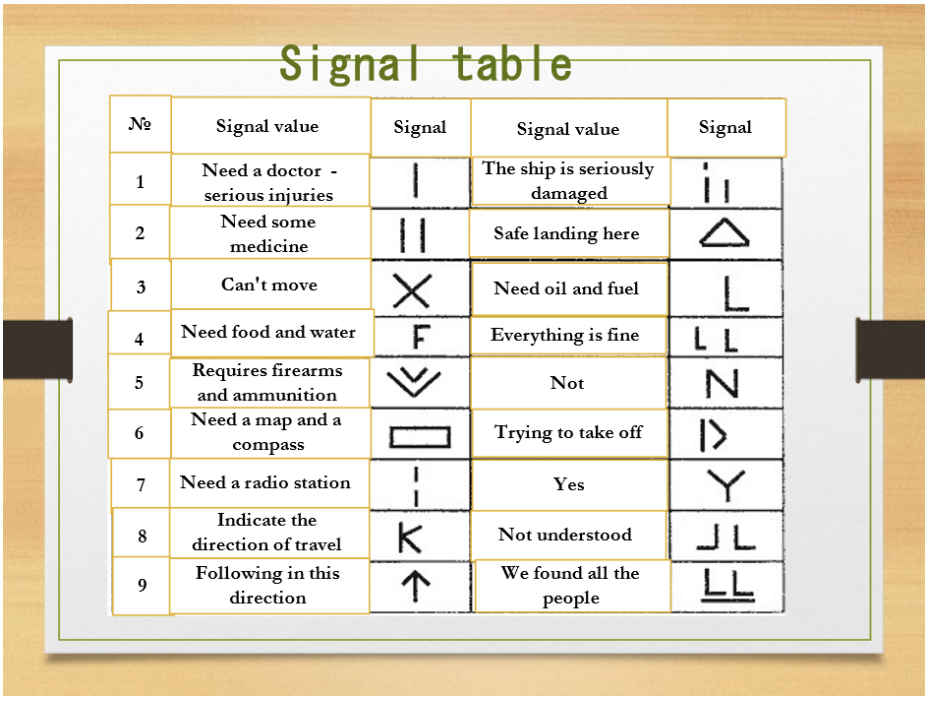
- Reflectors. To indicate your location in the absence of a signal mirror, you can use a cosmetic mirror, foil, or a knife blade. The more polished the plate is, the further the light signal is visible.
- Kite. A kite can serve you well, too. Make a frame out of thin boards, stretch thin (preferably colored) paper over it, tie pieces of foil and bright ribbons to the snake's tail.
- Signal flags. Hang signal "flags" – bright pieces of cloth on tall trees near your camp.

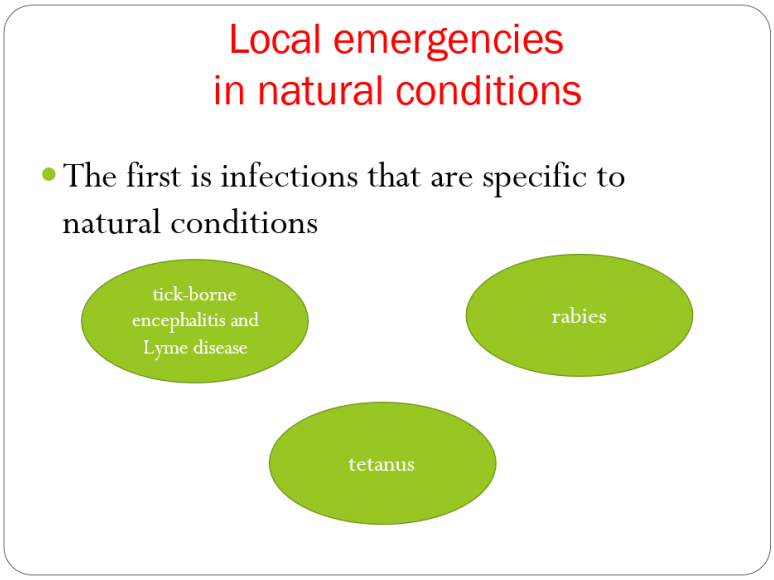
Signal bonfire

A bonfire located in an open area or on a high hill is visible from afar. At night, a brightly burning fire is visible from a distance of 20 km when viewed from the sky, 8 km when viewed from the ground. International distress signal – 3 bonfires with a distance of 20–30 m. However, for the idea to work, it is necessary to maintain a constant small fire near the bonfires, so you can make your “alarm” blaze in a short time.

Signal code system for communicating with pilots

- "Here is the landing! We need help!" – hands up, palms inward, legs together.
- "Landing is impossible! We don't need help!" – left arm up, legs together.
- "Straight" – arms raised, bent at the elbows, palms back. Feet shoulder width apart. Swaying the forearms back.
- "Back" – arms are raised forward to shoulder level. Palms forward.
- "Stop! Stop engine ” – cross your arms, the speed of this action corresponds to the degree of need to stop.
- "Hang up!" – arms to the sides, palms down.
- "Below" – swinging down with straight arms, palms down.
- "Higher" – swinging straight arms up, palms up.
- "Landing" – arms crossed in front of you below.





Ixodid ticks

- There are two epidemiologically dangerous seasons – spring and the summer-autumn transition. During these periods, ticks are active and their bites are possible.
- As for spring, that is the difference from year to year. The activity of ticks will curl in the spring from the air temperature. In general, the whole spring is considered dangerous, but we are warned about the periods of the greatest activity of ticks by the media.

To prevent tick bite

- Dress appropriately: clothing should be light-colored so that the tick is visible.
- There should be no bare strips of skin – ticks perceive us (warm-blooded animals) by our body heat.
- That's right: overalls, high boots, a headdress that fits tightly around the head.

To prevent tick bite

- Do not visit forest areas in epidemiologically dangerous seasons unless absolutely necessary!
- If necessary, get vaccinated against tick-borne encephalitis in advance.

If a tick has bitten you

- Do not remove the tick yourself if you do not have the appropriate skills!!!
- Contact any medical institution. There, the tick will be carefully taken out and given to you in a test tube – for laboratory research.

Diseases

- Tick-borne encephalitis is a severe, life-threatening infectious disease. The period from the bite to the onset of the disease is 45 days maximum.
- The disease can be in three forms: febrile (only high fever), in the form of meningitis (inflammation of the meninges (as a consequence – intracranial hypertension), in the form of encephalitis (loss of brain function, disability).

Lyme disease (tick-borne borreliosis)

- The disease affects the heart, kidneys, blood vessels, skin, joints.
- The course of the disease is long, disability is possible.
- According to recent data, ticks also carry anaplasmosis.

Emergency prevention

- We carry the tick to the laboratory for the study of ticks – we find out which laboratory is on duty via the Internet. Or we ask in the hospital where the tick was obtained.
- In the laboratory, the tick is examined and the result is given to us.
- Important! The tick must be delivered alive for its full examination.
- If the tick is infected with something, then we go to an epidemiologist, either to a state or private clinic.
- The doctor prescribes prophylactic treatment – antibiotics, antiviral drugs, emergency immunoprophylaxis (anti-tick gamma globulin).

Rabies

- It is a very old infection. This is a viral infection.
- Many mammals get sick. Man is a dead end link in the food chain, since man does not bite anyone.
- The virus is transmitted from a sick animal through a bite or when saliva comes into contact with the skin.
- There is a real story about a case in our area – the Perm Territory. In the village, a girl died of rabies, who stroked a kitten on the street, the kitten's hair was in the saliva of a rabid dog. The dog was chasing the kitten, its saliva dripping onto its fur.
- Rabies affects the brain.
- The animal acquires aggression, inappropriate behavior – for example, wild animals go to settlements.
- A person dies in the atmosphere of a horror movie – with frightening hallucinations
- There is no cure for rabies!
- Timely prevention of a bite is important.
- That is, the emergency introduction of the rabies vaccine.
- The vaccine is difficult to tolerate and with complications, but death from rabies is worse.
- Therefore, with such an incident, you need to go to the emergency room. The doctor will ask you about the circumstances in detail. Decide on vaccination.
- If the animal can be observed 10 days after the bite (catch, or it is a neighbor's dog), then it is better to wait with the vaccination and observe the animal. If it does not die within 10 days, vaccination is not needed.
- Since vaccination has many complications, it is carried out fractionally – within 45 days, every 3 days in portions.
- A sick leave is given for the entire period of vaccination.

Tetanus

- Tetanus is caused by the bacteria Clostridium tetani.
- Microbes are found in soil, dust and animal feces.
- When ingested, these bacteria produce a powerful neurotoxin, tetanospasmin.
- This toxin disrupts motor neurons – that is, the nerves that control muscles.
- There are convulsions, paralysis, death.
- The treatment is not effective. Only emergency immunization.
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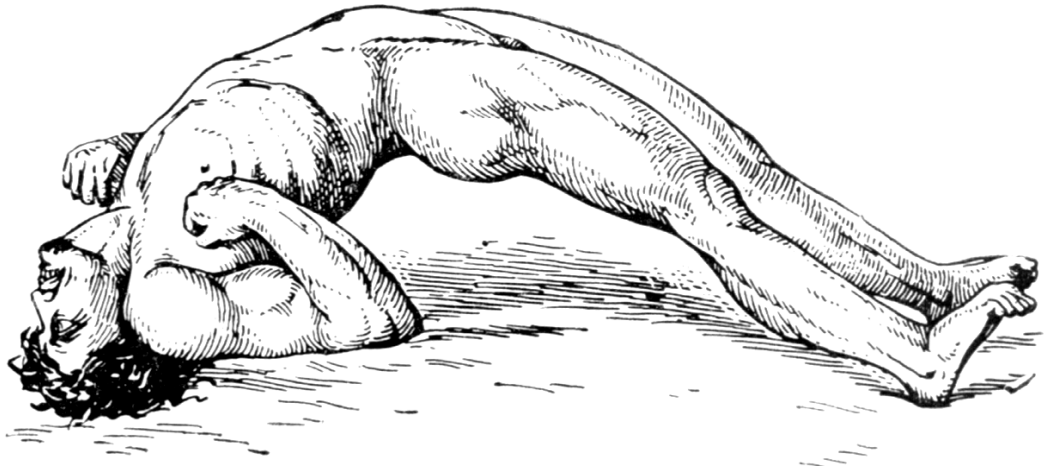
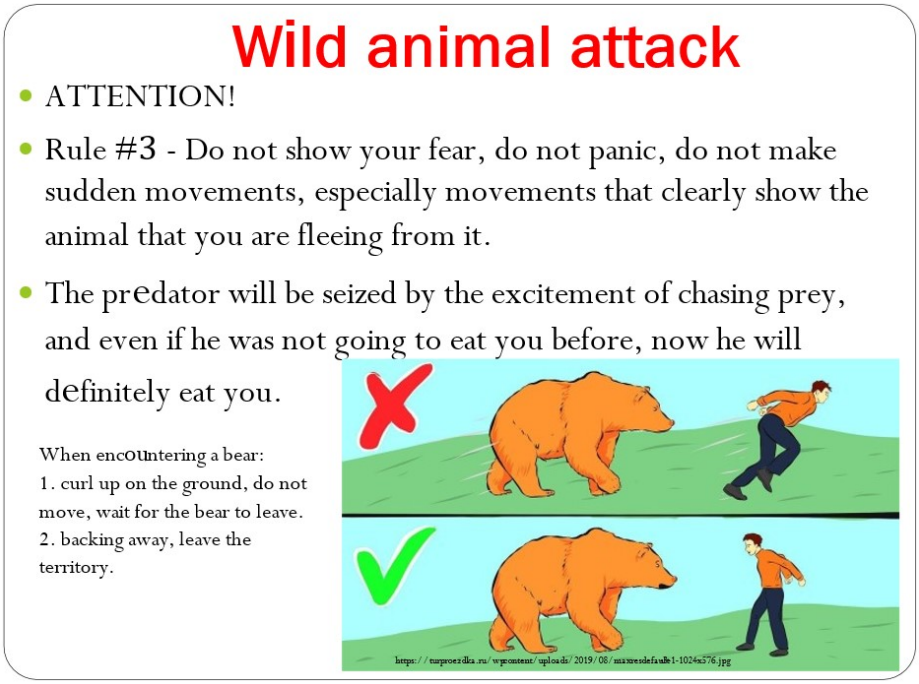


Therefore, all wounds and burns received outdoors should be considered dangerous in terms of tetanus!

Wild animal attack

ATTENTION!

- Rule № 1: Don't go into the forest if you have a wound. It will smell like "food" for a predatory animal.
- Rule № 2: Do not look into the eyes of a predator! Because the look "eye to eye" predator perceives as a direct challenge to measure strength.



Elephants

- A sign of aggression is a tucked up trunk and ears folded back.
- To minimize the threat, you need to hide behind any obstacle – a stone, a tree.

Sharks and crocodiles

Sharks and crocodiles must be beaten in the eyes

Rhinoceros

He sees very badly. Standing up or crouching behind any obstacle, a person merges with him for a rhinoceros. These animals will also not climb into tall grass or bushes.

Wild animal attack

Venomous snake bite

- Severe pain, swelling, bruising at the site of the bite, shortness of breath and palpitations
- In severe cases - impaired consciousness, vomiting, convulsions, decline in cardiac and respiratory activity

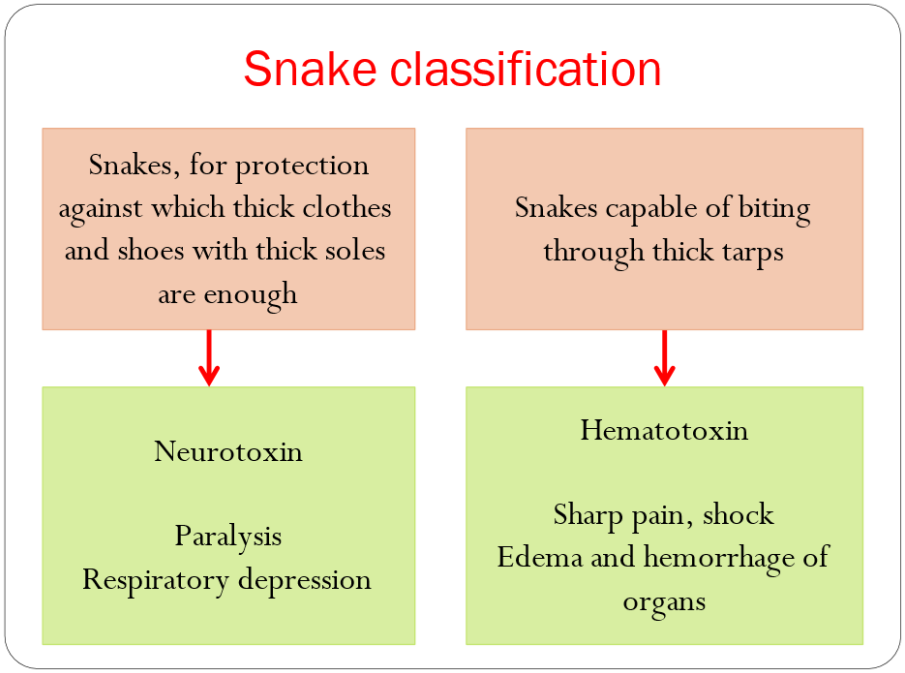
Skin poisoning

Venomous snake bite

- Severe pain, swelling, bruising at the site of the bite, shortness of breath and palpitations
- In severe cases - impaired consciousness, vomiting, convulsions, decline in cardiac and respiratory activity

Dangerous species of snakes

- common viper (а)
- Central Asian cobra (б)
- steppe, nosy, Caucasian and Armenian, gyurza (в)
- efa (г)
- common, stony,Ussuri muzzle (д)



Viper bite

Painful, quick and pronounced swelling of the extremities with a transition to the trunk, skin crimson-cyanotic. After 1–3 hours: increased bleeding from the site of the bite, nasal, gastrointestinal and other bleeding, hemorrhages in the internal organs, shock. Death occurs from internal bleeding and renal failure.

Cobra bite

Numbness in the bite area. Disturbed coordination of movements, speech, swallowing. Paralysis gradually spreading from the extremities to the muscles of the trunk and respiratory muscles. Collapse.

Rules of conduct in the "snake" places

Do not touch the snakes! Clothing should be made of thick and thick fabric, high boots made of durable leather. Be careful in places overgrown with thick grass, especially in hollows.

Do not walk at night: many snakes are especially active on warm summer nights.

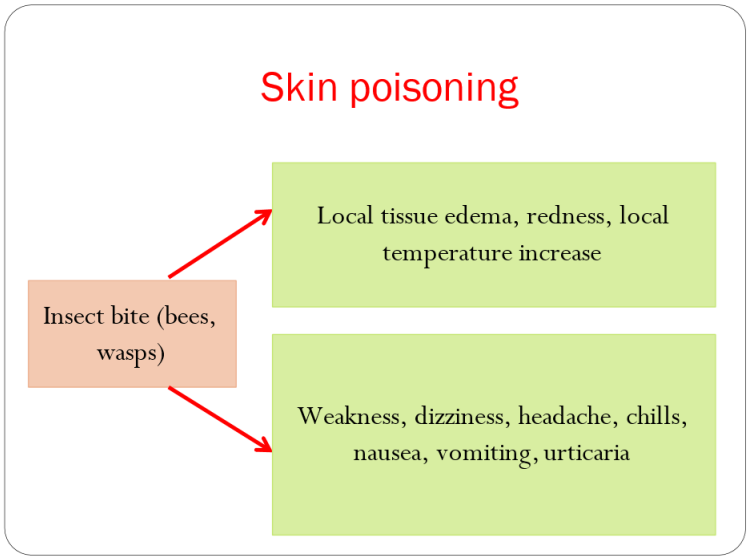
Do not spend the night near hollow trees, rotten stumps.

If you unexpectedly meet a snake, freeze in place. Then, without turning your back to her, walk away very slowly.

First aid for snake bites

- Put the victim in the shade so that the head is lowered below body level.

- If damage is superficial, rinse with plenty of clean water.
- Immobilize a limb, apply an aseptic recent dressing.
- Drink plenty of water to reduce the concentration of poison in the body.



First aid for bee and wasp stings

- If the sting remains in the wound, try to carefully remove it.
- Treat the wound with soap and water, then an antiseptic.
- Locally, cold is applied to the bite site.

Precautionary measures

- Keep calm, if you were surrounded by wasps or bees, do not wave your arms, do not run – try to calmly move away.
- Do not use aggressive smelling perfumes in the summer.
- Protect your throat and neck, and if you are stung in this place, drink cold water to reduce the spread of edema.

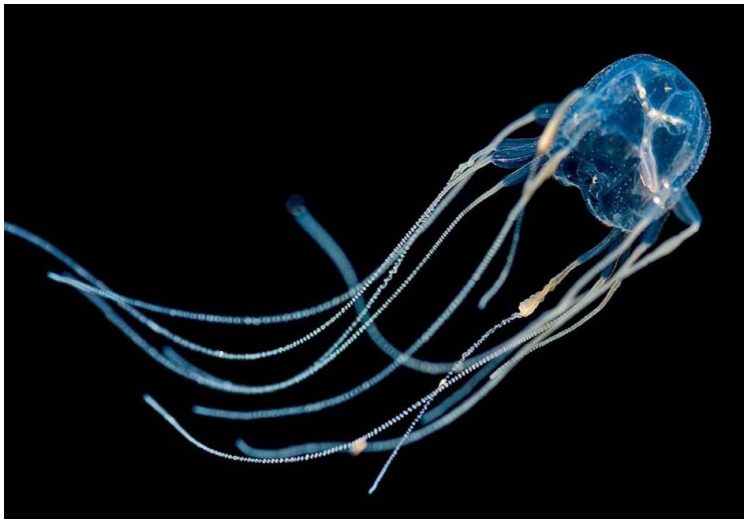
Damage caused by marine fauna

Dangerous to humans fish

- Biting: sharks, moray eels, piranhas, pike.
- Injuring spikes and spikes: scorpion, surgeons, stingrays.
- Foodborne Poisoning: Doggies, Hedgehog Fish, Moon Fish, Striped Tuna.
- Electric or stunning electric shock: ramp, eel.
- Fish of Poisoned Ponds.

Rules of conduct in the habitats of dangerous sharks, moray eels

- Do not swim, especially at night, do not swim alone.
- Do not enter the water if there are even slight abrasions and scratches on the body.
- Do not panic.
- Swim calmly without sudden movements.
- Swim in dark clothes, light attracts sharks.



Jellyfish burns

In contact with a jellyfish, a person has a strong burning sensation and pain, hyperemia and swelling of the skin, blisters.

After 15–20 minutes: the pain spreads to the muscles and joints, chills, a feeling of tightness behind the sternum, in some – bronchospasm, intestinal disorders.

Squeezing damaged skin in contact with a jellyfish can lead to increased release of poison to the skin.

Emergency contact with jellyfish

- Removing jellyfish residues from the skin.
- Treat the affected area with an antiseptic.
- Aseptic dressing if necessary.
- With respiratory arrest and cardiac activity – cardiopulmonary resuscitation.

Damage caused by marine fauna

Some types of marine fish: stingray, scorpions – strike a person with an injection containing neuroparalytic

First aid

- Needle debris, spike debris must be removed.
- Rinse the wound with water.

- When cardiac and respiratory arrest is performed, cardiopulmonary resuscitation is performed.

Damage caused by marine fauna

- Some types of marine fish: stingray, scorpions - strike a person with an injection containing neuroparalytic poison

Symptoms of Poisoning	→	Local effects of inflammation (pain and redness), suffocation, weakness, cramps, cardiac arrest and breathing

Damage caused by marine fauna

In case of defeat by electric fish (eel, stingray)	→	Sharp pain, tachypnea, trembling, cramps, loss of sensation in the limbs, heart rhythm disturbances, loss of consciousness

- Help consists in bringing the victim to the surface, conducting cardiopulmonary resuscitation, monitoring heart rate and ECG

Poisonous fish of the family of pufferfish

dog fish, hedgehog fish, pufferfish	→	Itching and numbness of the lips, tongue, burning in the throat, vomiting, abdominal pain; in severe cases - severe weakness, impaired coordination of movements, difficulty swallowing, breathing

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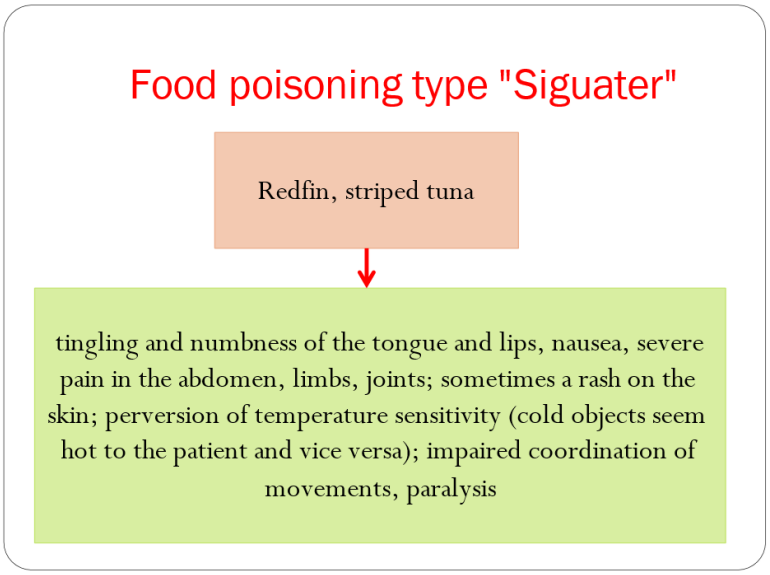

First aid for poisoning by secondary poisonous animals

- Gastric lavage (give 2–3 glasses of drink immediately, induce vomiting);
- Activated carbon;
- Monitoring the condition of the victim before the arrival of the doctor.

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