

# CBRNE

The name CBRNE (the English abbreviation Chemical, Biological, Radio-logical, Nuclear, Explosive) includes the issue of protecting individuals and society from dangerous substances and pollutants. The danger of these substances can manifest itself in accidents, terrorist attacks or war conflicts. This article is focused on the first contact of healthcare workers (IZS) with CBRNE substances and the subsequent response of the rescue system.

The issue of CBRNE is multidisciplinary and the scope of measures is governed by the type of damage (radiation accident, epidemic, accident of a tank carrying chemical substances, explosion), the size of the affected area and the number of affected.

Event identification may not be clear from the start. It is necessary to consider:

- place (interventions in industrial plants, sewerage areas, sewage treatment plants, in laboratory and chemical plants or in storage and agricultural facilities. A terrorist attack can occur in public buildings and buildings of government institutions)
- circumstances (traffic accidents during the transport of dangerous substances, an explosion in a public space, the sudden appearance of a large number of people with the same or similar symptoms. The development of health problems in those involved. Travel history of infectious diseases)

If the use of CBRNE is suspected, the entire IZS must be activated and masks and protective suits must be used. If the suspicion only occurred during contact with the patient, it is necessary to immediately submit a situational report to the ZOS (dispatch) (description of the situation, number of injured, position of MU, problems and risks, reinforcements). If there is a risk of contamination of the patient, it is advisable to undress him before loading him into the car, store his clothes in an airtight container and move away from the inner (dangerous) zone.

## Notes on chemical noxes

The release of toxic substances can occur both during chemical accidents and during fires, depending on the type of burning material, the burning temperature and the oxygen balance of the burning (the less oxygen - incomplete combustion - the more toxic the emissions are). In fires, carbon monoxide, methanol, aldehydes, hydrogen chloride, hydrogen cyanide, ammonia, phenol or acetone are most often produced.

Symptoms of mass poisoning with cholinesterase blockers (for example, sarin, novichok): shortness of breath, associated with profuse salivation, vomiting, sweating, passing urine and stool, tremors, convulsions, bradycardia. In 1995, a chemical attack was carried out on the Tokyo subway with sarin gas (12 dead, 999 hospitalized, 4643 outpatients).

## Hazardous gases

physically dangerous gases (all colorless)

- propane, butane are heavier than air, separately odorless (the commercial product is marked with a substance with a strong odor). When the liquid escapes into the air, it evaporates very quickly, forming an explosive mist, it gasifies above the water surface and forms an explosive layer. The contact of liquid gas with the skin causes frostbite, and in the event of an explosion and subsequent fire, burns
- acetylene is lighter than air, technical smells like garlic, extremely flammable, explosive.
- hydrogen is lighter than air, extremely flammable, explosive

toxic gases

- chlorine is greenish-yellow, pungent-smelling, heavier than air. When released into the gas phase, it creates poisonous and corrosive cold mists. It damages the eyes, mucous membranes and skin, there is a risk of swelling and respiratory arrest
- ammonia (ammonia) is colorless, irritating, pungent-smelling, well soluble in water, it is lighter than air, but with water vapor (even with air humidity) it creates a "fog" of heavier air.
- acetone vapors are clear, colorless, aromatic smelling and much heavier than air; forms explosive mixtures with air, vapors are easily flammable even on hot surfaces. In larger concentrations, it has a narcotic effect. It dissolves fats in the skin and tissues, irritates the eyes and mucous membranes of the respiratory tract

(According to the trauma plan of ZZS HMP)

## Marking of dangerous substances

There are more marking systems, generally it is a picture in a diamond with more detailed information or a numerical code. The current valid GSH system has been in place since the 1990s. The older system uses similar pictograms in an orange box.

**Globally Harmonized System of Classification and Labeling of Chemicals**



GHS01  
explosive  
substances



GHS02  
flammable  
substances



GHS03  
oxidizing  
substances



GHS04  
gases under  
pressure



GHS05  
corrosive and  
causti  
substances



GHS06  
toxic  
substances



GHS07  
irritants



GHS08  
substances  
hazardous to  
health



GHS09  
substances  
hazardous to  
the  
environment

When transporting substances, the so-called Kemler code is used in Europe, an orange table with an upper line characterizing the behavior of the substance. The lower code indicates the transported substance. According to ADR (European Agreement on the International Carriage of Dangerous Goods by Road), vehicles must be marked with a code and pictograms

## Notes on biological noxes

Biological threats are infections that spread spontaneously, or their misuse or accidents in the laboratory. Natural poisons can also be included here. Highly contagious diseases (HCVs) are characterized by high mortality and contagiousness and limited treatment options. VNN is suspected in patients with a history of travel - for example, a stay in West and Central Africa and in the countries of Southeast and East Asia. Symptoms include:

- sudden onset of fever
- intense weakness
- muscle pain, headache
- diarrhea
- vomiting
- rash
- non-traumatic internal or external bleeding.

## Notes on radiation noxes

Radioactivity affects dividing cells. The most severely damaged is the intestine, blood formation and blood vessels. Vomiting and nausea is an early sign of damage. The onset of vomiting in less than 30 minutes after irradiation indicates a lethal dose, the onset after more than two hours is a manifestation of the slow development of the disease due to radiation - mainly the suppression of hematopoiesis. Depending on the dose, there is also direct damage to the skin. As part of the initial treatment, it is necessary to record in detail the time of onset of prodromal symptoms and their nature, so that it is possible to estimate the dose and set the treatment correctly.

Radioactivity also damages the genetic code and increases the likelihood of developing tumors. These effects can occur even at low doses.

## Notes on explosions

An explosion creates a set of injuries, the so-called Blast syndrome. In the case of intentional, criminal or terrorist acts in connection with explosives, it is necessary to bear in mind the risk of secondary attacks directed at IZS components.

## Links

### related articles

- Biological weapons
- Blast syndrome
- Use of radioactivity
- Radiation sickness

- Antidote for intoxication

## **Zdroj**

E-Learning ZZSHMP

## **References**