



Maritime Health Trainings for Seafarers and Doctors

«Cardiac arrest-drowning and intoxication »

ERASMUS+ KA2 - Cooperation for Innovation and the Exchange of Good Practices
KA202 - Strategic Partnerships for vocational education and training



REPUBLIC OF TURKEY
MINISTRY OF HEALTH
GENERAL DIRECTORATE OF HEALTH
FOR BORDER AND COASTAL AREAS OF TURKEY



AP&A
GROUP

«Cardiac arrest-drowning and intoxication »

✓ Learning Objective;

In this section, it is aimed to give information and explain **immediate actions to be taken about cardiac arrest - drowning and intoxication** emergencies on-board. Upon completion of this section, trainers will be able to:

- Explain what it is cardiac arrest
- Causes of cardiac arrest
- Explain the symptoms of cardiac arrest
- How to treat cardiac arrest urgently
- Identify the chemicals and gases that cause drowning and intoxication on board
- Explain the drowning and intoxication symptoms
- Define the intervention methods in case of drowning and intoxication

Cardiopulmonary Arrest

- **Cardiopulmonary arrest** is an emergency situation which is a sudden cessation of blood circulation and respiration.

Causes of cardiopulmonary arrest

- Airway problems (trauma, foreign body aspiration, infection)
- Respiratory problems (trauma, pulmonary problems)
- Circulation problems (heart attack, arrhythmia, heart valve problems)

CPR

Symptoms of cardiac arrest

- Early symptoms of cardiac arrest are often warning signs.
- Usually there may be no symptoms appeared before cardiac arrest.
- Erratic or non-existent pulse, Not breathing or difficulty in breathing, Loss of consciousness, Faint skinn (Pale skin), Pupil dilatation , no heart beat.

CPR

Cardiopulmonary resuscitation is an emergency lifesaving procedure performed to gain heart beat, spontaneous breathing, normal brain functions back
Basic life support, Advanced Life Support, Post cardiac arrest care, are parts of resuscitation

Basic life support includes basic interventions for arrested person

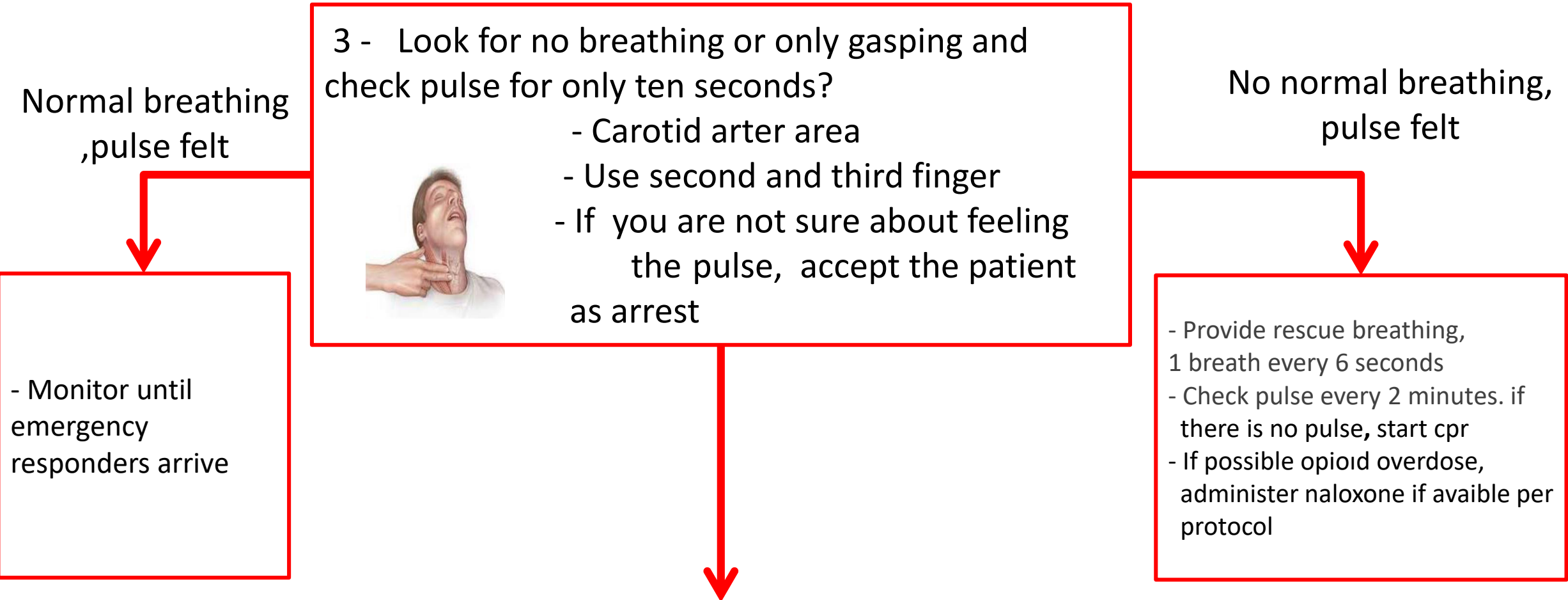
- Early recognition (diagnosis) and prevention
- Activation of emergency response
- High-quality CPR
- Defibrillation (giving heart muscle a direct current with a special electrical machine to make the heart work normally)

CPR - Basic Life Support

- 1 -** Verify/Make sure the scene safety
- 2 -** Check for responsiveness
Shout (Ask) for help nearby
Activate emergency response system
Get AED (automated external defibrillator) and emergency equipment



CPR - Basic Life Support



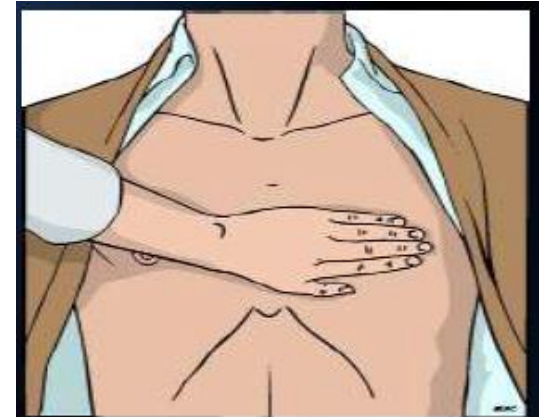
CPR - Basic Life Support

No breathing or only gasping, pulse not felt

4 - **Start CPR**

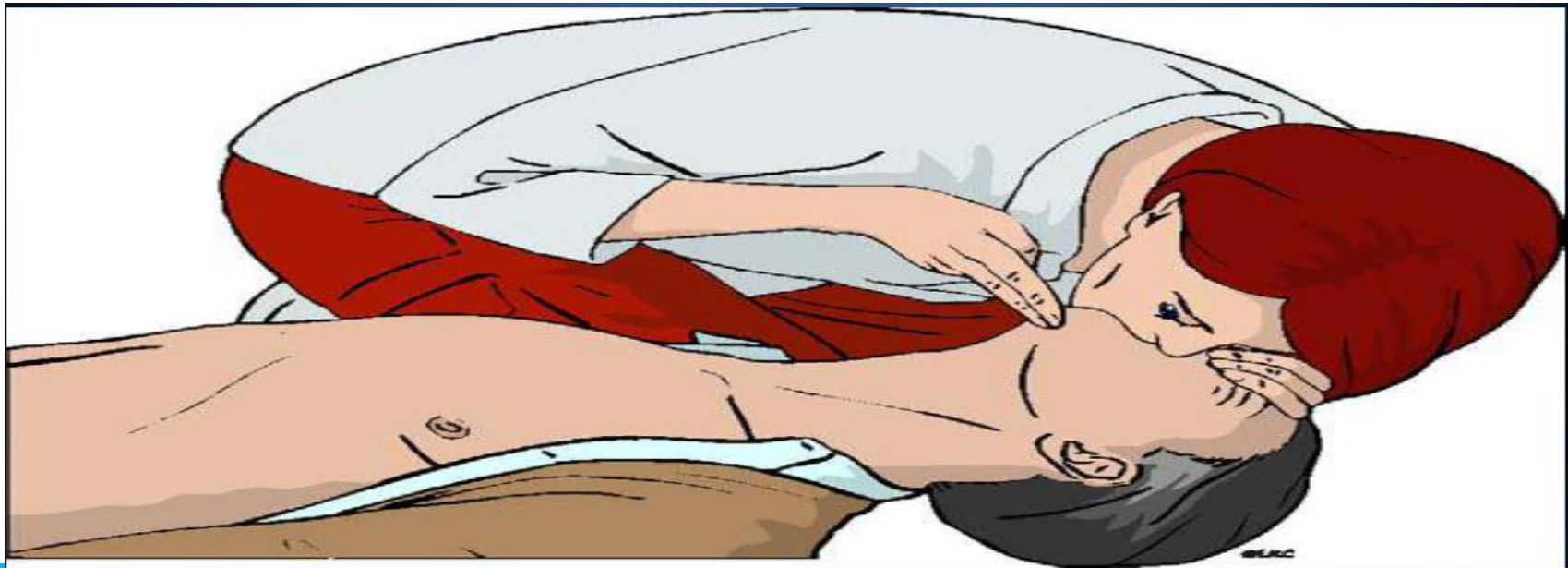
Perform cycles of 30 compressions and 2 breaths

- Place the heel of one hand in the centre of the chest, Place the other hand on its top, Interlock the fingers
- Compress the chest with between 100-120 chest compressions per minute.
- Compressions have to collapse chest minimally 5 cm every time
- Compressions should not be interrupted



CPR - Basic Life Support

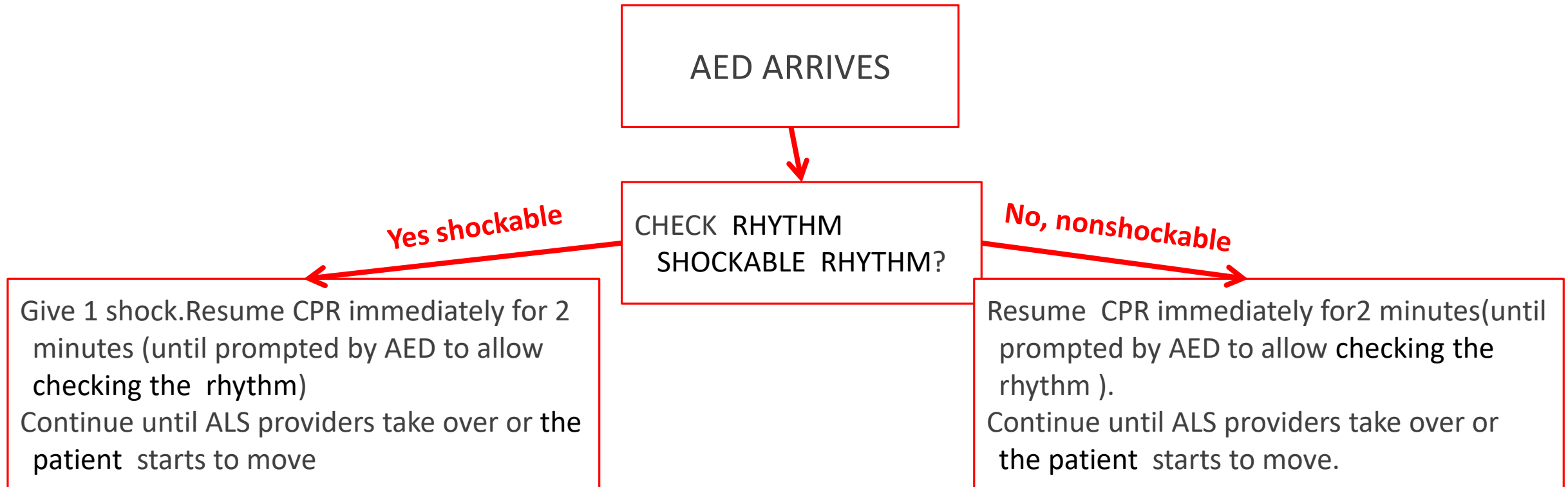
- Mouth to mouth/mouth to nose /using a bag or a mask for rescue breathing
- Take a normal breath(not deep) and give it to the patient for 1 second
- Chest wall must move while giving breath
- Minimal pause to chest compression for giving breath



CPR - Basic Life Support

5 - Try to reach AED (automated external defibrillator)

Follow the given instructions from AED AND CONTINUE CPR



Intoxication from chemicals and gas

- Risk high for people working on board as they may be exposed to gases or vapour that are toxic.



Intoxication from chemicals and gas

✓ Carbon monoxide:

- Carbon monoxide prevents haemoglobin, the oxygen carrying pigment of red blood cells, from releasing its oxygen to the tissues.

CARBON MONOXIDE

How to spot something that's colorless, odorless, and invisible?



Slight Headache
Nausea
Vomiting
Fatigue



Severe Headache
Confusion
Drowsiness
Fast Heart Rate



Unconsciousness
Convulsions
Cardio-respiratory Failure
Death

Intoxication from chemicals and gas

How Does Cyanide Kill?



Immediate Symptoms

Headache
Nausea/vomiting
Dizziness
Rapid heart rate

Symptoms of Longer Exposure

Unconsciousness
Convulsions
Respiratory failure
Coma
Death

Treatment

Get to fresh air
Rapidly wash body with soap and water

Seek medical care
Remove clothing

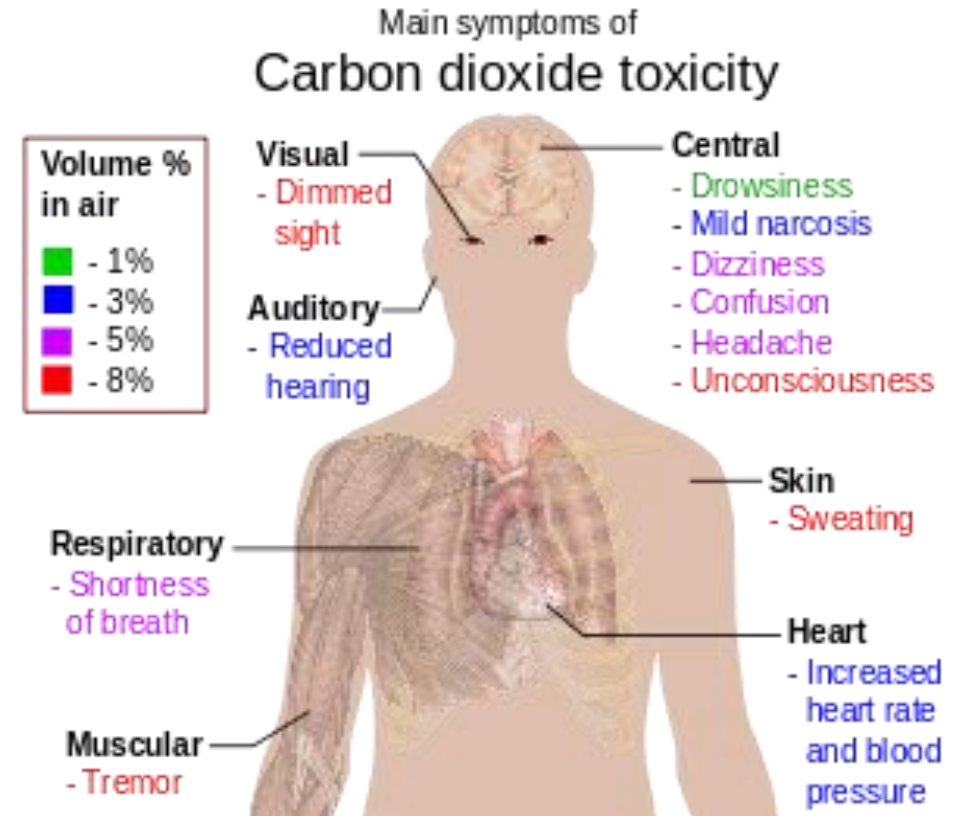
Cyanide:

- Sodium and potassium cyanide are solids, which on contact with acids produce hydrogen cyanide, which is a gas.
- Hydrogen cyanide is lighter than air, accumulates at the top of enclosed spaces, and is rapidly dispersed by adequate ventilation.

Intoxication from chemicals and gas

✓ Carbon dioxide:

- It is not toxic but displaces breathable air from enclosed spaces.
- It is heavier than air and accumulates at the bottom of enclosed spaces.

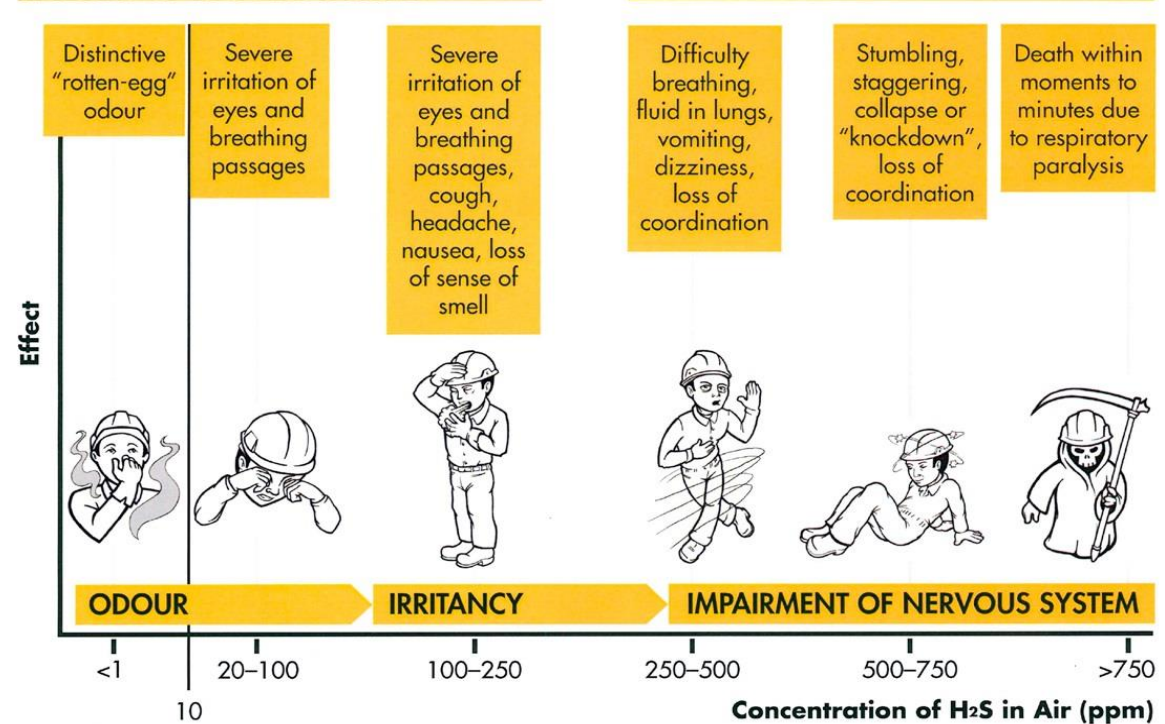


Intoxication from chemicals and gas

✓ Hydrogen sulphide:

- Hydrogen sulphide is produced in oil refining, and from decomposition of organic matter, especially manure.
- It is heavier than air and accumulates at the bottom of holds.
- Hydrogen sulphide is explosive and toxic.

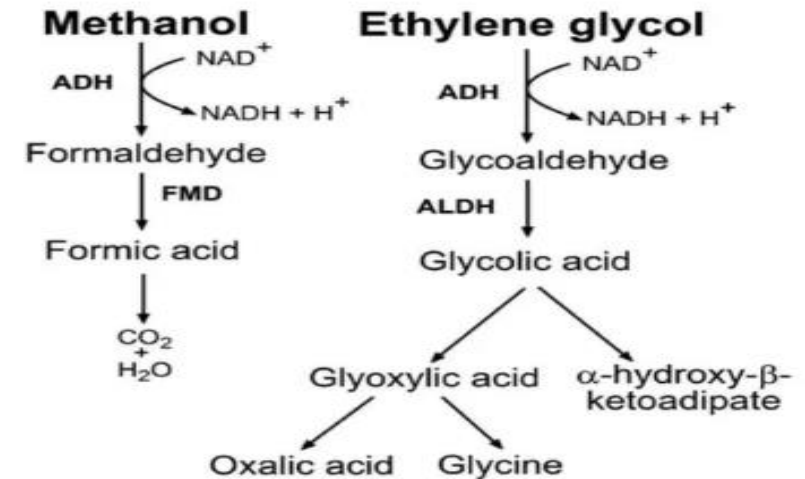
EFFECTS OF H₂S EXPOSURE



Intoxication from chemicals and gas

Methanol and ethylene glycol:

- Methanol and ethylene glycol are used in anti-freeze and de-icing liquids, in some cleaners and solvents, and in illicit alcohol.
- methanol and ethylene glycol cause intoxication similar to that caused by alcohol but they are converted by the body to toxic acids that can cause **blindness** and/or **kidney damage** (in the case of ethylene glycol).



Intoxication from chemicals and gas

✓ Caustics:

- Caustics are strong alkalis, such as sodium or potassium hydroxide (found in drain cleaners), and strong acids, such as sulphuric and phosphoric acid (found in toilet cleaners or battery fluid).

Signs and symptoms:

- Pain in the chest and upper abdomen;
- vomiting, often of blood.



**CAUSTIC
STORAGE TANKS**

<https://www.youtube.com/watch?v=wkngeCJYM0g>

Intoxication from chemicals and gas

✓ **Smoke Inhalation:**

- Smoke is toxic because it contains carbon monoxide and often hydrogen cyanide, as well as other combustion products that are toxic to the lungs.
- **Severe lack of oxygen causes coma and cardiac arrest.**

References

- [1] World Health Organization. (2007). *International medical guide for ships: including the ship's medicine chest*. World Health Organization.
- [2] Schlaich, C., Reinke, A., Savenich, C., Reimer, T., Oldenburg, M., Baur, X., ... & Ioannidis, N. (2009). Guidance to the International Medical Guide for Ships 3 rd edition. *International maritime health*, 74, 328-328.
- [3] *American College of Emergency Physicians, First Aid Manual, 5 th edition (2014)*.
- [4] 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care