



# 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 »

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### ✓ 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

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- **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

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## 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

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**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

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- 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

3 - Look for no breathing or only gasping and check pulse for only ten seconds?

- Carotid arter area
- Use second and third finger
- If you are not sure about feeling the pulse, accept the patient as arrest



Normal breathing  
, pulse felt

- Monitor until emergency responders arrive

No normal breathing,  
pulse felt

- Provide rescue breathing, 1 breath every 6 seconds
- Check pulse every 2 minutes. if there is no pulse, start cpr
- If possible opioid overdose, administer naloxone if available per protocol

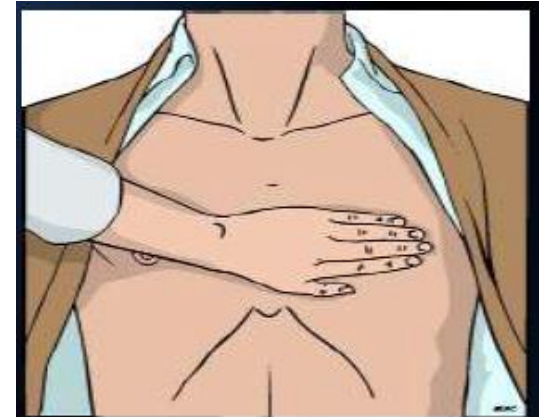
## CPR - Basic Life Support

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

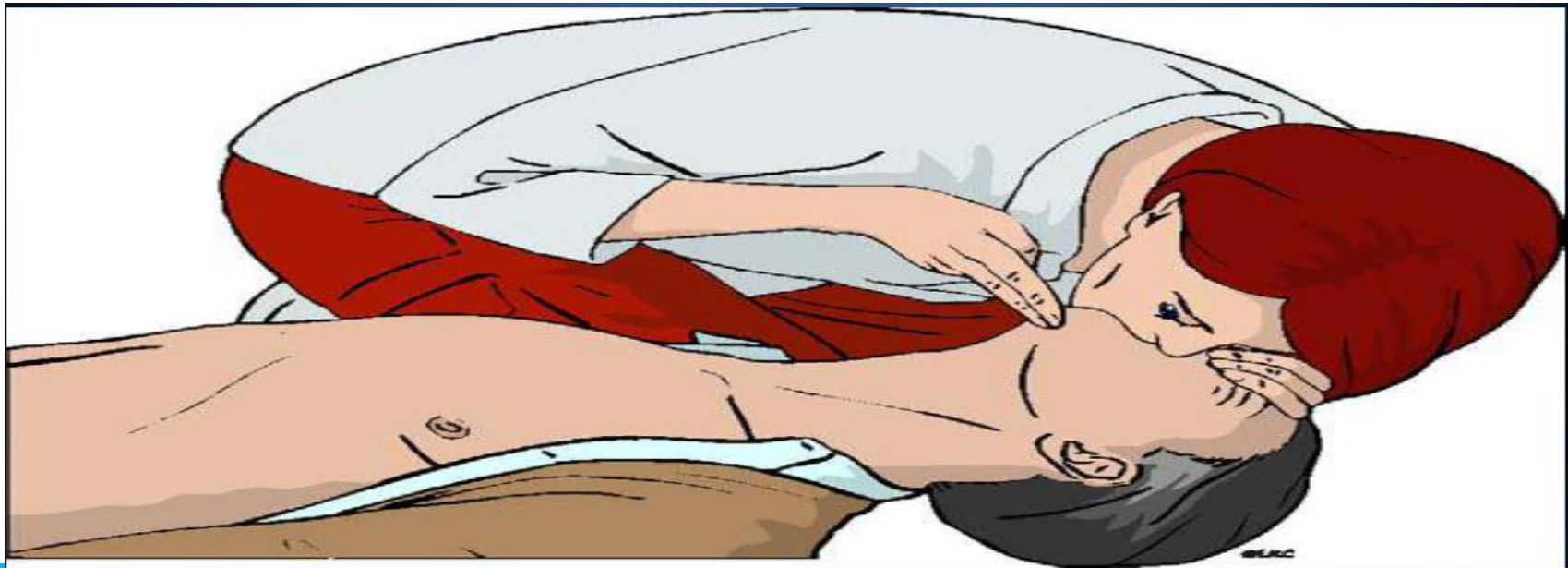




## CPR - Basic Life Support

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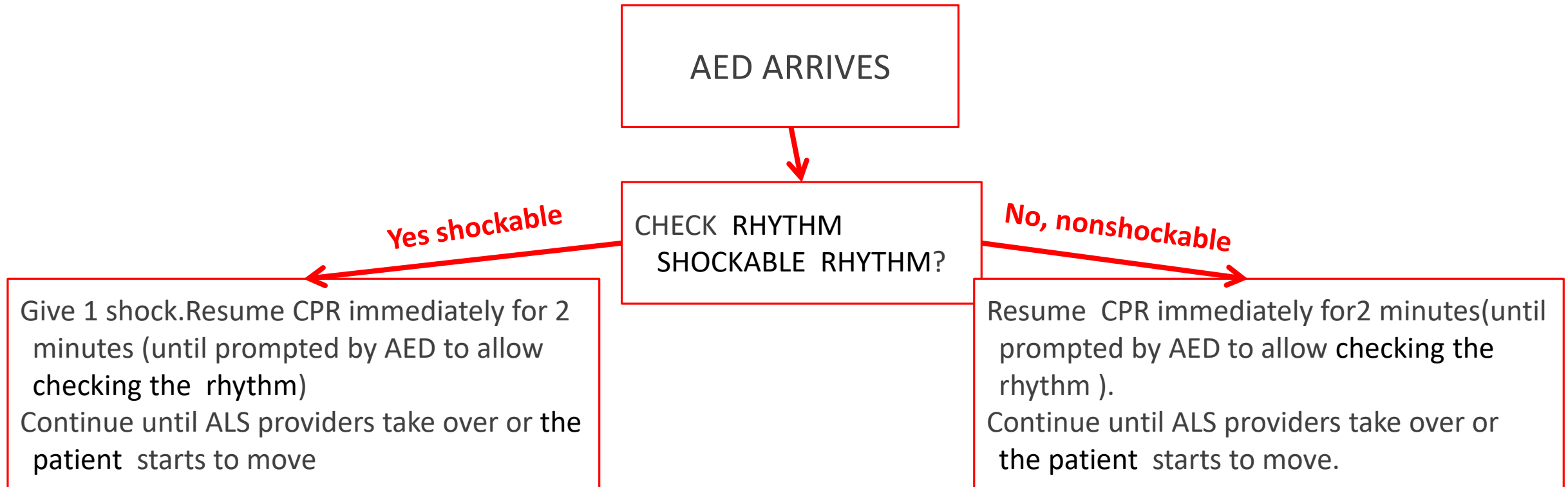
- Mouth to mouth/mouth to nose /using a bag or a mask for rescue breathing
- Take a normal breath(not deep) and give it to the patient for 1 second
- Chest wall must move while giving breath
- Minimal pause to chest compression for giving breath



## 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

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- 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?



<b>Immediate Symptoms</b>	<b>Symptoms of Longer Exposure</b>	
Headache	Unconsciousness	
Nausea/vomiting	Convulsions	
Dizziness	Respiratory failure	
Rapid heart rate	Coma	
	Death	
<b>Treatment</b>		
Get to fresh air	Seek medical care	
Rapidly wash body with soap and water	Remove clothing	

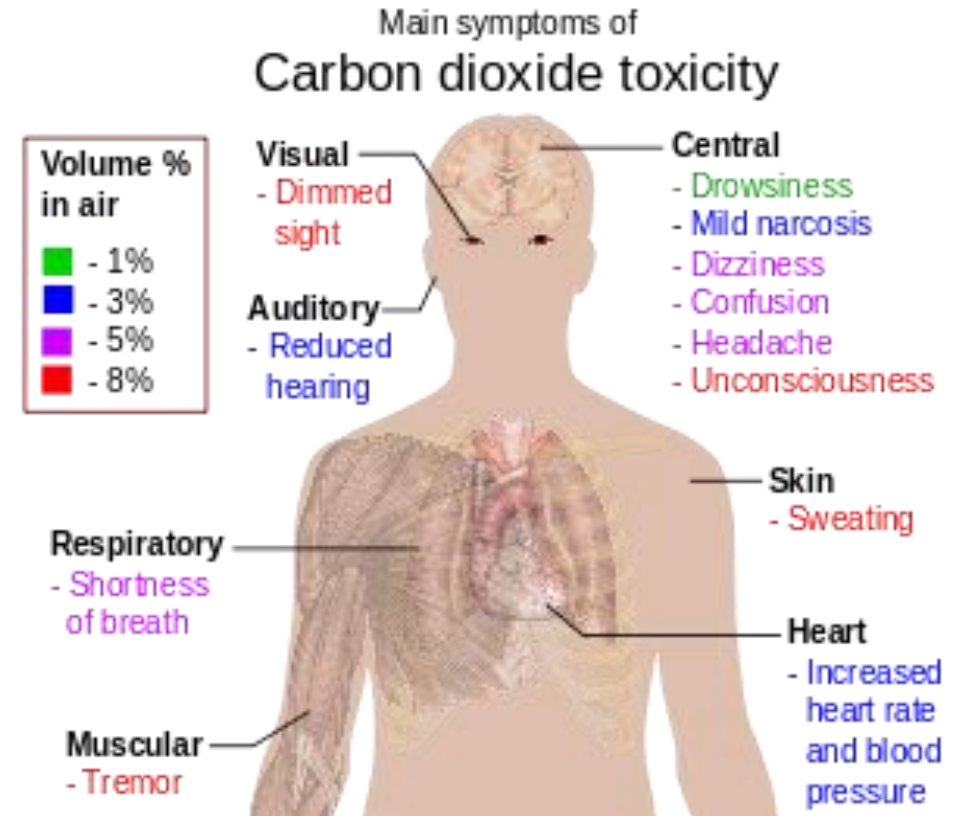
### Cyanide:

- 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.

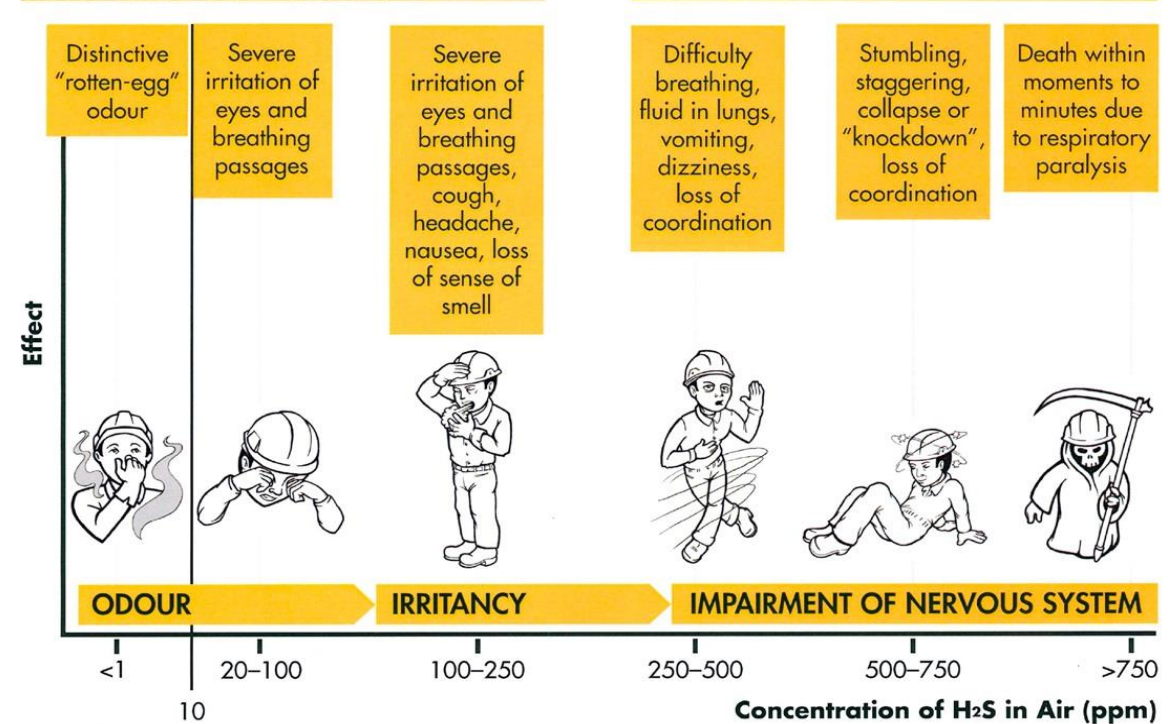


# Intoxication from chemicals and gas

## ✓ 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.

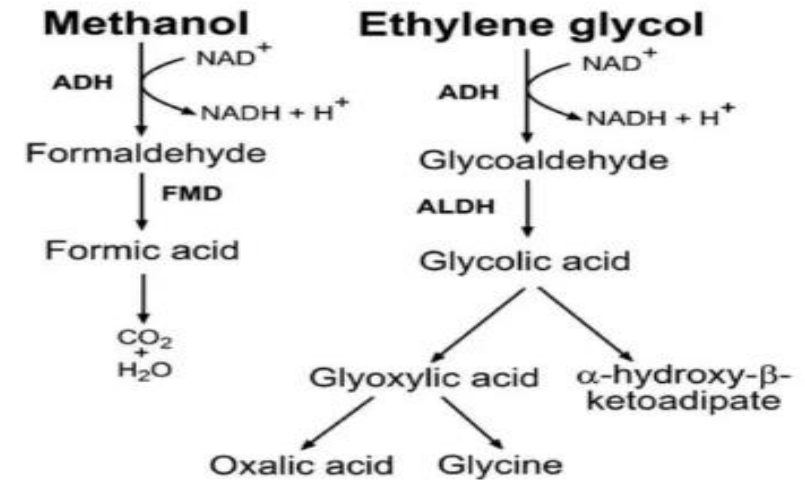
### EFFECTS OF H<sub>2</sub>S EXPOSURE



# 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

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### ✓ 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

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✓ **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

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- [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