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# Chemical Emergency Medical Guideline

## Information and recommendations for first responders and patients

# Phenol

## CAS No.: 108-95-2

**GHS symbols:**

**GHS05**
Corrosive

**GHS06**
Acute toxicity

**GHS08**
Health hazard

**Signal word: Danger**

**Hazard statements:**

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|---|---|
| H301 | Toxic if swallowed. |
| H311 | Toxic in contact with skin. |
| H314 | Causes severe skin burns and serious eye damage. |
| H331 | Toxic if inhaled. |
| H341 | May cause genetic defects. |
| H373 | May cause damage to organs through prolonged or repeated exposure. |

**Overview**

- A patient who is covered in phenol or whose clothing is contaminated with phenol may endanger other people through direct contact or through phenol vapors.
- Phenol is a corrosive chemical that is absorbed very easily and quickly by the body through any route of exposure. Phenol can cause severe damage at the site of exposure as well as systemic poisoning, which can lead to central nervous system disorders, cardiovascular and renal failure.
- Significant local damage can occur even before the patient feels any pain.
- The most important measure to take after skin exposition is to clean the area as quickly as possible by immediately rinsing it thoroughly with water and, if available, decontamination agents containing polyethylene glycol.
- There is no known specific antidote. Treatment depends on the extent of exposure and the symptoms.

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## 1. Information about the substance

Phenol ($C_6H_5OH$), CAS 108-95-2
Synonyms: carbolic acid, hydroxybenzene, phenyl alcohol.
At room temperature, phenol has low vapor pressure and is a clear to slightly pink crystalline solid, a white powder or a viscous liquid. Phenol is highly soluble in alcohol and moderately soluble in water. Phenol has a sweet, pungent odor.
Phenol is obtained by organic synthesis or fractional distillation of coal tar. It is used in the manufacture of a variety of products such as synthetic resins, plastics, photographic chemicals, rubber chemicals and dyes. Phenol is also used as a disinfectant, preservative and in some medical preparations as a local anesthetic or anti-itching agent.

## 2. Exposition

### 2.1. Inhalation

When inhaled, phenol is rapidly absorbed by the lungs and can then have toxic effects throughout the body. However, due to its low volatility, the risk of inhaling phenol at room temperature is limited. The smell of phenol usually provides sufficient warning of dangerous concentrations.

### 2.2. Skin/eye contact

Phenol is particularly dangerous after skin contact. Phenol is absorbed very easily and quickly through the skin and eyes in both vapor and liquid form and can then affect the entire body. If more than 100$cm^2$ of skin is affected, there is an immediate risk of death. Even diluted solutions (<2%) can cause severe burns to the eyes and skin if exposed for a prolonged period.

### 2.3. Ingestion

Accidental ingestion of phenol can quickly cause toxic effects throughout the body. Deaths in adults have been reported after ingesting one gram or more.

## 3. Acute health effects

Phenol can cause chemical burns after contact with skin or eyes, or if it is inhaled or swallowed. It can be absorbed very quickly into the body through the skin, lungs and stomach. Severe exposure can be acutely life-threatening. The brain is very sensitive to phenol. This can lead to seizures, loss of consciousness and respiratory problems. In addition, exposure of the lungs to phenol can lead to fluid accumulation in the lungs. Cardiac arrhythmia and kidney dysfunction are possible in severe cases.

Inhalation can cause irritation, swelling and ulcers in the upper respiratory tract, as well as fluid accumulation in the lungs n.

Phenol can cause severe chemical burns with permanent damage at all points of contact, whether in the mouth, throat, esophagus, skin or eyes.

A single, short-term exposure to low concentrations of phenol, from which the affected person recovers quickly, does not normally cause delayed or lasting damage to health.
In the event of severe exposure, symptoms may continue to develop for more than 12 hours. People who have been severely exposed to phenol may develop permanent damage to the nervous system or kidneys. Chemical burns to the skin, eyes and esophagus can also lead to permanent damage.

## 4. Measures

### 4.1. Self-protection of helpers

If there is a suspicion that the area the helper must enter may be contaminated with phenol vapors or liquid phenol, a self-contained breathing apparatus and a chemical protection suit must be worn. Contaminated equipment should not be used.

A patient who is wet with liquid phenol or whose clothing is wet with liquid phenol may endanger other people through direct contact or through evaporating phenol. When exposed to concentrated phenol vapors, phenol can be absorbed by clothing; appropriate care should be taken when cleaning.

### 4.2. Rescue

Patients should be removed from the danger zone immediately. If they are unable to walk unaided, they should be removed from the danger zone quickly using appropriate means, taking care to protect themselves. The "A, B, C procedure" has absolute priority.

**A) Clear the airways** (check for blockages caused by the tongue or foreign objects)
**B) Ventilation** (check the patient's breathing, if necessary, begin ventilation with adequate self-protection, e.g. breathing mask)
**C) Circulation** (begin resuscitation for any person who does not respond to verbal commands and is not breathing normally)

### 4.3. Cleaning

All patients who have been exposed to phenol must be cleaned immediately. If possible, patients should assist in their own cleaning. After contact of liquid phenol with clothing, it must be removed and securely wrapped.
If the eyes have been exposed to phenol or if there is eye irritation, rinse with water or neutral saline solution for 15 minutes. Remove any contact lenses, if possible, without causing additional danger to the eye. Other important emergency measures must be continued during this time.
In all cases of phenol exposure, rinse affected skin and hair with plenty of water (preferably running water) until polyethylene glycol-based decontamination agents are available. Protect the eyes during rinsing. Repeatedly dab the affected area with swabs soaked in polyethylene glycol for at least 20 minutes. After cleaning with polyethylene glycol, rinse the affected area again with plenty of water for at least 10 minutes. Other important first aid measures must be continued during this time.
If phenol is swallowed, do not induce vomiting. Vomit may contain phenol and thus endanger other people.

### 4.4. Further measures

Anyone who may have been exposed to phenol should seek medical attention immediately.

Patients who are conscious and able to swallow should, if possible, be given 50 g of activated charcoal (or 1 g/kg body weight for children weighing up to 50 kg). Activated charcoal may be administered repeatedly at any time to complete decontamination if there are signs or suspicion of ongoing absorption. For multiple doses, start with the single-dose amount mentioned above, followed by the same dose every four hours or half the dose every two hours. Avoid inhaling the product.

### 4.5. Instructions for further rules of conduct

Consult your family doctor or the emergency department of the nearest hospital if any abnormalities or symptoms occur within the next 24 hours, in particular:

- Breathing difficulties or shortness of breath
- Pain or tightness in the chest, irregular heartbeat
- Increased pain, swelling, redness or abnormalities in the affected skin areas
- Blood in urine (hematuria)

## 5. References

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