

**Trichloroethylene (Cl<sub>2</sub>C=CHCl)**  
**CAS 79-01-6; UN 1710**

Synonyms include acetylene trichloride, ethylene trichloride, ethinyl trichloride, trichloroethene, TCE, and tri.

- **Persons exposed only to trichloroethylene vapor do not pose significant risks of secondary contamination. Persons whose clothing or skin is contaminated with liquid trichloroethylene can cause secondary contamination by direct contact or through off-gassing vapor.**
- **Trichloroethylene is a colorless liquid at room temperature with a somewhat sweet chloroform-like odor and sweet burning taste. It is flammable at high temperatures. At temperatures >600 °F, it forms hydrogen chloride and phosgene, which are serious pulmonary irritants.**
- **When trichloroethylene contacts alkali or thermally decomposes, it may form dichloroacetylene, an explosive and neurotoxic compound. Odor generally provides inadequate warning of hazardous concentrations.**
- **Trichloroethylene is absorbed readily after inhalation and ingestion, and to a lesser extent, through the skin. Trichloroethylene can cross the placenta and has been detected in breast milk.**

**Description**

At room temperature, trichloroethylene is a clear, colorless liquid with a sweet, chloroform-like odor. It is volatile, producing potentially toxic concentrations at room temperature. It is nearly insoluble in water, but miscible with most organic solvents. Industrial grade trichloroethylene contains small amounts of stabilizers (0.1% by weight) such as epichlorohydrin, which may increase the irritant effects. At elevated temperatures and in the presence of alkali, trichloroethylene may form more toxic compounds such as phosgene, a serious pulmonary irritant, or dichloroacetylene, a neurotoxin. Since trichloroethylene decomposes photolytically, it should be stored in cans or dark glass bottles to minimize decomposition. Storage areas should be cool, well ventilated, flame-proof, and shielded from direct sunlight, high-temperature surfaces, or sparks.

**Routes of Exposure**

*Inhalation*

Trichloroethylene vapor is readily absorbed from the lungs, and inhalation is the main route of exposure. The recognition odor threshold of trichloroethylene is 110 ppm which is slightly higher than the OSHA PEL (100 ppm); thus, **odor generally provides an inadequate indication of hazardous concentrations.** Trichloroethylene is heavier than air and may cause asphyxiation in poorly ventilated or enclosed spaces and in low-lying areas.

Children exposed to the same levels of trichloroethylene vapor as adults may receive a larger dose because they have greater lung surface area:body weight ratios and increased minute volumes:weight ratios. In addition, they may be exposed to higher levels than adults in the same location because of their short stature and the higher levels of trichloroethylene vapor found nearer to the ground.

*Skin/Eye Contact*

Exposure to liquid trichloroethylene can result in skin irritation and minor corneal injury. Trichloroethylene is absorbed through intact skin, although not in quantities sufficient to cause systemic toxicity.

Children are more vulnerable to toxicants affecting the skin because of their relatively larger surface area:body weight ratio.

*Ingestion*

Gastrointestinal absorption is rapid and substantial. Ingestion can produce significant CNS depression. Pulmonary aspiration can cause chemical pneumonitis.

**Sources/Uses**

Trichloroethylene is manufactured either by oxychlorination of ethylene dichloride or by direct chlorination of ethylene dichloride.

Trichloroethylene has wide use as a metal degreasing agent. It is a common ingredient in cleaning agents, paints, adhesives, varnishes, and inks. In the past, it was used as a dry cleaning agent and for food extractions such as removal of caffeine from coffee. It also had limited use as an analgesic and an anesthetic agent, but is no longer used for these purposes because it is now recognized as a potential human carcinogen.

**Standards and Guidelines**

OSHA PEL (permissible exposure limit) = 100 ppm (averaged over an 8-hour workshift)

OSHA ceiling = 200 ppm

OSHA STEL (short-term exposure limit) = 300 ppm (5-minute exposure in any 2 hours)

NIOSH IDLH (immediately dangerous to life or health) = 1,000 ppm

AIHA ERPG-2 (emergency response planning guideline) (maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health

effects or symptoms which could impair an individual's ability to take protective action) = 500 ppm.

### **Physical Properties**

*Description:* Clear, colorless liquid with a chloroform-like odor.

*Warning properties:* Inadequate; chloroform-like odor at 110 ppm.

*Molecular weight:* 131.4 daltons

*Boiling point* (760 mm Hg): 189 °F (87 °C)

*Freezing point:* -99 °F (-73 °C)

*Specific gravity:* 1.46 at 68 °F (20 °C) (water = 1)

*Vapor pressure:* 58 mm Hg at 68 °F (20 °C)

*Gas density:* 4.53 (air = 1)

*Water solubility:* minimal; 0.1% at 77 °F (25 °C)

*Flammability:* Flammable liquid that does not burn easily; at temperatures >600 °F (316 °C), it forms hydrogen chloride and phosgene.

*Flammable range:* 8% to 10.5 % (concentration in air)

### **Incompatibilities**

Trichloroethylene reacts with strong alkalies and chemically active metals such as barium, lithium, sodium, magnesium, titanium, and beryllium.



## Health Effects

**Trichloroethylene is a mild skin, eye, and respiratory tract irritant. Inhalation or ingestion of trichloroethylene can produce CNS effects including headache, dizziness, lack of coordination, stupor, and coma. Respiratory depression or cardiac dysrhythmia from high-level exposures can result in death. Other effects of acute exposure include hypotension, nausea, vomiting, and diarrhea.**

**Trichloroethylene sensitizes the heart to epinephrine, making it more susceptible to epinephrine-induced arrhythmias. Trichloroethylene can cross the placenta and has been detected in breast milk.**

### Acute Exposure

Trichloroethylene is thought to depress the CNS via a solvent effect on lipids and protein components of neural membranes. It sensitizes the heart to epinephrine, making it more susceptible to epinephrine-induced arrhythmias. Direct exposure to liquid trichloroethylene degrades the skin, causing redness, blistering, and scaling. Trichloroethylene can cause respiratory and CNS depression and abnormal heart rhythm. Death may result from respiratory depression. Liver necrosis has been reported for some people exposed to fatal levels of trichloroethylene, but individuals exposed to trichloroethylene as an anesthetic showed only minimal effects on liver function.

Children do not always respond to chemicals in the same way that adults do. Different protocols for managing their care may be needed.

### CNS

Trichloroethylene exposure causes concentration-related CNS effects. In the past, concentrations as high as 5,000 to 20,000 ppm were used to produce light-to moderate surgical anesthesia. Typical symptoms of exposure to lower levels of trichloroethylene (>500 ppm) include excitation, lightheadedness, headache, nausea, incoordination, and impaired ability to concentrate. At higher doses (>1,000 ppm), lack of muscle tone, decreased deep-tendon reflexes, drowsiness, dizziness, impaired gait, and stupor may develop. Death may result from respiratory depression.

### Peripheral Neurologic

In a few cases, trichloroethylene exposure has been associated with peripheral and cranial nerve damage. A decomposition product of trichloroethylene, dichloroacetylene, is neurotoxic and may be responsible for the cranial nerve effects.

*Cardiovascular* At near anesthetic levels of exposure, trichloroethylene may cause acute cardiovascular effects including decreased contraction of the heart's muscle fibers, disordered electrical conduction, and lowered threshold of the heart to the effects of epinephrine, potentially disrupting the heartbeat. Trichloroethylene can also cause blood vessel dilation and low blood pressure.

*Respiratory* Trichloroethylene is a mild irritant to the lungs and respiratory tract; however, its thermal breakdown products, phosgene and hydrogen chloride, are severe pulmonary irritants, and phosgene is a suffocating agent. Accumulation of fluid in the lungs has been reported after severe trichloroethylene exposure; the exact role of trichloroethylene breakdown products is unknown.

Children may be more vulnerable because of relatively increased minute ventilation per kg and failure to evacuate an area promptly when exposed.

Hydrocarbon pneumonitis may be a problem in children.

*Hepatic* Liver toxicity can occur after prolonged inhalation of high concentrations of trichloroethylene. Ingestion of alcohol may increase this risk. However, liver effects have not been reported in acute-duration human exposure studies, although some older case reports have provided limited evidence of liver damage.

*Renal* Kidney effects have not been reported for acute-duration human exposure studies, although some older case reports have provided limited evidence of kidney damage. Minor changes in indicators of renal function have been reported for some workers occupationally exposed to trichloroethylene.

*Dermal* Liquid trichloroethylene can irritate the skin. When in prolonged contact with the skin, as under tight-fitting clothing or shoes, trichloroethylene can cause chemical burns. Exfoliative dermatitis and erythema have also been reported after 2 to 5 weeks exposure to trichloroethylene. Trichloroethylene inhalation in combination with alcohol ingestion may cause a red, blotchy appearance of the face and upper portion of the body, commonly referred to as "degreaser's flush."

Because of their relatively larger surface area:body weight ratio, children are more vulnerable to toxicants affecting the skin.

*Ocular* Trichloroethylene splashed in the eye produces pain and transient eye injury with complete recovery in a few days. Exposure to high concentrations of vapor may also cause these effects.

*Potential Sequelae* Some survivors of ingestion or severe inhalation exposure have experienced chronic nerve disorders. Inflammation of the nerves of the eye and blindness have been reported after ingestion.

**Chronic Exposure** Chronic exposure has been reported to be associated with damage to the cranial nerves and neurological effects such as memory loss and impaired cognitive function. However, these studies did not have accurate exposure data and individuals were often exposed to mixtures of chemicals. Prolonged or repeated application of trichloroethylene to skin causes degreasing and inflammation of the skin (i.e., contact dermatitis and exfoliative dermatitis). Diffuse fasciitis with eosinophilia and symptoms of systemic lupus erythematosus have been reported with chronic exposure (HSDB, 2014).

Chronic exposure may be more serious for children because of their potential longer latency period.

*Carcinogenicity* The DHHS is currently reviewing the classification of trichloroethylene; the NTP Board Subcommittee has recommended that it be listed as “reasonably anticipated to be a human carcinogen.” The International Agency for Research on Cancer has determined that trichloroethylene is probably carcinogenic to humans (Group 2A).

*Reproductive and Developmental Effects* Trichloroethylene is not included in *Reproductive and Developmental Toxicants*, a 1991 report published by the U.S. General Accounting Office (GAO) that lists 30 chemicals of concern because of widely acknowledged reproductive and developmental consequences. Trichloroethylene readily crosses the placenta and is found in fetal blood at levels comparable to those of the mother. Evidence that acute trichloroethylene exposure causes reproductive or developmental toxicity in humans is inconclusive. There have been some reports suggesting an increased incidence of birth defects in children whose mothers were chronically exposed to trichloroethylene in drinking water, but these studies are limited by several factors including poor exposure data and small study populations.





## Prehospital Management

**Victims exposed only to trichloroethylene vapor do not pose secondary contamination risks to rescuers. Victims whose clothing or skin is contaminated with liquid trichloroethylene can secondarily contaminate response personnel by direct contact or through off-gassing vapor. Trichloroethylene vapor may also off-gas from the vomitus of victims who have ingested trichloroethylene.**

**Trichloroethylene is a mild to severe skin, eye, and respiratory-tract irritant. Acute exposure can cause CNS and respiratory depression and cardiac dysrhythmias by inhalation or ingestion. Other effects include hypotension, nausea, vomiting, and diarrhea.**

**There is no antidote for trichloroethylene poisoning. Treatment consists of support of respiratory and cardiovascular functions.**

### **Hot Zone**

Rescuers should be trained and appropriately attired before entering the Hot Zone. If the proper equipment is not available, or if rescuers have not been trained in its use, assistance should be obtained from a local or regional HAZMAT team or other properly equipped response organization.

### *Rescuer Protection*

Trichloroethylene vapor is absorbed well by inhalation and is a mild respiratory-tract irritant. The liquid is a mild skin irritant with slow skin absorption.

*Respiratory Protection:* Positive-pressure, self-contained breathing apparatus (SCBA) is recommended in response situations that involve exposure to potentially unsafe levels of trichloroethylene vapor.

*Skin Protection:* Chemical-protective clothing is not generally required when only vapor exposure is expected because trichloroethylene vapor is neither irritating nor absorbed well through the skin. Chemical protective clothing is recommended when repeated or prolonged contact with the liquid is anticipated because skin irritation and dermal absorption may occur.

### *ABC Reminders*

Quickly access for a patent airway, ensure adequate respiration and pulse. If trauma is suspected, maintain cervical immobilization manually and apply a cervical collar and a backboard when feasible.

*Victim Removal*

If victims can walk, lead them out of the Hot Zone to the Decontamination Zone. Victims who are unable to walk may be removed on backboards or gurneys; if these are not available, carefully carry or drag victims to safety.

Consider appropriate management of chemically contaminated children, such as measures to reduce separation anxiety if a child is separated from a parent or other adult.

Care should be taken that victims (particularly children) do not have problems due to trichloroethylene being heavier than air and settling in pockets close to the ground.

**Decontamination Zone**

Patients exposed only to trichloroethylene vapor who have no skin or eye irritation may be transferred immediately to the Support Zone. Other patients will require decontamination as described below.

*Rescuer Protection*

If exposure levels are determined to be safe, decontamination may be conducted by personnel wearing a lower level of protection than that worn in the Hot Zone (described above).

*ABC Reminders*

Quickly access for a patent airway, ensure adequate respiration and pulse. Stabilize the cervical spine with a collar and a backboard if trauma is suspected. Administer supplemental oxygen as required. Assist ventilation with a bag-valve-mask device if necessary.

*Basic Decontamination*

Victims who are able may assist with their own decontamination. Quickly remove and double-bag contaminated clothing and personal belongings.

Flush exposed skin and hair with water for 3 to 5 minutes. Wash with mild soap and water (preferably under a shower). Rinse thoroughly with water. Use caution to avoid hypothermia when decontaminating children or the elderly. Use blankets or warmers when appropriate.

Irrigate exposed or irritated eyes with plain water or saline for 15 to 20 minutes. Remove contact lenses if easily removable without additional trauma to the eye. If a corrosive material is suspected or if pain or injury is evident, continue irrigation while transferring the victim to the Support Zone.

In cases of ingestion, **do not induce emesis**. If the victim is alert, asymptomatic, and has a gag reflex, administer a slurry of activated charcoal at 1 gm/kg (usual adult dose 60–90 g, child dose 25–50 g).

A soda can and straw may be of assistance when offering charcoal to a child. The efficacy of activated charcoal has not been demonstrated for trichloroethylene, but it may be of assistance, particularly in cases of mixed ingestion.

Consider appropriate management of chemically contaminated children at the exposure site. Provide reassurance to the child during decontamination, especially if separation from a parent occurs.

*Transfer to Support Zone*

As soon as basic decontamination is complete, move the victim to the Support Zone.

**Support Zone**

Be certain that victims have been decontaminated properly (see *Decontamination Zone* above). Victims who have undergone decontamination or have been exposed only to vapor generally pose no serious risks of secondary contamination. In such cases, Support Zone personnel require no specialized protective gear.

*ABC Reminders*

Quickly access for a patent airway. If trauma is suspected, maintain cervical immobilization manually and apply a cervical collar and a backboard when feasible. Ensure adequate respiration and pulse. Administer supplemental oxygen as required and establish intravenous access if necessary. Place on a cardiac monitor.

*Additional Decontamination*

Continue irrigating exposed skin and eyes, as appropriate.

In cases of ingestion, **do not induce emesis**. If the victim is alert, asymptomatic, and has a gag reflex, administer a slurry of activated charcoal at 1 gm/kg (usual adult dose 60–90 g, child dose 25–50 g), if it has not been administered previously. A soda can and straw may be of assistance when offering charcoal to a child. The efficacy of activated charcoal has not been demonstrated for trichloroethylene, but it may be of assistance, particularly in cases of mixed ingestion.

*Advanced Treatment*

In cases of respiratory compromise secure airway and respiration via endotracheal intubation. If not possible, perform cricothyroidotomy if equipped and trained to do so.

Patients who have bronchospasm may be treated with aerosolized bronchodilators. However, the use of sympathomimetic agents such as epinephrine and isoproterenol could precipitate fatal dysrhythmias and should be avoided. Selective beta-2 agonists would be preferred, but clinical reports of their use are lacking. Theophylline derivatives have not been studied. Use all catecholamines with caution because of the enhanced risk of cardiac dysrhythmias. Also

consider the health of the myocardium before choosing which type of bronchodilator should be administered.

Patients who are comatose, hypotensive, or having seizures or cardiac arrhythmias should be treated according to advanced life support (ALS) protocols.

#### *Transport to Medical Facility*

Only decontaminated patients or patients not requiring decontamination should be transported to a medical facility. "Body bags" are not recommended.

Report to the base station and the receiving medical facility the condition of the patient, treatment given, and estimated time of arrival at the medical facility.

If trichloroethylene has been ingested, prepare the ambulance in case the victim vomits toxic material. Have ready several towels and open plastic bags to quickly clean up and isolate vomitus.

#### **Multi-Casualty Triage**

Consult with the base station physician or the regional poison control center for advice regarding triage of multiple victims.

Patients with evidence of significant inhalation exposure such as CNS disruption, breathing difficulties, or cardiac dysrhythmia and patients who ingested trichloroethylene should be transported to a medical facility for evaluation. Others may be discharged from the scene after their names, addresses, and telephone numbers are recorded. Those discharged should be advised to seek medical care promptly if symptoms develop (see *Patient Information Sheet* below).

## Emergency Department Management

**Patients exposed only to trichloroethylene vapor do not pose secondary contamination risks to hospital personnel. Patients whose clothing or skin is contaminated with liquid trichloroethylene can secondarily contaminate response personnel by direct contact or through off-gassing vapor. Toxic vomitus from patients who have ingested trichloroethylene may also off-gas the solvent.**

**Trichloroethylene is a mild skin, eye, and respiratory-tract irritant. Acute exposures can cause CNS and respiratory depression and cardiac dysrhythmias by inhalation or ingestion. Other effects include hypotension, nausea, vomiting, and diarrhea.**

**There is no antidote for trichloroethylene poisoning. Treatment consists of support of respiratory and cardiovascular functions.**

### Decontamination Area

Unless previously decontaminated, all patients suspected of contact with liquid trichloroethylene and all victims with skin or eye irritation require decontamination as described below. All other patients may be transferred to the Critical Care area.

Be aware that use of protective equipment by the provider may cause fear in children, resulting in decreased compliance with further management efforts.

Because of their relatively larger surface area:body weight ratio, children are more vulnerable to toxicants affecting the skin. Also, emergency room personnel should examine children's mouths because of the frequency of hand-to-mouth activity among children.

### *ABC Reminders*

Evaluate and support airway, breathing, and circulation. In cases of respiratory compromise secure airway and respiration via endotracheal intubation. If not possible, surgically create an airway.

Patients who have bronchospasm may be treated with aerosolized bronchodilators. However, the use of sympathomimetic agents such as epinephrine and isoproterenol could precipitate fatal dysrhythmias and should be avoided. Selective beta-2 agonists would be preferred, but clinical reports of their use are lacking. Theophylline derivatives have not been studied. Use all catecholamines with caution because of the enhanced risk of cardiac dysrhythmias. Also consider the health of the myocardium before choosing which type of bronchodilator should be administered.

Patients who are comatose, hypotensive, or have seizures or ventricular arrhythmias should be treated in the conventional manner.

### *Basic Decontamination*

Patients who are able may assist with their own decontamination. Remove and double-bag contaminated clothing and personal belongings.

Flush exposed skin and hair with water for 3 to 5 minutes. Wash with mild soap and water (preferably under a shower). Rinse thoroughly with water. Use caution to avoid hypothermia when decontaminating children or the elderly. Use blankets or warmers when appropriate.

Flush exposed eyes with plain water or saline for 15 to 20 minutes. Remove contact lenses if easily removable without additional trauma to the eye.

In cases of ingestion, **do not induce emesis**. If the victim is alert, asymptomatic, and has a gag reflex, administer a slurry of activated charcoal at 1 gm/kg (usual adult dose 60–90 g, child dose 25–50 g), if it has not been administered previously. A soda can and straw may be of assistance when offering charcoal to a child. The efficacy of activated charcoal has not been demonstrated for trichloroethylene, but it may be of assistance, particularly in cases of mixed ingestion.

### **Critical Care Area**

Be certain that appropriate decontamination has been carried out (see *Decontamination Area* above).

#### *ABC Reminders*

Evaluate and support airway, breathing, and circulation as in *ABC Reminders* above. Establish intravenous access in seriously symptomatic patients if this has not been done previously. Continuously monitor cardiac rhythm.

Patients who are comatose, hypotensive, or have seizures or ventricular arrhythmias should be treated in the conventional manner. Avoid sympathomimetics or catecholamines or use them with caution. Beta-blockers may be more effective than lidocaine in cases of prolonged or resistant dysrhythmias.

#### *Inhalation Exposure*

Administer supplemental oxygen by mask to patients who have respiratory complaints. Patients who have bronchospasm may be treated with aerosolized bronchodilators. However, the use of sympathomimetic agents such as epinephrine and isoproterenol could precipitate fatal dysrhythmias and should be avoided.

Selective beta-2 agonists would be preferred, but clinical reports of their use are lacking. Theophylline derivatives have not been studied. Use all catecholamines with caution because of the enhanced risk of cardiac dysrhythmias. Also consider the health of the myocardium before choosing which type of bronchodilator should be administered.

*Skin Exposure*

If the skin was in prolonged contact with liquid trichloroethylene, chemical burns may result; treat as thermal burns.

Because of their relatively larger surface area:body weight ratio, children are more vulnerable to toxicants affecting the skin.

*Eye Exposure*

Ensure that adequate eye irrigation has been completed. Examine the eyes for corneal damage and treat appropriately. Immediately consult an ophthalmologist for patients who have corneal injuries.

*Ingestion*

**Do not induce emesis.**

If the victim is alert, asymptomatic, and has a gag reflex, administer a slurry of activated charcoal at 1 gm/kg (usual adult dose 60–90 g, child dose 25–50 g), if it has not been administered previously. A soda can and straw may be of assistance when offering charcoal to a child. The efficacy of activated charcoal has not been demonstrated for trichloroethylene, but it may be of assistance, particularly in cases of mixed ingestion.

Consider endoscopy to evaluate the extent of gastrointestinal-tract injury. Extreme throat swelling may require endotracheal intubation or cricothyroidotomy. Gastric lavage is useful in certain circumstances to remove toxic material and prepare for endoscopic examination. Consider gastric lavage with a small nasogastric tube if: (1) a large dose has been ingested; (2) the patient's condition is evaluated within 30 minutes; (3) the patient has oral lesions or persistent esophageal discomfort; and (4) the lavage can be administered within one hour of ingestion. Care must be taken when placing the gastric tube because blind gastric-tube placement may further injure the chemically damaged esophagus or stomach.

Because children do not ingest large amounts of toxic materials, and because of the risk of perforation from nasogastric intubation, lavage is discouraged in children unless performed under endoscopic guidance.

Toxic vomitus or gastric washings should be isolated (e.g., by attaching the lavage tube to isolated wall suction or another closed container).

*Antidotes and  
Other Treatments*

There is no antidote for trichloroethylene poisoning. Treatment is supportive of respiratory and cardiovascular functions.

*Laboratory Test*

The diagnosis of acute trichloroethylene toxicity is primarily clinical, based on symptoms of CNS disruption or respiratory distress. However, laboratory testing is useful for monitoring the patient and evaluating complications. Routine laboratory studies for all exposed patients include CBC, glucose, and electrolyte determinations. Additional studies for patients exposed to trichloroethylene include renal-function and liver-function tests. Patients who have respiratory complaints should be evaluated with pulse oximetry (or ABG measurements) and chest radiography.

Trichloroethylene blood or plasma levels are not clinically useful but may be used as a qualitative index to document an exposure. Exposure to trichloroethylene is also suggested by detection of trichloroacetic acid or trichloroethanol in blood or urine; however, these tests are not specific for trichloroethylene.

**Disposition and  
Follow-up**

Consider hospitalizing patients who have had significant inhalation exposure (e.g., with loss of consciousness) and patients who have ingested significant amounts of trichloroethylene.

*Delayed Effects*

Development of cardiac dysrhythmia may be delayed for 12 to 24 hours after exposure.

*Patient Release*

Patients who have not experienced alterations in mental status or cardiac dysrhythmia, or who had initially mild symptoms and are asymptomatic 12 to 24 hours later may be discharged. Discharged patients should be instructed to seek medical care promptly if symptoms develop (see *Trichloroethylene—Patient Information Sheet* below).

*Follow-up*

Obtain the name of the patient's primary care physician so that the hospital can send a copy of the ED visit to the patient's doctor.

Neurologic examination for post-hypoxic injury is recommended in cases of severe exposure.

**Reporting**

If a work-related incident has occurred, you may be legally required to file a report; contact your state or local health department.

Other persons may still be at risk in the setting where this incident occurred. If the incident occurred in the workplace, discussing it



with company personnel may prevent future incidents. If a public health risk exists, notify your state or local health department or other responsible public agency. When appropriate, inform patients that they may request an evaluation of their workplace from OSHA or NIOSH. See Appendices III and IV for a list of agencies that may be of assistance.



## **Trichloroethylene Patient Information Sheet**

This handout provides information and follow-up instructions for persons who have been exposed to trichloroethylene.

### **What is trichloroethylene?**

Trichloroethylene is a colorless liquid with a sweet, chloroform-like smell. It is volatile and flammable, but does not burn easily. Trichloroethylene is used to degrease metal parts and to dry clean fabric. It is also used as a solvent in printing inks, paints, lacquers, varnishes, and adhesives.

### **What immediate health effects can be caused by exposure to trichloroethylene?**

At high levels of exposure, trichloroethylene can cause dizziness, blurred vision, a feeling of excitement, nausea, and vomiting. Breathing very high levels can cause irregular heartbeat, fainting, brain damage, and even death. If the skin has been in contact with trichloroethylene for a long time, skin rash or chemical burns may result. Generally, the more serious the exposure, the more severe the symptoms.

### **Can trichloroethylene poisoning be treated?**

There is no antidote for trichloroethylene poisoning. Patients who have swallowed or inhaled large amounts of trichloroethylene need to be hospitalized. Most patients get completely well.

### **Are any future health effects likely to occur?**

A single small exposure from which a person recovers quickly is not likely to cause delayed or long-term effects. After a serious exposure or many exposures, damage to the nerves can occur. Fatigue, memory loss, headache, confusion, and depression have been reported by workers using trichloroethylene for long periods at their jobs. Trichloroethylene is believed to be a human carcinogen.

### **What tests can be done if a person has been exposed to trichloroethylene?**

Specific tests for the presence of trichloroethylene breakdown products in blood and urine generally are not useful to the doctor. If a severe exposure has occurred, blood and urine analyses and other tests may show whether the nerves, heart, lungs, liver, or kidneys have been damaged. Testing is not needed in every case.

### **Where can more information about trichloroethylene be found?**

More information about trichloroethylene can be obtained from your regional poison control center; your state, county, or local health department; the Agency for Toxic Substances and Disease Registry (ATSDR); your doctor; or a clinic in your area that specializes in occupational and environmental health. If the exposure happened at work, you may wish to discuss it with your employer, the Occupational Safety and Health Administration (OSHA), or the National Institute for Occupational Safety and Health (NIOSH). Ask the person who gave you this form for help in locating these telephone numbers.

## Follow-up Instructions

Keep this page and take it with you to your next appointment. Follow *only* the instructions checked below.

- Call your doctor or the Emergency Department if you develop any unusual signs or symptoms within the next 24 hours, especially:
- coughing, wheezing, or shortness of breath
  - dizziness or distorted perceptions
  - nausea or diarrhea
  - increased pain or a discharge from your eyes
  - increased redness or pain or a pus-like discharge in the area of a skin burn
- No follow-up appointment is necessary unless you develop any of the symptoms listed above.
- Call for an appointment with Dr. \_\_\_\_\_ in the practice of \_\_\_\_\_.  
When you call for your appointment, please say that you were treated in the Emergency Department at \_\_\_\_\_ Hospital by \_\_\_\_\_ and were advised to be seen again in \_\_\_\_\_ days.
- Return to the Emergency Department/ \_\_\_\_\_ Clinic on (date) \_\_\_\_\_ at \_\_\_\_\_ AM/PM for a follow-up examination.
- Do not perform vigorous physical activities for 1 to 2 days.
- You may resume everyday activities including driving and operating machinery.
- Do not return to work for \_\_\_\_\_ days.
- You may return to work on a limited basis. See instructions below.
- Avoid exposure to cigarette smoke for 72 hours; smoke may worsen the condition of your lungs.
- Avoid drinking alcoholic beverages for at least 24 hours; alcohol may worsen injury to your stomach or have other effects.
- Avoid taking the following medications: \_\_\_\_\_
- You may continue taking the following medication(s) that your doctor(s) prescribed for you: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Other instructions: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Provide the Emergency Department with the name and the number of your primary care physician so that the ED can send him or her a record of your emergency department visit.
  - You or your physician can get more information on the chemical by contacting: \_\_\_\_\_  
\_\_\_\_\_ or \_\_\_\_\_, or by checking out the following Internet Web sites: \_\_\_\_\_; \_\_\_\_\_.

Signature of patient \_\_\_\_\_ Date \_\_\_\_\_

Signature of physician \_\_\_\_\_ Date \_\_\_\_\_