Methylene Chloride (CH_2Cl_2)
CAS 75-09-2; UN 1593

Synonyms include dichloromethane, methylene bichloride, methane dichloride, and methylene dichloride.

- **Persons exposed only to methylene chloride vapor do not pose risks of secondary contamination. Persons whose clothing or skin is contaminated with liquid methylene chloride can cause secondary contamination by direct contact or through off-gassing vapor.**
- **Odor is not an adequate warning property for methylene chloride**
- **Methylene chloride is a combustible liquid, but its vapor is flammable only when present in relatively high concentrations (14% to 22% in air).**
- **Methylene chloride is absorbed readily after inhalation and ingestion. Skin absorption is slow but may contribute to total body burden.**

Description

At room temperature, methylene chloride is a clear, colorless liquid with a pleasant odor. It is volatile, producing potentially toxic concentrations at room temperature. It is slightly soluble in water and miscible with most organic solvents.

Routes of Exposure

Inhalation

Inhalation is the most important route of exposure and methylene chloride vapor is absorbed readily from the lungs. **Odor is not an adequate warning property for methylene chloride,** the odor threshold is 250 ppm, which is 10 times higher than the OSHA PEL (25 ppm). Olfactory fatigue may also occur at high concentrations. Methylene chloride is heavier than air and may cause asphyxiation in enclosed, poorly ventilated, or low-lying areas.

Children exposed to the same levels of methylene chloride vapor as adults may receive larger doses 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 methylene chloride vapor found nearer to the ground.

Skin/Eye Contact

Exposure to high levels of methylene chloride vapor can cause skin and eye irritation. Prolonged dermal contact with liquid

methylene chloride may produce chemical burns. Methylene chloride is absorbed slowly through intact skin but probably not in quantities that cause acute systemic toxicity.

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

Ingestion

Acute toxic effects, including death, can result from ingestion.

Sources/Uses

Methylene chloride is produced commercially in large volumes by direct chlorination of methane or methyl chloride. Methylene chloride is an important solvent in paint and varnish strippers and in degreasing agents. It is used in the production of photographic films, synthetic fibers, pharmaceuticals, adhesives, inks, and printed circuit boards. It is employed as a blowing agent for polyurethane foams and as a propellant for insecticides, air fresheners, and paints.

Standards and Guidelines

OSHA PEL (permissible exposure limit) = 25 ppm (averaged over an 8-hour workshift)

OSHA STEL (short-term exposure limit) = 125 ppm (over a 15-minute time period)

NIOSH IDLH (immediately dangerous to life or health) = 2,300 ppm

AIHA ERPG-2 (maximum airborne concentration below which it is believed that nearly all persons could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their abilities to take protective action) = 750 ppm

Physical Properties

Description: Clear, colorless liquid

Warning properties: Sweet, ether-like odor at 250 ppm; inadequate warning for hazardous exposures.

Molecular weight: 84.9 daltons

Boiling point (760 mm Hg): 104.2 °F (39.8 °C)

Freezing point: -139 °F (-95 °C)

Specific gravity: 1.33 (water = 1)

Vapor pressure: 349 mm Hg at 68 °F (20 °C)

Gas density: 2.9 (air = 1)

Water solubility: Water soluble (2% at 68 °F) (20 °C)

Flammability: Combustible liquid

Flammable range: 14% to 22% (concentration in air)

Incompatibilities

Methylene chloride reacts with strong oxidizers, caustic substances, chemically active metals such as aluminum and magnesium powders, potassium, sodium, and concentrated nitric acid.

Health Effects

- **Methylene chloride is irritating to the skin, eyes, and respiratory tract. These effects can result from inhalation or dermal exposure to methylene chloride. Prolonged skin contact may cause chemical burns.**
- **Exposure by any route can cause CNS depression. Ingestion of methylene chloride can cause severe gastrointestinal irritation.**
- **Carbon monoxide, a metabolite of methylene chloride, may contribute to delayed toxic effects. The fetus and neonates are particularly vulnerable to poisoning with carbon monoxide.**

Acute Exposure

Adverse health effects of methylene chloride are due both to the parent compound and carbon monoxide which is a metabolite of methylene chloride. The mechanism of neurotoxic effects of the parent compound is unknown but may be related to the lipophilic properties of the compound. Carbon monoxide induces the formation of carboxyhemoglobin, thus depriving the brain from normal oxygen delivery and utilization. Signs and symptoms of exposure to very high levels (>750 ppm) of methylene chloride may be evident within minutes of exposure onset. Less pronounced exposures may induce adverse signs and symptoms within hours.

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

CNS

Methylene chloride exposure causes dose-related CNS depression. Typical acute symptoms (within minutes to hours) include headache, drowsiness, lightheadedness, slurred speech, decreased alertness, slowed reaction times, irritability, impaired gait, and stupor. Rapid loss of consciousness, coma, seizures, and death have been reported.

Metabolic

Methylene chloride is metabolized in the liver, in part to carbon monoxide, which will produce elevated carboxyhemoglobin levels and decrease the oxygen-carrying capacity of the blood. Carboxyhemoglobin levels may continue to rise for several hours after exposure has ceased. The fetus is particularly vulnerable to poisoning with carbon monoxide.

Because of their relatively higher metabolic rate, children may be more vulnerable to toxicants interfering with basic metabolism.

Cardiovascular

Methylene chloride may cause electrocardiographic changes resembling those of carbon monoxide poisoning. Elevated carboxyhemoglobin and carboxymyoglobin levels may cause insufficient oxygen supply to the heart in persons who have preexisting coronary disease. Angina, myocardial infarction, and cardiac arrest associated with methylene chloride inhalation was reported in one patient, but no adverse cardiovascular effects from methylene chloride have been reported for occupationally exposed workers.

Respiratory

Victims of acute, high-level inhalation exposures may suffer airway irritation, inflammation of the lungs, and accumulation of fluid in the lungs.

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.

Gastrointestinal

Nausea, vomiting, gastrointestinal ulceration and bleeding have been reported after ingestion.

Hepatic

Liver dysfunction may result from acute, high-level exposure to methylene chloride.

Dermal

Methylene chloride causes skin irritation and blistering. Prolonged dermal contact may result in second- and third-degree chemical burns.

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

Ocular

High concentrations of methylene chloride vapor may cause eye irritation and tearing. When splashed in the eye, methylene chloride can cause burning pain, inflammation of the eye surface, and inflammation of the iris.

Potential Sequelae

Survivors of severe, acute exposure (e.g., cases of coma, seizures, or respiratory arrest) may suffer brain or heart damage from lack of oxygen to these organs. Exposure to high levels of methylene chloride, which may lead to the formation of high

amounts of the metabolite carbon monoxide, may lead to permanent sequelae, including mental deterioration, urinary and fecal incontinence, and gait disturbance. However, most cases of delayed neurologic sequelae are associated with loss of consciousness in the acute phase of intoxication.

Chronic Exposure

Cardiovascular effects have been documented in case reports but have not been demonstrated in epidemiologic studies of workers exposed to methylene chloride. Irritant contact dermatitis manifested by inflammation and hives has been noted in workers who have chronic skin exposure.

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

Carcinogenicity

The DHHS has determined that methylene chloride may be reasonably anticipated to be a human carcinogen based on adequate evidence in experimental animals.

Reproductive and Developmental Effects

In experimental animals, methylene chloride did not produce structural abnormalities but produced behavioral alterations and retarded development in offspring. The levels used in these studies were greater than 1,000 ppm. Whether these effects would have occurred in the absence of maternal toxicity is not clear. Embryotoxic effects have not been documented in humans. Methylene chloride 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.

Methylene chloride has been shown to cross the placenta in animals and has been found in human breast milk. The fetus and neonates are more susceptible to carbon monoxide, a methylene chloride metabolite, poisoning. Acute, nonlethal maternal intoxication with carbon monoxide may result in fetal death or permanent neurologic sequelae.

Prehospital Management

- **Victims exposed only to methylene chloride vapor do not pose contamination risks to rescuers. Victims whose clothing or skin is contaminated with liquid methylene chloride can secondarily contaminate response personnel by direct contact or through off-gassing vapor. Methylene chloride vapor may also off-gas from the toxic vomitus of victims who have ingested methylene chloride.**
- **Methylene chloride can cause acute CNS and respiratory depression, with resultant cardiac dysrhythmia. If inhaled at high levels, methylene chloride can cause respiratory tract irritation, and noncardiogenic pulmonary edema may ensue. Methylene chloride is metabolized slowly to carbon monoxide.**
- **There is no antidote for methylene chloride. Treatment consists of support of respiratory and cardiovascular functions. Oxygen is an antagonist of metabolically released carbon monoxide.**

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

Methylene chloride vapor is absorbed well by inhalation and is a 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 methylene chloride vapor.

Skin Protection: Chemical-protective clothing is not generally required when only vapor exposure is expected because methylene chloride vapor is neither highly irritating nor absorbed well through the skin. Chemical-protective clothing is recommended when repeated or prolonged contact with liquid methylene chloride 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.

Decontamination Zone

Victims exposed only to methylene chloride vapor who have no skin or eye irritation do not need decontamination. They may be transferred immediately to the Support Zone. All others require decontamination (see *Basic Decontamination* 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. Remove and double-bag contaminated clothing and personal belongings.

Flush exposed skin and hair with plain water for 3 to 5 minutes, then wash with mild soap. 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 at least 15 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 and able to swallow, 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.

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

parent occurs. If possible, seek assistance from a child separation expert.

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 undergone appropriate decontamination (see *Decontamination Zone* above). Victims who have undergone decontamination or have been exposed only to vapor pose no serious risks of secondary contamination to rescuers. 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 activated charcoal has not been given previously and the patient is alert and able to swallow, administer activated charcoal at 1 gm/kg (usual adult dose 60–90 g, child dose 25–50 g).

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.

Treat patients who have bronchospasm with aerosolized bronchodilators. The use of bronchial sensitizing agents in situations of multiple chemical exposures may pose additional risks. Consider the health of the myocardium before choosing which type of bronchodilator should be administered. Cardiac sensitizing agents may be appropriate; however, the use of cardiac sensitizing agents after exposure to certain chemicals may pose enhanced risk of cardiac arrhythmias (especially in the elderly).

Consider racemic epinephrine aerosol for children who develop stridor. Dose 0.25–0.75 mL of 2.25% racemic epinephrine solution in 2.5 cc water, repeat every 20 minutes as needed, cautioning for myocardial variability.

Patients who are comatose, hypotensive, or are 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 methylene chloride 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 who have evidence suggesting substantial exposure and all patients who have ingested methylene chloride should be transported to a medical facility for evaluation.

Patients who have brief or mild exposure and who are asymptomatic may be discharged from the scene after their names, addresses, and telephone numbers are recorded. These patients should be advised to rest and to seek medical care promptly if symptoms develop (see *Patient Information Sheet* below).

Emergency Department Management

- **Patients exposed only to methylene chloride vapor do not pose secondary contamination risks to hospital personnel. Patients whose clothing or skin is contaminated with liquid methylene chloride can secondarily contaminate hospital personnel by direct contact or through off-gassing vapor. Methylene chloride vapor may also off-gas from the toxic vomitus of victims who have ingested methylene chloride.**

- **Methylene chloride can cause acute CNS and respiratory depression with resultant cardiac dysrhythmias. If inhaled at high levels, methylene chloride may cause irritation of the respiratory tract, and noncardiogenic pulmonary edema may ensue. Methylene chloride is metabolized slowly to carbon monoxide.**

- **There is no antidote for methylene chloride. Treatment consists of support of respiratory and cardiovascular functions. Oxygen is an antagonist of metabolically released carbon monoxide.**

Decontamination Area

Previously decontaminated patients and patients exposed only to methylene chloride vapor who have no skin or eye irritation may be transferred immediately to the Critical Care Area. Others require decontamination as described below.

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 absorbed through the skin. Also, emergency room personnel should examine children's mouth 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.

Treat patients who have bronchospasm with aerosolized bronchodilators. The use of bronchial sensitizing agents in situations of multiple chemical exposures may pose additional risks. Consider the health of the myocardium before choosing which type of bronchodilator should be administered. Cardiac sensitizing agents may be appropriate; however, the use of cardiac sensitizing agents after exposure to certain chemicals

may pose enhanced risk of cardiac arrhythmias (especially in the elderly).

Consider racemic epinephrine aerosol for children who develop stridor. Dose 0.25–0.75 mL of 2.25% racemic epinephrine solution in 2.5 cc water, repeat every 20 minutes as needed, cautioning for myocardial variability.

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

Basic Decontamination

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

Flush exposed skin and hair with plain water for 2 to 3 minutes (preferably under a shower), then wash with mild soap. Rinse thoroughly with water. Use caution to avoid hypothermia when decontaminating children or the elderly. Use blankets or warmers when appropriate.

Irrigate exposed eyes with plain water or saline for at least 15 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 and asymptomatic, administer a slurry of activated charcoal if it has not been given previously. (More information is provided in *Ingestion Exposure* under *Critical Care Area* below).

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 ill patients. Continuously monitor cardiac rhythm.

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

Inhalation Exposure

Administer supplemental oxygen by mask to patients who have respiratory symptoms. Treat patients who have bronchospasm with aerosolized bronchodilators. The use of bronchial sensitizing agents in situations of multiple chemical exposures may pose additional risks. Consider the health of the

myocardium before choosing which type of bronchodilator should be administered. Cardiac sensitizing agents may be appropriate; however, the use of cardiac sensitizing agents after exposure to certain chemicals may pose enhanced risk of cardiac arrhythmias (especially in the elderly).

Consider racemic epinephrine aerosol for children who develop stridor. Dose 0.25–0.75 mL of 2.25% racemic epinephrine solution in 2.5 cc water, repeat every 20 minutes as needed, cautioning for myocardial variability.

Skin Exposure

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

Because of their relatively larger surface area:weight ratio, children are more vulnerable to toxicants absorbed through 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 severe corneal injuries.

Ingestion Exposure

Do not induce emesis.

If the patient is alert and charcoal has not been given previously, 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.

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 caustic 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 1 hour of ingestion. Care must be taken when placing the gastric tube because blind-tube placement may further injure the chemically damaged esophagus or stomach.

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

Antidotes and Other Treatments

There is no antidote for methylene chloride.

It is unlikely that the carbon monoxide produced from methylene chloride metabolism will justify hyperbaric oxygen therapy; however, 100% oxygen at normal pressure is a useful treatment. The comparative efficacy of 100% normobaric oxygen compared with that of hyperbaric oxygen has not been definitively studied.

Laboratory Tests

Routine laboratory studies for all exposed patients include CBC, glucose, and electrolyte determinations. In cases of substantial exposure, additional useful studies include ECG monitoring, determinations of carboxyhemoglobin levels, and liver-function tests. Chest radiography and pulse oximetry (or ABG measurements) are recommended for severe inhalation exposure or if pulmonary aspiration is suspected. Levels of methylene chloride in blood are not clinically useful; however, they may be used to qualitatively document exposure. Carboxyhemoglobin levels of exposed patients rarely exceed 15% but may remain elevated for 1 to 2 days after exposure due to continual metabolic conversion of fat-stored methylene chloride.

Disposition and Follow-up

Consider hospitalizing symptomatic patients who have a suspected serious exposure and are symptomatic.

Delayed Effects

In patients who have been seriously exposed, cardiac dysrhythmias and skin burns may develop several hours after exposure. Exposure to high amount of methylene chloride may give rise to high blood concentration of its metabolite carbon monoxide. This may lead to permanent sequelae including mental deterioration, urinary and fecal incontinence, and gait disturbance. However, most cases of delayed neurologic sequelae are associated with loss of consciousness in the acute phase of intoxication.

Patient Release

Patients who have not experienced respiratory difficulty or alterations in mental status may be discharged. Patients who initially had mild symptoms but who are asymptomatic 6 to 12 hours after exposure may also be discharged. Discharged patients should be advised to rest and to seek medical care promptly if symptoms develop or recur (see the *Methylene Chloride—Patient Information Sheet*). Patients should not be discharged solely on the basis of carboxyhemoglobin levels because oxygen treatment may render carboxyhemoglobin levels unreliable. Metabolic conversion of methylene chloride to carbon monoxide may be ongoing, and carboxyhemoglobin levels may rebound after oxygen therapy is stopped.

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.

Severely exposed patients should be monitored for lung, brain, heart, and liver damage. Patients who have skin burns or corneal injuries should be reexamined within 24 hours.

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.

Methylene Chloride
Patient Information Sheet

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

What is methylene chloride?
Methylene chloride is a colorless, volatile liquid with a sweet smell. It is used in plastics processing, as a paint and varnish remover, and as a cleaning liquid for electronic boards and metal parts.

What immediate health effects can be caused by exposure to methylene chloride?
Methylene chloride can affect the body if the vapor is inhaled, if the liquid touches the skin or eyes, or if it is swallowed. In the body, some methylene chloride is changed to carbon monoxide (a methylene chloride metabolite), which prevents the blood from carrying oxygen to the tissues. At moderate levels, methylene chloride can cause headaches, fatigue, difficulty walking, and dizziness. High levels can cause fainting and even death. Methylene chloride can irritate the lungs, causing a build-up of fluid in the lungs. It can also cause the heart to beat irregularly or to stop beating. Generally, the more serious the exposure, the more severe the symptoms. The fetus and neonates are particularly vulnerable to poisoning with carbon monoxide.

Can methylene chloride poisoning be treated?
If a person has inhaled or swallowed a large amount of methylene chloride, breathing 100% oxygen is helpful. These patients may need to be hospitalized. Most exposed patients get 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 repeated exposures, damage to the brain can cause memory loss, poor coordination, and decreased ability to think. Long-term exposures over many years have been associated with cancer.

What tests can be done if a person has been exposed to methylene chloride?
Specific tests for the presence of methylene chloride in blood or 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 liver, brain, heart, or lungs have been injured. Testing is not needed in every case.

Where can more information about methylene chloride be found?
More information about methylene chloride 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:

- headache, nausea, vomiting, dizziness
- chest pains, difficulty thinking, blurred vision
- dyspnea on exertion, weakness
- palpitations, tachycardia, tachypnea

[ ] 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 _____