
Lead (Pb) CAS 7439-92-1

- **Persons exposed to lead do not pose secondary contamination risks. Persons whose clothing or skin is contaminated with lead solutions are unlikely to secondarily contaminate others by direct contact.**
- **Elemental lead is a bluish-gray metal without characteristic taste or smell. It is nonflammable and insoluble in water. The water solubility of lead salts varies depending on the salt. Odor does not provide any warning of hazardous concentrations.**
- **Exposure to high amounts can cause dullness, irritability, poor attention span, epigastric pain, constipation, vomiting, convulsions, coma, and death. High exposure in children can leave residual cognitive deficits.**

Description

Lead exists in three oxidation states: Pb(0), the metal; Pb(II); and Pb(IV). This Medical Management Guideline focuses mostly on inorganic lead. Lead is a bluish-gray metal with no characteristic taste or smell. It is not soluble in water. Metallic lead is soft and malleable, easily melted, cast, rolled, and extruded (HSDB 2007). It is non-combustible, but may decompose upon heating to highly toxic fumes of lead (HSDB 2007). Some lead salts dissolve in water.

Routes of Exposure

Inhalation

Inhalation is the most common route of exposure among workers in lead industries. Direct inhalation of lead accounts for only a small part of total exposure for the general population. Absorption of deposited lead is influenced by particle size and solubility, and the pattern of regional deposition within the respiratory tract (ATSDR 2005).

Children exposed to the same levels of lead dusts as adults may receive a larger dose because they have greater lung surface area:body weight ratios and higher minute volumes:body 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 dust found nearer to the ground.

Skin/Eye Contact

Some lead aerosols may cause skin and eye irritation. Dermal absorption of inorganic lead is much less than absorption by inhalation or orally. In volunteers who applied lead acetate from cosmetic preparations, less than 0.3% of the applied lead dose was absorbed (ATSDR 2005).

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

Ingestion

Ingestion is the main route of exposure for the general population, particularly children (ATSDR 2005). For children, the most common source of lead exposure is lead-based paint deteriorated into chips and lead dusts (CDC 1997). Other common sources of lead ingestion include pottery and drinking water. Gastrointestinal absorption of water-soluble lead is higher in children (40-50%) than in adults (3-10%) (ATSDR 2005).

Sources/Uses

Lead rarely occurs in its elemental state. The main lead containing ores are galena (PbS), anglesite (PbSO₄), and cerussite (PbCO₃). Lead is used in the production of batteries, lead alloys, ammunition, soldering materials, medical equipment, in ceramic glazes, and in the manufacture of corrosion and acid-resistant materials used in the building industry (ATSDR 2005). Lead solder in water pipes is the major source of lead contamination in household water in the United States.

Standards and Guidelines

OSHA PEL (permissible exposure limit) = 50 µg/m³ as an 8-hour TWA concentration (OSHA 1999).

Action level = 40 µg/dL in whole blood.

Removal of employee from exposure = 50 µg/dL in blood.

NIOSH IDLH (immediately dangerous to life or health) = 100 mg/m³ (NIOSH 2005).

Physical Properties

Description: Bluish-gray, heavy, soft and malleable metal; no characteristic taste or smell (HSDB 2007). Lead salts vary in color.

Warning properties: None.

Molecular weight: 207.20 daltons (HSDB 2007).

Boiling point (760 mm Hg): 3,164 °F (1,740 °C) (HSDB 2007).

Melting point 621.3 °F (327.4 °C) (HSDB 2007).

Specific gravity: 11.34 g/cm³ (water = 1) (HSDB 2007).

Water solubility: Insoluble (ATSDR 2005).

Flammability limits: No data (ATSDR 2005).

Incompatibilities

Lead can react vigorously or explosively with a variety of oxidizing materials including sodium carbide, chlorine trifluoride, and fused ammonium nitrate (HSDB 2007).

Health Effects

- **Exposure to high amounts of lead may induce encephalopathy. Symptoms develop after repeated exposures and may include dullness, irritability, poor attention span, epigastric pain, constipation, vomiting, convulsions, coma, and death.**
- **The most sensitive targets for lead toxicity are the developing nervous system, the hematological and cardiovascular systems, and the kidney.**
- **Many of lead's toxic properties are due to its ability to inhibit or mimic the action of calcium. This results in wide-ranging actions that can involve almost every organ and system in the body.**

Acute Exposure

Lead competes with calcium for specific membrane binding sites, thereby interfering with mitochondrial respiration and normal function of neurological tissue. Lead also interferes with the activity of sodium-potassium transport pumps. Lead may deplete both protein-bound sulfhydryl groups and glutathione, resulting in production of reactive oxygen species. Lead disrupts or inhibits selected cellular enzymes by binding to active sulfhydryl groups; disruption of enzymes involved in heme synthesis may lead to anemia and adverse consequences beyond the hematological system. Severe effects such as encephalopathy can occur in children after exposures resulting in blood lead levels between 70 and 100 µg/dL and in adults at blood lead levels between 100 and 120 µg/dL (ATSDR 2005; Dart et al. 2004).

Children are more vulnerable to lead poisoning and more sensitive to the health effects of lead than adults (ATSDR 2005).

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

Gastrointestinal

Acute lead ingestion can produce anorexia, constipation, abdominal pain, and vomiting (Currence et al. 2007; Dart et al. 2004; HSDB 2007).

<i>Renal</i>	Reversible kidney damage has been observed following acute lead intoxication (Currance et al. 2007; Dart et al. 2004; HSDB 2007).
<i>CNS</i>	Symptoms of acute lead poisoning may include muscle weakness with muscle and joint pain, paresthesias, depression, and headache. More severe acute or chronic exposure may result in anxiety, delirium, hallucinations, memory loss, insomnia, loss of consciousness, increased intracranial pressure, seizures, and encephalopathy (Currance et al. 2007; Dart et al. 2004; HSDB 2007).
<i>Hematological</i>	Anemia may occur in cases of severe acute intoxication, particularly in children (Currance et al. 2007; Dart et al. 2004; HSDB 2007).
<i>Potential Sequelae</i>	Acute encephalopathy during childhood may resolve into chronic subclinical encephalopathy with associated cognitive dysfunction still evident in adulthood. Hypertension also has been reported in adults who suffered lead poisoning during infancy (ATSDR 2005).
Chronic Exposure	<p>The main concern of long-term exposure to lead is the development of neurobehavioral alterations in children following prenatal (<i>in utero</i>) and/or postnatal exposure. Studies suggest that IQ declines with increasing blood lead concentrations and that decrements in IQ can occur at blood lead levels below 10 µg/dL. Neurophysiological and neuropsychological alterations also have been observed in lead workers following long-term exposure (ATSDR 2005).</p> <p>Chronic lead exposure also has been associated with alterations in kidney function and anemia, and a slight but significant increase in systolic blood pressure in middle age individuals (ATSDR 2005).</p> <p>Chronic exposure may be more serious for children because children absorb more lead than adults from similar oral doses.</p>

Carcinogenicity

Lead has been assessed for carcinogenic effects. The International Agency for Research on Cancer (IARC 2006) has assigned inorganic lead compounds to Group 2A (probably carcinogenic to humans) and the Environmental Protection Agency (IRIS 2007) has assigned it to Group B2 (probable human carcinogen) based on sufficient evidence from studies in animals and inadequate or limited evidence in humans. IARC also determined that organic lead compounds are not classifiable as to their carcinogenicity in humans based on inadequate evidence from studies in humans and in animals (IARC 2006).

*Reproductive and
Developmental Effects*

Some epidemiological studies have associated lead exposure with abortion and pre-term delivery in women and alterations in sperm and decreased fertility in men. Lead also has been associated with delayed growth in children and delayed sexual maturation in girls (ATSDR 2005).

Lead can cross the placenta and can be transferred to nursing infants via the mother's milk.

Prehospital Management

- **Victims exposed to lead generally do not pose contamination risks to rescuers unless their clothing or skin is heavily contaminated with lead in solid form or as solutions of lead salts.**
- **The treatment course for lead poisoning is determined by confirmed results of lead levels in venous blood. Removal from exposure may be followed by chelation therapy in patients with blood lead levels between 45 and 70 µg/dL. Chelation therapy is required in patients with clinical symptoms suggesting encephalopathy.**

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

Exposure to highly concentrated lead fumes can produce metal fume fever, an influenza-like reaction characterized by an acute, self-limited neutrophil alveolitis. Some lead aerosols can induce eye and skin irritation (HSDB 2007).

Respiratory Protection: Positive-pressure, self-contained breathing apparatus (SCBA) is recommended in response situations that involve exposure to potentially unsafe levels of lead compounds (HSDB 2007).

Skin Protection: Chemical-protective clothing is recommended because some lead compounds can cause skin irritation. Fully encapsulating, vapor protective clothing should be worn to deal with spills or leaks with no fire (HSDB 2007).

ABC Reminders

Quickly establish 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.

Victims with chemically-induced acute disorders may suffer from anxiety, especially children who may be separated from a parent or other adult.

Decontamination Zone

Patients exposed to lead compounds 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 establish 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 copious amounts of water for at least 20 minutes. Wash with soap and rinse thoroughly with water. For minor skin contact, avoid spreading the material on unaffected skin (HSDB 2007). Use caution to avoid hypothermia when decontaminating victims, particularly children or the elderly. Use blankets or warmers after decontamination as needed.

Flush exposed or irritated eyes with tepid water for 15 minutes. Remove contact lenses if easily removable without additional trauma to the eye. Continue eye irrigation during other basic care and transport. If pain or injury is evident, continue irrigation while transferring the victim to the Support Zone.

Gastric lavage may be performed soon after ingestion of life-threatening amounts of liquid or powdered products.

Provide reassurance to chemically-contaminated victims during decontamination, particularly children who may suffer separation anxiety 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 pose no serious risks of secondary contamination to rescuers. In such cases, Support Zone personnel require no specialized protective gear.

ABC Reminders

Quickly establish 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. 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.

Advanced Treatment

In cases of respiratory compromise, secure airway and support respiration according to advanced life support (ALS) protocols.

Treat patients who have bronchospasm with an aerosolized bronchodilator such as albuterol. 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). Lead poisoning is not known to pose additional risk during the use of bronchial or cardiac sensitizing agents and sympathomimetic bronchodilators may reverse bronchospasm in patients exposed to lead.

Consider racemic epinephrine aerosol for children who develop stridor. Dose 0.25–0.75 mL of 2.25% racemic epinephrine solution; repeat every 20 minutes as needed while observing for myocardial variability.

Patients who are comatose, hypotensive, or having seizures or cardiac arrhythmias should be treated according to 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.

Multi-Casualty Triage

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

Asymptomatic patients who have not had a significant exposure may be discharged at 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). Patients who had significant exposure, even in the absence of clinical symptoms suggesting encephalopathy, may need chelation therapy (see *Antidotes and other Treatments* below) and should seek medical care. Children may need to be hospitalized to undergo treatment. Patients with

clinical symptoms suggesting encephalopathy require inpatient chelation therapy.

Emergency Department Management

- **Patients do not pose contamination risks after contaminated clothing is removed and the skin is washed.**
- **Exposure to high amounts of lead may induce encephalopathy. Symptoms develop after repeated exposures and may include dullness, irritability, poor attention span, epigastric pain, constipation, vomiting, convulsions, coma, and death.**
- **There is no antidote for lead. Lead poisoning is treated with chelation therapy. Protocols may vary depending on blood lead levels and whether patients are children or adults.**

Decontamination Area

Previously decontaminated patients and patients 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 anxiety, particularly 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 that react with the skin. Also, emergency department 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 according to ALS protocols.

Treat patients who have bronchospasm with an aerosolized bronchodilator such as albuterol. 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). Lead poisoning is not known to pose additional risk during the use of bronchial or cardiac sensitizing agents and sympathomimetic bronchodilators may reverse bronchospasm in patients exposed to lead.

Consider racemic epinephrine aerosol for children who develop stridor. Dose 0.25–0.75 mL of 2.25% racemic epinephrine solution; repeat every 20 minutes as needed while observing for myocardial variability.

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 all personal belongings.

If not already done, flush exposed skin and hair with copious amounts of water for at least 20 minutes. Wash with soap and rinse thoroughly with water. For minor skin contact, avoid spreading the material on unaffected skin. Use caution to avoid hypothermia when decontaminating victims, particularly children or the elderly. Use blankets or warmers after decontamination as needed.

If not already done, flush exposed eyes with plain tepid water for at least 15 minutes (HSDB 2007). Remove contact lenses if easily removable without additional trauma to the eye. Continue irrigation during other basic care and transport. If pain or injury is evident, continue irrigation while transferring the victim to the Critical Care Area.

If the victim is alert, asymptomatic, and has a gag reflex, consider administering a slurry of activated charcoal at a dose of 1 g/kg (infant, child, and adult dose) (HSDB 2007).

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 under *Decontamination Zone*. Establish intravenous access in seriously ill patients if this has not been done previously. Continuously monitor cardiac rhythm.

Patients who are comatose, hypotensive, or have seizures or cardiac 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 an aerosolized bronchodilator such as albuterol. 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). Lead poisoning is not known to pose additional risk during the use of bronchial or cardiac sensitizing agents and sympathomimetic bronchodilators may reverse bronchospasm in patients exposed to lead.

Consider racemic epinephrine aerosol for children who develop stridor. Dose 0.25–0.75 mL of 2.25% racemic epinephrine solution; repeat every 20 minutes as needed while observing for myocardial variability.

Skin Exposure

If the skin was in contact with lead salts, wash the exposed skin with soap and water to remove any residual amount.

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

Eye Exposure

Continue irrigation for at least 15 minutes. Test visual acuity. Examine the eyes for corneal damage and treat appropriately. Immediately consult an ophthalmologist for patients who have corneal injuries.

Ingestion Exposure

If not already performed, and if the victim is alert, asymptomatic, and has a gag reflex, consider administering a slurry of activated charcoal at a dose of 1 g/kg (infant, child, and adult dose) (HSDB 2007).

In cases of acute ingestion of a lead-containing foreign body, consider abdominal radiography and whole bowel irrigation or a cleansing enema if radiographic results are positive. If whole bowel irrigation is not effective, endoscopic removal may be necessary. Followup radiography should be performed to assess clearing of lead (Dart et al. 2004; HSDB 2007).

Because of the risk of perforation from NG intubation, lavage is discouraged in children unless performed under endoscopic guidance.

Antidotes and Other Treatments

There is no antidote for lead. Treatment of lead poisoning consists of removal from the source of exposure.

Chelation therapy should be considered for treatment of severe symptoms or markedly elevated blood lead levels. Chelation therapy is controversial in cases of asymptomatic and mildly symptomatic intoxication and should never be given prophylactically or during ongoing lead exposure. Once initiated, chelation therapy should be continued until symptoms improve and acceptable blood lead levels are achieved (Dart et al. 2004).

Adults: In the presence of severe encephalopathy or when blood lead levels exceed 100 µg/dL, chelation should start with dimercaprol (BAL) followed in 4 hours by another dose of BAL and either succimer (if oral administration is tolerated) or CaNa₂-EDTA (if intravenous infusion is required). BAL treatment is phased out while treatment with one of the other chelating agents is continued (typically for 5 days), followed by decreased or interrupted dosing because continued chelator usage is associated with decreasing amounts of urinary lead excretion (Dart et al. 2004).

Children: Use of chelators is not recommended for blood lead levels less than 25 µg/dL. At blood lead levels between 25 and 45 µg/dL, oral chelators may be of benefit if elevated blood levels persist following environmental intervention. Children with blood lead levels between 45 and 70 µg/dL should undergo chelation, usually with oral succimer; those with encephalopathy or with blood lead levels in excess of 70 µg/dL should be admitted to the hospital for parenteral therapy with BAL and EDTA. Therapy begins with BAL intramuscularly every 4 hours, establishment of adequate urinary output (hydration as needed), followed by CaNa₂-EDTA continuous infusion. CaNa₂-EDTA may be administered intramuscularly in divided doses every 4 hours. This combined therapy is continued for 5 days while liver and renal functions and blood lead levels are monitored. If blood lead levels rebound after 2 days without chelation therapy, a second course of therapy may be necessary (Dart et al. 2004).

Seizures may be treated with intravenous benzodiazepine. Diazepam (adult: 5–10 mg, repeat every 10 to 15 minutes as needed. Child: 0.2–0.5 mg/kg, repeat every 5 minutes as needed) or Lorazepam (adult: 2–4 mg; child: 0.05–0.1 mg/kg) (HSDB 2007). If seizures recur after diazepam, consider phenobarbital (30 mg adults; 10 mg children >5 years old).

Laboratory Tests

Parameters to monitor during chelation therapy include hepatic transaminases, urinalysis, BUN, creatinine, and complete blood count (Homan et al. 1998).

Disposition and Follow-up

After cessation of chelation therapy, if blood lead levels rebound, additional chelation therapy may be necessary (Dart et al. 2004).

Delayed Effects

Lead poisoning during infancy or childhood has resulted in diminished cognitive function and hypertension in adulthood (ATSDR 2005).

Patient Release

Patients may be discharged with instructions to seek medical care promptly if symptoms develop (see the *Lead—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 emergency department (ED) visit to the patient's doctor.

Provide education about lead hazards, cleaning, and diet. An environmental investigation should be conducted and lead hazard abatement procedures with removal of child from likely source of lead until remediation is satisfactory should be performed.

Evaluate children for iron deficiency; iron therapy is likely beneficial for lead-poisoned children with concurrent iron deficiency, but is not likely to be effective for children without iron deficiency (Dart et al. 2004).

Consider case management by an experienced lead team.

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 Appendix III for a list of agencies that may be of assistance.

Lead Patient Information Sheet

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

What is lead?

Lead is a naturally occurring bluish-gray metal. It can combine with other chemicals to form lead compounds. Its main use is in the production of batteries, but it is also used in the production of ammunition, metal products, and ceramic glazes. Some chemicals containing lead are used in paint, but currently, the use of leaded paint is not allowed in residential structures due to the potential harmful effects in people and animals. Leaded paint used in residences built before 1978 is often a major source of lead exposure, especially for children.

What immediate health effects can be caused by exposure to lead?

Acute exposure to high amounts of lead produces abdominal pain, cramps, and vomiting. Brief exposures to low or moderate lead levels may not cause any specific symptoms, but continued exposure to lead may cause encephalopathy. Early symptoms of encephalopathy may develop within weeks of initial exposure and include dullness, irritability, poor attention span, headache, muscular tremor, loss of memory, and hallucinations. The condition may then worsen, sometimes abruptly, to delirium, convulsions, paralysis, coma, and death.

Can lead poisoning be treated?

There is no antidote for lead. Seriously exposed persons may need to be hospitalized and undergo chelation therapy to accelerate the excretion of lead from the body. Chelation therapy is necessary when blood lead levels are higher than 45 $\mu\text{g/dL}$.

Are any future health effects likely to occur?

Studies have shown that lead poisoning during infancy or childhood can result in diminished intellectual function and hypertension as adults.

What tests can be done if a person has been exposed to lead?

The most common test to determine exposure to lead is to measure lead in blood. Lead can also be measured in bone, teeth, hair, breast milk, and urine. In general, lead in blood is an index of recent exposure, whereas lead in bone reflects cumulative exposure throughout a lifetime. Lead affects some hematological indices in blood, which can also be measured to assess exposure to lead.

Where can more information about lead be found?

More information about lead 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:

- abdominal pain, nausea, constipation, or vomiting
- irritability, headache, loss of memory, or tremors
- incoordination, weakness, foot or wrist drop, stupor, or convulsions

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 _____

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