Toxaphene and Related Compounds

SUBSTANCE IDENTIFICATION
Found as a waxy, amber-colored solid with a mild pine odor. Also found in dusts, sprays, wettable powders, and liquid preparations with oil solvents. Used as insecticides.

ROUTES OF EXPOSURE
Skin and eyes
Inhalation
Ingestion
Skin absorption

TARGET ORGANS
Primary
Skin
Eyes
Central nervous system
Secondary
Cardiovascular system
Respiratory system
Gastrointestinal system
Hepatic

LIFE THREAT
Death from respiratory failure and exhaustion secondary to seizures.

SIGNS AND SYMPTOMS BY SYSTEM
Cardiovascular: Circulatory collapse with tachycardia and hypotension.
Respiratory: Sudden onset of dyspnea, followed by respiratory failure. Upper respiratory tract irritation and sinusitis.
CNS: Headache, fatigue, hyperexcitability. shivering, muscle tremor, and spasms of leg and back muscles. Seizures that can be precipitated by external stimuli and tetanic muscular contractions may also be seen.
Gastrointestinal: Nausea, vomiting, and excessive salivation.
Eye: Chemical conjunctivitis and blurred vision.
Skin: Mild irritation, cyanosis, and dermatitis.
Hepatic: Liver damage.
Other: The onset of symptoms is usually abrupt. Oil-based solutions absorb faster than dusts or powders. NOTE: Some of these products may be mixed with a hydrocarbon solvent as a vehicle. Toxicity may result from the solvent. See appropriate guideline. Some products may present a human carcinogenic risk.

SYMPTOM ONSET FOR ACUTE EXPOSURES
Immediate
Symptoms may be delayed up to 1 hour

CO-EXPOSURE CONCERNS
Chlorinated hydrocarbon insecticides
Toxaphene and Related Compounds

THERMAL DECOMPOSITION PRODUCTS INCLUDE
Hydrogen chloride
Carbon monoxide

MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE
Respiratory system disorders
Cardiovascular system disorders
Central nervous system disorders

DECONTAMINATION
• Wear positive-pressure SCBA and protective equipment specified by references such as the DOT Emergency Response Guidebook or the CANUTEC Initial Emergency Response Guide. If special chemical protective clothing is required, consult the chemical manufacturer or specific protective clothing compatibility charts.
• Delay entry until trained personnel and proper protective equipment are available.
• Remove patient from contaminated area.
• Quickly remove and isolate patient’s clothing, jewelry, and shoes.
• Gently brush away dry particles and blot excess liquids with absorbent material.
• Rinse patient with warm water, 30° C/86° F, if possible.
• Wash patient with Tincture of Green soap or a mild liquid soap and large quantities of water.
• Leather absorbs pesticides and should be isolated and properly disposed of.
• Refer to decontamination protocol in Section Three.

IMMEDIATE FIRST AID
• Ensure that adequate decontamination has been carried out.
• If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask as trained. Perform CPR if necessary.
• Immediately flush contaminated eyes with gently flowing water.
• Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration.
• Keep victim quiet and maintain normal body temperature.
• Obtain medical attention.

BASIC TREATMENT
• Establish a patent airway. Suction if necessary.
• Watch for signs of respiratory insufficiency and assist ventilations if necessary.
• Administer oxygen by nonrebreather mask at 10 to 15 L/min.
• Monitor for shock and treat if necessary (refer to shock protocol in Section Three).
• Keep patient quiet, reduce external stimuli and be prepared to treat seizures (refer to seizure protocol in Section Three).
• For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline during transport (refer to eye irrigation protocol in Section Three).
• Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal (refer to ingestion protocol in Section Three and activated charcoal protocol in Section Four).

ADVANCED TREATMENT
• Consider orotracheal or nasotracheal intubation for airway control in the patient who is unconscious or in respiratory arrest.
Toxaphene and Related Compounds

- Monitor cardiac rhythm and treat arrhythmias if necessary (refer to cardiac protocol in Section Three).
- Start an IV with D₃W TKO. Use lactated Ringer's if signs of hypovolemia are present.
- For hypotension with signs of hypovolemia, administer fluid cautiously. Watch for signs of fluid overload (refer to shock protocol in Section Three).
- Treat seizures with diazepam (Valium) (refer to diazepam protocol in Section Four).
- Use proparacaine hydrochloride to assist eye irrigation (refer to proparacaine hydrochloride protocol in Section Four).

INITIAL EMERGENCY DEPARTMENT CONSIDERATIONS

- Useful initial laboratory studies include complete blood count, serum electrolytes, blood urea nitrogen (BUN), creatinine, glucose, urinalysis, and baseline biochemical profile, including serum aminotransferases (ALT and AST), calcium, phosphorus, and magnesium. Arterial blood gases (ABGs), chest radiograph, and electrocardiogram may be required.
- Obtain toxicological consultation if necessary.

SPECIAL CONSIDERATIONS

- Avoid epinephrine and related beta agonists (unless patient is in cardiac arrest or has reactive airways disease refractory to other treatment) because of the possible irritable condition of the myocardium. Use of these medications may lead to ventricular fibrillation.
- Products may be dissolved in hydrocarbon solvents. The solvent may add to the toxicity. The identity of the solvent should be identified and the appropriate guideline consulted.
Acrolein and Related Compounds

SUBSTANCE IDENTIFICATION
Colorless-to-yellow liquid unsaturated aldehyde with a disagreeable, choking odor. Used as a herbicide and biocide to control weed and algae; as a warning agent in methyl chloride refrigerants; in the manufacture of perfumes, pharmaceuticals, plastics, glycerin, and resins as a chemical intermediate; as a tissue fixative; and in military poison gas mixtures. Acrolein is more irritating than formaldehyde.

ROUTES OF EXPOSURE
Skin and eye contact
Inhalation
Ingestion
Skin absorption

TARGET ORGANS
Primary
Skin
Eyes
Cardiovascular system
Respiratory system
Secondary
Central nervous system
Gastrointestinal system

LIFE THREAT
Severe respiratory tract irritation leading to pulmonary edema and respiratory failure.

SIGNS AND SYMPTOMS BY SYSTEM
Cardiovascular: Tachycardia, arrhythmias, and hypertension.
Respiratory: Upper airway irritation, cough, dyspnea, and pulmonary edema. Bronchoconstriction.
CNS: Dizziness, headache, coma.
Gastrointestinal: Nausea, vomiting, and diarrhea.
Eye: Conjunctivitis, burns and corneal damage. Intense lacrimation.
Skin: Irritant dermatitis, erythema, and chemical burns.
Other: Nitrogen is usually added to biocide preparations to exclude air and prevent polymerization reactions. Hydroquinone may be added to inhibit oxygen mediated polymerizations. Some products may present a human mutagenic risk.

SYMPTOM ONSET FOR ACUTE EXPOSURE
Immediate
Possible delay of some symptoms, especially respiratory

THERMAL DECOMPOSITION PRODUCTS INCLUDE
Carbon dioxide
Carbon monoxide
Peroxides

MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE
Respiratory system disorders
DECONTAMINATION
- Wear positive-pressure SCBA and protective equipment specified by references such as the DOT Emergency Response Guidebook or the CANUTEC Initial Emergency Response Guide. If special chemical protective clothing is required, consult the chemical manufacturer or specific protective clothing compatibility charts.
- Delay entry until trained personnel and proper protective equipment are available.
- Remove patient from contaminated area.
- Quickly remove and isolate patient's clothing, jewelry, and shoes.
- Gently blot excess liquids with absorbent material.
- Rinse patient with warm water, 30°C/86°F, if possible.
- Wash patient with Tincture of Green soap or a mild liquid soap and large quantities of water.
- Refer to decontamination protocol in Section Three.

IMMEDIATE FIRST AID
- Ensure that adequate decontamination has been carried out.
- If victim is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask as trained. Perform CPR if necessary.
- Immediately flush contaminated eyes with gently flowing water.
- Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration.
- Keep victim quiet and maintain normal body temperature.
- Obtain medical attention.

BASICTREATMENT
- Establish a patent airway. Suction if necessary.
- Watch for signs of respiratory insufficiency and assist ventilations if necessary.
- Administer oxygen by nonrebreather mask at 10 to 15 L/min.
- Monitor for pulmonary edema and treat if necessary (refer to pulmonary edema protocol in Section Three).
- For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline during transport (refer to eye irrigation protocol in Section Three).
- Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal (refer to ingestion protocol in Section Three and activated charcoal protocol in Section Four).
- Cover skin burns with dry sterile dressings after decontamination (refer to chemical burn protocol in Section Three).

ADVANCED TREATMENT
- Consider orotracheal or nasotracheal intubation for airway control in the patient who is unconscious or in severe respiratory distress.
- Positive-pressure ventilation techniques with a bag-valve-mask device may be beneficial.
- Consider drug therapy for pulmonary edema (refer to pulmonary edema protocol in Section Three).
- Monitor cardiac rhythm and treat arrhythmias if necessary (refer to cardiac protocol in Section Three).
Acrolein and Related Compounds

- Start an IV with $D_5W$ TKO. Use lactated Ringer’s if signs of hypovolemia are present. Watch for signs of fluid overload.
- Use proparacaine hydrochloride to assist eye irrigation (refer to proparacaine hydrochloride protocol in Section Four).

INITIAL EMERGENCY DEPARTMENT CONSIDERATIONS

- Useful initial laboratory studies include complete blood count, serum electrolytes, blood urea nitrogen (BUN), creatinine, glucose, urinalysis, and baseline biochemical profile, including serum aminotransferases (ALT and AST), calcium, phosphorus, and magnesium. Determination of anion and osmolar gaps may be helpful. Arterial blood gases (ABGs), chest radiographs, and electrocardiogram may be required.
- Positive end-expiratory pressure (PEEP)-assisted ventilation may be necessary in patients with acute parenchymal injury who develop pulmonary edema or adult respiratory distress syndrome.
- Obtain toxicological consultation as necessary.

SPECIAL CONSIDERATIONS

- Acrolein functions as a cellular poison by binding to sulfhydryl groups.
Chlorophenoxy Herbicides and Related Compounds

SUBSTANCE IDENTIFICATION
Colorless to white, yellow, or tan color, odorless solid. Formulated as an emulsifiable concentrate, granule, or liquid. Used as a broad-leaf herbicide, defoliant, and plant hormone (growth regulator). May be mixed with other herbicides before use. Over 60 million pounds of 2,4-D are used in the United States annually. 2,4,5-T was banned for use in the United States by the EPA in 1979. In Vietnam, from 1966 to 1971, a 50/50 mixture of 2,4-D and 2,4,5-T was known as Agent Orange (named for the orange stripe on the 55-gallon drums). Agent White was 2,4-D, and Agent Blue was dimethylarsinic acid.

ROUTE OF EXPOSURE
Skin and eye contact
Inhalation
Ingestion
Skin absorption

TARGET ORGANS
Primary
Skin
Eyes
Central nervous system
Cardiovascular system

Secondary
Respiratory system
Gastrointestinal tract
Hepatic
Renal
Metabolism

LIFE THREAT
Hypohyperexcitation of the nervous system and respiratory failure. Ventricular fibrillation and seizures.

SIGNS AND SYMPTOMS BY SYSTEM
Cardiovascular: electrocardiogram abnormalities, including inverted or flattened T waves. Ventricular arrhythmias, vasodilation, and cardiovascular collapse.
Respiratory: Tachypnea, respiratory failure, and pulmonary edema.
CNS: Stiffness of the extremities, paresthesias, ataxia, vertigo, incoordination, paralysis, stupor, CNS depression, and coma. Muscle twitching and weakness. May cause peripheral neuropathy with nerve conduction velocity and/or electromyogram (NCV/EMG) changes and seizures. Neurobehavioral changes.
Gastrointestinal: Nausea, vomiting, abdominal pain, diarrhea, or blood in the stool.
Eye: Chemical conjunctivitis. Constricted pupils.
Skin: Dermatitis, diaphoresis, and chloracne
Renal: Kidney damage
Hepatic: Liver damage.
Metabolism: Metabolism acidosis and hyperkalemia.
Other: May cause disturbances in body temperature: reduction in cold climates and febrile responses on exertion in warm climates. Skeletal muscle myotonia, rhabdomyolysis, and myoglobinuria.

SYMPTOM ONSET FOR ACUTE EXPOSURES
Immediate
Some symptoms may be delayed

CO-EXPOSURE CONCERNS
Other chlorophenoxy herbicides

THERMAL DECOMPOSITION PRODUCTS INCLUDE
Carbon monoxide
Chlorine
Hydrogen chloride
Phosgene

MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE
Nervous system disorders

DECONTAMINATION
- Wear positive-pressure SCBA and protective equipment specified by references such as the DOT Emergency Response Guidebook or the CANUTEC Initial Emergency Response Guide. If special chemical protective clothing is required, consult the chemical manufacturer or specific protective clothing compatibility charts.
- Delay entry until trained personnel and proper protective equipment are available.
- Remove patient from contaminated area.
- Quickly remove and isolate patient’s clothing, jewelry, and shoes.
- Gently brush away dry particles and blot excess liquids with absorbent material.
- Rinse patient with warm water. 30° C/86° F, if possible.
- Wash patient with Tincture of Green soap or a mild liquid soap and large quantities of water.
- Refer to decontamination protocol in Section Three

IMMEDIATE FIRST AID
- Ensure that adequate decontamination has been carried out.
- If victim is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask as trained. Perform CPR if necessary.
- Immediately flush contaminated eyes with gently flowing water.
- Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration.
- Keep victim quiet and maintain normal body temperature.
- Obtain medical attention.

BASIC TREATMENT
- Establish a patent airway. Suction if necessary.
- Watch for signs of respiratory insufficiency and assist ventilations if necessary.
- Administer oxygen by nonrebreather mask at 10 to 15 L/min.
- Monitor for pulmonary edema and treat if necessary (refer to pulmonary edema protocol in Section Three).
Chlorophenoxy Herbicides and Related Compounds

- Monitor for shock and treat if necessary (refer to shock protocol in Section Three).
- Anticipate seizures and treat if necessary (refer to seizure protocol in Section Three).
- For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline during transport (refer to eye irrigation protocol in Section Three).
- Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal (refer to ingestion protocol in Section Three and activated charcoal protocol in Section Four).
- Monitor body temperature and treat if necessary.

ADVANCED TREATMENT
- Consider orotracheal or nasotracheal intubation for airway control in the unconscious patient.
- Positive-pressure ventilation techniques with a bag-valve-mask device may be beneficial.
- Start an IV with lactated Ringer’s TKO. Titrate to maintain adequate urine flow. Watch for signs of fluid overload.
- Monitor and treat cardiac arrhythmias if necessary (refer to cardiac protocol in Section Three).
- Consider drug therapy for pulmonary edema (refer to pulmonary edema protocol in Section Three).
- For hypotension with signs of hypovolemia, administer fluid cautiously. Consider vasopressors if hypotensive without signs of hypovolemia (refer to shock protocol in Section Three).
- Treat seizures with diazepam (Valium) (refer to diazepam protocol in Section Four).
- Use proparacaine hydrochloride to assist eye irrigation (refer to proparacaine hydrochloride protocol in Section Four).

INITIAL EMERGENCY DEPARTMENT CONSIDERATIONS
- Useful initial laboratory studies include complete blood count, serum electrolytes, blood urea nitrogen (BUN), creatinine, glucose, urinalysis, and baseline biochemical profile, including serum aminotransferases (ALT and AST), calcium, phosphorus, and magnesium. Determination of anion and osmolar gaps may be helpful. Arterial blood gases (ABGs), chest radiograph, and electrocardiogram may be required.
- Chronically exposed individuals require CBC, biochemistry profile, thyroid, folate, and vitamin B₁₂ determinations. Adipose tissue measurements of TCDD and neurobehavioral tests may be useful.
- Positive end-expiratory pressure (PEEP)-assisted ventilation may be necessary in patients with acute parenchymal injury who develop pulmonary edema or adult respiratory distress syndrome.
- Products may cause acidosis; hyperventilation and sodium bicarbonate may be beneficial. Bicarbonate therapy should be guided by patient presentation, ABG determination, and serum electrolyte considerations.
- If patient is comatose, exhibits severe metabolism acidosis, or myoglobinuria, forced alkaline diuresis with adequate potassium replacement may be beneficial to enhance elimination.
- Obtain toxicological consultation as necessary.
SPECIAL CONSIDERATIONS

· TCDD (dioxin) contamination, as well as the chlorophenoxy herbicides themselves, may be responsible for the chronic neurologic effects observed. Products contaminated with TCDD may pose a human carcinogenic risk.

· Unlike TCDD, which bioaccumulates, there is no evidence that the chlorophenoxy herbicides behave similarly.
Dichloropropane, Dichloropropene, and Related Compounds

SUBSTANCE IDENTIFICATION
A colorless, yellow, or purple liquid with an unpleasant mustard or chloroform-like odor. Used as a preplant fumigant with nematocidal properties

ROUTE OF EXPOSURE
Skin and eye contact
Inhalation
Ingestion
Skin absorption

TARGET ORGANS
Primary
Skin
Eyes
Respiratory system
Gastrointestinal system
Hepatic
Renal
Secondary
Cardiovascular system
Central nervous system

LIFE THREAT
Pulmonary edema, bronchospasm, and alveolar hemorrhage.

SIGNS AND SYMPTOMS BY SYSTEM
Cardiovascular: Arrhythmias caused by hypoxia.
Respiratory: Increased respiratory rate, coughing, dyspnea, substernal chest pain, bronchospasm, and pulmonary edema. Irritation to the upper airway.
CNS: Headache, dizziness, decreased level of consciousness, and coma
Gastrointestinal: Nausea, vomiting, and diarrhea.
Eye: Chemical conjunctivitis, lacrimation, corneal damage, eye pain, and photophobia.
Skin: Dermatitis, irritation, and chemical burns with deep-seated pain in the area of absorption.
Renal: Kidney damage.
Hepatic: Liver damage.
Other: Some products may present a human carcinogenic risk. NOTE: Some of these products may be mixed with a hydrocarbon solvent as a vehicle. Toxicity may result from the solvent.

SYMPTOM ONSET FOR ACUTE EXPOSURE
Immediate
Possible delay of some symptoms
CO-EXPOSURE CONCERNS
Hydrocarbon solvents

THERMAL DECOMPOSITION PRODUCTS INCLUDE
Carbon dioxide
Carbon monoxide
Hydrogen chloride
Phosgene

MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE
Respiratory disorders (COPD, asthma)

DECONTAMINATION
- Wear positive-pressure SCBA and protective equipment specified by references such as the DOT Emergency Response Guidebook or the CANUTEC Initial Emergency Response Guide. If special chemical protective clothing is required, consult the chemical manufacturer or specific protective clothing compatibility charts.
- Delay entry until trained personnel and proper protective equipment are available.
- Remove patient from contaminated area.
- Quickly remove and isolate patient’s clothing, jewelry, and shoes.
- Gently blot excess liquids with absorbent material.
- Rinse patient with warm water, 30°C/86°F, if possible.
- Wash patient with Tincture of Green soap or a mild liquid soap and large quantities of water.
- Refer to decontamination protocol in Section Three.

IMMEDIATE FIRST AID
- Remove victim from contact with the material.
- Ensure that adequate decontamination has been carried out.
- If victim is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask as trained. Perform CPR if necessary.
- Immediately flush contaminated eyes with gently flowing water.
- Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration.
- Keep victim quiet and maintain normal body temperature.
- Obtain medical attention

BASIC TREATMENT
- Establish a patent airway. Suction if necessary.
- Watch for signs of respiratory insufficiency and assist ventilations if necessary.
- Administer oxygen by nonrebreather mask at 10 to 15 L/min.
- Monitor for pulmonary edema and treat if necessary (refer to pulmonary edema protocol in Section Three).
- For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline during transport (refer to eye irrigation protocol in Section Three).
- Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal (refer to ingestion protocol in Section Three and activated charcoal protocol in Section Four).
- Cover skin burns with dry sterile dressings after decontamination (refer to chemical burn protocol in Section Three).
ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in the unconscious or severe respiratory distress patient.
- Positive-pressure ventilation techniques with a bag-valve-mask device may be beneficial.
- Monitor and treat cardiac arrhythmias if necessary (refer to cardiac protocol in Section Three).
- Start an IV with D5W TKO. Use lactated Ringer’s if signs of hypovolemia are present. Watch for signs of fluid overload and signs of pulmonary edema.
- Consider drug therapy for pulmonary edema (refer to pulmonary edema protocol in Section Three).
- Use proparacaine hydrochloride to assist eye irrigation (refer to proparacaine hydrochloride protocol in Section Four).

INITIAL EMERGENCY DEPARTMENT CONSIDERATIONS

- Useful initial laboratory studies include complete blood count, serum electrolytes, blood urea nitrogen (BUN), creatinine, glucose, urinalysis, and baseline biochemical profile, including serum aminotransferases (ALT and AST), calcium, phosphorus, and magnesium. Determination of anion and osmolar gaps may be helpful. Arterial blood gases (ABGs), chest radiograph, and electrocardiogram may be required.
- Positive end-expiratory pressure (PEEP)-assisted ventilation may be necessary in patients with acute parenchymal injury who develop pulmonary edema or adult respiratory distress syndrome.
- Obtain toxicological consultation as necessary.

SPECIAL CONSIDERATIONS

- Ascertain identity of the solvent involved and refer to appropriate guideline.
Dinitrophenol and Related Compounds

SUBSTANCE IDENTIFICATION
Found as a yellow solid with a musty, sweet odor. Used in solid, wettable powder and oil solution form. Formulated as fungicides, insecticides, and herbicides. Also used in wood preservatives, explosives, dyestuffs, photographic developers, and chemical intermediates.

ROUTES OF EXPOSURE
Skin and eye contact
Inhalation
Ingestion
Skin absorption

TARGET ORGANS
Primary
Skin
Eyes
Central nervous system
Cardiovascular system
Respiratory system
Hepatic
Renal
Metabolism
Blood
Secondary
Gastrointestinal system

LIFE THREAT
Respiratory and circulatory collapse. Pulmonary edema and marked elevation in body temperature.

SIGNS AND SYMPTOMS BY SYSTEM
Cardiovascular: Initially, blood pressure increase followed by hypotension. Ventricular arrhythmias and tachycardia.
Respiratory: Deep breathing followed by dyspnea, decreased rate, and respiratory arrest. Occasionally, pulmonary edema.
CNS: Extreme fatigue, headache, dizziness, weakness, and excitation, followed by mental status changes, depression, coma, and seizures.
Gastrointestinal: Nausea, vomiting, diarrhea, and abdominal pains. Extreme thirst.
Eye: Chemical conjunctivitis, corneal damage, dilated pupils, and nystagmus possible. Secondary glaucoma and or cataracts.
Skin: Dermatitis and chemical burns. Cyanosis or flushed color with profuse sweating. Yellow staining of the skin seen with dinitrophenol poisoning.
Renal: Kidney damage.
Hepatic: Liver damage with jaundice.
Metabolism: Fever (hyperthermia). Compounds are uncouplers of oxidative phosphorylation. Metabolic acidosis. Thyroid damage.
Blood: Methemoglobinemia.
Other: Some products may present a human teratogenic risk. Exposure may alter metabolism and cause severe hyperthermia. Response personnel should be warned against overheating, since the toxicity of these products may be exaggerated by high temperature environments. NOTE: Some of these products may be mixed with a hydrocarbon solvent as a vehicle. Toxicity may also result from the solvent.

SYMPTOM ONSET FOR ACUTE EXPOSURE
Immediate
Possible delay of some symptoms
Possible delay of liver and kidney damage 12 to 72 hours

CO-EXPOSURE CONCERNS
High temperature environments
Hydrocarbon solvents

THERMAL DECOMPOSITION PRODUCTS INCLUDE
Carbon dioxide
Carbon monoxide
Nitrogen oxides

MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE
Cardiovascular disorders

DECONTAMINATION
• Wear positive-pressure SCBA and protective equipment specified by references such as the DOT Emergency Response Guidebook or the CANUTEC Initial Emergency Response Guide. If special chemical protective clothing is required, consult the chemical manufacturer or specific protective clothing compatibility charts.
• Delay entry until trained personnel and proper protective equipment are available.
• Remove patient from contaminated area.
• Quickly remove and isolate patient's clothing, jewelry, and shoes.
• Gently brush away dry particles and blot excess liquids with absorbent material.
• Rinse patient with warm water, 30°C/86°F, if possible.
• Wash patient with Tincture of Green soap or a mild liquid soap and large quantities of water.
• Refer to decontamination protocol in Section Three.

IMMEDIATE FIRST AID
• Ensure that adequate decontamination has been carried out.
• If victim is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask as trained. Perform CPR if necessary.
• Immediately flush contaminated eyes with gently flowing water.
• Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration.
• Keep victim quiet and maintain normal body temperature.
• Obtain medical attention.

BASIC TREATMENT
• Establish a patent airway. Suction if necessary.
• Watch for signs of respiratory insufficiency and assist ventilations if necessary.
• Administer oxygen by nonrebreather mask at 10 to 15 L/min.
Monitor for shock and treat if necessary (refer to shock protocol in Section Three).
Monitor for pulmonary edema and treat if necessary (refer to pulmonary edema protocol in Section Three).
Anticipate seizures and treat if necessary (refer to seizure protocol in Section Three).
For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline during transport (refer to eye irrigation protocol in Section Three).
Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal (refer to ingestion protocol in Section Three and activated charcoal protocol in Section Four).
Cover skin burns with dry sterile dressings after decontamination (refer to chemical burn protocol in Section Three).
Rapid body cooling may be necessary in case of hyperthermia. Salicylates are contraindicated.

ADVANCED TREATMENT
Consider orotracheal or nasotracheal intubation for airway control in the patient who is unconscious or in severe respiratory distress.
Positive-pressure ventilation techniques with a bag-valve-mask device may be beneficial.
Monitor cardiac rhythm and treat arrhythmias if necessary (refer to cardiac protocol in Section Three).
Start an IV with lactated Ringer's to treat dehydration. Watch for signs of fluid overload and pulmonary edema.
For hypotension with signs of hypovolemia, administer fluid cautiously. Consider vasopressors for hypotension with a normal fluid volume. Watch for signs of fluid overload (refer to shock protocol in Section Three).
Consider drug therapy for pulmonary edema (refer to pulmonary edema protocol in Section Three).
Treat seizures with diazepam (Valium) (refer to diazepam protocol in Section Four).
Administer 1% solution methylene blue if patient is symptomatic with severe hypoxia, cyanosis, and cardiac compromise not responding to oxygen. DIRECT PHYSICIAN ORDER ONLY (refer to methylene blue protocol in Section Four).
Use proparacaine hydrochloride to assist eye irrigation (refer to proparacaine hydrochloride protocol in Section Four).

INITIAL EMERGENCY DEPARTMENT CONSIDERATIONS
Useful initial laboratory studies include: complete blood count, serum electrolytes, blood urea nitrogen (BUN), creatinine, glucose, urinalysis, and baseline biochemical profile, including serum aminotransferases (ALT and AST), bilirubin, calcium, phosphorus, magnesium and thyroid function. Determination of anion and osmolar gaps may be helpful. Arterial blood gases (ABGs), chest radiograph, and electrocardiogram may be required.
Monitor blood methemoglobin levels and treat with methylene blue if patient is symptomatic and/or has a blood methemoglobin level greater than 30% (refer to methylene blue protocol in Section Four).
Positive end-expiratory pressure (PEEP)-assisted ventilation may be necessary in patients with acute parenchymal injury who develop pulmonary edema or adult respiratory distress syndrome.
Dinitrophenol and Related Compounds

- Products may cause acidosis; hyperventilation and sodium bicarbonate may be beneficial. Bicarbonate therapy should be guided by patient presentation, ABG determination, and serum electrolyte considerations.
- Use of atropine is contraindicated.
- Obtain toxicological consultation as necessary.

**SPECIAL CONSIDERATIONS**
- Ascertain identity of the solvent involved and refer to appropriate guideline.