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1. PURPOSE AND CONTENTS

This appendix is intended to be a quick reference guide for staff at transportation agencies emergency operations centers regarding terrorism. It is meant to provide some guidance to use immediately after an act of terrorism or to prepare for a potential attack based upon intelligence gathered.

The appendix is divided into the following sections:

- Introduction to transit terrorism;
- Changing nature of the threat, including methods used against transportation targets;
- Nature of terrorism devices, including transportation employee response, supportative protective actions and weapons overview;
- High level what to do when a terrorism incident happens;
- Information on medical facilities; and
- Information on explosive detection dogs.

All incidents are to be considered a potential hazardous material incident by transit employees. Proper response guidelines need to be followed. Two page reference fact sheets, broken into chemical, biological, radiological, nuclear and explosive (CBRNE) categories and addressing the weapons of highest concern, are included in this section. These quick review “snapshots” will support employee understanding of the weapons, guide them on what to look for and what information to report. Each fact sheet contains the following information:

- Category and description of weapon
- Name of agent/device
- Description
- Immediate response actions (SIN and TDS)
- Authority notification information
- Signs and symptoms (something the victim call tell you about or you can observe)
- How weapon is used
- Indicators and clues (environmental situation; something you can see)
- Supporting Facts
- Resources

2. INTRODUCTION TO TRANSIT TERRORISM

Public transit systems around the world have for decades served as a principal target for terrorist acts. Since 1993, mass transit systems in the United States have figured prominently in five acts of terrorism and extreme violence. The Long Island Railroad shootings in 1993, the World Trade Center bombing in 1993 (which destroyed sections in the primary New York terminus of the bi-state Port Authority’s Trans-Hudson commuter system), the 1995 sabotage induced derailment of Amtrak’s Sunset Limited in Arizona, the Fulton Street New York City subway station fire bombings in 1997 and the destruction of the World Trade Center in 2001 (which destroyed sections in the primary New York terminus of the bi-state Port Authority’s Trans-Hudson commuter system and New York Transit stations) have demonstrated the vulnerability of the United States transportation infrastructure to acts of terrorism. Combined, these acts resulted in 14 fatalities and more than 1,000 injuries to transit passengers.

Concern over the vulnerability of transit systems has been heightened further by the more recent, deadly March 11, 2004 attacks on commuter rail trains in Madrid, Spain and the July 7, 2005 attacks on the London Underground and bus systems. The London attacks, in particular,

dominated news coverage for at least a week and raised popular concern over transit terrorism in the United States such that transit security in the United Stats is now widely viewed as an important public policy issue.

3. CHANGING NATURE OF THE THREAT

Terrorism is becoming increasingly lethal throughout the world as a wide variety of groups seeking influence, embrace escalating levels of violence.

Historically perpetrators of bombings in the transportation environment (in foreign countries such as Israel, France, India, and England) have used two tactics that intensify the magnitude of casualties inflicted by detonation of an improvised explosive device:

1. Perpetrators have detonated a small device to bring public safety personnel to the site, and a larger, more deadly device is detonated some time after the first, thereby inflicting heavy casualties on the First-Responder community and seriously weakening its ability to respond appropriately to additional events.

2. Perpetrators have used a real or simulated device to force evacuation of a facility only to detonate a much more substantial device in identified bomb-threat evacuation assembly areas. These attacks are especially harmful because the evacuation assembly areas often concentrate transportation personnel and passengers more densely than would otherwise be the case.

3.1. Methods Used Against Transportation Targets

The Terrorism and Violent Crime Chronology Database is a complication of all documented global terrorist incidents/acts of extreme violence from January 1, 1901 through December 31, 2002. This database is useful for establishing occurrences of public transportation terrorism as a segment of global terrorism events.

The most common tactics employed against transit include:

- explosives introduced onto a vehicle or station in abandoned backpacks, briefcases, or suitcases;
- weapons fired on buses or into stations; and
- suicide bombers wearing or carrying explosives.

4. NATURE OF TERRORISM DEVICES

Protecting transit agency staff and passengers from terrorist events require

- an understanding of action steps that need to be taken by vehicle operators,
- the importance of alert notifications,
- a generalized knowledge of the weapons, and
- knowledge of the types of potential harm the weapons can inflict.

Incidents that involve what is referred to as CBRNE weapons—weapons using chemical, biological, radiological, nuclear or explosive materials—are extremely dangerous. They readily kill innocent transit employees, customers, and bystanders as well as emergency responders. Their use introduces extensive challenges for transit agencies and responding law enforcement and medical authorities. This annex aims to help transit agency employees learn to respond to

these hazards in an informed and effective manner in order to save lives and minimize the physical and economic harm of a terrorist attack.

4.1. Transportation Employee Response

For the transit employees, acting quickly and being observant and alert to what is happening on the scene in order to report essential details is critical for saving lives. Response requires specialized assistance. Transit employees and riders should follow the protocols of law enforcement officers by not touching suspected devices but withdrawing to a safe distance to await the arrival of bomb technicians while potential victims are evacuated from the vicinity.

When an incident occurs, immediately call 911 to alert authorities who are equipped and trained to assess and respond to the situation. Two acronyms summarize the most important set of procedures on-scene transit employees should follow:

SIN

- SECURE vehicle and area
- ISOLATE vehicle without reentry
- NOTIFY 911

TDS

- TIME—limit time on target (near weapon)
- DISTANCE—get as far away as possible
- SHIELDING—create a barrier between self and weapon

The most critical lifesaving tactic is to reduce exposure. Instruct operators to direct transit riders to move as far away as possible from the source of a potential weapon—moving up-wind, up-hill, up-stream or against the incoming/outgoing tide or current, and to shield the body or vehicle (e.g., move the vehicle around a corner or behind a building). The greater the distance and shield, the greater the margin of safety.

Not only does the quality of incident reporting by transit employees enable a more rapid and effective lifesaving response, it also impacts the success of the incident investigation. The destructive potential of illegally used commercial explosives, military ordinances and improvised explosive devices demand a thorough investigative effort in order to determine the scope of the incident and identify those responsible. Details provided by transit employees are invaluable for that investigation.

It is not expected that employees on the scene will know what potential weapon or agent might present. The greater transit employee's general understanding of the types of potential weapons and harm, the more effectively they can respond to a situation, safeguard passengers, and inform officials of critical details.

As with any known or potential terrorism threat, transit employee priority is to cooperate with the fire, emergency medical services and law enforcement in their efforts to evaluate the situation, gathering information, take action, and possibly initiate a decontamination procedure. Alerting officials of signs and symptoms in passengers (e.g., breathing difficulties, reddened faces) and environmental indicators and clues (e.g., pools of liquid, smoke) will provide first responders with details to inform them in their action planning and response protocol.

4.2. Supportive Protective Actions

First responders will direct the course of action once on scene. Meanwhile, transit employees will support lifesaving by understanding and following basic principles of health and safety, including the following:

Isolate Hazard Area and Deny Entry means keep all employees and riders away from the area. This "isolation" task is done first to establish control. This is the first step for any protective actions that may follow.

Evacuate means move all employees and riders from the threatened area to a safer place. Begin evacuating people nearby and those outdoors in direct view of the scene downwind and crosswind.

Shelter-In Place means employees, riders and bystanders inside a building, rail station, vehicle or ferry should remain inside until the danger passes. Shelter-In Place protection is used when evacuating people would cause greater risk than staying where they are, or when an evacuation cannot be performed. Shelter-In Place protection may not be the best option if (a) the vapors are flammable; (b) if it will take a long time for the gas to clear the area; or (c) if the vehicle or building cannot be closed tightly. Vehicles are not as effective as buildings for in-place protection. Vehicles can offer some protection for a short period if the windows are closed and the ventilating systems are shut off. Direct the people inside to close all doors and windows; shut off all ventilating, heating and cooling systems. Maintain communications with competent persons inside the building or vehicle so that they are advised about changing conditions. Person sheltered should be warned to stay far from windows because of the danger from glass and projected metal fragments in a fire and/or explosion.

4.3. Weapons Overview

Current weapons terminology uses the acronym CBRNE to describe weapons using **chemical, biological, radiological, nuclear or explosive (and incendiary)** materials. While biological agents pose the greatest threat, chemical agents are easy to obtain and use. Key routes of exposure to CBRNE weapons are by **inhalation, ingestion, absorption and injection.** Historically, bombs have been the weapons of choice for terrorists. Approximately 70 percent of all terrorist incidents involve the use of explosives. Improvised explosive devices (known as IEDs) can be used to deliver a wide range of explosive effects—including providing vehicles for the dispersal of chemical, biological and radiological materials.

One commonly used classification system for "harm" categorizes weapons effects into six categories: heat, radiological, breathing, chemical, biological, and explosive. This description helps create in a simplified understanding what harm can be done:

Heat (thermal) hazards occur when there is potential of human exposure to products that are extremely hot or cold. *Explosives* and *incendiaries* produce significant thermal hazards.

Radiological hazards occur when there is the potential for human exposure to radiation. Radiological hazards are present following a nuclear detonation or exposure of victims to radiological materials in unshielded containers.

Breathing (asphyxiation) hazards occur when there is insufficient oxygen and accumulating carbon dioxide in the blood and tissues due to interference with respiration either by particles in

the air such as smoke from an explosive or incendiary device or physical trauma to the respiratory system. Without prompt treatment, it can be fatal.

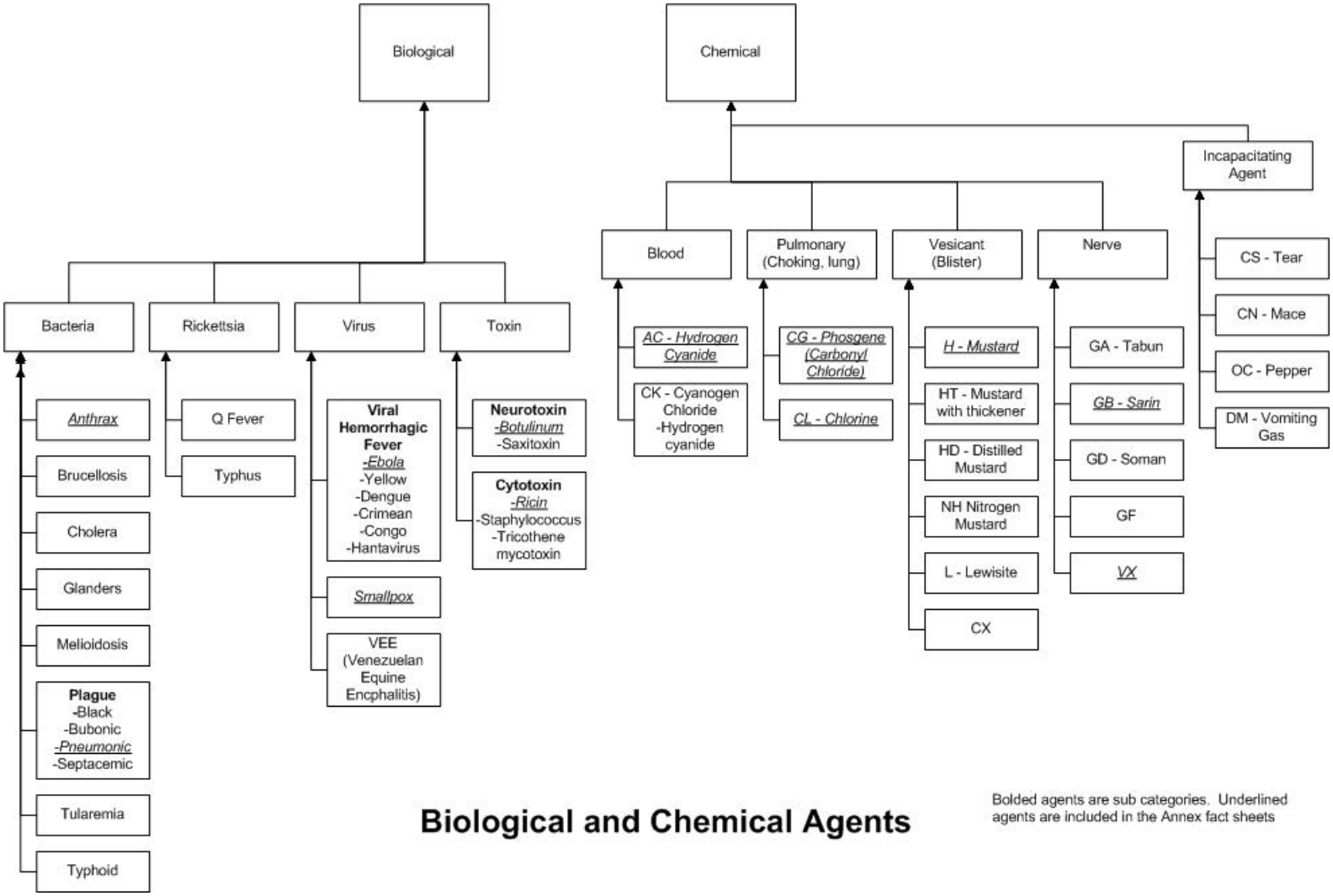
Chemical hazards occur when there is the potential for human exposure to toxic chemical substances. Chemical weapons—nerve, blood, blister and choking agents—produce chemical hazards. In addition, industrial chemicals such as chlorine, phosgene and some insecticides can cause substantial physical damage to human subjects.

Biological (etiological) and related hazards include bacteria, viruses or toxins that can cause disease or injury to human subjects. Weaponized material of this kind is extremely dangerous because its use may go undetected until it is too late to successfully treat victims exposed to it.

Explosive (mechanical) hazards include projectiles and shrapnel that cause lacerations, abrasions and punctures to unprotected persons.

Most indicators of weapon agents are self-explanatory; however, where bombs appear to “fizzle” as a failed or minimal explosion could suggest a bomb disseminating biological, chemical or radiological material. Biological weapons take the form of disease-causing organisms (bacteria, rickettsia or viruses) or toxins caused by living organisms. If a biological agent is used, it is highly unlikely any “real time” observations can be made, particularly in the very brief period of time prior to first responders’ arrival on the scene. Notification of a biological agent release will be provided by public health officials. Transit officials will be informed on the location of the potential release, which areas to avoid and the actions that are required, based on event and situation. Follow all response protocols issued.

Chemical agents have received widespread publicity, particularly since the Gulf War, increasingly since the use of these agents in the Iraq War. Some chemical agents have characteristic odors; however, many do not. Chemical agents are broken out into nerve, blister, blood, choking and irritant agents, and classified as either persistent (often referenced as lethal concentrations for more than 12 hours) or non-persistent (often references as lethal concentrations for less than 12 hours) which pertains to length of time the chemicals maintains as a major hazard. (See wire chart below for overview of biological and chemical agents. Agents currently of great concern to the CDC and law enforcement are underlined in the chart and described in the annex fact sheets.)



Biological and Chemical Agents

Bolded agents are sub categories. Underlined agents are included in the Annex fact sheets

5. HIGH LEVEL - WHAT TO DO WHEN A TERRORISM INCIDENT HAPPENS

The following is not intended to supersede agency security and safety measures but to provide emergency operations staff an idea of what to do when a terrorism incident happens.

Historically, terrorist who have utilized bombs have generally used two tactics that intensity the number of causalities:

- When an incident happens once, expect it to happen multiple times and multiple locations.
- The first incident may be a smoke screen to more extensive damage.

5.1. Responding to an Attack

Responding to an attack will require coordination between the local transportation agency and local authorities (police and fire) and potentially hazardous material teams. The local authorities should be notified first after detection. Emergency Operations Center staff should ensure that local authorities (police and fire) have been contacted via communicate with dispatch/central control.

5.2. Things to Keep In Mind

After an act of terrorism, transportation employees will become alert to objects out of the ordinary. If for some reason, dispatch/central control can not communicate with field staff (bus drivers/operators, mechanics, etc.) and the Emergency Operations Center staff can, the following procedures are suggested when an employee finds a suspicious object[1]:

- Do not touch or disturb it.
- Safely isolate and deny access to area.
- Immediately evacuate the area (no less than 100 yards from the object).
- Prepare to describe the object in great detail to the bomb squad.
- Do not conduct cellular phone transmissions within 100 yards of a suspect object, or in direct line of sight of the object.
- Suspect the possibility of a secondary device.
- Maintain an awareness of secondary impact on the transit system.

If an evacuation of a vehicle and/or facility is required, the Emergency Operations Center staff should be notified by dispatch/central control. More than likely dispatch/central control will issue an evacuation message to the driver/operator since they will be radio contact. However, if Emergency Operations Center staff is recruited to deliver the message, the public announcement should be clear and calm, and provide definitive directions regarding evacuation destinations and instructions. Evacuation directions should stress the need to maintain order and avoid deception. Undue emphasis on words such as "bomb," "blast," "explosion," "detonate," and "blow up," should be avoided. In this instance, pre-recorded messages can be valuable to use to inform the public of the situation, since they are not delivered with unusual stress or emotion.

If a search is required of a vehicle or a facility, the Emergency Operations Center staff should be informed of this situation since it will impact transportation operations. Emergency Operations Center staff should remember that all searchers should have received periodic training on safe search practices and explosives awareness from bomb squad professionals; with each search having a designated leader.

[1] Critical Incident Management Guidelines, Federal Transit Administration, July 1998.

6. INFORMATION ON MEDICAL FACILITIES

During an act of terrorism, the transportation agency will be in contact with 911 and the local law enforcement agencies. In case a driver, operator or staff person is dispatched to a medical facility, the following is a list of facilities per county.

All facilities listed are part of the Emergency Medical System in their home counties. They are geographically sorted. Note: Some facilities are designated as base hospitals for adjacent counties (though not notated) as part of mutual aid response. All facilities are capable of handling chemical, biological and nuclear cases. Locations listed as "trauma" facilities are equipped to manage patients with severe injuries that cannot be handled by base facilities.

Table C-1
List of Medical Facilities

County	City, State, Zip	Facility	Type	Licensed Beds	Address	Phone
Alameda						
Alameda	Alameda, CA 94501	Alameda Hospital	base	135	2070 Clinton Avenue	510-522-3700
Alameda	Berkeley, CA 94705	Alta Bates Medical Center	base	433	2450 Ashby Avenue, Berkeley, CA 94705	510-655-4000
Alameda	Castro Valley, CA 94546	Eden Medical Center	trauma	387	20103 Lake Chabot Road	510-537-1234
Alameda	Fremont, CA 94538	Washington Hospital	base	337	2000 Mowry Avenue, Fremont, CA 94538	510-797-1111
Alameda	Hayward, CA 94545	Kaiser Hospital, Hayward	base	316	27400 Hesparian Boulevard	510-784-4000
Alameda	Hayward, CA 94545	St. Rose Hospital	base	163	27200 Calaroga Avenue	510-264-4000
Alameda	Livermore, CA 94550	Valley Memorial Center	base	169	1111 East Stanley Boulevard	925-447-7000
Alameda	Oakland, CA 94609	Alta Bates Summit Medical Center	base	433	350 Hawthorne Street	510-655-4000
Alameda	Oakland, CA 94609	Children's Hospital & Research Center, Oakland	trauma (pediatric)	170	747 52nd Street	510-428-3045
Alameda	Oakland, CA. 94602	Highland Hospital	trauma	236	1411 East 31st Street	510-437-4800
Alameda	Oakland, CA 94611	Kaiser Hospital, Oakland	base	396	280 West MacArthur Boulevard	510-752-1000
Alameda	Pleasanton, CA 94588	ValleyCare Medical Center	base	186	5575 W. Las Positas Boulevard	925-847-3000
Alameda	San Leandro, CA 94578	San Leandro, Hospital	base	122	13855 East 14th Street, San Leandro, CA 94578	510-357-6500
Alameda	San Ramon, CA 94623	San Ramon Regional	base	123	6001 Norris Canyon Road	925-275-9200

County	City, State, Zip	Facility	Type	Licensed Beds	Address	Phone
		Medical Center				
Contra Costa						
Contra Costa	Antioch, CA 94509	Sutter/Delta Medical Center	base	111	3901 Lone Tree Way	925-779-7200
Contra Costa	Concord, CA 94524-4110	John Muir Medical Center - Concord Campus	base	254	2540 East Street	925-682-8200
Contra Costa	Martinez, CA 94553	Contra Costa Regional Medical Center	base	164	2500 Alhambra Avenue	925-370-5000
Contra Costa	Richmond, CA 94504	Kaiser Medical Center - Richmond	base	50	901 Nevin Avenue	510-307-1500
Contra Costa	San Pablo, CA 94806	Doctor's Medical Center - San Pablo	base	232	2000 Vale Road	510-970-5000
Contra Costa	San Ramon, CA 94583	San Ramon Regional Medical Center	base	123	6001 Norris Canyon Road	925-275-9200
Contra Costa	Walnut Creek, CA 94598	John Muir Medical Center - Walnut Creek Campus	trauma	321	1601 Ygnacio Valley Road	925-939-3000
Contra Costa	Walnut Creek, CA 94596	Kaiser Medical Center - Walnut Creek	base	229	1425 South Main Street	925-295-4000
Marin						
Marin	Greenbrae, CA 94904	Marin General Hospital	base	235	250 Bon Air Road	415-925-7200
Marin	Novato, CA 94945	Novato Community Hospital (NCH)	base	47	180 Rowland Way	415-209-1350
Marin	San Rafael, CA 94903	Kaiser Hospital San Rafael (KSR)	base	120	99 Montecillo Road	415-444-2400
San Mateo						
San Mateo	Burlingame, CA 94010	Mills-Peninsula Medical Center	base	380	1501 Trousdale Drive	650-696-5400
San Mateo	Daly City, CA 94015	Seton Medical Center	base	384	1900 Sullivan Avenue	650-992-4000
San Mateo	Moss Beach, CA 94038	Seton Coastside Hospital	base	121	600 Marine Boulevard	650-563-7100
San Mateo	Palo Alto, CA 94304-1290	Palo Alto Veterans Hospital	base	885	3801 Miranda Avenue	650-493-5000
San Mateo	Redwood City CA 94063	Kaiser Redwood City	base	213	1150 Veterans Boulevard	650-299-2000
San Mateo	Redwood City, CA 94062	Sequoia Hospital	base	308	170 Alameda de las Pulgas	650-369-5811
San Mateo	San Mateo, CA 94403	San Mateo Medical Center	base	448	222 West 39th Avenue	650-573-2222
San Mateo	South San Francisco, CA 94080	Kaiser South San Francisco	base	120	1200 El Camino Real	650-742-2000
San						

County	City, State, Zip	Facility	Type	Licensed Beds	Address	Phone
Francisco						
San Francisco	San Francisco, CA 94133	Chinese Hospital	base	54	845 Jackson Street	415-677-2300
San Francisco	San Francisco, CA 94114	CPMC-Davies Medical Center	base	238	Castro & Duboce Streets	415-600-0600
San Francisco	San Francisco, CA 94115	California Pacific Medical Center	base	521	2333 Buchaman	415-923-3333
San Francisco	South San Francisco, CA 94080	Kaiser Medical Center - South San Francisco	base	120	1200 El Camino Real	650-742-2601
San Francisco	San Francisco, CA 94115	Kaiser Permanente Medical Center	base	247	2425 Geary Street	415-202-2000
San Francisco	San Francisco, CA 94110	San Francisco General Hospital	trauma	477	1001 Potrero	415-206-8111
San Francisco	San Francisco, CA 94117	St. Mary Medical Center	base	331	450 Stanyan	415-750-5700
San Francisco	San Francisco, CA 94120	St. Francis Memorial Hospital	base	239	900 Hyde Street	415-353-6000/415-353-6300
San Francisco	San Francisco, CA 94110	St. Luke's Hospital	base	260	3555 Cesar Chavez	415-647-8600/415-641-6625
San Francisco	San Francisco, CA 94143	UCSF	base	574	505 Parnassus Avenue	415-476-1037
San Francisco	San Francisco, CA 94121	VA Medical Center	base	124	4150 Clement Street	415-221-4810
Solano						
Solano	Fairfield, CA 94533	NorthBay Medical Center	base	140	1200 B. Gale Wilson Boulevard	707-429-3600
Solano	Vacaville, CA 95687	VacaValley Hospital	base	50	1000 Nut Tree Road	707-446-4000
Solano	Vallejo, CA 94589	Kaiser Permanente Vallejo Medical Center	base	227	975 Sereno Drive	707-651-1000
Solano	Vallejo, CA 94589	Sutter Solano Medical Center	base	111	300 Hospital Drive	707-554-4444
Santa Clara						
Santa Clara	Gilroy, CA 95020	St. Louise Regional Hospital	base	92	9400 No Name Uno	408-848-2000
Santa Clara	Los Gatos, CA 95030	Community Hospital of Los Gatos	base	143	815 Pollard Road	408-378-6131
Santa Clara	Mountain View, CA 94040	El Camino Hospital	base	320	2500 Grant Road	650-940-7000
Santa Clara	San Jose, CA 95116	Regional Medical Center of San Jose	base	204	225 North Jackson Avenue	408-259-5000
Santa Clara	San Jose, CA 95119	Kaiser Santa Teresa Hospital	base	228	250 Hospital Parkway	408-972-3000
Santa Clara	San Jose, CA 95124	Good Samaritan Medical Center	base	332	2425 Samaritan Drive	408-559-2011

County	City, State, Zip	Facility	Type	Licensed Beds	Address	Phone
Santa Clara	San Jose, CA 95128	O'Connor Hospital	base	348	2105 Forest Avenue	408-947-2500
Santa Clara	San Jose, CA 95128	Santa Clara Valley Medical Center	base	510	751 South Bascom Avenue	408-885-5000
Santa Clara	Santa Clara, CA 95051	Kaiser Santa Clara Medical Center	base	327	700 Lawrence Expressway	opens in August 2007
Santa Clara	Stanford, CA 94305	Stanford University Hospital	trauma	449	300 Pasteur Drive	650-723-4000

7. INFORMATION ON METROPOLITAN MEDICAL RESPONSE SYSTEM

Metropolitan Medical Response System (MMRS) is an operational system at the local level to respond to a terrorist incident and other public health emergencies that create mass casualties or casualties requiring unique care capabilities. MMRS enables a Metropolitan Area to manage the event until State or Federal response resources are mobilized. MMRS is a locally developed, owned, and operated mass casualty response system to victims of terrorist incidents and other public health emergencies.

MMRS characteristics include:

- integrated medical response system;
- detailed system response and operations plans;
- specially trained responders at all levels;
- specialized response equipment;
- specialized medical equipment and pharmaceutical cache; and
- enhanced medical transport and treatment capabilities.

MMRS on the local level includes:

- pharmaceutical cache and distribution plan;
- early warning plans and notification system;
- incident response management/coordination;
- mass/surge patient care/fatality management;
- development of communications systems;
- planning and preparedness training; and
- victim transportation.

Transportation agencies should be aware that part of the MMRS planning process involves the planning for the triage of causalities. Triage casualty collection sites may be established after an incident.

Triage involves the classification of causalities based on medical condition. The fours colors of triage are:

- Black (deceased) no care needed.
- Red (immediate) life threatening injuries.
- Yellow (delayed) non-threatening injuries.
- Green (minor) minor injuries.

During an incident, transportation agencies may be requested by their Operational Areas to provide transportation from triage casualty collection sites based on the triage color or the greatest need.

8. INFORMATION ON EXPLOSIVE DETECTION DOGS (K-9'S)

Formal and informal procedures exist for accessing explosive detection dogs in a single incident event. The procedures range from formally-established mutual aid agreements, operating service contracts,

informal co-location relationships, and informally agreed upon asset support. The primary procedure in place now in the San Francisco Bay Area is to use an informal day-to-day request.

If a suspicious package or object is sighted, a transportation agency employee should use the normal protocol established for that transportation agency. If no protocol has been established, the transportation agency should contact the local law enforcement agency in its jurisdiction where the incident is occurring (e.g., 911 or the phone number of the local law enforcement agency). If the incident occurs on the ferry system on the San Francisco Bay, and if no procedures are in place with the law enforcement, or if the transportation agency employee is unsure of the procedures, the U.S. Coast Guard should be contacted.

8.1. Formal Requests

If a formal request is needed, call the dispatcher of the local law enforcement agency. Follow this procedure with the answering dispatcher:

1. Introduce yourself and state that your agency is experiencing an incident where an explosive detection dog may be needed.
2. Request law enforcement mutual aid.
3. Request the law enforcement agency take lead in addressing the incident.
4. Identify the possible need for an explosive detection dog and/or Explosive Ordnance Disposal Unit.
5. Explain the key facts of the incident.

8.2. Inadequate Assets

If the law enforcement agency does not have the assets to meet the transportation agency needs, the transportation agency should ask the law enforcement agency to request assistance from their County Sheriff's Department through the Law Enforcement Mutual Aid System.

If for any reason the County Sheriff's Department is not accessible, the following action steps will be taken by the law enforcement agencies:

- The law enforcement agency will contact the Alameda County Sheriff's Office Emergency Services Dispatch Center who will contact the Region II Law Mutual Aid Coordinator (24/7 availability).
- The Coordinator will contact the law enforcement or the transportation agency directly to assess the needs.
- The Coordinator will identify and deploy assets nearest to the incident.
- After deploying available assets, the Law Mutual Aid Coordinator will contact the Regional Emergency Operations Center of the California Office of Emergency Services Coastal Region to inform the Regional Mutual Aid Coordinator of the request.
- The Regional Mutual Aid Coordinator will provide the Law Mutual Aid Coordinator with a mission assignment number for tracking purposes (and potential reimbursement, though unlikely, as law enforcement mutual aid is not generally reimbursable). The mission assignment number will be provided to both the requesting and responding agencies.

It is important to note that not all explosive detection dogs currently in use in the San Francisco Bay Area are formally trained, certified and vetted, nor does a master manifest of dogs currently exist. A gap analysis of explosive detection dogs in the San Francisco Bay Area will be conducted through the upcoming 2006 Super Urban Area Security Initiative contracts.

NOTE: For BART and MUNI, the transportation agency can request their own dispatch or emergency operation center to contact their respective established program supports, since there are detection dog programs currently in place.

9. FACT SHEETS

The following fact sheets are provided in this section and correspond to the CBRNE categories.

1. Chemical
   - Blood – Hydrogen Cyanide
   - Pulmonary – Phosgene
   - Pulmonary – Chlorine
   - Vesicant – Mustard
   - Nerve – Sarin
   - Nerve – VX
2. Biological
   - Bacteria – Anthrax
   - Bacteria – Pneumonic Plague
   - Virus – Ebola
   - Virus – Smallpox
   - Toxin – Botulism
   - Toxin – Ricin
3. Radiological – Radiological Dispersal Device
4. Nuclear – Nuclear Bomb
5. Explosive –Explosive Device

CHEMICAL

IMMEDIATE RESPONSE

If you suspect a release, immediately dial 911, explain what has happened, and follow their directions.

SIN

Secure Area
Stop vehicle
Evacuate passengers
Get to fresh air

Isolate Area & Exposed Victims
Do not reenter vehicle

Notify Authorities
Inform 911 operator of:

- Incident environment
- Smell
- Physical effects (vomiting, reddened face, sweating)
- Visual signs (wires, package expansion, unknown substance, mist, smoke, vapor)
- Auditory signs (hissing, popping, ticking, grinding)

TDS

Time — limit time near weapon
Distance — get as far away as possible
Shielding — create barrier between self and weapon

SIGNS AND SYMPTOMS

- ✓ Smells like burnt almonds
- ✓ Vomiting
- ✓ Convulsions
- ✓ Cherry red skin/lips
- ✓ Rapid breathing
- ✓ Dizziness
- ✓ Dilated pupils
- ✓ Excessive salivation

INDICATORS AND CLUES

- ✓ Spraying or other unusual activities prior to a public event
- ✓ Discovery of abandoned specialized equipment (e.g., aerosol cans)
- ✓ An unusual number of sick, ill, or dying wild animals or pets

HOW THE WEAPON IS USED

- ✓ Introduced in ventilation systems
- ✓ Misting, aerosolizing devices, or sprayers
- ✓ Passive release (container of chemical left open)
- ✓ Bombs, mines, or other explosive devices that contain chemicals other than explosives

HYDROGEN CYANIDE

WHAT IS HYDROGEN CYANIDE?

Hydrogen cyanide is a rapidly acting, potentially deadly chemical known as a blood agent. Hydrogen cyanide can be a colorless gas or a crystal. Hydrogen cyanide sometimes is described as having a "bitter almond" smell, but it does not always give off an odor, and not everyone can detect this odor. It absorbs into the body through the act of breathing and interferes with the body's ability to use oxygen. Once in the body and bloodstream, it causes lethal damage preventing the cellular use of oxygen.

- Has immediate effect on victims
- Normally distributed as aerosols or gas
- Influenced by weather conditions
- Can be protected against, treated, and decontaminated

QUICK FACTS:

Contagious: No
Rate of action: Rapid
Mortality (if left untreated): High

PROTECTIVE ACTIONS

Leave the area of release and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure. If the release was outdoors, move away from the area. Go to the highest ground possible. If the release was indoors, get out of the vehicle or building.

Removing and Disposing of Clothing

If avoiding exposure is not possible, rapidly remove the agent from the body. Getting the agent off as soon as possible after exposure is the only effective way to prevent or decrease tissue damage to the body. Quickly remove any clothing that has liquid on it. If possible, seal the clothing in a plastic bag, and then seal that bag inside a second plastic bag.

Washing the Body

As soon as possible, wash any exposed part of the body (eyes, skin, etc.) thoroughly with plain, clean water. Eyes need to be flushed with water for 5 to 10 minutes. Do NOT cover eyes with bandages, but do protect them with dark glasses or goggles. If someone has ingested the agent, do NOT induce vomiting or give fluids to drink.

NOTE: Adequate personal protective equipment, and the training to use it, is required when assisting victims exposed to chemicals or chemical warfare agents and not properly decontaminated.

CHEMICAL

WHAT IS A CHEMICAL WEAPON?

A chemical attack is the spreading of toxic chemicals with the intent to do harm. A wide variety of chemicals could be made, stolen, or otherwise acquired for use in an attack. Industrial chemical plants or the vehicles used to transport chemicals could also be sabotaged. Harmful chemicals that could be used in an attack include:

- ✓ Chemical weapons (warfare agents) developed for military use.
- ✓ Toxic industrial and commercial chemicals that are produced, transported, and stored in the making of petroleum, textiles, plastics, fertilizers, paper, foods, pesticides, household cleaners, and other products.

RESOURCES

Centers for Disease Control and Prevention — http://www.bt.cdc.gov/agent/cyanide/

Department of Defense — http://www.njha.com/ep/pdf/bio-USAMRICDResources.pdf
http://chemdef.apgea.army.mil/TBMED296.aspx

FACTS ABOUT HYDROGEN CYANIDE

Cyanide is released from natural substances in some foods and in certain plants such as cassava. Cyanide is contained in cigarette smoke and the combustion products of synthetic materials such as plastics. Combustion products are substances given off when things burn.

In manufacturing, cyanide is used to make paper, textiles, and plastics. It is present in the chemicals used to develop photographs. Cyanide salts are used in metallurgy for electroplating, metal cleaning, and removing gold from its ore. Cyanide gas is used to exterminate pests and vermin in ships and buildings.

If accidentally ingested (swallowed), chemicals found in acetonitrile-based products that are used to remove artificial nails can produce cyanide.

Hydrogen cyanide, under the name Zyklon B, was used as a genocidal agent in World War II. Reports have indicated that during the Iran-Iraq War in the 1980s, hydrogen cyanide gas may have been used along with other chemical agents in northern Iraq.

For informational use only. Please defer to first responding agency personnel for instructions during an emergency.

CHEMICAL

IMMEDIATE RESPONSE

If you suspect a release, immediately dial 911, explain what has happened, and follow their directions.

SIN

Secure Area
Stop vehicle
Evacuate passengers
Get to fresh air

Isolate Area & Exposed Victims
Do not reenter vehicle

Notify Authorities
Inform 911 operator of:

- Incident environment
- Smell
- Physical effects (vomiting, reddened face, sweating)
- Visual signs (wires, package expansion, unknown substance, mist, smoke, vapor)
- Auditory signs (hissing, popping, ticking, grinding)

TDS

Time — limit time near weapon
Distance — get as far away as possible
Shielding — create barrier between self and weapon

SIGNS AND SYMPTOMS

- ✓ Smells like mown hay
- ✓ Painful cough
- ✓ Nausea
- ✓ Eye and airway irritation
- ✓ Dizziness
- ✓ Trouble breathing
- ✓ Headache

INDICATORS AND CLUES

- ✓ Spraying or other unusual activities prior to a public event
- ✓ Discovery of abandoned specialized equipment (e.g. aerosol cans)
- ✓ An unusual number of sick, ill, or dying wild animals or pets

HOW THE WEAPON IS USED

- ✓ Introduced in ventilation systems
- ✓ Misting, aerosolizing devices, or sprayers
- ✓ Passive release (container of chemical left open)
- ✓ Bombs, mines, or other explosive devices that contain chemicals other than explosives

PHOSGENE

WHAT IS PHOSGENE?

Phosgene, which is referred to as a vesicant (choking) agent, primarily attacks the lungs and lung tissue after inhalation. It is characterized by pronounced irritation of the upper and lower respiratory tract. Inhalation is the primary exposure route and the effects are dose- and time-dependent. With no specific antidotes available, treatment includes supportive care based on patient presentation.

- Has immediate effect on victims
- Generally liquid (when containerized)
- Normally distributed as aerosols or gas
- Can be protected against, treated, and decontaminated

QUICK FACTS:
Rate of action: Rapid at high concentrations, delayed at lower concentrations
Contagious: No
Mortality (if left untreated): Unusual

PROTECTIVE ACTIONS

Leave the area of release and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure. If the release was outdoors, move away from the area. Go to the highest ground possible. If the release was indoors, get out of the vehicle or building.

Removing and Disposing of Clothing

If avoiding exposure is not possible, rapidly remove the agent from the body. Getting the agent off as soon as possible after exposure is the only effective way to prevent or decrease tissue damage to the body. Quickly remove any clothing that has liquid on it. If possible, seal the clothing in a plastic bag, and then seal that bag inside a second plastic bag.

Washing the Body

As soon as possible, wash any exposed part of the body (eyes, skin, etc.) thoroughly with plain, clean water. Eyes need to be flushed with water for 5 to 10 minutes. Do NOT cover eyes with bandages, but do protect them with dark glasses or goggles. If someone has ingested the agent, do NOT induce vomiting or give fluids to drink.

NOTE: Adequate personal protective equipment, and the training to use it, is required when assisting victims exposed to chemicals or chemical warfare agents and not properly decontaminated.

CHEMICAL

WHAT IS A CHEMICAL WEAPON?

A chemical attack is the spreading of toxic chemicals with the intent to do harm. A wide variety of chemicals could be made, stolen, or otherwise acquired for use in an attack. Industrial chemical plants or the vehicles used to transport chemicals could also be sabotaged. Harmful chemicals that could be used in an attack include:

- ✓ Chemical weapons (warfare agents) developed for military use.
- ✓ Toxic industrial and commercial chemicals that are produced, transported, and stored in the making of petroleum, textiles, plastics, fertilizers, paper, foods, pesticides, household cleaners, and other products.

RESOURCES

Centers for Disease Control and Prevention
http://www.bt.cdc.gov/agent/phosgene/

Department of Defense
http://www.njha.com/ep/pdf/bio-USAMRICDResources.pdf
http://chemdef.apgea.army.mil/TBMED296.aspx

Department of Homeland Security
http://www.ready.gov

US Environmental Protection Agency
http://www.epa.gov/ttn/atw/hlthef/phosgene.html

FACTS ABOUT PHOSGENE

Phosgene is a major industrial chemical used to make plastics and pesticides. At room temperature (70°F), phosgene is a poisonous gas. With cooling and pressure, phosgene gas can be converted into a liquid so that it can be shipped and stored. When liquid phosgene is released, it quickly turns into a gas that stays close to the ground and spreads rapidly.

Phosgene gas may appear colorless or as a white to pale yellow cloud. At low concentrations, it has a pleasant odor of newly mown hay or green corn, but its odor may not be noticed by all people exposed. At high concentrations, the odor may be strong and unpleasant. Phosgene itself is nonflammable (not easily ignited and burned).

Phosgene was used as a weapon during the First World War, but has since been used primarily as an industrial chemical. Phosgene is also known by its military designation, "CG."

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CHEMICAL

IMMEDIATE RESPONSE

If you suspect a release, immediately dial 911, explain what has happened, and follow their directions.

SIN

Secure Area
Stop vehicle
Evacuate passengers
Get to fresh air

Isolate Area & Exposed Victims
Do not reenter vehicle

Notify Authorities
Inform 911 operator of:
- Incident environment
- Smell
- Physical effects (vomiting, reddened face, sweating)
- Visual signs (wires, package expansion, unknown substance, mist, smoke, vapor)
- Auditory signs (hissing, popping, ticking, grinding)

TDS

Time — limit time near weapon
Distance — get as far away as possible
Shielding — create barrier between self and weapon

SIGNS AND SYMPTOMS:
- ✓ Smells like bleach
- ✓ Difficulty breathing
- ✓ Painful cough
- ✓ Nausea
- ✓ Eye and airway irritation
- ✓ Dizziness
- ✓ Headache

INDICATORS AND CLUES
- ✓ Spraying or other unusual activities prior to a public event
- ✓ Discovery of abandoned specialized equipment (e.g. aerosol cans)
- ✓ An unusual number of sick, ill, or dying wild animals or pets

HOW THE WEAPON IS USED
- ✓ Introduced in ventilation systems
- ✓ Misting, aerosolizing devices, or sprayers
- ✓ Passive release (container of chemical left open)
- ✓ Bombs, mines, or other explosive devices that contain chemicals other than explosives

CHLORINE

WHAT IS CHLORINE?

Chlorine, which is referred to as a choking agent, primarily attacks the lungs and lung tissue after inhalation. It is characterized by pronounced initiation of the upper and lower respiratory tract. Inhalation is the primary exposure route and the effects are dose- and time-dependent. With no specific antidotes available, treatment includes supportive care based on patient presentation.
- Has immediate effect on victims
- Generally liquid (when containerized)
- Normally distributed as aerosols or gas
- Can be protected against, treated, and decontaminated

QUICK FACTS:

Contagious: No
Rate of action: Rapid at high concentrations, delayed at lower concentrations
Mortality (if left untreated):

PROTECTIVE ACTIONS

Leave the area of release and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure. If the release was outdoors, move away from the area. Go to the highest ground possible. If the release was indoors, get out of the vehicle or building.

Removing and Disposing of Clothing

If avoiding exposure is not possible, rapidly remove the agent from the body. Getting the agent off as soon as possible after exposure is the only effective way to prevent or decrease tissue damage to the body. Quickly remove any clothing that has liquid on it. If possible, seal the clothing in a plastic bag, and then seal that bag inside a second plastic bag.

Washing the Body

As soon as possible, wash any exposed part of the body (eyes, skin, etc.) thoroughly with plain, clean water. Eyes need to be flushed with water for 5 to 10 minutes. Do NOT cover eyes with bandages, but do protect them with dark glasses or goggles. If someone has ingested the agent, do NOT induce vomiting or give fluids to drink.

NOTE: Adequate personal protective equipment, and the training to use it, is required when assisting victims exposed to chemicals or chemical warfare agents and not properly decontaminated.

CHEMICAL

WHAT IS A CHEMICAL WEAPON?

A chemical attack is the spreading of toxic chemicals with the intent to do harm. A wide variety of chemicals could be made, stolen, or otherwise acquired for use in an attack. Industrial chemical plants or the vehicles used to transport chemicals could also be sabotaged. Harmful chemicals that could be used in an attack include:

- ✓ Chemical weapons (warfare agents) developed for military use.
- ✓ Toxic industrial and commercial chemicals that are produced, transported, and stored in the making of petroleum, textiles, plastics, fertilizers, paper, foods, pesticides, household cleaners, and other products.

RESOURCES

Centers for Disease Control and Prevention
http://www.bt.cdc.gov/agent/chlorine/

Department of Defense
http://www.njha.com/ep/pdf/bio-USAMRICDResources.pdf
http://chemdef.apgea.army.mil/TBMED296.aspx

Department of Homeland Security
http://www.ready.gov

FACTS ABOUT CHLORINE

Chlorine is an element used in industry and found in some household products and is sometimes in the form of a poisonous gas. Chlorine is used in water treatment, so it's loaded into railcars and tanker trucks that crisscross the U.S. every day, making it a large vulnerability. Chlorine gas can be pressurized and cooled to change it into a liquid so that it can be shipped and stored. When liquid chlorine is released, it quickly turns into a gas that stays close to the ground and spreads rapidly.

Chlorine gas can be recognized by its pungent, irritating odor, which is like the odor of bleach. The strong smell may provide an adequate warning to people that they have been exposed. The gas appears to be yellow-green in color. Chlorine itself is not flammable, but it can react explosively or form explosive compounds with other chemicals such as turpentine and ammonia.

Insurgents in Iraq have incorporated canisters of liquefied chlorine into vehicle-borne improvised explosive devices. One of these attacks on February 21, 2007 left several dead and scores suffering from exposure to the dispersed chlorine in an area of Baghdad. These are not the first instances of fighters exploring the use of chemicals in explosive devices, but they may be distinguished by their employment methods which can act as potential windows into the tactical and strategic thinking of such insurgents. Terrorists developing this capability is a significant threat.

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CHEMICAL

IMMEDIATE RESPONSE

If you suspect a release, immediately dial 911, explain what has happened, and follow their directions.

SIN

Secure Area
Stop vehicle
Evacuate passengers
Get to fresh air

Isolate Area & Exposed Victims
Do not reenter vehicle

Notify Authorities
Inform 911 operator of:
- Incident environment
- Smell
- Physical effects (vomiting, reddened face, sweating)
- Visual signs (wires, package expansion, unknown substance, mist, smoke, vapor)
- Auditory signs (hissing, popping, ticking, grinding)

TDS

Time — limit time near weapon
Distance — get as far away as possible
Shielding — create barrier between self and weapon

SIGNS AND SYMPTOMS
- ✓ Persistent vapors which smell like garlic or mustard
- ✓ Blistering of skin, mucous membranes, and respiratory tract
- ✓ Nausea, vomiting, diarrhea
- ✓ Difficulty breathing
- ✓ Dry cough
- ✓ Eye damage

INDICATORS AND CLUES
- ✓ Spraying or other unusual activities prior to a public event
- ✓ Discovery of abandoned specialized equipment (e.g. aerosol cans)
- ✓ An unusual number of sick, ill, or dying wild animals or pets

HOW THE WEAPON IS USED
- ✓ Introduced in ventilation systems.
- ✓ Misting, aerosolizing devices, or sprayers
- ✓ Passive release (container of chemical left open)
- ✓ Bombs, mines, or other explosive devices that contain chemicals other than explosives

MUSTARD

WHAT IS MUSTARD?

Mustard gas is a type of chemical warfare agent known as a vesicant (blister) agent. Mustard sometimes smells like garlic, onions, or mustard and sometimes has no odor. It can be a vapor (the gaseous form of a liquid), an oily-textured liquid, or a solid. Mustard can be clear to yellow or brown when it is in liquid or solid form.
- Has immediate effect on victims
- Generally liquid (when containerized)
- Normally distributed as aerosols or gas
- Influenced by weather conditions
- Can be protected against, treated, and decontaminated

QUICK FACTS:

Rate of action: Delayed 2 to 24 hours
Contagious: No
Mortality (if left untreated): Unusual

PROTECTIVE ACTIONS

Leave the area of release and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure. If the release was outdoors, move away from the area. Go to the highest ground possible. If the release was indoors, get out of the vehicle or building.

Removing and Disposing of Clothing

If avoiding exposure is not possible, rapidly remove the agent from the body. Getting the agent off as soon as possible after exposure is the only effective way to prevent or decrease tissue damage to the body. Quickly remove any clothing that has liquid on it. If possible, seal the clothing in a plastic bag, and then seal that bag inside a second plastic bag.

Washing the Body

As soon as possible, wash any exposed part of the body (eyes, skin, etc.) thoroughly with plain, clean water. Eyes need to be flushed with water for 5 to 10 minutes. Do NOT cover eyes with bandages, but do protect them with dark glasses or goggles. If someone has ingested the agent, do NOT induce vomiting. Give the person milk to drink.

NOTE: Adequate personal protective equipment, and the training to use it, is required when assisting victims exposed to chemicals or chemical warfare agents and not properly decontaminated.

CHEMICAL

WHAT IS A CHEMICAL WEAPON?

A chemical attack is the spreading of toxic chemicals with the intent to do harm. A wide variety of chemicals could be made, stolen, or otherwise acquired for use in an attack. Industrial chemical plants or the vehicles used to transport chemicals could also be sabotaged. Harmful chemicals that could be used in an attack include:

- ✓ Chemical weapons (warfare agents) developed for military use.
- ✓ Toxic industrial and commercial chemicals that are produced, transported, and stored in the making of petroleum, textiles, plastics, fertilizers, paper, foods, pesticides, household cleaners, and other products.

RESOURCES

Centers for Disease Control and Prevention
http://www.bt.cdc.gov/agent/sulfurmustard/

Agency for Toxic Substances and Disease Registry
http://www.atsdr.cdc.gov/MHMI/mmg165.pdf

Department of Defense
http://www.njha.com/ep/pdf/bio-USAMRICDResources.pdf
http://chemdef.apgea.army.mil/TBMED296.aspx

FACTS ABOUT MUSTARD

Mustards are vesicants and alkylating agents. They are colorless when pure but are typically a yellow to brown oily substance with a slight garlic or mustard odor. Sulfur mustards evaporate slowly. They are very sparingly soluble in water but are soluble in oils, fats, and organic solvents. They are stable at ambient temperatures but decompose at temperatures greater than 149EC.

Mustard was first developed in the early-to-mid-1800s and was introduced as a chemical warfare agent in 1917 during World War I. They have been used extensively in chemical warfare and remain a major threat. More than a dozen countries have sulfur mustard in their chemical arsenals. Destruction of U.S. stockpiles of chemical agents, including sulfur mustards, was mandated by the Chemical Weapons Convention to take place before April 2007.

The biochemical mechanisms of mustards are not clearly understood. They are highly reactive and combine rapidly with proteins, DNA, or other molecules. Therefore, within minutes following exposure intact mustard or its reactive metabolites are not found in tissue or biological fluids. Sulfur mustards also have cholinergic activity, stimulating both muscarinic and nicotinic receptors. The onset of clinical symptoms and their time of onset depend on the severity of exposure. The death rate from exposure to sulfur mustard is low (2 to 3% during World War I). Death usually occurs between the 5th and 10th day due to pulmonary insufficiency complicated by infection due to immune system compromise.

For informational use only. Please defer to first responding agency personnel for instructions during an emergency.

CHEMICAL

IMMEDIATE RESPONSE

If you suspect a release, immediately dial 911, explain what has happened, and follow their directions.

SIN

Secure Area
Stop vehicle
Evacuate passengers
Get to fresh air

Isolate Area & Exposed Victims
Do not reenter vehicle

Notify Authorities
Inform 911 operator of:
- Incident environment
- Smell
- Physical effects (vomiting, reddened face, sweating)
- Visual signs (wires, package expansion, unknown substance, mist, smoke, vapor)
- Auditory signs (hissing, popping, ticking, grinding)

TDS

Time — limit time near weapon
Distance — get as far away as possible
Shielding — create barrier between self and weapon

SIGNS AND SYMPTOMS
- ✓ Odorless, persistent vapors
- ✓ Seizures
- ✓ Convulsions
- ✓ Nausea
- ✓ Difficulty breathing
- ✓ Vomiting
- ✓ Pinpointing of pupils
- ✓ Headache

INDICATORS AND CLUES
- ✓ Spraying or other unusual activities prior to a public event
- ✓ Discovery of abandoned specialized equipment (e.g. aerosol cans)
- ✓ An unusual number of sick, ill, or dying wild animals or pets

HOW THE WEAPON IS USED
- ✓ Introduced in ventilation systems
- ✓ Misting, aerosolizing devices, or sprayers
- ✓ Passive release (container of chemical left open)
- ✓ Bombs, mines, or other explosive devices that contain chemicals other than explosives

SARIN

WHAT IS SARIN?

Sarin is a human-made chemical warfare agent known as a nerve agent. It is one of the most toxic and rapidly acting of the known chemical warfare agents. Sarin is a clear, colorless, and tasteless liquid that has no odor in its pure form. However, sarin can evaporate into a vapor (gas) and spread into the environment.
- Sarin is influenced by weather conditions
- Sarin can be detected with proper equipment
- Sarin can be protected against, treated, and decontaminated

QUICK FACTS:

Contagious: No
Rate of action: Within seconds for vapors; liquid effects may be delayed up to 18 hours
Mortality (if left untreated): High

PROTECTIVE ACTIONS

Leave the area of release and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure. If the release was outdoors, move away from the area. Go to the highest ground possible. If the release was indoors, get out of the vehicle or building.

Removing and Disposing of Clothing

If avoiding exposure is not possible, rapidly remove the agent from the body. Getting the agent off as soon as possible after exposure is the only effective way to prevent or decrease tissue damage to the body. Quickly remove any clothing that has liquid on it. If possible, seal the clothing in a plastic bag, and then seal that bag inside a second plastic bag.

Washing the Body

As soon as possible, wash any exposed part of the body (eyes, skin, etc.) thoroughly with plain, clean water. Eyes need to be flushed with water for 5 to 10 minutes. Do NOT cover eyes with bandages, but do protect them with dark glasses or goggles. If someone has ingested the agent, do NOT induce vomiting or give fluids to drink.

NOTE: Adequate personal protective equipment, and the training to use it, is required when assisting victims exposed to chemicals or chemical warfare agents and not properly decontaminated.

CHEMICAL

WHAT IS A CHEMICAL WEAPON?

A chemical attack is the spreading of toxic chemicals with the intent to do harm. A wide variety of chemicals could be made, stolen, or otherwise acquired for use in an attack. Industrial chemical plants or the vehicles used to transport chemicals could also be sabotaged. Harmful chemicals that could be used in an attack include:

- ✓ Chemical weapons (warfare agents) developed for military use.
- ✓ Toxic industrial and commercial chemicals that are produced, transported, and stored in the making of petroleum, textiles, plastics, fertilizers, paper, foods, pesticides, household cleaners, and other products.

RESOURCES

Centers for Disease Control and Prevention
http://www.bt.cdc.gov/agent/sarin/

Department of Defense
http://www.njha.com/ep/pdf/bio-USAMRICDResources.pdf
http://chemdef.apgea.army.mil/TBMED296.aspx

Department of Homeland Security
http://www.ready.gov

FACTS ABOUT SARIN

Sarin is the most volatile of the nerve agents, which means that it can easily and quickly evaporate from a liquid into a vapor and spread into the environment. People can be exposed to the vapor even if they do not come in contact with the liquid form of sarin. Because it evaporates so quickly, sarin presents an immediate but short-lived threat.

The extent of poisoning caused by sarin depends on the amount of sarin to which a person was exposed, how the person was exposed, and the length of time of the exposure.

Symptoms will appear within a few seconds after exposure to the vapor form of sarin and within a few minutes up to 18 hours after exposure to the liquid form.

All the nerve agents cause their toxic effects by preventing the proper operation of the chemical that acts as the body's "off switch" for glands and muscles. Without an "off switch," the glands and muscles are constantly being stimulated. They may tire and no longer be able to sustain breathing function.

The sarin gas attack on the Tokyo subway was an act of domestic terrorism perpetrated by members of Aum Shinrikyo on March 20, 1995. In five coordinated attacks, the conspirators released sarin gas on several lines of the Tokyo Metro, killing twelve people, severely injuring fifty and causing temporary vision problems for nearly a thousand others. The attack was directed against trains passing through Kasumigaseki and Nagatacho, home to the Japanese government. This was the most serious attack to occur in Japan since the end of the Second World War.

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CHEMICAL

IMMEDIATE RESPONSE

If you suspect a release, immediately dial 911, explain what has happened, and follow their directions.

SIN

Secure Area
Stop vehicle
Evacuate passengers
Get to fresh air

Isolate Area & Exposed Victims
Do not reenter vehicle

Notify Authorities
Inform 911 operator of:
- Incident environment
- Smell
- Physical effects (vomiting, reddened face, sweating)
- Visual signs (wires, package expansion, unknown substance, mist, smoke, vapor)
- Auditory signs (hissing, popping, ticking, grinding)

TDS

Time — limit time near weapon
Distance — get as far away as possible
Shielding — create barrier between self and weapon

SIGNS AND SYMPTOMS
- ✓ Seizures
- ✓ Convulsions
- ✓ Nausea
- ✓ Difficulty in breathing
- ✓ Vomiting
- ✓ Pinpointing of pupils
- ✓ Headache

INDICATORS AND CLUES
- ✓ Odorless, persistent vapors
- ✓ Spraying or other unusual activities prior to a public event
- ✓ Discovery of abandoned specialized equipment (e.g. aerosol cans)
- ✓ An unusual number of sick, ill, or dying wild animals or pets

HOW THE WEAPON IS USED
- ✓ Introduced in ventilation systems
- ✓ Misting, aerosolizing devices, or sprayers
- ✓ Passive release (container of chemical left open)
- ✓ Bombs, mines, or other explosive devices that contain chemicals other than explosives

VX

WHAT IS VX?

VX is a human-made chemical warfare agent known as a nerve agent. It is one of the most toxic and rapidly acting of the known chemical warfare agents. VX is a clear, colorless, and tasteless liquid that has no odor in its pure form. However, VX can evaporate into a vapor (gas) and spread into the environment. VX is very similar to tabun and soman nerve gases, which have similar characteristics.
- Has immediate effect on victims
- Normally distributed as aerosols or gas
- Influenced by weather conditions
- Can be protected against, treated, and decontaminated

QUICK FACTS:
Rate of action: Rapid for vapors; liquid effects may be delayed
Contagious: No
Mortality (if left untreated): High

PROTECTIVE ACTIONS

Leave the area of release and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure. If the release was outdoors, move away from the area. Go to the highest ground possible. If the release was indoors, get out of the vehicle or building.

Removing and Disposing of Clothing

If avoiding exposure is not possible, rapidly remove the agent from the body. Getting the agent off as soon as possible after exposure is the only effective way to prevent or decrease tissue damage to the body. Quickly remove any clothing that has liquid on it. If possible, seal the clothing in a plastic bag, and then seal that bag inside a second plastic bag.

Washing the Body

As soon as possible, wash any exposed part of the body (eyes, skin, etc.) thoroughly with plain, clean water. Eyes need to be flushed with water for 5 to 10 minutes. Do NOT cover eyes with bandages, but do protect them with dark glasses or goggles. If someone has ingested the agent, do NOT induce vomiting or give fluids to drink.

NOTE: Adequate personal protective equipment, and the training to use it, is required when assisting victims exposed to chemicals or chemical warfare agents and not properly decontaminated.

CHEMICAL

WHAT IS A CHEMICAL WEAPON?

A chemical attack is the spreading of toxic chemicals with the intent to do harm. A wide variety of chemicals could be made, stolen, or otherwise acquired for use in an attack. Industrial chemical plants or the vehicles used to transport chemicals could also be sabotaged. Harmful chemicals that could be used in an attack include:

- ✓ Chemical weapons (warfare agents) developed for military use.
- ✓ Toxic industrial and commercial chemicals that are produced, transported, and stored in the making of petroleum, textiles, plastics, fertilizers, paper, foods, pesticides, household cleaners, and other products.

RESOURCES

Centers for Disease Control and Prevention
http://www.bt.cdc.gov/agent/vx/

Department of Defense
http://www.njha.com/ep/pdf/bio-USAMRICDResources.pdf
http://chemdef.apgea.army.mil/TBMED296.aspx

Department of Homeland Security
http://www.ready.gov

FACTS ABOUT VX

VX is a human-made chemical warfare agent classified as a nerve agent. Nerve agents are the most toxic and rapidly acting of the known chemical warfare agents.

VX is the least volatile of the nerve agents, which means that it is the slowest to evaporate from a liquid into a vapor. Therefore, VX is very persistent in the environment. Under average weather conditions, VX can last for days on objects that it has come in contact with. Under very cold conditions, VX can last for months. Because it evaporates so slowly, VX can be a long-term threat as well as a short-term threat. Surfaces contaminated with VX should therefore be considered a long-term hazard.

VX operates by cutting off the nervous system. It binds to the enzyme that transmits signals to the nerves and inhibits them. Therefore the nerves become isolated and uncontrollable. The antidote, atropine, is a toxin itself but it counteracts the effect of the VX by removing it from the enzyme. It is an anti-nerve agent so does the reverse of the VX, a nerve agent. It is normally injected into the arm or thigh but for gaseous attacks the atropine must go immediately into the heart.

VX has not been used to its fullest potential yet because it is too dangerous to use for local attacks with wind that could blow the VX back onto the base. If these weapons were launched against a nation there would be the possibility of a nuclear counterattack because VX is a weapon of mass destruction that spreads from impact point killing all in its path. The only countries known to possess VX are the U.S., France, and Russia.

For informational use only. Please defer to first responding agency personnel for instructions during an emergency.

BIOLOGICAL

IMMEDIATE RESPONSE

Notification of a biological agent release will be provided by public health officials. Transit officials will be informed on the location of the potential release, which areas to avoid and the actions that are required, based on event and situation. Follow all response protocols issued.

Notify Authorities

Inform 911 operator if any passengers appear to be extremely sick or dead. If the person is ambulatory, request that the person seek medical attention. Alert the officials of the following:

- Potentially exposured riders
- Incident environment
- Smell
- Physical effects (vomiting, reddened face, sweating)

SIGNS AND SYMPTOMS

- ✓ Odorless powder or spray
- ✓ Cough
- ✓ Profound sweats
- ✓ Fever
- ✓ Fatigue
- ✓ Myalgias
- ✓ Can take days to effect victims
- ✓ Unusual flu-like symptoms

INDICATORS AND CLUES

- ✓ Abandoned bags
- ✓ Chemicals or poisons found in abandoned aerosol equipment
- ✓ Discovery of abandoned specialized equipment
- ✓ Spraying or other unusual activities prior to a public event
- ✓ Unseasonal flu symptoms

HOW THE WEAPON IS USED

- ✓ Aerosol dissemination
- ✓ Food or water
- ✓ Human carriers
- ✓ Infected animals
- ✓ Insects
- ✓ Physically distributed

ANTHRAX

WHAT IS ANTHRAX?

Anthrax (dry) is likely found in the form of light brown colored spores. The absence of a powder is an indicator that Anthrax is not present.

- Anthrax spores are harmful if inhaled, ingested or if there is contact with an open wound.
- Quarantine of exposed persons is not necessary; Anthrax is not contagious. It is responsive to antibiotics.
- Anthrax requires an incubation period of 1 to 6 days.

QUICK FACTS:

Contagious: No
Incubation period: 1-6 days, but it can take up to 42
Mortality (if left untreated): High, if inhaled

PROTECTIVE ACTIONS

Leave the area of release and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure. If the release was outdoors, move away from the area. Go to the highest ground possible. If the release was indoors, get out of the vehicle or building.

Removing and Disposing of Clothing

If avoiding exposure is not possible, rapidly remove the agent from the body. Getting the agent off as soon as possible after exposure is the only effective way to prevent or decrease tissue damage to the body. Quickly remove any clothing that has liquid on it. If possible, seal the clothing in a plastic bag, and then seal that bag inside a second plastic bag.

Washing the Body

As soon as possible, wash any exposed part of the body (eyes, skin, etc.) thoroughly with plain, clean water. Eyes need to be flushed with water for 5 to 10 minutes. Do NOT cover eyes with bandages, but do protect them with dark glasses or goggles. If someone has ingested the agent, do NOT induce vomiting or give fluids to drink.

NOTE: Adequate personal protective equipment, and the training to use it, is required when assisting victims exposed to biological warfare agents and not properly decontaminated.

BIOLOGICAL

WHAT IS A BIOLOGICAL WEAPON?

A biological attack is the intentional release of a pathogen (disease causing agent) or biotoxin (poisonous substance produced by a living organism) against humans, plants, or animals. An attack against people could be a means of causing illness, death, fear, societal disruption, and economic damage. An attack on agricultural plants and animals would primarily cause economic damage, loss of confidence in the food supply, and possible loss of life. It is useful to distinguish between two kinds of biological agents:

- ✓ Transmissible agents that spread from person to person (e.g., smallpox, Ebola) or animal to animal (e.g., foot and mouth disease).
- ✓ Agents that may cause adverse effects in exposed individuals but that do not make those individuals contagious to others (e.g., anthrax, botulinum toxin).

RESOURCES

Centers for Disease Control and Prevention
http://www.bt.cdc.gov/agent/anthrax/

Infectious Disease Society of America
http://www.cidrap.umn.edu/idsa/bt/anthrax/resources/anthrax-resources.html

National Institute of Allergy and Infectious Disease
http://www.niaid.nih.gov/factsheets/anthrax.htm

FACTS ABOUT ANTHRAX

The threatened use of Anthrax by known terrorist groups has spawned a cynical and senseless series of hoaxes across the nation. Individuals, not believed to be terrorists, but acting irresponsibly, have used the U.S. mail and the telephone systems to cause numerous scares through hoax letters and telephone calls in California. During the month of December 1998, numerous such hoaxes caused great discomfort and inconvenience to working citizens and cost substantial taxpayer dollars for the emergency response. These acts tend to erode our readiness and unnecessarily place the lives of emergency first responders at risk.

In October 2001 tests confirmed high concentrations of anthrax spores in a letter received by the office of Senator Tom Daschle. As the FBI hunted the source of the letter, the offices of 12 senators in the Hart Senate Office Building, including Daschle's, were shut for tests expected to last two or three days. The closed offices share a ventilation system. Once the substance was proved to be anthrax, the office and those surrounding it were evacuated. Between 40 and 50 people were treated with antibiotics. On Tuesday, senators and hundreds of staffers received tests for exposure to anthrax.

In November, 2001, a 94-year-old woman in rural Oxford, Connecticut was diagnosed with inhalational anthrax and died 1 day later. No obvious source of exposure to anthrax was identified. She was the 22nd patient diagnosed with anthrax in the United States in 2001. The mail was considered a likely source of contamination for the patient in Connecticut, and is still likely to be used as a dissemination technique by terrorists.

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BIOLOGICAL

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- Potentially exposured riders
- Incident environment
- Smell
- Physical effects (vomiting, reddened face, sweating)

SIGNS AND SYMPTOMS

- ✓ Unusual flu-like symptoms
- ✓ Fever
- ✓ Cough
- ✓ Shortness of breath
- ✓ Sore lymph nodes
- ✓ Nausea, vomiting, diarrhea

INDICATORS AND CLUES

- ✓ Abandoned bags
- ✓ Chemicals or poisons found in abandoned aerosol equipment
- ✓ Discovery of abandoned specialized equipment
- ✓ Spraying or other unusual activities prior to a public event
- ✓ Unseasonal flu symptoms

HOW THE WEAPON IS USED

- ✓ Aerosol dissemination
- ✓ Food or water
- ✓ Human carriers
- ✓ Infected animals
- ✓ Insects
- ✓ Physically distributed

PNEUMONIC PLAGUE

WHAT IS PNEUMONIC PLAGUE?

Pneumonic plague is an infectious disease caused by bacteria called Yersinia pestis. These bacteria are found mainly in rodents, particularly rats, and in the fleas that feed on them. Other animals and humans usually contract the bacteria from rodent or flea bites. There are four type of plague (black, bubonic, pneumonic, septacemic) but pneumonic is the most deadly and largest threat.

Although the United States does not currently expect a plague attack, it is possible that pneumonic plague could occur via an aerosol distribution. The Yersinia pestis bacterium is widely available in microbiology banks around the world, and thousands of scientists have worked with plague, making a biological attack a serious concern.

QUICK FACTS:

Contagious: Yes
Incubation period: 1-7 days
Mortality (if left untreated): High

PROTECTIVE ACTIONS

Leave the area of release and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure. If the release was outdoors, move away from the area. Go to the highest ground possible. If the release was indoors, get out of the vehicle or building.

Removing and Disposing of Clothing

If avoiding exposure is not possible, rapidly remove the agent from the body. Getting the agent off as soon as possible after exposure is the only effective way to prevent or decrease tissue damage to the body. Quickly remove any clothing that has liquid on it. If possible, seal the clothing in a plastic bag, and then seal that bag inside a second plastic bag.

Washing the Body

As soon as possible, wash any exposed part of the body (eyes, skin, etc.) thoroughly with plain, clean water. Eyes need to be flushed with water for 5 to 10 minutes. Do NOT cover eyes with bandages, but do protect them with dark glasses or goggles. If someone has ingested the agent, do NOT induce vomiting or give fluids to drink.

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BIOLOGICAL

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- ✓ Transmissible agents that spread from person to person (e.g., smallpox, Ebola) or animal to animal (e.g., foot and mouth disease).
- ✓ Agents that may cause adverse effects in exposed individuals but that do not make those individuals contagious to others (e.g., anthrax, botulinum toxin).

RESOURCES

Centers for Disease Control and Prevention —
http://www.bt.cdc.gov/agent/plague/

Infectious Disease Society of America
http://www.cidrap.umn.edu/idsa/bt/plague/biofacts/plaguefactsheet.html

National Institute of Allergy and Infectious Disease
http://www.niaid.nih.gov/factsheets/plague.htm

U.S. Army Medical Research Institute of Infectious Diseases
http://www.usamriid.army.mil

U.S. Department of Health and Human Services
http://www.hhs.gov/emergency

FACTS ABOUT PNEUMONIC PLAGUE

Plague outbreaks following use of a biological weapon are a plausible threat. In World War II, a secret branch of the Japanese army, Unit 731, is reported to have dropped plague-infected fleas over populated areas of China, thereby causing outbreaks of plague. In the ensuing years, the biological weapons programs of the United States and the Soviet Union developed techniques to aerosolize plague directly, eliminating dependence on the unpredictable flea vector.

In 1970, the World Health Organization (WHO) reported that, in a worst case scenario, if 50 kg of Yersinia pestis were released as an aerosol over a city of 5 million, pneumonic plague could infect as many as 150,000 persons, 36,000 of whom would be expected to die. The plague bacilli would remain viable as an aerosol for 1 hour for a distance of up to 10 km. Significant numbers of city inhabitants might attempt to flee, further spreading the disease.

While U.S. scientists had not succeeded in making quantities of plague organisms sufficient to use as an effective weapon by the time the US offensive program was terminated in 1970, Soviet scientists were able to manufacture large quantities of the agent suitable for placing into weapons. More than ten institutes and thousands of scientists were reported to have worked with plague in the former Soviet Union. In contrast, few scientists in the United States study this disease.

There is little published information indicating actions of autonomous groups or individuals seeking to develop plague as a weapon. However, in 1995 in Ohio, a microbiologist with suspect motives was arrested after fraudulently acquiring Yersinia pestis by mail. New anti-terrorism legislation was introduced in reaction.

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BIOLOGICAL

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- Incident environment
- Smell
- Physical effects (vomiting, reddened face, sweating)

SIGNS AND SYMPTOMS

- ✓ Sudden onset
- ✓ Fever
- ✓ Headache
- ✓ Vomiting and diarrhea
- ✓ Rash
- ✓ Generalized bleeding in severe cases

INDICATORS AND CLUES

- ✓ Abandoned bags
- ✓ Chemicals or poisons found in abandoned aerosol equipment
- ✓ Discovery of abandoned specialized equipment
- ✓ Spraying or other unusual activities prior to a public event

HOW THE WEAPON IS USED

- ✓ Aerosol dissemination
- ✓ Food or water
- ✓ Human carriers
- ✓ Infected animals
- ✓ Insects
- ✓ Physically distributed

EBOLA

WHAT IS EBOLA?

Ebola hemorrhagic fever is a severe, often-fatal disease in humans and nonhuman primates that has appeared sporadically since its initial recognition in 1976. The disease is caused by infection with Ebola virus, named after a river in the Democratic Republic of the Congo (formerly Zaire) in Africa, where it was first recognized.

No case of the disease in humans has ever been reported in the United States. Ebola hemorrhagic fever typically appears in sporadic outbreaks, usually spread within a health-care setting (a situation known as amplification).

QUICK FACTS:

Contagious: Yes
Incubation period: 4-21 days
Mortality (if left untreated): 50-80%

PROTECTIVE ACTIONS

Leave the area of release and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure. If the release was outdoors, move away from the area. Go to the highest ground possible. If the release was indoors, get out of the vehicle or building.

Removing and Disposing of Clothing

If avoiding exposure is not possible, rapidly remove the agent from the body. Getting the agent off as soon as possible after exposure is the only effective way to prevent or decrease tissue damage to the body. Quickly remove any clothing that has liquid on it. If possible, seal the clothing in a plastic bag, and then seal that bag inside a second plastic bag.

Washing the Body

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RESOURCES

Centers for Disease Control and Prevention —
http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/ebola.htm

Infectious Disease Society of America —
http://www.cidrap.umn.edu/idsa/bt/vhf/biofacts/vhffactsheet.html

National Institute of Allergy and Infectious Disease —
http://www.niaid.nih.gov/biodefense/

U.S. Army Medical Research Institute of Infectious Diseases —
http://www.usamriid.army.mil

U.S. Department of Health and Human Services —
http://www.hhs.gov/emergency

FACTS ABOUT EBOLA

Ebola hemorrhagic fever is a severe, often-fatal disease in humans and nonhuman primates (monkeys, gorillas, and chimpanzees) that has appeared sporadically since its initial recognition in 1976. The disease is caused by infection with Ebola virus, named after a river in the Democratic Republic of the Congo (formerly Zaire) in Africa, where it was first recognized.

In the early stages, Ebola may not be highly contagious. Contact with someone in early stages may not even transmit the disease. As the illness progresses, bodily fluids from diarrhea, vomiting, and bleeding represent an extreme biohazard. Due to lack of proper equipment and hygienic practices, large scale epidemics occur mostly in poor, isolated areas without modern hospitals or well-educated medical staff.

Ebola shows potential as a biological weapon because of its lethality but due to its relatively short incubation period it may be more difficult to spread since it may kill its victim before it has a chance to be transmitted. As a terrorist weapon, Ebola has been considered by members of Japan's Aum Shinrikyo cult, whose leader, Shoko Asahara led about 40 members to Zaire in 1992 under the guise of offering medical aid to Ebola victims in what was presumably an attempt to acquire a sample of the virus. Among humans, the virus is transmitted by direct contact with infected body fluids, or to a lesser extent, skin or mucus membrane contact. The incubation period can be anywhere from 2 to 21 days, but is generally between 5 and 10 days.

No case of the disease in humans has ever been reported in the United States. Ebola hemorrhagic fever typically appears in sporadic outbreaks, usually spread within a health-care setting (a situation known as amplification).

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BIOLOGICAL

IMMEDIATE RESPONSE

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- Incident environment
- Smell
- Physical effects (vomiting, reddened face, sweating)

SIGNS AND SYMPTOMS

- ✓ Fever
- ✓ Aches
- ✓ After 2–4 days rash appears

INDICATORS AND CLUES

- ✓ Abandoned bags
- ✓ Chemicals or poisons found in abandoned aerosol equipment
- ✓ Discovery of abandoned specialized equipment
- ✓ Spraying or other unusual activities prior to a public event

HOW THE WEAPON IS USED

- ✓ Aerosol dissemination
- ✓ Food or water
- ✓ Human carriers
- ✓ Infected animals
- ✓ Insects
- ✓ Physically distributed

SMALLPOX

WHAT IS SMALLPOX?

Smallpox is a serious, contagious, and sometimes fatal infectious disease. There is no specific treatment for smallpox disease and the only prevention is vaccination. Scientists are currently researching new treatments.

Generally, direct and fairly prolonged face-to-face contact is required to spread smallpox from one person to another. Smallpox also can be spread through direct contact with infected bodily fluids or contaminated objects such as bedding or clothing. Rarely, smallpox has been spread by air in enclosed settings such as buildings, buses, and trains. Smallpox is not known to be transmitted by insects or animals.

QUICK FACTS:

Contagious: Yes
Incubation period: 7-17 days
Mortality (if left untreated): Less than 30%

PROTECTIVE ACTIONS

Leave the area of release and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure. If the release was outdoors, move away from the area. Go to the highest ground possible. If the release was indoors, get out of the vehicle or building.

Removing and Disposing of Clothing

If avoiding exposure is not possible, rapidly remove the agent from the body. Getting the agent off as soon as possible after exposure is the only effective way to prevent or decrease tissue damage to the body. Quickly remove any clothing that has liquid on it. If possible, seal the clothing in a plastic bag, and then seal that bag inside a second plastic bag.

Washing the Body

As soon as possible, wash any exposed part of the body (eyes, skin, etc.) thoroughly with plain, clean water. Eyes need to be flushed with water for 5 to 10 minutes. Do NOT cover eyes with bandages, but do protect them with dark glasses or goggles. If someone has ingested the agent, do NOT induce vomiting or give fluids to drink.

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- ✓ Transmissible agents that spread from person to person (e.g., smallpox, Ebola) or animal to animal (e.g., foot and mouth disease).
- ✓ Agents that may cause adverse effects in exposed individuals but that do not make those individuals contagious to others (e.g., anthrax, botulinum toxin).

RESOURCES

Centers for Disease Control and Prevention —
http://www.bt.cdc.gov/agent/smallpox/

Infectious Disease Society of America —
http://www.cidrap.umn.edu/idsa/bt/smallpox/biofacts/smllpx-summary.html

National Institute of Allergy and Infectious Disease
http://www.niaid.nih.gov/factsheets/smallpox.htm

U.S. Army Medical Research Institute of Infectious Diseases —
http://www.usamriid.army.mil

U.S. Department of Health and Human Services —
http://www.hhs.gov/emergency

FACTS ABOUT SMALLPOX

Smallpox is a serious, even deadly, disease. Centers for Disease Control calls it a "Category A" agent. Category A agents are believed to present the greatest potential threat for harming public health. Because smallpox was wiped out many years ago, a case of smallpox today would be the result of an intentional act. A single confirmed case of smallpox would be considered an emergency.

Thanks to the success of vaccination, the last natural outbreak of smallpox in the U.S. occurred in 1949. By 1972, routine smallpox vaccinations for children in the U.S. were no longer needed. In 1980, smallpox was said to be wiped out worldwide, and no cases of naturally occurring smallpox have happened since.

Today, the smallpox virus is kept in two approved labs in the U.S. and Russia. However, credible concern exists that the virus was made into a weapon by some countries and that terrorists may have obtained it.

One of the best ways to prevent smallpox is through vaccination. If given to a person before exposure to smallpox, the vaccine can completely protect them. Vaccination within 3 days after exposure will prevent or greatly lessen the severity of smallpox in most people. Vaccination 4 to 7 days after exposure likely offers some protection from the disease or may decrease the severity of the disease. Vaccination will not protect smallpox patients who already have a rash.

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BIOLOGICAL

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- Incident environment
- Smell
- Physical effects (vomiting, reddened face, sweating)

SIGNS AND SYMPTOMS

- ✓ Muscle paralyzing illness

INDICATORS AND CLUES

- ✓ Abandoned bags
- ✓ Chemicals or poisons found in abandoned aerosol equipment
- ✓ Discovery of abandoned specialized equipment
- ✓ Spraying or other unusual activities prior to a public event

HOW THE WEAPON IS USED

- ✓ Aerosol dissemination
- ✓ Food or water
- ✓ Human carriers
- ✓ Infected animals
- ✓ Insects
- ✓ Physically distributed

BOTULISM

WHAT IS BOTULISM?

Botulism, a rare but serious paralytic illness that can be fatal, is caused by Botulinum toxin, a nerve toxin produced by bacteria. The three naturally-occurring forms of the illness are food borne, infant, and wound botulism.

An antitoxin is available to treat botulism, but must be administered within hours of exposure. The antitoxin is effective in reducing the severity of symptoms if administered early in the course of the disease. Most patients eventually recover after weeks to months of supportive care. A supply of botulism antitoxin is maintained by Centers for Disease Control.

QUICK FACTS

Contagious: No
Incubation period: 12 hrs - 5 days
Mortality (if left untreated): High

PROTECTIVE ACTIONS

Leave the area of release and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure. If the release was outdoors, move away from the area. Go to the highest ground possible. If the release was indoors, get out of the vehicle or building.

Removing and Disposing of Clothing

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RESOURCES

Centers for Disease Control and Prevention —
http://www.bt.cdc.gov/agent/botulism/

Infectious Disease Society of America —
http://www.cidrap.umn.edu/idsa/bt/botulism/biofacts/botulismfactsheet.html

National Institute of Allergy and Infectious Disease —
http://www.niaid.nih.gov/biodefense/

U.S. Army Medical Research Institute of Infectious Diseases —
http://www.usamriid.army.mil

U.S. Department of Health and Human Services —
http://www.hhs.gov/emergency

FACTS ABOUT BOTULISM

Botulism poses a major bio-weapon threat because of its extreme potency and lethality; its ease of production, transport, and misuse; and the need for prolonged intensive care among affected persons. An outbreak of botulism constitutes a medical emergency that requires prompt provision of botulism antitoxin and, often, mechanical ventilation, and it constitutes a public health emergency that requires immediate intervention to prevent additional cases. Timely recognition of a botulism outbreak begins with an astute clinician who quickly notifies public health officials.

Botulism is the most poisonous substance known. A single gram of crystalline toxin, evenly dispersed and inhaled, would kill more than 1 million people, although technical factors would make such dissemination difficult. The basis of the phenomenal potency of botulism is enzymatic; the toxin is a zinc proteinase that cleaves 1 or more of the fusion proteins by which neuronal vesicles release acetylcholine into the neuromuscular junction.

Terrorists have already attempted to use botulism as a bio-weapon. Aerosols were dispersed at multiple sites in downtown Tokyo, Japan, and at U.S. military installations in Japan on at least 3 occasions between 1990 and 1995 by the Japanese cult Aum Shinrikyō. These attacks failed, apparently because of faulty microbiological technique, deficient aerosol-generating equipment, or internal sabotage. The perpetrators obtained their *C botulinum* from soil that they had collected in northern Japan.

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- Smell
- Physical effects (vomiting, reddened face, sweating)

SIGNS AND SYMPTOMS

Inhalation:

- ✓ Difficulty breathing
- ✓ Fever, cough, nausea
- ✓ Tightness in the chest
- ✓ Heavy sweating
- ✓ Pulmonary edema
- ✓ Skin might turn blue

Ingestion:

- ✓ Vomiting and diarrhea that may become bloody
- ✓ Severe dehydration
- ✓ Hallucinations
- ✓ Seizures

INDICATORS AND CLUES

- ✓ Abandoned bags
- ✓ Chemicals or poisons found in abandoned aerosol equipment
- ✓ Discovery of abandoned specialized equipment
- ✓ Spraying or other unusual activities prior to a public event
- ✓ Unseasonal flu symptoms

HOW THE WEAPON IS USED

- ✓ Aerosol dissemination
- ✓ Food or water
- ✓ Physically distributed

RICIN

WHAT IS RICIN?

Ricin is a poison that can be made from the waste left over from processing castor beans. It can be in the form of a powder, a mist, or a pellet, or it can be dissolved in water or weak acid.

Ricin is a stable substance. For example, it is not affected much by extreme conditions such as very hot or very cold temperatures. Ricin poisoning is not contagious. It cannot be spread from person to person through casual contact. It would take a deliberate act to make ricin and use it to poison people. Accidental exposure to ricin is highly unlikely.

QUICK FACTS:

Contagious: No
Rate of action: Delayed 6 to 8 hours
Mortality (if left untreated): Unusual

PROTECTIVE ACTIONS

Leave the area of release and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure. If the release was outdoors, move away from the area. Go to the highest ground possible. If the release was indoors, get out of the vehicle or building.

Removing and Disposing of Clothing

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BIOLOGICAL

WHAT IS A BIOLOGICAL WEAPON?

A biological attack is the intentional release of a pathogen (disease causing agent) or biotoxin (poisonous substance produced by a living organism) against humans, plants, or animals. An attack against people could be used to cause illness, death, fear, societal disruption, and economic damage. An attack on agricultural plants and animals would primarily cause economic damage, loss of confidence in the food supply, and possible loss of life. It is useful to distinguish between two kinds of biological agents:

- ✓ Transmissible agents that spread from person to person (e.g., smallpox, Ebola) or animal to animal (e.g., foot and mouth disease).
- ✓ Agents that may cause adverse effects in exposed individuals but that do not make those individuals contagious to others (e.g., anthrax, botulinum toxin).

RESOURCES

Centers for Disease Control and Prevention
http://www.bt.cdc.gov/agent/ricin/

Department of Defense
http://www.njha.com/ep/pdf/bio-USAMRICDResources.pdf
http://chemdef.apgea.army.mil/TBMED296.aspx

Department of Homeland Security
http://www.ready.gov

FACTS ABOUT RICIN

A highly lethal poison, the 3rd most lethal substance known, ricin is derived from the commonly found castor bean, which is borne from the castor plant, *Ricinus communis*, and is now sometimes used as an agent of bioterrorism.

It would take a deliberate act to make ricin and use it to poison people. Accidental exposure to ricin is highly unlikely. However, the threat of overt or covert chemical terrorism is increasing in the United States.The discovery of a package containing ricin and a threatening note at a South Carolina Postal Office in October of 2003 illustrates the need for proactive education of clinicians and public health authorities regarding chemical-associated illness and highlighted the need for periodic focused education on a particular agent.

People can breathe in ricin mist or powder and be poisoned. Ricin can also get into water or food and then be swallowed. Pellets of ricin, or ricin dissolved in a liquid, can be injected into people's bodies. Depending on the route of exposure (such as injection or inhalation), as little as 500 micrograms of ricin could be enough to kill an adult. A 500-microgram dose of ricin would be about the size of the head of a pin. A greater amount would likely be needed to kill people if the ricin were swallowed. Some reports have indicated that ricin may have been used in the Iran-Iraq war during the 1980s and that quantities of ricin were found in Al Qaeda caves in Afghanistan.

Ricin poisoning is not contagious. It cannot be spread from person to person through casual contact.

For informational use only. Please defer to first responding agency personnel for instructions during an emergency.

RADIOLOGICAL

IMMEDIATE RESPONSE

If you suspect a release, immediately dial 911, explain what has happened, and follow their directions.

SIN

Secure Area
Stop vehicle
Evacuate passengers
Get to fresh air

Isolate Area & Exposed Victims
Do not reenter vehicle

Notify Authorities
Inform 911 operator of:

- Incident environment
- Smell
- Physical effects (vomiting, reddened face, sweating)
- Visual signs (wires, package expansion, unknown substance, mist, smoke, vapor)
- Auditory signs (hissing, popping, ticking, grinding)

TDS

Time — limit time near weapon
Distance — get as far away as possible
Shielding — create barrier between self and weapon

SIGNS AND SYMPTOMS

- ✓ Acute Radiation Syndrome (Symptoms include nausea, vomiting, diarrhea, and reduced blood cell counts. Can also cause skin burns and localized injury.)
- ✓ Seizure
- ✓ Unconsciousness
- ✓ Injuries from the blast

INDICATORS AND CLUES

- ✓ Abandoned or suspicious bags
- ✓ Discovery of abandoned specialized equipment
- ✓ Reports of stolen radiological materials
- ✓ Explosions or fires near radiological facilities

HOW THE WEAPON IS USED

- ✓ A "dirty bomb" using a conventional explosion to disperse radioactive material over a targeted area
- ✓ Placing a container of radioactive material in a public place
- ✓ Aerosolized forms of radioactive material
- ✓ Airplane dispersal

RADIOLOGICAL DISPERSAL DEVICE

WHAT IS A RADIOLOGICAL DISPERSAL DEVICE?

A radiological dispersal device (RDD), commonly referred to as a "dirty bomb" uses dynamite or other explosives to scatter radioactive dust, smoke, or other material in order to cause radioactive contamination. A "dirty bomb" is not the same as an atomic bomb. An atomic bomb, like those bombs dropped during World War II involves the splitting of atoms and a huge release of energy that produces the atomic mushroom cloud. A dirty bomb works completely differently and cannot create an atomic blast.

QUICK FACTS:

Contagious: No
Rate of action: Rapid
Mortality (if left untreated): High

PROTECTIVE ACTIONS

If you are outside and close to the incident

Cover nose and mouth with a cloth to reduce the risk of breathing in radioactive dust or smoke. Don't touch objects thrown off by an explosion—they might be radioactive. Quickly go into a building where the walls and windows have not been broken. Once inside, take off outer layer of clothing and seal it in a plastic bag if available. Put the cloth used to cover mouth in the bag, too. Removing outer clothes may get rid of up to 90% of radioactive dust. Put the plastic bag where others will not touch it and keep it until authorities tell you what to do with it. As soon as possible, wash with soap and water. Be sure to wash hair. Tune to the local radio or television news for more instructions.

If you are inside and close to the incident

If the walls and windows of the building or vehicle are not broken, stay inside and do not leave. Shut all windows and outside doors. Turn off fans and heating and air-conditioning systems. It is NOT necessary to put duct tape or plastic around doors or windows. If the walls and windows of the building are broken, go to an interior room and do not leave. If the building has been heavily damaged, quickly go into a building where the walls and windows have not been broken. If forced to go outside, be sure to cover nose and mouth with a cloth. Once inside, take off outer layer of clothing and seal it in a plastic bag if available. Store the bag where others will not touch it. As soon as possible, wash with soap and water, removing any remaining dust. Be sure to wash hair. Tune to local radio or television news for more instructions.

NOTE: Adequate personal protective equipment, and the training to use it, is required when assisting victims exposed to radiation or radioactive materials and not properly decontaminated.

RADIOLOGICAL

WHAT IS A RADIOLOGICAL WEAPON?

A radiological attack is the spreading of radioactive material with the intent to do harm. Radioactive materials are used every day in laboratories, medical centers, food irradiation plants, and for industrial uses. If stolen or otherwise acquired, many of these materials could be used in a "radiological dispersal device" (RDD).

The security and safekeeping of radiological sources has always been a daunting task. Unfortunately, radiological materials can be accessed elsewhere, including medical, construction, research and academic facilities.

It is very difficult to design an RDD that would deliver radiation doses high enough to cause immediate health effects or fatalities in a large number of people. Therefore, experts generally agree that an RDD would most likely be used to:

- Contaminate facilities or places where people live and work, disrupting lives and livelihoods.
- Cause anxiety in those who think they are being, or have been, exposed.

RESOURCES

Centers for Disease Control and Prevention —
http://www.bt.cdc.gov/radiation
- See fact sheets: "Radioactive Contamination and Radiation Exposure" and "Radiation Measurement"

International Atomic Energy Agency
http://www.iaea.org/Publications/Factsheets/index.html

Radiation Emergency Assistance Center —
http://www.orau.gov/reacts/

U.S. Department of Energy, National Nuclear Security Administration — http://www.nnsa.doe.gov

U.S. Nuclear Regulatory Commission —
http://www.nrc.gov/what-we-do/safeguards.html

Armed Forces Radiobiology Research Institute (AFRRI) —
http://www.afrri.usuhs.mil

FACTS ABOUT RADIOLOGICAL WEAPONS

Experts are concerned that terrorists could develop a crude radiological dispersal device using radioactive sources commonly used in every day life. The number of radioactive sources around the world is vast: those used in radiotherapy alone are in the order of ten thousand. Many more are used in industry; for example, to check for welding errors or cracks in buildings, pipelines and structures. They are also used for the preservation of food. There is a large number of unwanted radioactive sources, many of them abandoned, others being simply "orphaned" of any regulatory control.

Such materials could be used in a "dirty bomb" by shrouding conventional explosives around a source containing radioactive material, although handling the nuclear material could well be deadly.

The accidental contamination of Goiânia, a major city in Brazil, with a medical radiation source exemplifies the potential for a terrorist group to wreak havoc on an urban centre. In September 1987, scrap scavengers broke into an abandoned radiological clinic and stole a highly radioactive caesium 137 source and moved it to a junkyard for sale as scrap. Workers broke open the encasement and cut up the 20-gram capsule of caesium 137 into pieces. The valuable-looking scrap was then distributed to friends and family of workers around the city. Fourteen people were overexposed, and 249 contaminated. Four subsequently died. More than 110,000 people had to be continuously monitored. To decontaminate the area, 125,000 drums and 1470 boxes were filled with contaminated clothing, furniture, dirt and other materials; 85 houses had to be destroyed.

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NUCLEAR

IMMEDIATE RESPONSE

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- Auditory signs (hissing, popping, ticking, grinding)

TDS

Time — limit time near weapon
Distance — get as far away as possible
Shielding — create barrier between self and weapon

SIGNS AND SYMPTOMS

- ✓ Acute Radiation Syndrome (nausea, vomiting, diarrhea, skin burns and localized injury)
- ✓ Seizure
- ✓ Unconsciousness
- ✓ Injuries from the blast

INDICATORS AND CLUES

- ✓ Initial effects of the nuclear explosion—the shockwave, heat, and radiation—cover an approximately circular area of devastation. Effects decrease with distance from ground zero. For nuclear devices with a higher yield, heat damage becomes the primary initial effect of concern.
- ✓ Radioactive fallout spreads in an irregular elliptical pattern in the direction the wind blows. The most dangerous fallout would occur near the explosion site within minutes of the explosion, but fallout could be deposited several miles away.

HOW THE WEAPON IS USED

- ✓ Military bomb
- ✓ "Suitcase" bomb
- ✓ Improvised nuclear device

NUCLEAR BOMB

WHAT IS A NUCLEAR BOMB?

A nuclear weapon is a weapon which derives its destructive force from nuclear reactions of fission or fusion. As a result, even a nuclear weapon with a small yield is significantly more powerful than the largest conventional explosives, and a single weapon is capable of destroying an entire city.

The first nuclear weapons were created in the United States by an international team as part of the top-secret Manhattan Project. Since World War II, nuclear weapons have been detonated for testing and demonstration purposes. Apart from their use as weapons, nuclear explosives have been tested and used for various non-military uses.

QUICK FACTS:

Contagious: No
Rate of action: Rapid
Mortality (if left untreated): High

PROTECTIVE ACTIONS

If you are near the blast when it occurs:

Turn away, close and cover eyes to prevent damage to sight. Drop to the ground face down and place your hands under your body. Remain flat until the heat and two shock waves have passed.

If you are outside when the blast occurs:

Cover the mouth and nose, with something such as a scarf, handkerchief, or other cloth. Remove any dust from clothes by brushing, shaking, and wiping in a ventilated area, keeping the mouth and nose covered while you do this. Move to a shelter, basement, or other underground area, preferably located away from the direction that the wind is blowing. Remove clothing since it may be contaminated; if possible, take a shower, wash hair, and change clothes before entering a shelter.

If you are already in a shelter or basement:

Cover mouth and nose with a face mask or other material (such as a scarf or handkerchief) until the fallout cloud has passed. Shut off ventilation systems and seal doors or windows until the fallout cloud has passed. Listen to the local radio or television for information and advice. Authorities may direct the population to shelter in place or evacuate to a safer place away from the area. Use stored food and drinking water. Do not eat local fresh food or drink water from open water supplies.

NOTE: Adequate personal protective equipment, and the training to use it, is required when assisting victims exposed to radiation or nuclear warfare agents and not properly decontaminated.

NUCLEAR

WHAT IS A NUCLEAR WEAPON?

Unlike a "dirty bomb" which disperses radioactive material using conventional explosives, a nuclear attack is the use of a device that produces a nuclear explosion. A nuclear explosion is caused by an uncontrolled chain reaction that splits atomic nuclei (fission) to produce an intense wave of heat, light, air pressure, and radiation, followed by the production and release of radioactive particles. An electromagnetic pulse from the explosion could also disrupt telecommunications and power distribution.

The energy released by a nuclear explosion is distributed roughly as 50% shockwave; 35% heat; 5% initial nuclear radiation; and 10% fallout radiation. This distribution varies depending on the design of the weapon and the altitude of the explosion.

RESOURCES

Centers for Disease Control and Prevention —
http://www.bt.cdc.gov/radiation
- See fact sheets: "Radioactive Contamination and Radiation Exposure" and "Radiation Measurement"

Radiation Emergency Assistance Center —
http://www.orau.gov/reacts/

U.S. Department of Energy, National Nuclear Security Administration — http://www.nnsa.doe.gov

U.S. Nuclear Regulatory Commission —
http://www.nrc.gov/what-we-do/safeguards.html

Armed Forces Radiobiology Research Institute (AFRRI) —
http://www.afrri.usuhs.mil

Radiation Effects Research Foundation —
www.rerf.jp

FACTS ABOUT NUCLEAR WEAPONS

Traditional cold-war concerns were focused on the possible use of military nuclear weapons. A nuclear terrorist attack might be carried out with an improvised nuclear device (IND), which is a crude nuclear device built from the components of a stolen weapon or from scratch using nuclear material (plutonium or highly enriched uranium).

The primary obstacle to a nuclear attack is limited access to weapon-grade nuclear materials. Highly enriched uranium, plutonium, and stockpiled weapons are carefully inventoried and guarded.

Nuclear attack is also impeded for a mutliple reasons. Building nuclear weapons is difficult—general principles are available in open literature, but constructing a workable device requires advanced technical knowledge in areas such as nuclear physics and materials science.

Crude nuclear weapons are typically very heavy, ranging from a few hundred pounds to several tons, and are difficult to transport, especially by air. Specially designed small nuclear weapons, including the so-called "suitcase nuclear weapons" are much lighter, but they are difficult to acquire and to construct.

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EXPLOSIVE

IMMEDIATE RESPONSE

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- Physical effects (vomiting, reddened face, foaming mouth, sweating)
- Visual signs (wires, package expansion, unknown substance, mist, smoke, vapor)
- Auditory signs (hissing, popping, ticking, grinding)

TDS

Time — limit time near weapon
Distance — get as far away as possible
Shielding — create a barrier between self and weapon

SIGNS AND SYMPTOMS

- ✓ Mechanical injuries (i.e., trauma)
- ✓ Blackened or burnt clothing
- ✓ Projectile or burn wounds
- ✓ Difficulty hearing
- ✓ Temporary blindness
- ✓ Bleeding from ears

INDICATORS AND CLUES

- ✓ Abandoned containers out of place
- ✓ Obvious devices (e.g., blasting caps)
- ✓ Abandoned vehicles not belonging in immediate environment
- ✓ Strong chemical odor
- ✓ Unusual devices attached to pressurized containers, bulk storage containers, or supply pipes
- ✓ Trip wires or other booby traps
- ✓ Suspicious mailing containers

HOW THE WEAPON IS USED

- ✓ Placed in containers, such as a pipe or other household item
- ✓ Imbedded into toys
- ✓ Imbedded into parcels, backpacks, or suitcases
- ✓ Human borne, in vests or undergarments
- ✓ Vehicles

EXPLOSIVE DEVICE

WHAT IS AN EXPLOSIVE DEVICE?

Explosives are divided into two categories: low explosives and high explosives. Low explosives, such as black powder or smokeless powder, are said to burn instead of explode. They are used primarily as propellants. In a low explosive mixture, as the substance burns, the gases produced build up causing them to exert a rapid pushing effect rather than a shattering effect. Low explosives are frequently used in homemade pipe-bombs. Incendiary devices can also be considered low explosives.

High explosives, such as TNT and Semtex, are designed to shatter and destroy. They differ from low explosives in that they must, in general, be initiated by the shock of a blasting cap. High explosives detonate which is described as instant combustion and causes a much larger explosion than low explosives.

QUICK FACTS:

Contagious: No
Rate of action: Rapid, unless time delay is utilized
Mortality (if left untreated): High, depending on quantity

PROTECTIVE ACTIONS

Any explosion should be treated as a possible chemical, biological, or radioactive incident.

If you are outside and close to the incident

Cover nose and mouth with a cloth to reduce the risk of breathing in dust or smoke. Don't touch objects thrown off by an explosion—they might be toxic or radioactive. Quickly go into a building where the walls and windows have not been broken. Take off outer layer of clothing and seal it in a plastic bag if available. Put the cloth used to cover mouth in the bag. Put the plastic bag where others will not touch it and keep it until authorities tell you what to do with it. As soon as possible, wash with soap and water. Be sure to wash hair.

If you are inside and close to the incident

If the walls and windows of the building or vehicle are not broken, stay inside and do not leave. Shut all windows and outside doors. If the walls and windows of the building or vehicle are broken, go to an interior room and do not leave. If the building has been heavily damaged, quickly go into a building where the walls and windows have not been broken. If forced to go outside, be sure to cover nose and mouth with a cloth. Take off outer layer of clothing and seal it in a plastic bag if available. Store the bag where others will not touch it. As soon as possible, wash with soap and water, removing any remaining dust. Be sure to wash hair.

NOTE: Adequate personal protective equipment, and the training to use it, is required when assisting victims exposed to radiation or radioactive materials and not properly decontaminated.

EXPLOSIVE

WHAT IS AN EXPLOSIVE?

An explosive can be a wide variety of materials from small pipe bombs to large vehicle bombs. Historically, bombs have been the weapon of choice for terrorists. Approximately 70 percent of all terrorist incidents involve the use of explosives. Improvised explosive devices (IEDs) can be designed by terrorists to deliver a wide range of explosive effects – including providing a vehicle for the dispersal of chemical, biological, and radiological materials.

Explosives are either mechanical or chemical. There are a number of ways of initiating the explosion, including non-electric means (such as using a safety fuse, time fuse, or blasting caps) and electric means (such as using a blasting cap and detonator).

- ✓ Common low explosives include: black powder, pyrodex, golden powder and black canyon powder, potassium chlorate mixtures, and potassium perchlorate mixtures.
- ✓ Common high explosives include: lead azide, lead styphnate, mercury fulminate, dynamite, ammonium nitrate, nitro-carbo-nitrates (NCN), water gels, TNT, tetrytol, Semtex, and C-4.

RESOURCES

Centers for Disease Control and Prevention
http://www.bt.cdc.gov/masscasualties/tiidefacts.asp

New England Journal of Medicine
http://content.nejm.org/cgi/content/full/353/6/543

U.S. Department of Health and Human Services
http://www.hhs.gov/emergency

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FACTS ABOUT EXPLOSIVE DEVICES

Explosive weapons release several forms of energy, including fire, heat, and sound. The types of energetic materials used include pyrotechnics, propellants and explosives. Explosives are designed to produce almost instantaneous production of super-heated gases which rapidly expand to a greater volume causing a blast.

Over five billion pounds of commercial high explosives are used in the United States every year, making explosives a large vulnerability. However, most commercial explosives are ammonium nitrate which is used in less than 5% of all bombings.

Improvised explosive devices often include vehicle bombs and pipe bombs. Vehicle bombs are usually large, powerful devices that consist of a quantity of explosives fitted with a timed or remote trigger detonator packed into a car or truck. The two most famous vehicle bombings on United State soil are the World Trade Center bombing in New York and the Federal Building bombing in Oklahoma City.

Pipe bombs are the most common explosive devices. They are at the opposite end of the scale from vehicle bombs in terms of size and destructive potential. Pipe bombs usually consist of a quantity of explosives sealed into a length of metal or plastic pipe. A timing fuse usually controls detonation. Other possible methods include electronic timers, remote triggers, and motion sensors. Incendiary devices such as Molotov cocktails and other fire bombs are also common.

On July 7th, 2005, a series of coordinated terrorist bomb blasts hit London's public transport system during the morning rush hour. The bombings killed 56 people, injured 700, and caused a severe day-long disruption of the city's transport and mobile telecommunications infrastructure countrywide. The bombs were made of triacetone triperoxide (TATP), an explosive made from acetone and peroxide, the most widely used explosive in suicide belts/vests.

In July, 2006 seven bombs exploded on trains in Mumbai (Bombay), India killing nearly 200 people and causing major damage to the train system. The bombs were made of pressure cookers stuffed with an explosive called RDX. All the bombs had timers to coordinate the attacks.