Personal Safety and Health for Emergency Responders

COUNTY OF SAN MATEO
EMERGENCY
MEDICAL SERVICES

Overview

As a responder, you put yourself in harm's way in order to help others. Emergencies can occur at any time, often without warning. While rescue and recovery work can be rewarding, response workers are not immune from the physical and psychological toll of disasters.

In order to respond safely, you must be prepared, and train for your response regularly. If you become sick, injured or are ill prepared during a response, you may actually hinder the rescue effort. If you are a volunteer, you have made a commitment to be ready to respond in an emergency. If you are an employee of a health department, hospital, or clinic, this emergency response may be part of your expectations as an employee.

This course will help the emergency responder understand the types of dangers that may be encountered in a disaster setting, as well as the common injuries and other health impacts that can be sustained during an emergency response. This course will also examine various health and safety preparedness measures a responder may take before, during, and after an emergency.

Overview

The course has four modules. Each of the first three modules has a number of case studies to examine. By answering questions in the quiz related to each case study as you go, you "learn by doing" and will satisfy the objectives for that module and ultimately for the entire course

Please have the quiz open and answer as you read through the modules

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Learning Objectives

After completing this module, you will be able to describe:

- Classify any emergency scenario into one of three classes of hazards.
- Identify common injuries that are often sustained during a disaster, including physical injuries, chemical exposures, and infectious diseases.
- Discuss psychological safety and health for emergency responders.
- Give examples of how emergency responders may protect themselves before, during, and after an emergency response.

1. Emergencies & Responder Preparedness

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Who will respond?

You may be called upon to respond.

You may be:

- A member of a volunteer group (such as a Medical Reserve Corps unit, a Community Emergency Response Team, American Red Cross, or some other volunteer organization) that assists in local emergencies.
- A health department employee whose responsibilities include disaster response.
- A health department employee who may be asked to leave your normal responsibilities to help with the response efforts.
- A hospital or clinic employee who may be asked to leave your normal responsibilities to provide surge capacity to deal with victims.

Are you ready to respond? Do you have the tools necessary to keep yourself safe during your response?

If you are a volunteer, you have made a commitment to be ready to respond in an emergency. If you are an employee of a health department, hospital, or clinic, this emergency response may be part of your expectations as an employee.

This course is not intended for "traditional" first responders, such as paramedics, EMTs, or fire fighters, who already have specialized knowledge of the content presented in this course. Knowledge from this course will help "nontraditional" first responders better help traditional first responders and others in an emergency situation.

Emergencies can occur at any time, often without warning. In order to respond safely, you must be prepared, and train for your response regularly. If you become sick, injured or are ill prepared during a response, you may actually hinder the rescue effort.

In this course you will learn about:

- Types of hazards that may be encountered at an emergency scene.
- Common injuries that are often sustained during a disaster including physical injuries, chemical exposures, and infectious diseases.
- Psychological impacts of disasters.
- How to protect yourself before, during and after an emergency response.

Types of Emergencies

Emergencies can occur at any time and in any place. They can be of any size. They can occur as a result of several kinds of hazards.

The Federal Emergency Management Agency (FEMA) classifies hazards as:

- Natural (e.g., tornadoes, ice storms, earthquakes, infectious disease outbreak)
- Man-made, Unintentional (e.g., transportation accidents, environmental, power grid failure, industrial)
- Man-made, Intentional (e.g., mass shootings, terrorist attack, civil disobedience)

FEMA

Natural Hazards

Hazards are conditions or situations that have the potential for causing harm to people, property, or the environment. The word "natural" is used to describe situations that are not induced by man. For example, oil seeping from beneath the earth is a natural hazard unless it was caused by human intervention. Likewise, disease outbreaks occur naturally unless humans intentionally use living organisms or their toxins to cause illness or death.
Natural hazards are generally considered as environmental conditions not caused by humans, but situations to which humans must respond!

Natural hazards can be weather-related, such as:

- Hurricanes
- Tornadoes
- Thunderstorms/lightning
- Blizzards/snow storms
- Ice Storms
- Wind storms
- Sand storms
- Heat waves
- Cold waves
- Fog
- Drought
- Wildfires (as a result of lightning strikes and/or drought)

Also, one natural hazard event can cause another. For example, heavy rain and snow can also cause the following natural hazards:

- Mudslides/landslides
- Avalanches
- Floods

Natural hazards can be geologic in nature, such as

- Earthquakes
- Tsunami
- Volcanoes
- Sinkholes

Natural hazards can be caused by or result in disease outbreaks, which can be:

- Communicable (e.g., tuberculosis, seasonal or pandemic flu, Norwalk virus)
- Infectious (e.g., food poisoning from bacterium, Legionnaire's Disease, E. coli 0154:H7)
- Zoonotic (diseases that can be transmitted from animals to humans, e.g., Ebola, West Nile Virus, and SARS)
- Non-infectious (e.g., as a result of environmental toxins or contaminants, such as lead and mercury poisoning) or result from a bioterrorism agent (e.g., anthrax, plague, smallpox). Bioterrorism is categorized as a man-made, intentional hazard or emergency.

Man-made, Unintentional Hazards

An accident by definition is neither expected nor intended. Technologies, because they are invented by humans, will almost always have built-in frailties. All of the following technologies can result in unintentional hazards:

- Transportation (e.g., air, train, nautical, mass-transit)
- Industrial (e.g., explosion, fire, chemical spills)
- Hazardous material spills (e.g., industrial or transportation accident)
- Technological or Utilities (e.g., power system failure, computer network failure)
- Nuclear
- Building collapses
- Bridge collapses
- Dam or levee failures
- Structure fires

Notice, too, that all of the above unintentional accidents can also be targets of intentional acts of terrorism or sabotage.

Man-made, Intentional Hazards

In the confusion of the moment, what may seem at first to be an unintentional accident later may be determined to be an intentional act of terrorism (domestic or foreign) or other criminal action.

Man-made, intentional hazards include:

- Terrorism
  - Explosions/bombings
  - Chemical threats
  - Biological threats
  - Nuclear/radiological
- Mass shootings
- Civil disobedience
- Arson
- War

Is your community vulnerable?

Think about which types of hazards your community is most vulnerable to. As part of your training as a potential responder during a disaster situation, realize the emergency events that could happen in your own community.

How likely is an event to happen?
What impact would the event have on your community? Is your community ready to respond?

Probability of Occurrence

One way to categorize hazards includes rating them based on the likelihood of them occurring, such as low, moderate, high. A more thorough way to assess your community's vulnerability to specific hazards is to score them using a point system.

The frequency at which the hazardous event occurs is its probability or likeliness. The more likely of an event in your community, the more points are given:

- 5 points—this event happens at least annually
- 4 points—event has happened within the last 2–5 years
- 3 points—event has happened within the last 5–10 years
- 2 points—event happened over 10 years ago
- 1 point—this event has never happened before

The higher the point total for each hazard, the greater the overall impact of the event and may help direct training needs.

Economic and Social Impact on Community

Disasters may cause a substantial burden on a community, in the way of business closings (e.g., offices, manufacturing, grocery stores, pharmacies, gas stations), worker absenteeism or loss of customer base (temporary or permanent), school and medical facility closings, infrastructure disruptions (e.g., power, telecommunications, roads, transportation, public safety, information networks), medical system overloads from surge of patients (e.g., shortages of supplies, workers, hospital beds), public and community services disruption (e.g., meals on wheels, waste removal), and isolation of citizens—especially in rural areas or by bridge collapses.

Give more points for more community disruption:

- 5 points—this event would have severe economic and/or social impact on community
- 4 points—event would have significant economic and/or social impact on community
- 3 points—event would have moderate economic and/or social impact on community
- 2 points—event would have minimal economic and/or social impact on community
- 1 point—no economic and/or social impact on community

The higher the point total for each hazard, the greater the overall impact of the event and may help direct training needs.

Overall Impact on Community

Think about past emergencies in your community—hazards that are similar to the one you are currently rating.

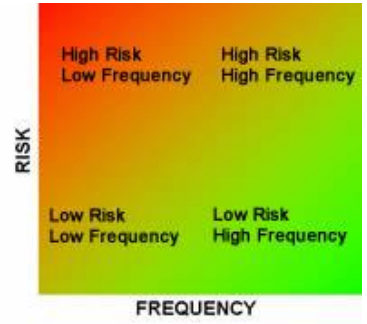
What was the average impact on the wider community?

- 5 points—required a federal response
- 4 points—required a state government response
- 3 points—required county government response
- 2 points—resolved with a local response
- 1 point—no response necessary

The higher the point total for each hazard, the greater the overall impact of the event and may help direct training needs.

Evaluate Emergency Events

Another way to evaluate emergency events in your community is to use a quadrant system. Emergencies can be categorized into high or low risk events, and also high or low frequency events. The following diagram illustrates this:



What types of emergency events are the response community typically least prepared for? Most prepared for? Communities and responders are adept at handling high frequency events for the mere fact that these emergencies happen often enough that proficiency has been gained and lessons have been learned. Where the response community often gets into trouble is with emergencies that fall into the high risk, low frequency category (HRLF).

HRLF events rarely happen, if they have happened at all, and therefore the response community is less familiar and less practiced at dealing with this type of emergency. This is especially true for those events that are unpredictable (i.e., no discretionary time), as opposed to those events that have some advance warning (i.e., discretionary time), which provides some time to think about your response before event happens.

Case Study 1: Hurricane Katrina

Tuesday, August 23, 2005—Friday, August 26, 2005
A tropical depression develops about 200 miles southeast of Nassau in the Bahamas. By Thursday, the tropical storm was elevated to a hurricane named "Katrina," and made landfall in Florida as a Category 1 hurricane. By Friday, Katrina moved westward into the Gulf of Mexico, where it was elevated to a Category 2 hurricane.

Saturday, August 27, 2005
- 4 a.m.: National Hurricane Center (NHC) predicts that Katrina, now a Category 3 hurricane, will make landfall directly on New Orleans.
- 9 a.m.: Louisiana Emergency Evacuation Plan begins.
- 1 p.m.: Mayor Ray Nagin issues a voluntary evacuation of the City of New Orleans and announces that the Superdome will open at 8 a.m. on Sunday as a special-needs shelter.
- 7-10 p.m.: National Weather Service advises City of New Orleans Office of Emergency Preparedness that the New Orleans levees could be overtopped. NHC predicts surge flooding of 15 to 20 feet above normal tides and locally as high as 25 feet. Hurricane-force winds are expected within 24 hours.

Sunday, August 28, 2005
- 1-7 a.m.: Katrina strengthens to Category 4 with 145 mph winds and then to Category 5 with maximum sustained winds near 160 mph.
- 9:30-10 a.m.: Mayor Nagin orders a mandatory evacuation of Orleans Parish. NHC increases storm-surge forecast to 18 to 22 feet above normal tide levels and locally as high as 28 feet.
- 12 p.m.: The Superdome opens as a "refuge of last resort" for the general population.

Monday, August 29, 2005
- 6:10 a.m. -7 a.m.: Downgraded to a Category 4 storm, Katrina makes landfall on the Louisiana coast. Storm surge overtops the levees on the east bank of the river, "crosses" the river, overtops the levees on the west bank, and sends additional water into neighborhoods. By 10 a.m., the hurricane was downgraded to a Category 3 and made a second landfall at the Louisiana/Mississippi border.

Case Study 1: Hurricane Katrina

Monday, August 29, 2005

- The Superdome loses air conditioning, plumbing in all but the first floor, and its communication system fails. A backup generator provides minimal lighting. The roof begins to leak.
- Breaches at the 17th Street and London Avenue outfall canals occur when the I-wall sheet pile deflects, splitting the levees/floodwalls into two parts.
- Foundation failure caused the northern floodwall breach on the east side of the Inner Harbor Navigation Canal (IHNC). Overtopping and subsequent scour and erosion solely caused the larger IHNC breach.
- Flooding overwhelms New Orleans. Search-and-rescue operations begin as the storm passes. State and local first responders' communications begin to fail.

Tuesday, August 30, 2005

- Mayor Nagin opens the New Orleans Convention Center as a refuge for the general population.
- Flooding continues. Pumping stations are not operable for several reasons: prior evacuation of operators; loss of power; and loss of clean cooling water for the pumps.
- Evening: Plumbing fails completely at the Superdome. Conditions at the stadium deteriorate because of massive crowds and lack of air conditioning and sanitation.

Wednesday, August 31, 2005

- Emergency health-personnel are called to service, including (1) approximately 6,000 officers from the U.S. Public Health Service (USPHS); (2) approximately 6,900 volunteers from the Medical Reserve Corps (MRC); (3) approximately 1,400 federal health personnel volunteers from an emergency federal volunteer database; and (4) volunteers from other federal agencies, such as the Department of Defense (DOD) and Veterans Affairs (VA).
- Federally contracted buses begin to evacuate Louisiana residents from New Orleans to the Houston Astrodome in Texas. Superdome and Convention Center evacuation is complete on Saturday, September 3, 2005.

Post-Katrina

- Federal, state, and local officials combined rescued over 60,000 people.
- Katrina killed more than 1,500 and left hundreds of thousands homeless.
- Federal legislation required the Army Corps of Engineers not only to repair the pump stations damaged by Katrina but also to ensure that they are outfitted to remain operable during and after future storm events. Had the pumps been able to operate, the extent of flooding may not have been affected greatly, but the duration of flooding could have been significantly reduced.

Adapted from "Hurricane Katrina: Timeline of Key Events," Hurricane Katrina: A Nation Still Unprepared, Special Report of the Committee on Homeland Security and Governmental Affairs, United States Senate, Congressional Report: S. Rpt. 109-322; "Pump Station Repairs and Stormproofing," U.S. Army Corps of Engineers, Team New Orleans; "NOAA National Hurricane Center Hurricane Katrina Forecast Timeline," U.S. Senate Committee on Commerce, Science, & Transportation; AND "Levee Breaches during Hurricane Katrina," Hurricane & Storm Damage Risk Reduction System (HSDRRS), Frequently Asked Questions, U.S. Army Corps of Engineers, Team New Orleans Home, Sept. 18, 2006. IMAGES: National Oceanic & Atmospheric Administration (NOAA), U.S. Department of Commerce, AND FEMA Media Library. [All websites accessed August 2015]

Please answer quiz questions #3 - #8

Case Study 2: Plane Crashes into Austin, Texas Building

At 9:18 a.m. on February 18, 2010, firefighters in Austin, Texas were called to a large house fire in North Austin. The house was destroyed, although no injuries occurred. At 9:40 a.m. a single-engine plane took off from a municipal airport north of Austin and headed south. At 9:56 a.m, a small plane crashed into a large, four-story office building northwest of Austin. Witnesses said the plane seemed to accelerate before impact.

Stock photograph of single engine airplane motor.
The plane crash ignited a huge explosion, causing fire and debris to fall onto the surrounding highways. Morning commuters stopped their damaged vehicles in the roadways. Paramedics set up a triage center. Numerous people were considered "walking wounded" with minor injuries, and at least two people were hospitalized with burns and smoke inhalation. A command center was set up in the parking lot.

Photograph of bystanders watching the Austin office building in flames.
Image posted on Twitter by Jeff_Lake.

The North American Aerospace Defense Command (NORAD) launched two F-16 fighter jets from Ellington Field in Houston to conduct an air patrol in response to the crash. "This response from NORAD is a prudent precaution and consistent with our response to recent similar air incidents," said a spokesperson for NORAD, which is part of the U.S. Department of Defense's Unified Command Plan.

An Internal Revenue Service (IRS) field office was located in the office building along with other state and federal government agencies. Public records indicated that the destroyed house and plane both were owned by Andrew Joseph Stack III. Further investigation found that Stack was troubled by continued financial difficulties. He had posted a suicide note and anti-government proclamations on his website. Mr. Stack and Internal Revenue Service manager Vernon Hunter were killed in the plane crash, and thirteen others were injured.

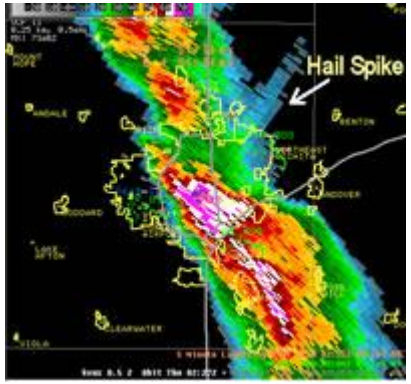
Adapted from news stories: "Man Crashes Plane Into Texas I.R.S. Office", The New York Times; "Plane Hits Northwest Austin Office Building", The Austin American-Statesman; AND "NORAD Launches Fighters As Security Measure", NORAD News. Image posted on Twitter by Jeff_Lake and reproduced on http://www.airsafenews.com/2010/02/man-deliberately-crashes-plane-into.html . [All websites accessed August 2015]

Please answer quiz questions #9 - #12

Case Study 3: Hailstorm Hits Wichita, Kansas

On July 8, 2009 at around 8:45 p.m. a line of severe thunderstorms quickly developed over far western Wichita, Kansas and moved eastward. KNSS News Radio reported that by 9:29 p.m. baseball-sized hail was damaging cars two miles southwest of downtown Wichita, and by 9:30 p.m. baseball-sized hail was reported in downtown Wichita.

The Lawrence-Dumont Stadium, home to the Wichita Wingnuts Baseball team, was under the core of this storm that Wednesday evening as it passed over the city. With the Wingnuts coming to bat in the bottom of the seventh inning, ominous skies suddenly appeared, giving way to rain and then large hail.



A crowd of more than 4,000 at the baseball stadium witnessed windows breaking and roof damage as the slow-moving storm caused baseball-sized hail to fall for about 30 minutes, covering the field by the time the storm ended. Numerous vehicles were severely damaged in the stadium parking lots, and damage to the stadium itself was also reported.

KNSS News Radio reported damaging hail in south-central Kansas until well into the early morning hours. In the Wichita metro area the hail was estimated to have caused 12.5 million dollars of property damage. No injuries were reported.

The Wingnuts fell 2-1 to the St. Paul Saints as the game was shortened by the massive storm. For the record, Tom Buske earned his first pro win, while Adam Cowart suffered the defeat.

Adapted from "Baseball Hail at the Baseball Stadium in Wichita," by Mary-Beth Schreck and Jerilyn Billings, National Oceanic and Atmospheric Administration (NOAA), National Weather Service, Wichita, Kansas Weather Forecast Office, July 9, 2009; "Baseball Hail at the Baseball Game," by Mary-Beth Schreck, Storm Fury on the Plains, Fall Spotter Newsletter, NOAA National Weather Service, Wichita, KS, November 2009, pp. 6-7; AND "Wingnuts stopped by Saints, Hailstorm," Wichita Wingnuts Baseball website. Images courtesy of National Weather Service, Wichita, Kansas Weather Forecast Office at http://www.crh.noaa.gov/. [All websites accessed August 2015]

Please answer quiz questions #13 - #16

2. Possible Health Consequences of Disasters

COUNTY OF SAN MATEO
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The Careful Responder

As a responder, you put yourself in harm's way in order to help others. While the brunt of the disaster may have played itself out (such as a hurricane), hazards produced by the disaster pose a threat to anyone working in the disaster zone.

The prudent responder understands the types of dangers that may be encountered, as well as the common injuries and other health impacts that can be sustained during an emergency response.

Dangers That May Be Encountered in a Disaster Setting

Disasters can be chaotic, scary, confusing, loud, dusty, dirty, smelly, crowded, and above all, dangerous. The following are some of the dangers that you may encounter when responding to a disaster:

- Debris, unstable structures, and slick and unstable surfaces can become tripping and crush hazards, which may result in strains, sprains, broken bones, lacerations, abrasions, bruises, eye injuries, and crush injuries.
- Flooding and contaminated water—submerged hazards, chemicals and other pollutants in water, and drowning are all potential hazards in floodwaters. Keep in mind that flood waters can be very turbulent or have unanticipated surges.
- Spoiled or contaminated food.
- Communicable and infectious diseases.
- Chemicals, pollutants, and hazardous materials (HAZMAT).
- Contact with blood or body fluids from directly or indirectly handling animals or humans (e.g., body recovery teams, medical teams, animal rescue teams).
- Gas leaks, including carbon monoxide.
- Indoor quality—airborne asbestos, lead dust, mold, and growth of other microorganisms.
- Explosions.
- Smoke, fire, and hot spots.
- Unclean air—particles, ash, chemical fumes.
- Downed trees or unstable trees and limbs.
- Downed wires and electrical hazards.
- Extreme heat and/or extreme cold.
- Frightened animals (both domestic and wild), other wildlife (snakes), and insects.

Types of Physical Injuries Common to Many Disasters

The following injuries can occur in almost any disaster setting:

- Strains.
- Sprains.
- Cuts, scrapes, abrasions, and lacerations.
- Burns.
- Fractures and dislocations.
- Foreign body or substance in eyes and other eye injuries.
- Inhalation injuries (e.g., from smoke, chemical gases/fumes, particulate material).
- Worsening or aggravation of existing chronic medical conditions.

Commonly Injured Body Parts

- Hands
- Eyes (not using proper eye protection)
- Back (improper lifting)
- Ankles (uneven terrain, improper footwear)
- Wrists
- Knees
- Feet (trench foot)
- Shoulders
- Neck
- Elbows
- Hips
- Head/brain
- Lungs (asthma)

Carbon Monoxide (CO) Poisoning

Response workers need to be especially vigilant of carbon monoxide poisoning when working in buildings and other enclosed settings.

- Signs and symptoms include: headache, dizziness, drowsiness, nausea, progressing to vomiting, loss of consciousness, and collapse.
- Prolonged or high exposure to carbon monoxide can be fatal. The higher the concentration, the more quickly symptoms appear and the more severe they will be.
- Use CO warning sensors when working around combustion sources.
- Never use gasoline generators or portable fuel driven tools in confined spaces or poorly ventilated areas.
- Never work in areas near exhaust. CO poisoning occurs even outdoors if engines generate high concentrations of CO.

Animal Bites and Scratches

Response workers should understand that any frightened animal, either domestic or wild, is at an increased risk of biting or attacking during a chaotic situation. Additionally, be aware of snakes swimming in flood waters.

Use your knowledge to protect yourself and to protect others.

Heat Illness Syndromes

A variety of heat-related illnesses can cause mild to severe ill health—and even death:

Mild heat stress can manifest itself in a rash (i.e., a red cluster of pimples or small blisters) or cramps (i.e., muscle pain or spasms usually in the abdomen, arms, or legs as a result of heavy sweating, which depletes the body of salt and moisture levels).
Heat exhaustion, a more severe form of heat stress, happens when the body loses an excessive amount of water and salt. Symptoms of heat exhaustion include:

- Heavy sweating
- Extreme weakness or fatigue
- Dizziness, confusion
- Nausea
- Clammy, moist skin
- Pale or flushed complexion
- Muscle cramps
- Slightly elevated body temperature
- Fast and shallow breathing

Hyperthermia (also known as heat stroke) is the most severe form of heat-related illness. The body becomes unable to control its temperature, which rises rapidly. The sweating mechanism fails, and the body is unable to cool down. When heat stroke occurs, the body temperature can rise to 106 degrees Fahrenheit or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not given. Symptoms of heat stroke include:

- Hot, dry skin (no sweating)
- Hallucinations
- Chills
- Throbbing headache
- High body temperature
- Confusion/dizziness
- Slurred speech

Cold Injury Syndromes

Prolonged exposure to cold temperatures can lead to heat loss, which affects the skin and the entire body.

- *Frostnip* causes skin to feel waxy or rubbery, but there is no tissue destruction.
- *Frostbite* causes skin to turn white and feels "wooden." Tissue destruction occurs.
- *Hypothermia* is abnormally low body temperature. Symptoms include intense shivering, inability to use hands, inability to walk, muscle weakness, rapid pulse, and irrational behavior. If body temperature is below 95 degrees Fahrenheit, the situation is an emergency and medical attention should be immediately sought
  NOTE: *Hyperthermia* is heat-related illness.

SOURCE: *Winter Weather FAQs*, Centers for Disease Control and Prevention.

Exposures to Chemical Toxins

Chemicals can enter the body in three ways:

- Absorption (through the skin)
- Ingestion (through the GI tract)
- Inhalation (through the respiratory tract

Some common disaster-related chemical exposures include:

- Petroleum fuels
- Bulk HAZMATS
- Cleaning products
- Bleach
- Pesticides
- Welding / metal cutting fumes

Blast Injury

As a responder, it is unlikely that you will be affected by blast injuries. In a large-scale disaster, fires could be widespread, which could provoke explosions from damaged fuel pipes and containers that are leaking fuel, gas, or fumes.

However, the 2013 Boston Marathon Bombing demonstrated that all communities need to be prepared for blast injuries. A total of 264 individuals were triaged and transported to local hospitals after the bombs exploded. A large number of patients suffered otologic trauma—others were treated for amputations, shrapnel, and blood loss. This incident prompted CDC to develop the CDC Blast Injury Mobile Application to assist first responders, healthcare and public health during a blast event.

Crash Injury and Crush Syndrome

One nurse was killed when debris fell on her during rescue operations following the Oklahoma City bombing of the Alfred P. Murrah Federal Building. Crush injury results from direct physical compression of a part of the body.

Typically affected areas include:

- Lower extremities (74%)
- Upper extremities (10%)
- Trunk (9%)

Crush syndrome is localized crush injury with systemic manifestations, which are caused by traumatic muscle breakdown and the release of potentially toxic muscle cell components and electrolytes into the circulatory system. Crush syndrome can cause local tissue injury, organ dysfunction, and metabolic abnormalities, including acidosis, hyperkalemia, and hypocalcemia.

Disasters and Infections

The risk for certain infections might be increased following a disaster, such as a hurricane or other storm. According to the CDC, diarrheal, respiratory, and skin infections are the most common diseases following a natural disaster. These infections usually result from crowded and unsanitary conditions. Infectious disease outbreaks, however, are rare following natural disasters, especially in developed countries. Airborne, waterborne, and foodborne diseases are expected to occur up to one month after a disaster.

The Risk of Zoonotic Disease

The risk of contracting a zoonotic disease is not necessarily appreciably higher after a disaster. However, mosquito populations often increase after hurricanes and floods, which increases one's risk of becoming infected with a vector-borne disease, such as West Nile Virus. The increased risk is predominantly because of people spending more time outdoors in cleanup and recovery activities.

Potential Gastrointestinal (GI) Infections

Flood waters may contain fecal material from overflowing sewage systems and agricultural and industrial byproducts, therefore there is some risk of disease from drinking or eating contaminated water and food.

Disasters and Irritations

Potential Respiratory Irritations
Smoke from wildfires is a mixture of gases and fine particles from burning trees and plant materials. Smoke can irritate the respiratory system and worsen chronic heart and lung diseases, such as asthma. Smoke produced from burning synthetic debris can contain toxic chemicals, too, and volcanoes can produce ash and toxic gases as well.

Emergency responders may expect diminished air quality after most explosions. For example, in April 1996, an oven exploded as two persons were using acetone, hydrochloric acid, and sodium hydroxide to manufacture methamphetamine in an illicit apartment laboratory; one person sustained chemical burns and was taken to a hospital emergency department. The source of the burns was not revealed and, as a result, three hospital employees had nausea and vomited while treating the person. Three emergency medical technicians (EMTs) and two police officers exposed to emissions from the explosion's fire had eye and respiratory irritation. None of the injured first responders was wearing personal protective equipment (PPE) at the time of injury.

Potential Skin Infections and Rashes
Trench foot, also known as immersion foot, occurs when the feet are wet for long periods of time. In severe cases, untreated trench foot can involve the toes, heel, or entire foot.

Responding to disasters has its consequences, and these skin infections and rashes are typical but preventable:

- Wound infections
- Fungal infections (e.g., ringworm, athlete's foot)
- Staph infections
- Prickly heat
- Insect bites
- Trench foot (i.e., immersion foot)

SOURCES: "Air Quality and Emergencies," Centers for Disease Control and Prevention (CDC) website; AND "Public Health Consequences Among First Responders to Emergency Events Associated With Illicit Methamphetamine Laboratories — Selected States, 1996–1999," *Morbidity and Mortality Weekly Report (MMWR)*, November 17, 2000, Vol. 49, No. 45, pp. 1021-1022.

Know Your Own Health

Disasters are complex, stressful situations. Responders may experience the following symptoms of stress:

- Behavioral and Emotional (anxiety, fear, doubt, anger, irritability, etc.)
- Cognitive (memory loss, lack of focus, confusion, distraction, nightmares, etc.)
- Physiological (fatigue, nausea, heart palpitations, etc.)

Everyone has physical and psychological limitations. The dynamics of an emergency situation will exacerbate any existing chronic medical problems—both biological and psychological.

The CDC website lists a number of tools to help assess physical and mental well-being before, during and after a disaster. The PERLCs Disaster Mental Health Assistance in Public Health Emergencies toolkit also helps responders recognize potential stress reactions and identify strategies for self-care during a disaster.

Volunteer emergency responders are not only responsible for the health and safety of event victims, but also the health and safety of themselves. Try to self-reflect and know your own vulnerabilities and limitations

Case Study 1: California Wildfires

Long–term drought conditions and strong Santa Ana winds brought devastating wildfires to Southern California in October 2007. Numerous large fires burned over 900,000 acres during the month across the region.

From Oct. 20 to Oct. 21 alone, twenty-three wildfires spread across Southern California from Malibu to San Diego County. A half-million residents evacuated the threatened areas.

By the end of October, incident management teams had contained the largest of the wildfires in Southern California.

In the early hours of November 24, however, another destructive wildfire struck Malibu. These destructive fires eventually claimed 10 lives and injured 292 people. The fires burned 522,398 acres, destroying more than 3,290 structures and damaging 292 others.

The fires burned 92% of the La Jolla Indian Reservation land. Emergency responders cleared branches and brush from culverts in order to reduce flood risk and control erosion.

FEMA partnered with other federal, state, and local disaster officials, tribal leaders, and volunteer agencies to launch a far-reaching recovery effort. By mid-December, nearly $12 million in FEMA funding was disbursed for a variety of essential needs, ranging from temporary housing and home repairs to replacement of basic items lost in the fires.

Record-setting fires continue to plague the United States, mostly in the western portion of the country. Record droughts have affected the incidence and intensity of wildfires, prompting the National Association of State Foresters to incorporate climate change factors into their wildfire management strategy.

Please answer quiz questions #17 - #19

Case Study 2: Fall and Spring Blizzards

Spring storms on March 28, 2009 brought a mix of severe weather extending from the Great Plains down to the Gulf Coast. In Kansas and Oklahoma, bands of heavy precipitation dumped several feet of snow and brought brief periods of thundersnow. The heavy snow and strong winds resulted in blizzard conditions in some areas of Kansas from Friday into early Saturday.

Significant accumulations of ice from freezing rain and sleet also affected the Flint Hills and southeast Kansas, with record-breaking snow accumulations before the wintry precipitation ended Saturday evening. Several areas reported power outages from the snow, ice, and wind.

In the northern Plains region, the semi-frozen ground was already saturated from snowmelt. The additional snowfall caused the Red River along the North Dakota and Minnesota border to swell. On March 28, the river crested in Fargo at a record level of 40.8 feet. An estimated 3,500 people were evacuated from the area and as many as 25,000 more were expected to leave. News sources reported two fatalities, 50 injuries, and 82 rescues in flood-related incidents.

Another historic storm brought blizzard conditions to the Buffalo, New York area in November 2014. Six feet of snow fell in the 1st day stranding people and cars everywhere. The highest accumulation recorded was 88 inches. One of the biggest challenges to responders was clearing to individuals that needed assistance. The storm occurred early in the season prompting flooding concerns as the temperature rose to normal averages and snow melted.

Please answer quiz questions #20 - #22

Case Study 3: Floods

A large weather system slowly moved east across the central United States from March 17 to 19, 2008. A large upper trough with a closed upper low allowed a strong southerly flow to transport extreme amounts of moisture from the deep south into the midwest.

Several waves of low pressure moved along a nearly stationary frontal boundary that remained just south of the forecast area, across northern Arkansas and extreme southern Illinois. Numerous rounds of rain and thunderstorms brought locally heavy precipitation to much of the forecast area, with the greatest amounts confined along and south of Interstate 44 in Missouri and Interstate 70 in Illinois. The excessive rainfall led to flash flooding of low lying areas and major flooding on local rivers and creeks for the next week.

In 2011, Hurricane Irene impacted the entire U.S. East Coast, producing wide spread flooding in Vermont, New Hampshire, New York, and New Jersey. Significant damage was caused by wind, tornadoes, and storm surge. The heavy rainfall, along with soil conditions (saturated from Tropical Storm Lee) produced historic-level 500-year floods in many areas, wiping out roads, bridges, residences and even some Emergency Operation Centers and entire towns. Forty-five individuals lost their lives, 23 from inland flooding and another six from storm surge/waves. Millions of people were affected and billions of dollars of damage was reported.

SOURCES: National Weather Service, St. Louis, MO Weather Forecast Office; AND Hurricane Irene, August 21–30, 2011, Service Assessment. NOAA, NWS, Department of Commerce. Images courtesy of FEMA Photo Library.

Please answer quiz questions #23 - #26

Case Study 4: Oil Platform Explosion, Gulf of Mexico

Located 51 miles southeast of Venice, Louisiana, the Deepwater Horizon Mobile Offshore Drilling Unit (MODU) with 126 people onboard exploded on April 20, 2010. Oil and gas ignited as the fuel spewed forcefully from the drilled well up through nearly one mile of water to the surface. The destroyed drilling platform sunk into the Gulf of Mexico the morning of April 22. All but 11 platform workers were rescued from the surrounding waters.

Efforts to stop the flow of oil and minimize its environmental impact began almost immediately by the principal developer, British Petroleum (BP). Thousands of barrels of oil a day flowed into the waters surrounding the well head. For over a month, BP used airplanes to disperse highly toxic chemicals in an attempt to break up the surface oil before it reached shore. On May 26th, the U.S. Environmental Protection Agency (EPA) and the U.S. Coast Guard issued a directive to BP requiring them to decrease overall volume of dispersant by 75 percent and to stop use of dispersant on the surface of the water altogether. EPA allowed BP to use undersea dispersants to reduce the amount of oil reaching the surface.

Various methods were attempted to stop the flow of oil and capture it before it drifted to land. Booms were deployed to not only protect shorelines, but also to round up oil for controlled burns. Nevertheless, on July 1 FEMA estimated 35,000 to 60,000 barrels of oil per day continued being discharged, affecting 225.5 miles of shoreline.

Some coastal residents reported smelling odors and were experiencing eye, nose, and throat irritation, nausea, and headaches. EPA responders used portable monitoring devices and aircraft to collect air sampling data. Air was monitored for vapors that may evaporate from the water/oil mixture as well as for particulate matter from the smoke of controlled burns. EPA tracked the levels of particulate matter and Volatile Organic Compounds (VOCs).[1] The Centers for Disease Control and Prevention (CDC) reviewed the sampling results to determine the likely short-term and long-term health effects. CDC determined that the pollutant levels may have caused the described symptoms, but the odor was worse than the physical health effects—the pollutants at low levels may cause temporary, short-term symptoms, but would not cause long-term harm. As the odor persisted, air quality concerns had a psychological impact on the community.

[1]Particulate matter is a mixture of extremely small particles and liquid droplets made up of a number of components, including acids (e.g., nitrates and sulfates), organic chemicals, metals, and soil or dust particles. VOCs are chemicals (i.e., benzene, toluene, ethylbenzene, xylene, and naphthalene) that can be smelled at levels well below those that would cause health problems.

Case Study 4: Oil Platform Explosion, Gulf of Mexico

As of June 17, about 20,000 people had volunteered to work in the region. Volunteers could work in wildlife recovery centers only if they received appropriate training as paraprofessionals and were allowed to handle wildlife only if holding federal or state wildlife licenses. Responders were trained for many assignments, including shoreline cleanup, wildlife monitoring, boom placement and recovery, decontamination, oil skimming and pumping, boom loading and unloading, boat launching and landing, and general retrieval of oil-covered debris.

The Vessels of Opportunity (VOO) program was implemented to provide local boat operators an opportunity to assist with response activities, including transporting supplies, assisting wildlife rescue, and deploying containment booms. To qualify for the program, boat operators and crew were required to complete four hours of training, pass a U.S. Coast Guard dockside examination, meet crewing requirements based on vessel size, and certify their vessels as safe. As of July 5, over three thousand of the nearly seven thousand response vessels (e.g., barges, skimmers) were VOOs, and more than 45,000 personnel had responded overall.

The Occupational Safety and Health Administration (OSHA) noted these potential hazards to emergency responders in this uncontrolled discharge of oil event:

- Heat stress, ranging from heat exhaustion to heat stroke.
- Sunburn and sun poisoning.
- Skin and eye irritation or rashes from contact with "weathered" oil.
- Cuts, sprains and other injuries.
- Drowning.
- Being hit by earthmoving or other equipment.
- Traffic hazards and car accidents.
- Bites from snakes, fire ants and mosquitoes, rodents and alligators.
- Lightning and severe weather.
- Back injury from lifting and carrying.
- Noise.
- Exhaustion and fatigue from long hours and demanding work.

Adapted from "Deepwater Horizon Response," U.S. Department of Energy; AND "Questions and Answers about the BP Oil Spill in the Gulf Coast," U.S. Environmental Protection Agency (EPA); AND "BP Gulf Oil Spill Response: Protecting the Responders" National Institute of Environmental Health Sicences; AND RestoreTheGulf website; AND OSHA Fact Sheet DTSEM 5/2010 on Deepwater Horizon Response. OSHA. [all websites accessed August 2015] Photography courtesy of Deepwater Horizon Response, United States Coast Guard Visual Information Gallery.

Please answer quiz questions #27 - #31

3. Responder Health, Safety, and Preparedness

COUNTY OF SAN MATEO
EMERGENCY
MEDICAL SERVICES

Responder Health, Safety, and Preparedness

Communities can prepare for many weather-related emergencies—hurricanes and flooding often have some prior warning. Other emergencies (e.g., earthquakes, industrial freight train accidents, explosions) may be anticipated but usually occur without warning.

Even with forewarning there is still precious little time to fully prepare for an emergency. And while you may never really be fully prepared for a disaster, there are some things you can do to prepare yourself personally and professionally that will help you to better manage the stress and chaos of the event and protect your physical well being.

This module examines health and safety preparedness measures a responder may take before, during, and after an emergency event.

Have a Pre-Deployment Plan

Have a personal/family preparedness plan. As a response worker who will be committing time to an emergency event, it is vital that you activate your personal or family preparedness plan as soon as you become aware of an emergency. In general, you should have a personal or family preparedness plan for any emergency situation, regardless of whether or not you will be called to duty.

Having a preparedness plan will enable you to report to duty with peace of mind, knowing that your loved ones are safe and that your personal affairs are taken care of. Some items that should be thought through before deployment include:

- Child care.
- Spousal/family support (other than financial).
- Pet care.
- Household chores.
- Mail pick up.
- Home and business security.
- Medications or assisted devices.
- Financial preparedness. This is especially pertinent if you are a volunteer and will be away from your normal paying job. How will the bills get paid in the event of a multi-week deployment? Have you made arrangements with your primary employer for time away while deployed? Do you have personal life and disability insurance? These are all important things to consider before deploying.

Update Personal Medical Information Before You Go

In an emergency, you may not be able to access your medical records. The CDC has developed a "Keep It With You" Personal Medical Form where you can keep track of relevant medical information. This can be used by healthcare workers until your medical records can be accessed. See the References area in this online course for more information.

Remember to keep your emergency contact information current. You will want your response agency to have an up-to-date emergency contact list, and it's not a bad idea to carry this information with you.

Contacts should include:

- Primary contact(s) in the event you are injured, become ill, or are killed while deployed.
- Primary care and specialty physicians.
- Medications or assisted devices.

Pack Essentials Before You Go

What is essential when you never know what you will be asked to do?

- Clothing, including outerwear, hats, sleepwear, and footwear suitable for the weather, conditions, and task. Footwear should be thoroughly broken in before deployment to avoid blisters and broken skin.
- Personal Protective Equipment (PPE). While some of the PPE you will need will be supplied to you, it's not a bad idea to bring along any PPE you may own, such as an N-95 mask or chainsaw attire (depending on the event).
- Identification and credentials.
- Additional changes of clothes, shoes, and outerwear.
- Water, food, and snacks (especially for those on special diets).
- Plastic garbage or shopping bags to store soiled/contaminated/wet clothing.
- Personal sleeping gear.

Other personal items can be placed in a "go kit" or "go bag." Be sure to periodically replace any expendable items. If you cannot pack beforehand, make a list of your essentials, which may include these personal items:

- Medications and prescriptions.
- Contact lenses, case, and solution.
- Personal hygiene items (e.g., toothbrush, toothpaste, deodorant, shampoo, brush/comb, lip balm)
- Cell phone with travel charger.
- Sunscreen and bug repellent.
- Hand sanitizer or antibacterial wipes.
- Toilet paper.
- Flashlight and extra batteries.
- Basic first aid supplies.
- Whistle.
- Cash money (but not too much!)

Other items to consider: paper/notebook and pens/pencils; household chlorine bleach; chlorine or iodine tablets for disinfecting water; compass; small shovel.

Training Before You Go

In order to be as prepared as possible to respond to various types of emergencies, it is prudent to participate in emergency preparedness drills, exercises, and other trainings that are offered through your response agency or other organization. Besides practicing the skills necessary to do emergency tasks (e.g., working with hazardous materials), training exercises often give you the opportunity to asses your own physical and mental conditioning.

It is essential that you ensure you are physically and mentally able to respond. This means getting annual physicals and being honest with yourself about your health. For the well-being of all, you should not deploy if you are ill or otherwise not in good health. For those with chronic medical conditions, it is advised that you discuss your situation with your doctor and make him or her aware of the potential to deploy in the event of an emergency and what your duties are likely to be.

Protect Yourself During Deployment

Many injuries can be prevented if you are outfitted appropriately, which includes wearing appropriate clothing and proper personal protective equipment (PPE). The specific type of disaster and its aftermath will help dictate how to properly outfit yourself.

PPE is a type of "barrier protection." Another type is the vaccination. Protective equipment, vaccination, and communication and safety skills are the responder's tools to save lives, property, and stay safe and healthy.

This module examines how responders can protect themselves from physical harm when responding in a disaster.

Basic Types of Personal Protective Equipment (PPE):

- Goggles or other eye protection.
- Gloves (medical gloves for clinical personnel, leather for debris removal).
- Hearing protection.
- Surgical masks or other face shields.
- N-95 respirator.
- Hard hat or helmet.
- Steel-toe boots.
- Disposable gowns made of polyethylene-coated polypropylene or other nonabsorbent laminate materials.
- Outerwear appropriate for the situation and weather.
- Sunscreen.
- Bug repellant.

Specific Use PPE

The level of PPE required by responders will depend on the specific event. Based on lessons learned from new research and previous disasters, protection for responders is continuously improved. The Ebola epidemic is a perfect example of evolving PPE recommendations. The fact that so many healthcare workers originally contracted the disease from their patients led to adoption of higher levels of PPE for healthcare workers as seen in this video produced by the CDC and John Hopkins.

Volunteers should consult their supervisors for specific PPE recommendations.

As a volunteer, especially if you are a non-medical volunteer, you may be asked to assist with debris removal, or a situation may require debris removal before rescue operations can continue. If you will be using a chainsaw, it is important to wear proper chainsaw PPE.
This includes:

- A hard hat, which protects the user's head from flying or falling debris and from the cutter bar should kickback occur.
- Goggles or a visor, which reduces the chance of chips getting into the eyes.
- Ear protection, which protects against the noise of the saw.
- Chainsaw chaps/pants and shirt, constructed of durable protective material specifically for chainsaw users, which provide a barrier of protection from mishaps, insects, and allergic reactions.
- Chainsaw gloves, which are specially constructed of cut-proof fabric.
- Chainsaw or steel-toe work boots, which provide a barrier of protection that helps a responder maintain balance.

Respiratory Protection

Many emergency situations can have respiratory hazards, including:

- Particulates
- Fibers
- Volatile organic compounds (VOCs)
- Pesticides
- Infectious agents
- Smoke
- Heat
- Fumes/gases

Several types of respiratory protection are available. What type of hazard you may be dealing with will determine the type of protection you will need. However, more dangerous situations will be handled by trained professionals that may utilize more advanced respiratory protection. The types of protection you are most likely to use are a surgical mask or an N-95 respirator.

Surgical Mask
A surgical mask prevents the release of potential contaminants from the user into the immediate environment. Surgical masks can come with or without a face shield. Since 1991, surgical masks have been recommended as part of the universal precautions to protect the wearer from direct splashes and sprays of infectious blood or body fluids. However, surgical masks do not effectively filter small particles from air and do not prevent leakage around the edge of the mask when the user inhales.

Respirators

Respirators protect the wearer from hazardous dusts, gases, chemicals, smoke, carbon monoxide, and certain infectious respiratory diseases, such as tuberculosis and SARS. As you can imagine, only trained professionals, such as fire, military, and other specially trained emergency personnel, would be utilized during situations involving hazardous substance releases.

However, in this time of pandemic influenza, the use of N-95 facepiece particulate respirators are becoming commonplace protection. Disposable respirators cover the nose and mouth and protect the wearer against particles, but not gases or vapors. Biological agents, such as viruses and bacteria, are particles, and therefore can be filtered by N-95 particulate respirators (e.g., influenza virus is primarily spread by inhaling virus droplets floating in the air).

Respirators

Types of Respirators

N-95 respirators are designed and engineered to provide very high levels of particle collection. This respirator filters at least 95% of airborne particles. The N-95 respirator is one of nine types of particulate respirators that collect 95%, 99% and 100% of airborne particles. Such respirators may have a rating of "N" (not resistant to oil), "R" (somewhat resistant to oil), and "P" (strongly resistant to oil). Some industrial oils can remove electrostatic charges from the filter media, thereby reducing the filter efficiency.

- N-95, N-99 and N-100
- R-95, R-99 and R-100
- P-95, P-99 and P-100

Personnel who may utilize N-95 respirators need to be fit-tested to ensure proper fit in order to minimize the degree of leakage around the facepiece.

Understanding Respirator Risks

While N-95 masks are disposable, according to the National Institute for Occupational Safety and Health, "If sufficient supply of respirators is not available, healthcare facilities may consider reuse as long as the device has not been obviously soiled or damaged (creased or torn). Reuse may increase the potential for contamination; however, this risk must be balanced against the need to fully provide respiratory protection for healthcare personnel." However, any time a mask is worn, it should be considered potentially contaminated and "a procedure (should be implemented) for safer reuse to prevent contamination through contact with infectious droplets on the outside of the respirator."

Food and Water During Deployment

Eat healthy meals and snacks and stay hydrated. Other things to keep in mind:

Stay well hydrated.
Water is your best option in the field, but in hot conditions, it may be necessary to replace losses in sodium, potassium, and other electrolytes because of excessive sweating. Sports drinks are a good option. Stay away from alcohol and beverages high in caffeine—caffeine is a diuretic. Drinks high in sugar are not only a poor nutritional choice, but the high sugar content can actually make you thirstier. Water may also be boiled or treated to make it drinkable. See the References area in this course for more information on boiling and treating water for consumption.

Water may be contaminated.
Do not eat any food that has come in contact with flood or storm water. Depending on the disaster, public water sources may be contaminated. Therefore, you will want to drink bottled water. Water can be infected with any number of bacteria, viruses, or parasites (e.g., Giardiasis, Cryptosporidium, shigellosis, norovirus, and E. colii 0157:H7). Water may also be contaminated with chemicals, sewage, and petroleum products.

Wash your hands before eating.
Use sanitizing hand gels if soap and water aren't available. This may seem obvious, but how many of us actually wash our hands before eating our meals? Washing your hands while "in the field" is especially important as you will likely have been in contact with such things as dirt, germs, body fluids, chemicals and other contaminants.

Know the signs and symptoms of foodborne illness:

- The most commonly recognized foodborne infections are those caused by the bacteria Campylobacter, Salmonella, E. Coli 0157:H7, and by a group of viruses called calicvirus (also known as Norwalk and Norwalk-like viruses).
- Remember the saying, "When in doubt, spit it out." If a food doesn't taste right, spit it out! If it doesn't smell right, look right, or if food has been sitting out for a while don't eat it! This is especially true for food that is served in warmer environs. Meat, poultry, fish, eggs, and dairy products, as well as items made with mayonnaise, will spoil more quickly than other foods like whole fruits, vegetables, nuts, and grain products. Meals Ready to Eat (MREs) are also an alternative.
- Also be aware of the environment in which food is being served. Food will ideally be served away from the disaster zone, well out of the way from contaminants, such as dust, smoke, fumes, etc.

Rest and Sleep During Deployment

Be familiar with the signs of stress and what you should do—all discussed in Module 4.

Get plenty of sleep and take adequate rest breaks during deployment. This may be easier said than done, as your adrenaline and urgency to help may override any thoughts of rest. But sleep and rest are essential. Your ability to function, both physically and mentally, becomes impaired without adequate sleep and rest, thereby potentially putting your and others' safety at risk. Team leaders should impose mandatory rest periods. Work hours should be no more than 12 hours, with an ideal break period of 12 hours.

Basic Skills

Larger and more complex disaster incidents require a written plan, called an Incident Action Plan, which the team leader will have access to. This plan is used to coordinate response and recovery activities and will include a "safety briefing," which describes how safety and medical concerns are handled, precautions to be taken, and information on specific risks and dangers.

While working in a disaster setting, it is imperative that you never work alone and that you stay alert and attentive to the potential risks and dangers surrounding you. You should monitor yourself for signs of exhaustion and take breaks when needed. It is important that you communicate problems, injuries, fatigue, and other concerns to your supervisor.

Decontamination

As a non-traditional emergency responder, it is unlikely that you will wear a chemical protective suit. In the event of a known hazardous materials spill, trained HazMat professionals will be called to the scene. Even so, during a large-scale disaster there is a greater likelihood for unknown chemical and biohazard releases into the environment. Team leaders will assess the area and situation before sending you into the field.

Nevertheless, effective decontamination is a key aspect to protecting the health of responders and the wider community. Your skin, clothing, and personal protective equipment could be contaminated with any number of things, from chemicals to biohazards. Insufficient decontamination can lead to the spread of contamination on and away from the disaster site.

Decontamination may be necessary for both the responder and the responder's gear—both during deployment and after the disaster.

After a Hazardous Materials Incident

Responder decontamination usually simply means washing hands or taking a shower. However, in the likelihood that you came in contact with hazardous material, specific decontamination protocols should be followed and will likely involve hazardous materials teams. If there is ever a question as to whether or not you came in contact with hazardous materials, you should always check with your team leader.

The responder's gear (PPE), clothing, tools, and personal belongings may need decontamination after the disaster. This may simply be a matter of washing clothing and gear in the washing machine or hand washing or scrubbing specific items, such as boots, goggles, tools, wedding bands, and wristwatches. However, if you came in contact with known hazardous materials, specific decontamination protocols should be followed. Again, if there is any question about contact with hazardous materials, your team leader should be consulted.

As a responder, you should be aware that some items may be so contaminated that they cannot be decontaminated and returned. Therefore, irreplaceable items should not be taken to the scene. Such items may include photos, cameras, jewelry, and other items with sentimental value. In addition to contamination, there is the potential for these items to become lost, stolen, or damaged. Wallets should also not be taken into the work area.

You should check with your agency or organization regarding compensation for or replacement of any personal items or gear that were damaged or destroyed during deployment as a result of the response. Policies may be in place that address these concerns.

Post-Disaster

It is just as important to take care of yourself after deployment as it is during deployment. Some of the things you should keep in mind when your mission is complete include medical follow-up and post-deployment medical screenings.
Follow-up is especially encouraged if the responder:

- Sustained injuries during deployment.
- Sustained infections during deployment.
- Was exposed to known toxins.
- Engaged in an incident that was particularly traumatic.

In the many years since 2001, the World Trade Center Medical Monitoring and Treatment Program (or www.wtcexams.org) continues to provide opportunities for free and confidential medical and mental health assistance. Workers and volunteers who responded to the 9/11 attacks on New York City were subject to extreme conditions, both physically and mentally. Some exposures (e.g., asbestos) may have long-term effects on health. Data suggests that compared with the general population, responders who were engaged in the rescue, recovery, cleanup, and restoration activities have higher rates of persistent symptoms, including PTSD, panic disorder, increased drinking, and other mental health problems. Continued surveillance is encouraged. The program is federally funded by the National Institute for Occupational Safety and Health (NIOSH).

Post-Deployment Surveillance
The responsibility for medical follow-up lies with both the individual responder and the response organization. It is prudent that the response agency follow-up with each volunteer to monitor and track physical and mental health outcomes. Tracking health outcomes (i.e., surveillance) provides a means to understand any long-term health consequences that may have resulted from a particular disaster. Information gleaned from surveillance will allow for the development and implementation of better protective measures for responders in the future.

Post-Deployment Responsibility
A responder may develop an infection or illness after deployment as a result of contact with microbes or chemical exposures in the field. Mental health issues may also arise in the days or weeks following a disaster response. While many people may find it difficult admitting that they are dealing with stress, anger, or depression, response workers are strongly encouraged to ask for and seek help if these issues become problematic and affect relationships and quality of life.

While your response agency or organization may urge you to obtain medical screening and follow-up, the individual responder is ultimately responsible for his or her own health—both mental and physical health. It will be up to you to schedule and go to any medical appointments and communicate pertinent information with your organization, such as any illnesses or injuries that occurred as a result of your response work and any long-term consequences.

So, who pays for all of this?

It is important for you to be aware of any policies and procedures within your response organization that describe who is financially responsible for any medical appointments, screening and follow-up.

Who will pay for you to go to the hospital or doctor if you are injured or become ill? Additionally, what are the policies on worker's compensation should you be out of work from your regular job as a result of an injury or illness sustained while responding to the emergency?

Case Study 1: Grain Elevator Explosion

On Monday, June 8, 1998, at approximately 9:20 a.m., a series of explosions occurred at a grain elevator facility in Haysville, five miles south of Wichita, Kansas. The DeBruce Grain elevator was one of the largest in the world, consisting of a half-mile double row of concrete silos, each measuring 30 feet in diameter and over 120 feet in height. Across the top of the silos were two galleries, one for the south silo array and the other for the north. Grain was carried by belt in each gallery and then dumped into a designated silo. Beneath all the silos were four conveyor tunnels, approximately 7 feet high, 8 feet wide and 1,300 feet in length.

At the time of the incident, the facility was filled to about 33 percent of capacity. The explosions occurred as the facility was being prepared for the early summer harvest of wheat. Workers were cleaning the top gallery houses as well as the conveyor tunnels under the silos. Routine maintenance (e.g., greasing bearings) was taking place throughout the facility. An unknown ignition source caused the first explosion of grain dust. That explosion caused more particulate dust to become suspended in the air, thereby contributing to a chain of explosions.

Initial rescue efforts focused on finding four workers who were last seen in the south tunnels before the blast. Early accountability for the number and location of affected workers was hampered by a lack of knowledge by personnel of an emergency action plan—a plan existed on paper, but had neither been described to nor exercised with workers—coupled with an absence of documented work assignments for all personnel working in the elevator at the time (i.e., DeBruce Grain workers, independent contractors, and trucking firms).

The rescue and recovery efforts involved local, state, and federal resources. Upon entering the tunnels beneath the silos, the rescuers were confronted with tons of grain. The distribution chutes below each silo had been destroyed in the blasts, allowing grain to spill into the tunnels. The technical rescue teams had to construct shoring beneath each silo to stem the flow of grain and allow the removal of the grain by vacuum. As responders searched the tunnels in the June heat, smoldering fires continued to burn in several silos remote from the rescue area.

The 62-member Nebraska Task Force worked in 12-hour shifts from about 1 a.m. Tuesday through Saturday morning. After that, rescue efforts were scaled back as volunteers focused on making the facility safe to conduct a recovery operation for the one remaining worker, who was not located until July 22. Ultimately, seven workers were killed and ten workers were injured by the blasts.

Please answer quiz questions #32 - #34

Case Study 2: Graniteville Train Derailment

On Thursday, January 6, 2005 a train traveling from Macon, Georgia to Columbia, South Carolina (SC), derailed in Graniteville, SC. While traveling through Graniteville at 45 miles per hour, the train ran into a parked locomotive on a side rail—the rail switch had not been redirected. At 2:40 a.m fourteen cars derailed, spewing a white substance all over the ground and creating a toxic plume of gas.

At 2:50 a.m. night shift workers at the town's textile mill turned off their machines and gathered in a back room. When the gas became too intense, approximately 500 workers abandoned the mill. Ultimately, five of the nine deaths were from this first group of evacuees.

Reverse 9-1-1 was used to notify 3,600 homes to shelter-in-place. Later they were told to evacuate. Mandatory evacuation was ordered for approximately 5,400 residents in a one-mile radius around the crash site. Shelters opened for both human and small animal evacuees. Traffic Control Points were established. A curfew was in effect for a radius of two-miles around the crash site. Forty-five rescue workers from two counties set up decontamination centers. Schools closed.

South Carolina Department of Health and Environmental Control (DHEC) response efforts centered on determining the contents of the damaged railcars. One tanker carrying 131 tons of chlorine was breached and began leaking immediately. The toxic gas primarily flowed through town in a northeasterly direction. Because of chlorine's heavy weight, gas also descended southwesterly toward lower elevations and against the prevailing winds. The train's manifest confirmed that the train carried three chlorine gas cars, one liquid sodium hydroxide car, and one liquid creosol car. One chlorine car had an instantaneous release on impact and two cars had a slow consistent release. The white substance on the ground was believed to be Kaolin, from two uncovered rail containers, and was considered not dangerous.

Responders made a door-to-door sweep of the affected area. Federal and state resources were coordinated for a "possible" evacuation of a three-mile radius, which included a hospital, four nursing homes, and a residential care facility. The magnitude of damage was confirmed when a large fish kill was discovered at Horse Creek.

Case Study 2: Graniteville Train Derailment

Around the "hot zone," roughly 200–300 law enforcement officers from various agencies patrolled the incident and enforced the curfew. A 3,000 feet no-fly zone extended for 3 miles around the hot zone. By January 9, operations to trans-load 16,000 gallons of sodium hydroxide were completed, but an operation to patch the leaking chlorine tank car was unsuccessful. Crisis counseling "Town Meetings" were scheduled to keep the community informed.

By January 12, the chlorine gas leak from one of the damaged railcars had been temporarily patched. Responders continued to monitor the tank car and maintain a stable seal with additional patches as necessary. Schools beyond the incident site began to reopen after inspection and decontamination. Contract workers continued to pump chlorine from the remaining cars into railcars brought to the scene to transport the remaining chemical away from the scene. The fuel tanks of the locomotives were also pumped out. Projected costs to Aiken County alone were in the millions of dollars because of the potential damage to electrical systems and equipment within homes and businesses, the cost of the first response and recovery operations, damage to fire and response vehicles, and the treatment of the victims.

Much of the equipment in the nearby textile mill was beyond repair. Chlorine gas had reacted with air moisture and corroded or contaminated all aspects of the mill's operations—dust, lint, dirt, coal, gas, oil fuel, and fabric dyes.

The nine casualties included the train's engineer and a man who innocently had driven through the toxic gas. Train service through Graniteville resumed twenty-four days after the event. In addition to the nine deaths, 250 people were injured, and 4,000 people lost their jobs when the mill went out of business.

Please answer quiz questions #35 - #39

Case Study 3: Northridge Earthquake

On January 17, 1994, the people around Northridge, California, were awakened early in the morning by a large earthquake. The quake struck at 4:31 a.m. and had a magnitude of 6.7, according to the U.S. Geological Survey.

The fault responsible for the earthquake ran underneath the San Fernando Valley and had been unknown before the Northridge Earthquake. The actual rupture of the fault lasted about 8 seconds, but because of amplification and reverberation of the seismic waves, most people felt shaking for 20 to 30 seconds.

The quake was felt for 2,000 square miles in Los Angeles, Orange, and Ventura counties. There were nearly 15,000 aftershocks following the main earthquake. The earthquake killed 57 people and injured nearly 12,000 people. The event caused extensive damage to about 100,000 houses and businesses. Parking garages collapsed, roadways collapsed, and some apartment buildings were reduced to rubble. The earthquake caused more than $40 billion in damage.

The area was declared a federal disaster. Hundreds of workers were deployed to Southern California to help the communities recover. More than 600,000 people applied for state and federal disaster assistance.

Please answer quiz questions #40 - #43

Case Study 4: Steam Pipeline Explodes

At approximately 5:56 p.m. on Wednesday, July 18, 2007, a 20-inch diameter steam pipeline owned and operated by Consolidated Edison Company (Con Ed) ruptured in the intersection of 41st Street and Lexington Avenue in Manhattan, New York City. Escaping steam broke through the pavement, creating a large crater measuring approximately 32 feet x 32 feet x 16 feet deep in the intersection.

There was one fatality reported as a person suffered a heart attack while fleeing the scene just after the rupture. Two persons were seriously injured, suffering extensive burns when the tow truck they were riding in fell into the cavity created by the escaping steam. Many others sustained less severe injuries.

The rupture also affected telecommunications utilities in the area as well as natural gas and electric transmission and distribution facilities owned and operated by Con Ed. Con Ed personnel who initially responded to the incident had to close a total of twelve valves in order to isolate the ruptured section of pipeline and stop the flow of steam. This was accomplished by approximately 7:40 p.m.

Eighteen steam customers temporarily lost service as a result of the rupture and subsequent isolation of the steam main. There was an immediate loss of several electric feeders affecting local networks. There were no customer interruptions, but a press release was issued requesting that customers reduce load. Several temporary cables were installed and the networks were returned to full service by the night of July 20

Please answer quiz questions #44 - #46

Case Study 5: Extreme Weather

Joplin, Missouri Tornado

In May 2011 a devastating Category F5 tornado hit Joplin Missouri, carrying winds estimated at more than 200 mph. The sheer size (path 22.1 miles long and 1 mile wide) and velocity of the tornado was historical. The tornado caused massive destruction including the loss of 158 lives and over 1000 injured. Although sirens warned residents of the impending extreme weather, many were desensitized to the warnings and failed to seek appropriate shelter.

The National Weather Service conducted an assessment post-event to investigate the reason why so many people failed to follow the warnings. They reported that only 24 percent of tornado warning result in an actual sighting of a tornado. Communities with risk of tornados are now rethinking their hazard vulnerability along with how to educate residents about potential impacts and preventive measures.

Please answer quiz questions #47 - #48

Psychological Impacts of Disasters & Course Wrap-Up

COUNTY OF SAN MATEO
EMERGENCY
MEDICAL SERVICES

Protect Yourself During Deployment

Psychological Impacts of Disasters

Disasters are stressful events that can be life changing. Response workers put themselves in harm's way to help others. While rescue and recovery work can be rewarding, response workers are not immune to the effects that a disaster can have on emotional and psychological well-being.

According to SAMHSA's Field Manual for Mental Health and Human Service Workers in Major Disasters, no one who sees a disaster is untouched by it. Disaster stress and grief are normal responses to an abnormal situation.

Disasters:

- Are a matter of perspective.
- Are life altering events.
- Leave deep scars on victims, responders and the community as a whole.
- Create challenges for public and private mental health practitioners.
- Human Reactions to Disasters
- FEMA photo of pensive woman on phone.

What are typical reactions to traumatic events?

- No one who responds to a mass casualty event is untouched by it.
- Profound sadness, grief and anger or normal reactions to an abnormal event.
- You may not want to leave the scene until the work is finished.
- You likely will try to override stress and fatigue with dedication and commitment.
- You may deny the need to rest and recovery time.

The Dynamics and Complexities of the Situation

It's not just the aftermath of the disaster—the destruction, the victims—that can cause stress. Responders are frequently in the line of danger themselves.

Physical threat comes not only from the effects of the disaster, such as wreckage and flooding, but may also come from a breakdown of security, such as following a large-scale disaster. Responders' values, ideals, and beliefs may also be challenged, especially if responding outside of their home country (e.g., during a humanitarian aid mission). Responders often work long hours—hours that may be spent doing physically demanding and emotionally draining work.

Responders working long hours as part of a team may encounter cultural and personality differences. The stress that other workers may feel can impede the entire group. Some responders may not have clear job descriptions, or they may even have been asked to perform tasks or roles outside of their area of expertise.

Being away from family and friends can be stressful, especially if they were also impacted by the disaster. First time responders may lack experience or confidence.

Stress

Stress is a normal and inevitable part of life and this is certainly true regarding emergencies. Not everyone experiences and responds to an emergency the same way; a person's response to a traumatic event may vary. Two people encountering the same emergency may have different perceptions and reactions to it.

According to the National Institute for Occupational Safety and Health (NIOSH), response workers may experience physical, cognitive, emotional, or behavioral symptoms of stress.

Your own personal characteristics along with the characteristics of the disaster influence your level of stress. However, you are at risk for higher levels of stress if

- You are exposed to multiple trauma and grief experiences.
- The event impacts children.
- The disaster causes death and injuries.
- You feel helpless to assist others or save lives.
- If you are experiencing stress in other areas of your life.
- If you have your own unresolved grief issues from current or past trauma.

Physical Symptoms of Stress

Seek immediate medical attention if you experience at least one of the following:

- Chest pain
- Difficulty breathing
- Severe pain
- Symptoms of shock (shallow breathing, rapid or weak pulse, nausea, shivering, pale and moist skin, mental confusion, and dilated pupils)

Other physical symptoms include:

- Fatigue
- Nausea / vomiting
- Dizziness
- Profuse sweating
- Thirst
- Headaches
- Visual difficulties
- Clenching of jaw
- Nonspecific aches and pains

Symptoms of Stress

Often responders do not recognize the need to take care of themselves and to monitor their own emotional and physical health. This is especially true if recovery efforts stretch into several weeks, as happened after the 2001 terrorist attacks. Often the symptoms of stress are not simply physical. Many responders experience cognitive, emotional, or behavioral reactions immediately at the scene, while for others symptoms may occur weeks or months later. Responders should be aware of these symptoms before, during, and after deployment.

Cognitive Symptoms of Stress

Response workers who experience any of these symptoms on the scene may not be able to remain as focused as they need to be, thereby putting themselves and potentially others at risk. If symptoms become chronic or begin to interfere with daily activities, workers should seek medical attention.

- Confusion
- Disorientation
- Heightened or lowered alertness
- Poor concentration
- Poor problem solving
- Difficulty identifying familiar objects or people
- Memory problems
- Nightmares

Emotional Symptoms of Stress

Remember that strong emotions are ordinary reactions to a traumatic or extraordinary situation. Workers are encouraged to seek support from a mental health professional if symptoms or distress continue for several weeks or they interfere with daily activities.

- Anxiety
- Guilt
- Denial
- Grief
- Fear
- Irritability
- Loss of emotional control
- Depression
- Sense of failure
- Feelings of helplessness
- Feeling overwhelmed
- Blaming others or self
- Severe panic (rare)

Behavioral Symptoms of Stress

As a result of a traumatic incident, workers may notice the following behavioral changes in themselves or coworkers:

- Intense anger
- Withdrawal
- Emotional outburst
- Temporary loss or increase in appetite
- Excessive alcohol consumption
- Inability to rest, pacing
- Change in sexual functioning

Post-Traumatic Stress Disorder (PTSD)

Most people report feeling better on their own within three months after a traumatic event. If the problems become worse or last longer than one month after the event, the person may be suffering from post-traumatic stress disorder, or PTSD. This topic looks at PTSD and will let you share some of your experiences.

According to the CDC, PTSD is an intense physical and emotional response to thoughts and reminders of a terrifying event. This anxiety may last for many weeks or months after the traumatic event. The symptoms of PTSD fall into three broad types:

- Re-living (also known as re-experiencing)
- Avoidance
- Increased arousal (also known as hyperarousal)

Re-Experiencing Symptoms

Re-experiencing symptoms may cause problems in a person's everyday routine. They can start from the person's own thoughts and feelings. Words, objects, or situations that are reminders of the event can also trigger re-experiencing. Re-experiencing symptoms include

- Flashbacks—reliving the trauma over and over, including physical symptoms like a racing heart or sweating
- Bad dreams
- Frightening thoughts

Avoidance Symptoms

Things that remind a person of the traumatic event can trigger avoidance symptoms. These symptoms may cause a person to change his or her personal routine. For example, after a bad car accident, a person who usually drives may avoid driving or riding in a car. Symptoms of avoidance include:

- Staying away from places, events, or objects that are reminders of the experience
- Feeling emotionally numb
- Feeling strong guilt, depression, or worry
- Losing interest in activities that were enjoyable in the past
- Having trouble remembering the dangerous event

Hyperarousal Symptoms

Hyperarousal symptoms are usually constant, instead of being triggered by things that remind one of the traumatic event. They can make the person feel stressed and angry. These symptoms may make it hard to do daily tasks, such as sleeping, eating, or concentrating. Hyperarousal symptoms may include:

- Being easily startled
- Feeling tense or "on-edge"
- Having difficulty sleeping
- Having angry outbursts

Other PTSD Symptoms

Any task can be stressful during a deployment. It is natural to have some of these symptoms of stress after a dangerous event. Sometimes people have very serious symptoms that go away after a few weeks. This is called acute stress disorder, or ASD. Serious symptoms can include panic attacks, depression, suicidal thoughts and feelings, alcohol/drug abuse, and feelings of being estranged and isolated. When the symptoms last more than a few weeks and become an ongoing problem, they might be PTSD. Some people with PTSD may not show any symptoms for weeks or months.

Sometimes large numbers of people are affected by the same event. For example, a lot of people needed help after Hurricane Katrina in 2005 and the terrorist attacks of September 11, 2001. Most people will have some PTSD symptoms in the first few weeks after events like these. This is a normal and expected response to serious trauma, and for most people, symptoms generally lessen with time. But some people do not get better on their own. A study of Hurricane Katrina survivors found that, over time, more people were having problems with PTSD, depression, and related mental disorders.

What You Can Do—and What you Might Experience

There is no way to sugarcoat a hazard experience. Disasters by their very nature are stressful. Responders, however, have tools to help mitigate and manage stress. You can start by preparing yourself before deployment. There are things you can do while deployed to help manage your stress, as well as things you can do after your deployment is over. This topic reviews a responder's personal preparedness—before, during, and after an emergency experience.

Pre-Deployment

- Be aware of and educated about the potential physical and mental health consequences of disaster response.
- Attend pre-deployment briefings. This will help you understand the severity of the event and what you might encounter.
- Most of all, be honest with yourself and acknowledge whether or not you are physically and mentally prepared to face the type of devastation you may come upon.
- Check it out! The Emergency Responder Health Monitoring and Surveillance (ERHMS) program at NIOSH, CDC, has compiled a list of resources to help you assess your pre-deployment health and readiness.

Keeping Healthy During Deployment

During an emergency event, staying in touch with your family and friends should help you physically, emotionally, and mentally. Giving and receiving information will keep communication channels open and relieve some of the personal stress you may feel during deployment. Be self-reflective, reminding yourself and your family of the reasons and motivations for your actions.

Knowing your own motivations takes some self-examination, which should begin before deployment. Try to understand your own behaviors, especially by examining your personal prejudices, cultural perceptions, and any stereotypes that may influence your actions.

What You Can Do—and What you Might Experience

Let's review what you can do to keep yourself safe during deployment.

For physical health, eat and sleep (or rest) regularly:

- Limit on-duty work hours to no more than 12 hours per day (ideally with 12 hours off).
- Drink plenty of fluids, such as water and juice, and eat healthy snacks such as fresh fruit, whole grain breads, and other energy foods.
- Avoid excessive junk food and drugs, including caffeine, alcohol, and tobacco.
- Take frequent, brief breaks from the scene, as practicable.
- Rotate work from high-stress to lower-stress functions and from the scene to routine assignments, as practicable.
- Reduce physical tension by activities such as taking deep breaths, meditating, and walking mindfully.

As was discussed in Module III, always use personal protective equipment (PPE) appropriate to the task you are assigned.

For the health of you and your colleagues:

- Pair up with another responder (i.e., the buddy system) so that you can monitor one another's stress (both physical and mental) and generally watch out for each other's well-being.
- Encourage and support your coworkers.
- Learn to recognize and heed early warning signs for stress reactions.
- Talk about emotions and reactions with coworkers during appropriate times.

What You Can Do—and What you Might Experience

Coping Strategies:

The first step should be to examine what strategies you use to cope with stressful events. Determine which ones are helpful and which are not. Focus on the ones that you are likely to use and find helpful. The following are some recommended strategies:

- Recognize and accept what you cannot change (e.g., the chain of command, organizational structure, waiting, equipment failures).
- Don't take others' anger too personally—what appears to be outrage is often an expression of frustration, guilt, or worry.
- Avoid overly identifying with survivors' and victims' grief and trauma.
- Recognize the difference between relationships of professional helping and friendships.
- Talk to people when YOU feel like it. You decide when you want to discuss your experience. Talking about an event may be reliving it. Choose your own comfort level.
- If your employer provided you with formal mental health support, use it!
- Limit TV and Internet exposure.
- Pray or follow your other usual spiritual practices.

Post-Deployment

After your "tour of duty," transition back to your previous life slowly and deliberately. Include the following activities:

- Attend a debriefing (typically called a "hot wash").
- Give your coworkers recognition and appreciation for a job well done.
- Don't overwhelm children with you experiences. Be sure to talk about what happened in their lives while you were gone.
- Participate in memorials and rituals, and use symbols as a way to express feelings.
- Don't be surprised if you experience mood swings, which will diminish over time.
- Eat well and get adequate sleep in the days following the event.
- Maintain as normal a routine as possible, but take several days to "decompress" gradually. "Getting back to normal" may take time, so gradually work back into your routine and let others carry more weight for a while at home and at work.
- Spend time with others or alone doing the things you enjoy to refresh and recharge yourself.
- Do not make any big life decisions, but do make as many daily decisions as possible to give yourself a feeling of control over your life.

What You Can Do—and What you Might Experience

Keep Open to Recovery
Talk about your emotions. Talking sometimes helps process what you have seen and done. Try to understand that while it's perfectly normal to want to talk about the disaster, it is equally normal not to want to talk about it. Remember that those who haven't been through it might not be interested in hearing all about it—they might find it frightening or simply be satisfied that you returned safely.

If talking doesn't feel natural, other forms of expression or stress relief, such as journal writing, hobbies, and exercise are recommended. Use counseling assistance programs available through your agency.

Also remember to take care of yourself physically. Your physical and mental well-being work together. Recovery is not a straight path but a matter of two steps forward and one back. You will make progress.

What You Can Do—and What you Might Experience

Expect Structure and Leadership

Remember that as a volunteer, you are part of a larger organization. You can expect structure and leadership from that organization. An effective management structure and leadership provides:

- Clear chain of command and reporting relationships.
- Available and accessible supervisors.
- Disaster orientation for all workers.
- Shifts of no longer than 12 hours, followed by 12 hours off.
- Briefings at the beginning of shifts as workers enter the operation. Shifts should overlap so that outgoing workers brief incoming workers.
- Necessary supplies (e.g., paper, forms, pens, educational materials).
- Communication tools (e.g., mobile phones, radios).

Organizational Planning

Organizations can develop a plan for managing the stress of their volunteers. Processes may include these actions:

- Regularly assessing workers' functioning.
- Rotating workers among low-, mid-, and high-stress tasks.
- Encouraging breaks and time away from the assignment.
- Educating about signs and symptoms of worker stress and coping strategies.
- Providing individual and group defusing and debriefing.
- Developing an exit plan for workers leaving the operation, including a debriefing, reentry information, opportunity to critique, and formal recognition of service.

What You Can Do—and What you Might Experience

Organizational Response

Ideally your response organization will be pro-active in helping you reduce and prevent stress. Some of the ways that management can help include:

- Develop an effective management structure.
- Define a clear purpose and goal for the individual and the group.
- Orient and train staff with written role descriptions (such as job action sheets) for each assignment setting. When a setting is under the jurisdiction of another agency, inform workers of each agency's role, contact people, and expectations.
- Nurture team support.
- Develop a plan for stress management.

Develop a Plan

Many injuries can be prevented if you are outfitted appropriately, which includes wearing appropriate clothing and proper personal protective equipment (PPE). Hard hat, goggles, and N-95 particulate respirators are specific use PPE. But how do responders protect themselves from stress?

Volunteers can develop a plan for managing their own stress. Along with everything presented in this online course, your processes may include these actions:

- Regularly assessing your own physical, mental, and emotional functioning.
- Acknowledging that rotation among low-, mid-, and high-stress tasks is not a punishment to your working ability, but an appreciation for your health and well-being.
- Take breaks. Spend some time away from the assignment.
- Become educated about the signs and symptoms of stress, recognize the signs and symptoms in you and your co-workers, and initiate coping strategies
- Attend individual and group defusing and debriefing.
- Know that you made a difference in responding to the emergency event.

What You Can Do—and What you Might Experience

Know When To Ask for Help

Disasters can be chaotic, scary, confusing, loud, dusty, dirty, smelly, crowded, and above all, dangerous. Hazards are stressful both physically and mentally—before, during, and after deployment. Physical pain can affect your mental state—and mental anguish can affect you physically. Ask for help if you:

- Are not able to take care of yourself or your children.
- Are not able to do your job.
- Use alcohol or drugs to get away from your problems.
- Feel sad or depressed for more than two weeks.
- Think about suicide.

Ultimately, your personal safety and health are in your hands.

Additional Resources

CDC website:

- Traumatic Incident Stress
- Coping with Stress After a Traumatic Event
- Emergency Responder Health Monitoring and Surveillance (ERHMS)

National Institute of Mental Health
Disaster Mental Health Assistance for Public Health Emergencies

References

All content in this training was adopted from the "Personal Safety and Health for Emergency Responders" Course
from the
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