



An emergency is defined as a serious situation or occurrence that happens unexpectedly and demands immediate action. Preparing for an emergency response, whether resulting from a natural disaster or a building facilities failure, is an important aspect of collection care. Policies for response should be included in an organization's disaster plan and should address not only the procedures to recover collections but the health and safety of the responders.

Any time collection caretakers are called upon to respond to an emergency, it is important to remember that not all stages of an emergency demand rapid response—the recovery and assessment of cultural property will be a secondary response. Access to cultural properties will only be allowed once immediate threats to life and health are cleared.

Always put the health and safety of individuals first, otherwise, you put the entire response effort at risk. With every experience in an emergency response, greater insight is gained into those accumulated best practices that promise to improve both personal skills and lasting contributions to the knowledge of emergency response.

The following topics should be taken into consideration while preparing for and performing emergency response and will assist in protecting the individuals involved, allowing the project to run smoothly and will also benefit everyday practice.

Before You Sign On

Careful and considered personal assessment and preparation will help ensure that response efforts are successful.

- Evaluate your fitness to respond, including: your general health, physical stamina and emotional strength. Remember that common health conditions like high blood pressure may make you ineligible to wear certain protective devices. If in doubt, consult with a physician or with health and safety staff at your own institution.
- Consider what arrangements would need to be made for life at home to function in your absence (e.g., responsibilities for children, ill or aging relatives, pets, etc.). Check that your health and legal directives are current.
- Check that your immunizations (Tetanus, Hepatitis A, Hepatitis B) and medical evaluation are up-to-date. See www.cdc.gov for additional information.
- Keep your annual respirator fit testing up-to-date.
- Contemplate whether you can work patiently and with sensitivity in an unpredictable setting relying on individuals under great stress who may have difficulty succinctly conveying essential information.
- Evaluate the contributions you could make in light of your training, experience and skill set; know what role is expected of you.

COMMUNITY EMERGENCY RESPONSE TRAINING

Involvement in community emergency response training (CERT) is an excellent means of acquiring a fundamental understanding of an emergency response system focused on people. CERT covers basic first aid and incident command structure. Information on CERT (including finding the CERT program nearest you) is available at: www.fema.gov/community-emergency-response-teams

Before You Leave For the Site

Though it may seem counterintuitive, slow down when responding to cultural property emergencies. The collection caretaker's role is not to rush in and rescue, depleting energy and making ill-informed decisions. By first gaining information about custodial priorities and concerns, collection personnel will be able to make reasoned and informed choices about how a response may best proceed.

Learn as much as you can about site conditions so that you know what supplies and equipment may be necessary.

Access and Accommodation

- Is the location accessible? Have roads been closed?
- What kinds of arrangements can be made for transportation and lodging?
- Can food, gas and other supplies be acquired locally?
- Is there clean water and is it safe to drink?
- Are restrooms and shower facilities in working order?
- Can you and your vehicle obtain appropriate identification to allow passage to restricted areas?
- Have curfews been set and can you accomplish your work within a limited time span?
- Are repair facilities and vehicle fuel available?
- What are the viable transportation routes?
- Is new information about the site's vicinity available? (via personal contact, internet, radio, etc.)
- Are there reliable means of communication?

Site Working Conditions

- Is information about an institution's collections and facilities available?
- Are floor plans, emergency plans, chemical inventories and other relevant data available for review?
- Are you responding to a fire, flood or hurricane or other emergency?
- What are current and anticipated weather conditions?
- What are anticipated temperatures inside and outside?
- Is there standing water or mud?
- Does the site have electrical power?
- Is there a working communication system?
- Is there an established level of Personal Protective Equipment (PPE) required for site entry?

Custodial Priorities

- Is the staff at the site ready for you?
- Confirm who will meet you and who will have keys?
- Will the equipment you need be available? Can you make all equipment compatible?
- Is there working space within the location or will you be removing objects to be cared for elsewhere?

Upon Arrival

Your initial arrival at the disaster site is one of the most important times in the response effort. Keep in mind that significant steps to ready the site have already occurred, such as actions by public authorities, collection custodians or other conservators.

Approach with humility and sensitivity as well as with confidence that you can make a contribution to the team effort.

DISASTER RE-ENTRY CHECKLIST

From Robert Herskovitz, AIC's *Train the Trainer in Emergency Response*, 2000

1. Has everyone known/believed to have been inside the structure been accounted for? Have all injuries and notification(s) been attended to?
2. Has permission been given by civil authorities to re-enter?
 - Fire department
 - Police department
 - Government inspection services:
 - Building Inspector for structural, plumbing and electrical
 - Health Department
 - Other: e.g. National Guard
3. Are utilities safe to use? If indicated, have they been turned-off?
 - Electricity
 - Lighting available
 - Check for shorts and fires
 - Gas
 - Potential for leaks and explosion?
 - Water
 - For fire suppression
 - Domestic supply
 - Storm sewer
 - Steam
 - Burn & explosion hazard?
4. Do you understand your objective?
 - This is not a salvage or recovery mission
 - This is an initial assessment only
 - Identify specific locations, types and extent of damage
5. Are you equipped with appropriate protective equipment?
6. Do you have a buddy to go with you? **Never enter or work alone.**
7. Do you have communications established?
 - Is command center operational and informed about re-entry?
 - Equipment (Walkie-talkies, cell phones, etc.)
 - Does the equipment work inside the building?
 - Is there back-up equipment or alternatives?
8. Do you have means for quick initial documentation?

At the Site

All safety precautions that would apply during normal conservation practice apply, including Job Hazard Analysis (JHA), the use of appropriate tools, equipment and Personal Protective Equipment (PPE) as well as the ability to evaluate the situation as it unfolds. The last thing that you want to do in an emergency response is to become a casualty. Wearing yourself out will not help you, your teammates or the collections being addressed.

Know your own limits

- Do not sacrifice your physical and emotional well-being to the event.
- Conserve your energy by setting task priorities and pacing the work.
- Take frequent breaks before fatigue sets in.
- Drink plenty of non-carbonated, non-caffeinated fluids (e.g., water) every 15-20 minutes so that you imbibe at least 60 ounces per day.
- Eat regular meals.
- Sleep consistently for as long as needed.

Make effective communication a priority

- Always work and be with a "buddy".
- Never venture out of your colleague's hearing or visual range.
- Be sure that others know your whereabouts at all times.
- Adhere to a schedule and rendezvous point.

Adopt good personal hygiene practices, critical to disease prevention

- Even if gloves are worn, wash hands frequently after removing gloves.
- Use pre-packaged wipes or waterless sanitizer if the water supply is limited or questionable.
- Keep work areas tidy to minimize tripping hazards and discourage new pest habitats.

Avoiding Bodily Injuries

- Practice and understand possible hazards and proper First Aid procedures (see "First Aid" inset on page 4).

GO-KITS

A "go-kit" is a pre-packed collection of items you may need in case of emergency. Having a properly supplied and accessible kit can save precious time if you must act quickly. The Federal Emergency Management Agency (FEMA) recommends a 72-hour supply of food, water and emergency items for a basic go-kit (see Resources, p. 10).

In your collection care responder kit you may want to include a combination of personal and conservation supplies as well as the personal protective equipment that you may need responding to an emergency at your workplace or as a responder assisting at another location (see suggestions in Supplies, p. 9).

Whatever your kit, be aware that one size does not fit all. Kits should be updated regularly (i.e. to ensure they are seasonally appropriate or that food and other supplies have not expired), readily accessible, easily maneuverable and light enough to carry (backpacks, bags with handles and wheels).

Debriefing

Once the emergency has been brought under control, it is important that all participants meet to document the incident as well as their response to it.

- Gather complete and accurate information about the incident.
- Assess successful aspects of the response and specific areas of response that could benefit from improvement.
- Help address stress by allowing participants to “unburden” and share their personal reactions to the event.

CREATING AN INCIDENT REPORT

An activity log is useful to outline the event's chronology. Elements will include the following information:

Time

Individual relating data

Communication mode (PA, radio, telephone, in-person)

Type of incident

Activity Log data:

- Who witnessed or discovered problem
- Who was notified
- Actions taken to address event (in what order and by whom: internal/external personnel)

Description of relevant conditions:

- Weather
- Building conditions
- Equipment involved
- Human elements
- Warnings

Personnel Record

- Individuals involved (including names, addresses and phone numbers of all staff, volunteers and external assistance)
- Actions/activities
- Time Spent
- Injuries/illness related to the incident
- Explore “human factor” (emotional response, adequate rest and sustenance, understanding of what transpired)

Actions required after incident

Building stabilization

Response and recovery efforts

Outcome of the event

MINDING YOUR MENTAL HEALTH

Responding to an emergency is stressful even when we do our best to take care of ourselves. During times of extreme stress, one works at a significantly reduced capacity. It is not uncommon for individuals involved in an emergency to experience the stages of grief—denial, anger, bargaining, depression and acceptance. They may feel as if everything they did was wrong, that everything was their fault or they haven't done enough to help. Individual experiences may vary from “fight or flight” to “tend-and-befriend” behaviors. The Substance Abuse and Mental Health Services Administration (SAMHSA) offers a variety of mental health resources for anyone affected by disaster.

If you are experiencing signs of distress as a result of a disaster, the SAMHSA Disaster Distress Helpline provides 24/7, year-round crisis counseling and support. Call 1-800-985-5990 or text "TalkWithUs" to 66746

KNOW YOUR HAZARDS: AVOIDING ILLNESS & INJURY

Emergency response often involves working in an uncontrolled environment, i.e., one without lighting, heating, cooling, structural integrity, waste or pest management. When the environment is not well-controlled, conditions may change quickly and without warning. Preventing injuries and illnesses in uncontrolled work environments requires planning, preparation and caution.

PROTECT YOURSELF

In the absence of environmental (engineering) controls, Personal Protective Equipment (PPE) and safe work practices are your primary tools. Detailed information on the selection and use of PPE can be found in Health & Safety Network articles and website (see Resources, p.10).

- Plan to provide your own PPE that is appropriate for the anticipated working conditions.
- Make sure you have a supply to last for the anticipated duration of your work or a means to replenish.
- Determine if specific PPE requirements have been established for site entry. If so, pack accordingly.
- If you are making your own PPE selection remember to consider all potential hazards (chemical, physical and biological) that may be encountered as well as potential points of injury or routes of entry (head protection, eye and face protection, hand protection, respiratory protection, foot protection and full body).

The following sections describe common hazards and control measures to be considered.

CHEMICAL HAZARDS

Some kinds of emergencies may result in possible exposure to dangerous chemicals, either from external sources such as spilled fuel or internal sources such as laboratory chemicals.

- Be aware of the sources of chemicals in your area.
- If you suspect you may come in contact with chemicals, make sure you are wearing personal protective equipment that will protect you from the specific chemical. See Resources section for information on proper selection.
- **In addition to being a respiratory hazard, chemical vapors can also contaminate clothing.**
- If you come in contact with a dangerous chemical, remove and dispose of your clothing right away and then wash yourself.
- Most chemical agents can penetrate clothing and are absorbed rapidly through the skin. The most important and effective decontamination is done within the first minutes after exposure.
- Always follow the instructions of local emergency coordinators on proper decontamination.

PARTICULATE HAZARDS

Extremely small, airborne particles (such as mold, dust, dirt, smoke, soot and liquid droplets) can have serious health effects if inhaled. The size of the particles is directly linked to their potential for causing health problems. Particles that are 10 micrometers in diameter or smaller can pass through the throat and nose and enter the lungs. Once inhaled, these particles can have serious effects on the heart and lungs.

- Mold is a concern in buildings or on objects damaged by water. Mold growth will be a serious risk to those with allergies, asthma and other respiratory ailments.
- Residual dried mud and sediment pose an inhalation risk when their dusts become airborne.
- Soot can be contaminated with any number of chemicals and may require special handling.
- For large remediation activities or those requiring special handling, seek assistance from experienced commercial services.
- Always wear appropriate personal protective equipment.
 - Respirator (P100) High Efficiency Particulate Air (HEPA) cartridges.
 - Combination HEPA/organic cartridges may be used to minimize mold odor.
 - Protect eyes with non-vented goggles.
 - Cover entire hair area.
 - Use duct tape to cover clothing areas where particles might drift (e.g., zippers, cuffs).
- Aspirate debris from space and objects with HEPA vacuum suction.
- Bags need to be emptied inside a glovebag (a flexible containment that encloses an item or forms a confined work area), in the still-contaminated space or outdoors.
- If a HEPA vacuum is not available, place the exhaust of a regular vacuum outside and away from air intake areas to prevent redistribution of particulates.
- If items are dry, but power is unavailable, gently brush debris from items outside in the direction of the wind, away from the practitioner.

RESPIRATORY PROTECTION

Particulates, as well as chemical vapors, pose a serious health risk if inhaled. If you believe that the collections you are handling/treating have been infected with rodent droppings, mold or other toxic materials make every effort to achieve suitable respiratory protection.

- Bring portable exhaust ventilation equipment.
- If it is not feasible to establish exhaust ventilation, respiratory protection should be implemented, using respirators equipped with 100-series (formerly known as HEPA) filters.
- According to NIOSH, the choice of respirator type will need to be evaluated based on the degree of contamination and the methods and degree of disturbance that will be used on the collections.
- For mold, NIOSH-approved particulate respirators are recommended if spores can be made airborne, with the 95-series respirators being the minimal selection.
- Only individuals who have had appropriate medical evaluation, training and fit testing may safely wear this equipment.

PHYSICAL HAZARDS

Stability Hazards

Although the site may be declared safe for re-entry, be alert to any signs of instability, such as teetering shelving or objects that appear to be hanging without appropriate support.

- Leave immediately if shifting or unusual noise signals a possibility of collapse.

FIRST AID

First aid is immediate care to stabilize an injured or suddenly ill person; it does not take the place of proper medical treatment. First aid offers temporary assistance until that person gets to medical care or until the chance of recovery without medical care is assured. Always encourage the person to seek medical care.

- Discern whether you can treat an injury yourself, or if you must call a health professional. Immediately attend to even minor cuts and burns which in non-emergency settings might be deferred.
- Clean all open wounds and cuts with soap and clean water.
- If clean water and soap are not available, use an alcohol-based product.
- Alcohol-based rubs are fast-acting and capable of significantly reducing germs on skin.
- Since any wound or rash has the potential to become infected, consult with a health care provider at the earliest opportunity.
- Disaster does not increase the risk for tetanus. However, tetanus is a risk from contaminated water or soil that enters cuts or open wounds.
- Make sure you have an up-to-date first aid kit. The kit should contain everything you need to bandage a wound, control bleeding, treat a burn, create a sling to support a fracture and address other medical emergencies. It should have information regarding first aid procedures (see Supplies, p. 9)
- CPR is part of first aid; administering CPR or using AED devices (automated external defibrillators) requires special training.

Physical Stress

Physical injury may occur from repetitive motions, manual labor or slips and falls. Individuals suffering from fatigue are more likely to be injured because they may be unaware of just how tired they are. Operating equipment or machinery without proper training or sufficient rest can injure people, collections and historic structures.

- Never manually lift more than 50 lbs. or any weight that you sense is beyond your capability or comfort level.
- ***Wet materials weigh more than expected.***
- Use proper automated-assisted lifting devices when practical.
- Obtain appropriate training in advance of the event to safely operate any type of heavy equipment, including battery-powered lifts.
- Do not operate or allow anyone else to operate anything more sophisticated than a hand pallet without adequate training.
- Take frequent breaks and stretch your muscles before performing physical work.
- Be sure that you are rested before engaging in any activity that requires special focus.

Noise

Excessive noise caused by large or noisy equipment can cause permanent hearing loss. If voices need to be raised to be heard by colleagues in close proximity, hearing protection is needed.

- Wear earplugs or similar hearing protection.
- Be especially alert to your surroundings since warning calls may not be heard.
- Arrange in advance for a visual warning, (such as a red piece of paper) to gain a colleague's attention.
- Avoid any sudden unanticipated movement as to not startle a colleague wearing hearing protection. This will help minimize additional damage inflicted on an object.

Eye & Vision Hazards

Working in disaster areas exposes workers to numerous eye and vision hazards such as particulates, chemicals, light, heat and pathogens. Common injuries include corneal abrasions and conjunctivitis (red eye), slivers embedded in the eye, chemical splashes or burns, eyeball laceration and facial contusions.

- Before selecting appropriate eye protection for emergency, assess the conditions and hazards.
- At a minimum, wear safety glasses with side protection.
- Wear goggles or face shields for more protection.
- Protect eyes from sun exposure if working outside for extended periods with wrap-around sun glasses that provide 100% UV (A and B) protection.
- Water, snow and sand can reflect light and increase the damaging effects of the sun.
- Safety eyewear should comply with the American National Standards Institute Occupational and Educational Personal Eye & Face Protection Devices Standard Z87.1.
- Seek medical attention for eye injuries.

Hot Environments

High temperatures and excessive clothing or protective gear can lead to fatigue, dizziness, cramps, fainting, heat rash, heat exhaustion or heat stroke.

- Become familiar with the signs and symptoms of heat injuries. Remember that heat stroke should be treated as a serious medical emergency.
- Wear light-colored and loose-fitting clothing.
- If possible, seek shade and work during cooler hours of the day.
- Use sunscreen on skin and lips whenever you are outside. The American Academy of Dermatology recommends sunscreen that offers: broad-spectrum protection (protects against UVA and UVB rays), Sun Protection Factor (SPF) 30 or higher and water resistance.
- If you are experiencing any of the signs of heat stress, seek help from a health professional immediately.
- Stay well hydrated.
- Take frequent breaks.

Cold Environments

Exposure to low temperatures can result in numbing of the hands and feet, chilblains (inflammation of extremities), frostbite or hypothermia.

- Limit exposure times.
- Take frequent rest breaks in a warm area.
- Replace sweat-dampened or wet clothing.
- If you are experiencing any of the signs of cold exposure, seek help from a health professional. Hypothermia can occur when exposed in temperatures below 75°F (24°C). It is exacerbated by wet or poorly insulated clothing or remaining in the water for too long.

Wet Environments

Flood waters can be contaminated with agricultural and industrial chemicals, human and animal waste, pesticides, solvents or other contaminants (lead, arsenic, chromium).

- Always test water depth with a pole before entering. The bottom may not be visible even in shallow water.
- Explore each step with the pole as you move.
- Inspect for hazards such as deep holes, broken glass, live snakes or animals, collection items, etc.
- Wear appropriate protective gear including puncture-resistant, watertight rubber boots and a life jacket.
- Take frequent breaks out of the water.

Trench foot (also known as immersion foot) occurs when the feet are wet for long periods of time. Symptoms include: tingling and/or itching sensation, pain, swelling, cold, blotchy skin, numbness and a prickly or heavy feeling in the foot.

- Take frequent breaks out of the water.
- If possible, air dry and elevate your feet.
- Exchange wet shoes and socks for dry ones as often as practical, but at least daily.
- Treat affected parts with application of warm packs or warm water soaking (at 102-110°F) for 5 minutes.
- Do not wear wet socks when resting or sleeping.

Electrical Hazards

By the time the secondary responders are involved in responding to an emergency, all electrical hazards should have been eliminated. Particular situations may require improvements (including flickering or dimming lights, frequently interrupted power and damaged wiring) that necessitate a licensed electrician.

- Be aware of the location of downed power-lines.
- Never enter water-flooded rooms unless you are certain that the electricity has been cut off.
- Always use Ground Fault Circuit Interrupter (GFCI) protected extension cords/equipment if working in a wet environment. A GFCI device shuts off an electric power circuit when it detects that current is flowing along an unintended path such as water.
- A plug-in GFCI adaptor should always be used on any electrical circuit unless it is known to already be protected with a GFCI system and that system has been tested. GFCI devices contain "test" and "reset" buttons.
- OSHA requires GFCIs on all outlets used for tools during repair and construction and for outlets within 10 ft of water.
- Never attach a generator directly to the electrical system of a building unless a qualified electrician has properly installed a transfer switch or unless you have obtained the approval of the electrical utility. Backfeed electricity can occur from generators and can be powerful enough to electrocute someone working on the lines.
- Position fuel-powered generators so that the exhaust cannot be drawn into building or active work areas.
- Refueling a generator poses a fire hazard. Follow manufacturer's warnings and have a tri-class (A, B, C) fire extinguisher nearby. Keep fuel safely away from the generator while it is running.
- Use ear protection if working in close proximity to generator operation.
- Carry and use a non-contact voltage detector to verify that dead circuits are truly dead and that live circuits are live.

Confined Spaces

Any space with limited means of exit or entry and a potentially impaired ventilation system is defined as a “confined space.” Such spaces may lack oxygen, have accumulated toxic gases or pose explosion hazards.

- **Work in confined spaces is extremely hazardous and requires specialized training.** See OSHA regulations for permit-required confined spaces for general industry (29 CFR 1910.146) available at <http://www.osha.gov>.
- Never enter a confined space unless someone who has received training in confined spaces has examined the space and determined that it is safe.
- Never attempt to rescue someone in a confined space who has become incapacitated unless you have received the appropriate training to carry out a rescue.

Fire Hazards

Fire detection and suppression systems may be rendered inoperable or diminished and the potential for a fire event can increase during recovery. Emergency responders, including the fire department, may have delayed or minimal response to incidents because of concurrent demands. Fire alarm systems may be operating on battery power that may have limited duration.

- Include the local fire department in all stages of pre-planning for emergency response to ensure they are familiar with your facility, the special hazards, etc.
- A full complement of portable fire extinguishers must be available throughout the facility in accordance with the National Fire Protection Association Standard, NFPA 10: *Portable Fire Extinguishers*. Ensure that they are properly inspected, tested and maintained in accordance with the code before any work proceeds.
- If a fire protection system is impaired, ensure that proper interim compensatory safety measures are instituted, such as a fire watch, etc. Workers cannot be onsite without a functional fire protection system.
- If the fire protection systems are out of service, ensure that notification is made to the local authority having jurisdiction, insurance company and other appropriate parties as applicable.
- If damaged or a hazard, ensure that all facility utilities are secured as appropriate. This may include the electric, gas, propane, water, etc.
- If emergency lighting is provided throughout the facility, it may have limited duration unless supported by an electric generator. After approximately 1.5 hours, other sources of portable lighting such as flashlights will become necessary. NEVER use open flames such as candles or lanterns.
- If hazardous situations, such as unsecured chemicals, damaged containers, tanks or drums are encountered, immediately leave the area and report the hazard to the local authorities such as the fire department.
- Fuel-burning equipment should not be introduced into a facility if at all possible. This may include but is not limited to generators, gas grills and heaters—all of which can create a fire hazard, as well as a significant risk for carbon monoxide exposure. Such equipment must only be used a safe distance from the facility, never near any intake location such as a vent, open window or door. Never use the equipment in a confined or poorly ventilated location.

BIOLOGICAL HAZARDS

Plant Hazards

Dermatitis causing plants include poison ivy, western poison oak and poison sumac; all urushiol producing plants. A rash is acquired by direct or indirect contact with urushiol, either by touching the plant, contaminated clothing or even an animal that has brushed against the plant.

- Be able to recognize plants that can cause skin reactions.
- Protect skin from direct contact.
- Wash skin immediately with soap and water using a nail brush to reach under fingernails.
- Discard or wash clothing separately from non-contaminated garments.
- Never incinerate leaves or materials contaminated with urushiol—the oil becomes airborne and the smoke can cause very severe reactions.

Animal Hazards

The habitats for wild and domestic animals may be disturbed and they may take refuge in buildings or wander into other areas. Live, captive animals in zoos or museum research and display collections may escape. Insect and rodent populations may proliferate. Stray creatures, especially those that are ill or injured may be sources of a variety of zoonotic agents such as rabies. Note that snakes are a particular hazard in disasters that disturb their natural habitats or where large quantities of water are present.

- Take extreme care in moving piles of debris.
- Use an exploratory wood or plastic probe before reaching into dimly lit spaces.
- Never approach stray animals.
- Report ill or injured animals to animal control experts.
- Immediately seek medical attention if bitten by any animal, tick or if an insect bite appears to cause an abnormal reaction.
- For snake bites, it is important to report details about the type of snake when requesting medical attention.

Breathing in biological contaminants resulting from animal waste can cause disease in humans. Wear appropriate respiratory protection in areas where animal excrement is present. Wetting down suspected areas of contamination will help minimize airborne particles. However, wetting collections is not advised. Contracting with a professional experienced in infection control procedures is recommended.

- **Hantavirus Pulmonary Syndrome (HPS).** This virus is carried in the animal saliva and excreta found in rodents. Humans contract the disease by inhaling contaminated particulates from the excreta. HPS is a serious condition that in some instances can be fatal. The virus is susceptible to a 10% sodium hypochlorite solution (bleach) or hospital-grade disinfectants that meet the approval of the EPA in the US.
- **Histoplasmosis.** This disease is caused by a fungus that forms in high organic content soil contaminated with bird and bat droppings. It infects people and animals who inhale its airborne conidia. Histoplasmosis can be fatal.

Waterborne Illnesses

Waterborne diseases may be contracted by either drinking or coming into direct contact with contaminated water when sewage systems and drinking water supplies are disrupted during a disaster. Risk of outbreaks can be minimized through proper hygiene, PPE and, most importantly, prioritizing the provision of clean water. Contaminated water also increases the risk of wound infections, dermatitis, conjunctivitis and ear, nose and throat infections.

- Practice good hygiene (handwashing) after contact with flood waters.
- Avoid exposure to flood waters if you have an open wound or rash.
- If a wound develops redness, swelling or drainage, seek immediate medical attention.
- Use only trusted sources of bottled water or tap water that has been confirmed as safe.
- Seek medical attention if you think that you have been exposed to something serious, are vomiting or have a high fever or diarrhea accompanied by blood.
- Always use appropriate PPE if wading into potentially contaminated waters.
- Unless brought from elsewhere, any outbreaks that occur are almost always from diseases that were already in the disaster affected area prior to disaster.
- Diseases like cholera or typhoid are rare in developed countries and do not typically occur after a natural disaster.
- **Leptospirosis.** A zoonotic bacterial disease transmitted through contact of the skin and mucous membranes with water, damp soil or vegetation contaminated with rodent urine. It is the only epidemic-prone infection which can be transmitted directly from *contact* with contaminated water.
- **Cryptosporidiosis and giardiasis.** Diarrheal illnesses caused by parasites and most commonly transmitted via drinking and recreation water. An outer shell allows the parasites to survive outside the body for long periods of time and makes *Cryptosporidium* very tolerant and *Giardia* tolerant to chlorine disinfection. *Cryptosporidium* is leading cause of waterborne disease in the United States.

Vector-borne Illnesses

Long periods of being outdoors and exposure to areas of standing water increases the potential for exposure to vector-borne infections such as dengue, malaria and West Nile fever.

- When using a repellent, be sure to review the SDS or label to determine the safest means of application. Some repellents should only be applied in the outdoors with natural ventilation.
- Repellents containing permethrin may be sprayed on clothing and on non-facial exposed skin. Permethrin impregnated clothing is commercially available (withstands 70 washings).
- DEET (20-30%) may be used on clothing and non-facial exposed skin. Lower concentrations will lower the length of time protected.
- Minimize standing water to discourage mosquito populations. Where water persists, use a laticide such as *Bacillus thuringiensis israelensis* (Bti). Bti is a naturally occurring soil bacterium that can effectively kill mosquito larvae present in water.
- Wear a long sleeved shirt and long pants when outdoors.

MAKING SAFE DRINKING WATER

(According to the Centers for Disease Control)

As a last resort, contaminated water can often be made safe to drink using the following methods. Limitations apply.

- Bottled water is the safest choice for drinking and all other uses.
- Certain health conditions (allergies, pregnancy) may limit the use of these methods.
- **Water contaminated with fuel or toxic chemicals will not be made safe by boiling or disinfection.** Always use bottled water or a different source of water if you know or suspect that your water might be contaminated with fuel or toxic chemicals.
- If water is cloudy, draw off clear water after filtering (clean cloth, paper towel, coffee filter) OR by settling.
- Store the water in sanitized containers with tight lid.

Boiling

- Best method to kill viruses, bacteria and parasites.
- Boil for one minute (three minutes at elevation).

Sodium Hypochlorite (unscented household bleach)

- Kills most viruses and bacteria, not as effective on parasites.
- Appropriate amount of bleach depends on concentration.
- Mix well and let it stand for at least 30 minutes.

Chlorine or Iodine Tablets

- Follow the manufacturer's instructions.
- Chlorine dioxide tablets can be effective against *Cryptosporidium*.
- Iodine-containing tablets or chlorine tablets are not effective against *Cryptosporidium*.

Filtering

- Many portable water filters can remove parasites if filter pore size is small enough.
- Most do NOT remove bacteria or viruses.
- Carefully read and follow the manufacturer's instructions
- Disinfectants may be needed to kill viruses and bacteria.

Distillation

- Only method to remove salt or dissolved toxins.
- Boil water, condense and collect.

Radiation

- Ultraviolet (UV) and Solar Radiation are less effective on cloudy water.
- Portable UV units deliver a measured dose.
- Put water in a clear plastic bottle on a reflective surface (aluminum foil) for a minimum of 6 hours in bright sunlight.

- **Lyme Disease.** A deer tick-borne bacterial infection that results when an infected tick bites a human. Inspect yourself daily for ticks. If you find a tick that has been attached to you for more than 24 hours, wash the tick and skin with isopropyl alcohol and remove the tick with flat head tweezers. Seek medical attention to determine whether or not a regimen of antibiotics is required.
- **West Nile Virus.** A mosquito-borne virus that normally cycles between mosquitoes and birds. It is transferred to humans by mosquito bites or in handling dead birds that have become infected by the virus. Most human infections (about 80%) cause no symptoms. In some cases the disease may manifest itself as West Nile Fever and may lead to encephalitis or meningitis. Call upon professionals with experience and expertise in removing dead birds to reduce the risk of exposure.

COLLECTION HAZARDS

Hazardous chemical exposures can occur from museum or heritage collections, laboratories used for conservation, chemistry or exhibit preparation work, building components or the surrounding environment. The following table includes a list of potential hazards by chemical class, with an indication of appropriate PPE. Consultation with a HAZMAT team and protecting yourself from inhalation, absorption or skin contact is crucial. Do not contaminate the rest of your clothing or your household with soiled garments. The use of disposable clothing, lab coats, aprons and other garments can protect your personal clothing. When in doubt, discard.

HAZARD	EXAMPLES OF SOURCES	PATHWAY/DANGER	PRECAUTION
Acids & Bases			
Acids and Bases	Found in laboratories; cleaning, plumbing & other maintenance supplies; batteries	Contact, inhalation (ammonia)	Nitrile gloves; un-vented goggles; respirator with acid gas/organic vapor or with ammonia multi gas/vapor cartridge; can neutralize
Biological Agents			
Bacteria, viruses, fungi (mold), parasites	Soil, air water, contaminated by human remains, sewage, recently dead animals; frozen specimens or tissues; some fluid-preserved anatomy specimens; live animals that serve as disease vectors (deer, mice); infestations by mice, bats, birds, fungi; rotting foodstuffs, damp or wet objects	Inhalation, ingestion via open wound or improper sanitary precautions, contact with contaminated materials (wet or dry). Relatively mild, allergic reactions to serious medical conditions, even death (www.osha.gov select ? at site index).	P-100 filtering face piece, impermeable gloves, bag specimens or suspected source, before they defrost or affect you, if possible. For mice or animal fecal material, spray with a solution of bleach in water wearing mask and gloves, area can safely cleaned up later.
Compressed Gases			
Compressed gas tanks	Laboratories, welding shops, hospitals	Explosion or asphyxiation.	Use strapping to constrain; use soap solution to check for leaks; check valves for damage
Drugs/Poisons/Controlled Substances			
Curare and other arrow poisons, many herbs and seeds, many old pharmaceuticals, including hallucinogens and concentrated forms of drugs	Anthropology, botany, ethnobotany & collections; medical & science/technology collections	Contact with skin penetration, liquids and powders may pose inhalation hazards	HEPA filtering respirator; impermeable gloves; goggles; spill booms, pillows or powders
Explosives			
Black powder, ammunition, picric acid, anhydrous ethyl ether, nitrite salts, land mines, grenades (also including picric acid)	Fertilizers, court records, gun collections, laboratories, war museums; field collecting equipment	Explosion	Explosives are in the same category as agents of chemical warfare; evacuate and contact a firearms expert or bomb expert; if picric acid is present, do not touch, seek help immediately
Formaldehyde			
Formaldehyde (dust), Formalin (liquid, a solution of formaldehyde gas in water)	Fixative for fluid-preserved biological specimens in natural history collections; adhesive in wood composites (urea formaldehyde) and acoustic insulation	Inhalation or contact	Respirator with multi gas/vapor cartridge + HEPA if dust; nitrile or laminated film gloves; unvented goggles; appropriate spill kits
Live Vertebrates & Invertebrates			
Toxins from venomous species	Insect stings, animal or snake bites, ticks; snakes and any injured or displaced animals may be aggressive in disaster situations	Internal; rabies may be contacted via contact with saliva of infected animals; any tick infected with Lyme disease left on human skin for more than 24 hrs. can cause illness	Use appropriate repellent; if allergic carry antidote; wear appropriate clothing (high boots for fields, high rubber for water, chaps for legs); for insects: watch for infection, inspect daily for ticks; for snakes: bites, physiognomic details will help with ID, keep spot where bitten below heart and seek medical help; for all animals bites, seek medical attention immediately
Metals/Metal Salts			
Chromium, cobalt, nickel and mercury metals or salts, lead	Metal plating; mercury amalgams; conservation treatments; some scientific and technical equipment; batteries; house paints, pewter, glass, solder; mineralogy collections; thermometers, manometers; laboratories with old vacuum shutoff valves and gauges, fluorescent light tubes	Ingestion or inhalation (dusts, mercury vapor); some chromium compounds are human carcinogens	HEPA filtered respirator, with mercury vapor cartridges for any form of inorganic mercury; impermeable gloves; goggle; disposable clothing or impermeable suit & booties; seek professional remediation if there are liquids present or if lead paint is friable or burned on a large scale
PCB's and other Toxins			
PCB's	Transformers, by-products of burning, chlorine bleaching of paper. Microscope slides were often prepared with Aroclor.	High concentration can lead to chloracne, a painful skin condition.	Impermeable gloves and if handling the liquid, protective clothing (safety goggles, respirator and impermeable clothes)
Radioactive Materials			
Radium (produces radon gas) spent uranium oxides, radioactive isotopes, polonium and other decay products	Radium-sold in early 1900s to promote health, used as gunsight illuminator, watchface; missile warheads; notebooks from labs working with radioactive materials; medical & technology collections; some fossils and minerals; some glassware & ceramics	Hazardous via any route	Professional remediation and clean-up necessary
Residual Pesticides/Fungicides			
Inorganic (arsenic, mercury, & talc or silica used as carriers) organophosphates (ex: dichorvos) organochlorines (ex: DDT or chlordane), botanicals (pyrethrins, strychnine), pyrethroid (ex: permethrin), creosote (coal tar)	Residues from past pest control or fungal control treatments on or in objects & building materials	Inhalation (dusts, mercury vapor), skin contact; arsenic, creosote and silica are human carcinogens	HEPA filtered respirator, with mercury vapor cartridges for any inorganic mercury salts; nitrile gloves; goggles; disposable clothing or impermeable suit & booties; destroy clothing if contaminated with carcinogens
Solvents			
Distilled hydrocarbons such as gasoline, kerosene, benzene, mineral spirits, alcohol, ethylene glycol, carbon tetrachloride	Found in cleaners; inks; paints; early fire extinguishers; dry cleaning agents; conservation, exhibition, photography, & chemical labs; as storage medium for some biological specimens, carriers for aerosols	Inhalation and contact, flammability	Glove choice will depend upon chemical ID; unvented goggles; respirator with organic vapor cartridges; spill booms, pillows or powders;

SUPPLIES

(Non-conservation supplies for disaster response scenarios)

Basic Supplies

- Flashlight and batteries
- Pencils and note pads
- Radio with AM/FM/TV and weather bands(hand crank recommended)
- Extension cord and multiple outlet adapters
- Portable GFCI outlet
- Device to test for presence of AC power
- Photographer's vest with multiple pockets
- Emergency water filtration/purification
- Compass
- Pocket knife and/or Leatherman™ tool
- Sunscreen (at least SPF 30)
- Insect repellent (DEET-based)
- First aid kit (including antibacterial ointment)
- Emergency blanket
- Hat
- Sunglasses
- Light rope/string
- Duct tape
- Wet weather gear
- Fanny pack
- Garbage bags and re-sealable plastic bags
- Mess kit (knife, fork, spoon, cup, dish)
- Copy of driver's license, insurance information
- Food, Water and Accommodations: If you expect to be in an area where the infrastructure has not been restored or services are limited.

Personal Supplies

- Cash (sufficient for food purchase for a week)
- Medications (in original containers)
- Toiletries (soap, shampoo, deodorant, toothbrush, toothpaste)
- Toilet paper
- Waterless hand cleaner
- Razor for men (shave for respirator use)
- Towel and washcloth

Electronic Equipment

- Cellular telephone and charger
- Multiple channel walkie-talkie
- Digital camera, extra batteries and memory cards, converters, cables, charger
- Extra batteries and charger
- Video camera, extra tapes, cables, batteries and charger
- Laptop computer
- Backup drive (buss powered)
- Keychain drive, jump drive, thumb drive
- If power is unreliable: AC inverter for powering equipment from auxiliary power (auto cigarette lighter) with (to allow more than one device to be powered at once) jump-start power device

Camping Supplies

- Tent
- Sleeping bag
- Sleeping pad
- Backpack stove (Note: fuel cannot be transported by air)
- Appropriate clothing
- Food
- Water filtering device and/or sufficient water supply
- Backpack

*Health and Safety Supplies**

- Gloves (thin disposable, leather work gloves, thermally insulated gloves for cold conditions)
- Respirator (fit tested half-mask or full face with cartridges for particulates and organics/particulates)
- Filtering face piece (disposable) respirators
- Unvented safety goggles that fit while wearing respirator
- Safety glasses with side protection, goggles and/or face shields
- Boots (waterproof, steel toe and steel shank)
- Hardhat
- Extra clothing and/or disposable clothing
- Jacket and/or weather appropriate clothing
- HEPA vacuum filters and bags

* Health and safety supplies may need to be specific to the hazard.

First Aid Supplies

The American National Standards Institute recommends the following items in first aid kit:

- First Aid Guide
- Absorbent Compress
- Adhesive Bandages
- Adhesive Tape
- Antiseptic Skin Wipes
- Burn Treatment Applications
- Sterile Pads
- Pair Medical Exam Gloves
- Triangular Bandage
- Antibiotic Treatment Applications
- Oral Analgesic (Aspirin)
- Bandage Compress
- Breathing Barrier
- Burn Dressing
- Cold Pack
- Eye Covering (patch)
- Rolled Bandage
- Hand Sanitizer

COLLECTION CARE EMERGENCY PREPARATION & RESPONSE

Health & Safety for Museum Professionals, Society for the Preservation of Natural History Collections and American Institute for Conservation of Historic & Artistic Works, 2011.

HELP! An Emergency Preparedness Manual for Museums, 2nd Edition. Alberta Museums Association (AMA), 2016.

HELP! Online Resources. Alberta Museums Association (AMA)
<https://www.museums.ab.ca/what-we-do/emergency-preparedness/help!-online-resources.aspx>

“The Safety and Security Team,” *Building an Emergency Plan: A Guide for Museums and Other Cultural Institutions*, Getty Conservation Institute, 1999.
https://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/emergency_plan.pdf

Alliance for Response
<http://www.heritageemergency.org/>

Conservation Online (CoOL) Disaster Preparedness and Response
<https://cool.culturalheritage.org/bytopic/disasters/>

Cultural Heritage Preservation, Smithsonian
<http://culturalrescue.si.edu/>

Heritage Emergency National Task Force
<https://culturalrescue.si.edu/hentf/>

National Heritage Responders, American Institute for Conservation
<https://www.culturalheritage.org/resources/emergencies/national-heritage-responders>

GENERAL DISASTER PREPARATION & RESPONSE

U.S. Centers for Disease Control (CDC), Health & Safety Response for Disasters
<http://emergency.cdc.gov/disasters/alldisasters.asp>

National Institute for Occupational Health and Safety (NIOSH), Emergency Preparedness and Response Resources
<http://www.cdc.gov/niosh/emres/>

Federal Emergency Management Agency (FEMA)
www.fema.gov
www.ready.gov

Canadian Center for Occupation Health and Safety (CCOHS), Emergency Planning
<http://www.ccohs.ca/oshanswers/hsprograms/planning.html>

World Health Organization (WHO), Emergencies
<http://www.who.int/topics/emergencies/en/>

PERSONAL PROTECTIVE EQUIPMENT

Understanding Personal Protective Equipment Series, AIC Health & Safety Network
http://www.conservation-wiki.com/wiki/Health_&_Safety

Choosing Gloves, AIC Health & Safety Network
http://www.conservation-wiki.com/w/images/5/5b/H%26S_PPE_Chemical_Selection_Guide_1_Page.pdf

Quick Selection Guide to Chemical Protective Clothing, 5th Edition. Wiley & Sons Inc., 2007.

SUPPLIES

FEMA Go-Kits
<https://www.ready.gov/build-a-kit>

DRINKING WATER

CDC Water Disinfection for Travelers
<http://wwwnc.cdc.gov/travel/yellowbook/2016/the-pre-travel-consultation/water-disinfection-for-travelers>

CDC Making Water Safe in an Emergency
<http://www.cdc.gov/healthywater/emergency/drinking/making-water-safe.html>

MENTAL HEALTH

CDC Mental Health Resources for Traumas & Disasters
<http://emergency.cdc.gov/mentalhealth/>

Substance Abuse and Mental Health Services Administration (SAMHSA), Disaster Preparedness
<http://www.samhsa.gov/disaster-preparedness>

BIOLOGICAL HAZARDS

CDC Infectious Disease After a Disaster
<https://www.cdc.gov/disasters/disease/infectious.html>

CDC Immunization Recommendations for Disaster Responders
<https://www.cdc.gov/disasters/disease/responderimmun.html>

WHO Flooding and communicable diseases fact sheet: Risk assessment and preventive measures
http://www.who.int/hac/techguidance/ems/flood_cds/en/index1.html

COLLECTION HAZARDS

Collection-based Hazards: The Dark Side of Collections, Postprints of the AIC Conservators in Private Practice Health and Safety Session, AIC Annual Meeting, Dallas, TX, 2001.

Controlling Hazardous Collection Materials
AIC Health & Safety Network Presentation, Health and Safety Session, AIC Annual Meeting, San Francisco, CA, 2014.
http://www.conservation-wiki.com/wiki/Health_&_Safety_Network

FIRST AID & PERSONAL SAFETY

Supplying Your First Aid Kit, AIC Health & Safety Network
http://www.conservation-wiki.com/w/images/9/97/H%26S-First_Aid_Brochure-english.pdf

American National Red Cross, Red Cross Training
<http://www.redcross.org/ux/take-a-class>

OSHA Fundamentals of a Workplace First-Aid Program
www.osha.gov/Publications/OSHA3317first-aid.pdf

NIOSH Pocket Guide to Chemical Hazards, First Aid Procedures
www.cdc.gov/niosh/npg/firstaid.html

NIOSH Eye Safety for Emergency Response and Disaster Recovery
<http://www.cdc.gov/niosh/topics/eye/eyesafe.html>

CHEMICAL HAZARDS

CDC Chemical Agents: Facts About Personal Cleaning and Disposal of Contaminated Clothing
<http://emergency.cdc.gov/planning/personalcleaningfacts.asp>

**For conservation specific resources and more information,
visit the Health & Safety Network wiki:
www.conservation-wiki.com/wiki/Health_&_Safety**

About the Health & Safety Network

The Health & Safety Network provides educational and technical information to the AIC membership to increase knowledge of safety hazards and general health issues related to the conservation profession. It offers information through lectures, workshops, displays, AIC's publications, AIC's website and other electronic and print media. It also addresses health and safety issues of concern to the AIC membership by maintaining current information through research, by collaboration with health and safety professionals and with other health and safety organizations and, periodically, by statistically valid surveys, the results of which will facilitate establishing priorities.

Contact the Health & Safety Network via email:
Health-Safety@culturalheritage.org.

About AIC

The American Institute for Conservation of Historic & Artistic Works (AIC) is the national membership organization supporting conservation professionals in preserving cultural heritage by establishing and upholding professional standards, promoting research and publications, providing educational opportunities and fostering the exchange of knowledge among conservators, allied professionals and the public.

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