

FS No. 052-0125

Handling of Human Remains from Natural Disasters

1. **BACKGROUND.** Natural disasters often lead to fatalities due to trauma, such as blunt force injury, or drowning. Human remains resulting from natural disasters are generally no more likely than the local population to have acute infections or rare diseases. As the remains cool, they begin to decompose with internal and external variables determining the speed of decomposition. As the decomposition progresses, bloodborne pathogens and other potentially infectious agents (e.g., gastrointestinal and respiratory pathogens) may persist. Personnel in direct contact with human remains must take precautions to protect themselves from infectious hazards, which may include hepatitis B, hepatitis C, human immunodeficiency virus (HIV), enteric pathogens, and *Mycobacterium tuberculosis*.

2. **POTENTIAL HEALTH HAZARDS.** Blood and body fluids, feces, and gastrointestinal toxins pose the most concern for personnel handling human remains. Exposures on intact skin pose little risk as transmission is relatively inefficient for diseases. Percutaneous exposure (from a needle stick or exposure from a sharp penetrating object) or direct contact with mucous membranes (such as eyes, nose, or mouth); or direct contact with non-intact skin (abraded, chapped, inflamed, or with visible wounds or trauma) can provide additional exposures. Exposures occur through direct contact with the victim's remains. This includes soiled clothes, fecal-oral route transmission, and other health hazards which may be present from contaminated equipment and vehicles used to transport human remains. Included are hazards associated with water supply contamination. However, human remains in contact with local potable water systems have rarely been associated with transmission of bacterial or viral gastrointestinal diseases. Water supplies in affected regions are much more likely to be contaminated due to extensive damage to sanitation systems.

3. **PROTECTIVE EQUIPMENT AND OTHER PRECAUTIONS.** Personnel handling human remains should treat all body fluids as if they are potentially infectious. Personal protective equipment (PPE) and universal/standard precautions can greatly reduce the risk of exposure to gastrointestinal toxins and other aerosolized agents.

Gloves. When handling human remains, personnel should wear gloves (fluid proof – polyvinyl chloride (PVC), vinyl, rubber, latex) to provide protection against handling infectious materials. Structural fire-fighting gloves that meet the requirements of 29 CFR 1910.156, Fire Brigades, are recommended for situations where broken glass and sharp edges may be encountered, such as when extricating remains from wrecks. Select gloves that fit tightly around the wrists to prevent contamination of the hands for situations where large amounts of blood are likely to be encountered.

Alternatively, double gloving with a waterproof glove under a heavy work glove will protect the hands from both cuts and scrapes and exposure to fluids and/or floodwater.

Personnel should also practice good personal hygiene after handling remains.

Masks and Eyewear. Other PPE, such as surgical masks and protective eyewear, should be used when managing large quantities of blood, or there are known infectious hazards. This PPE is usually not necessary when handling human remains following a natural disaster. The use of a face mask is rarely considered to be necessary. Since masks limit ventilation and the workers tire more easily, using them can slow down the tasks of moving, storing, and preparing human remains. Gases and strong odors are the most unsettling aspect, and when necessary, covering the nose and mouth is sufficient.

Outer Clothing. Protective disposable clothing is recommended when working in these environments. Gowns or aprons should be properly donned and worn during procedures that are likely to generate splashes of blood or other body fluids. Closed, boot-style shoes are also recommended in these instances. Wear rubber boots or appropriate shoe covers where there is potential for footwear to become grossly contaminated. Rain gear may be useful in case of rain or storms. To avoid cross-contamination, do not use personal items, such as pens or combs, while wearing gloves or other protective clothing.

Human Remains Pouches. Human remains pouches will further reduce the risk of infection and are useful for the transport of human remains that have been badly damaged. Pouches containing human remains should be refrigerated if possible or kept in a cool location to slow decomposition.

Washing/Cleansing. After handling remains, remove contaminated overgarments or clothing, wash hands and contaminated body parts with antiseptic hand soap and clean, potable water. Always do this before smoking and before eating. If proper hand washing is not available, the frequent use of a medical grade hand sanitizer is encouraged.

Vaccinations. In addition to routine adult vaccinations recommended by the Advisory Committee on Immunization Practices (ACIP) and approved by the CDC, the vaccinations against the following diseases are strongly recommended: Hepatitis A, Hepatitis B, Typhoid, and Tetanus. A Tuberculin skin test (TST) or interferon-gamma release assay (IGRA) should be obtained after handling of human remains if working in an area where tuberculosis is endemic or if the cause of death is suspected to be tuberculosis. These tests should be completed 5 weeks or more after exposure for most accurate results. A prior vaccination with bacilli Calmette-Guérin (BCG) should not be considered protective against tuberculosis.

This fact sheet supersedes APHC Fact Sheet No. 37-032-0917.

Defense Centers for Public Health—Aberdeen, Environmental Health Sciences Division
8300 Ricketts Point Road, Aberdeen Proving Ground, MD 21010
410-417-1337

Approved for public release; distribution is unlimited.

4. DISPOSAL OF PPE. Remove used gloves and place them in a bag designated for disposal of PPE. Contaminated PPE should be disposed of as regulated medical waste (Placed in Biohazard bag) and managed in accordance with State and local regulations. Where non-disposable gloves or other durable PPE are used, place them in a separate bag or liquid proof container designated for appropriate treatment (e.g., steam sterilization, chemical disinfection) to render them non-infectious. Clean, disinfect, and dry all reusable items between uses in accordance with the manufacturer's guidance. Change out gloves as often as necessary to minimize the risk of contaminating personal items. Make gloves readily available during the removal and processing of human remains so that personnel can quickly and easily replace soiled gloves.

5. DISINFECTING EQUIPMENT. Wear PPE appropriate for the disinfectant used. Equipment disinfectants are too harsh for skin exposure. Carefully wash all equipment, including clothes, stretchers, and vehicles used in the handling of remains with an EPA-approved disinfectant after use or before reuse (list at: <https://www.epa.gov/pesticide-registration/epas-registered-antimicrobial-products-effective-sterilants-list>). Place contaminated reusable PPE and clothing into leak-proof, puncture resistant bags or containers immediately upon removing the articles. Never wash contaminated PPE and clothing with personal laundry. Wash and dry reusable PPE and clothing according to the instructions on their labels, in hot water at least 160°F (71° C) and detergent for 25 minutes, or with manufacturer recommended disinfection product at the proper concentration for low temperature washing. Use an EPA-approved disinfectant to decontaminate reusable gloves, protective eyewear, face shields, and similar PPE. Follow the manufacturer's recommendations for disinfectant concentrations and contact times. Brush scrub contaminated boots and leather goods with soap and hot water. Place contaminated disposable PPE and clothing that is saturated, dripping, or caked with dried blood into a regulated medical waste container for appropriate disposal.

6. PERSONAL EFFECTS. Leave personal effects on the remains of the deceased person. (Alternatively, place all items in a plastic bag and secure them to the remains.) Mortuary affairs personnel should inventory all personal effects. Safeguarding personal effects for final processing is just as critical as safely and carefully handling the human remains. Follow local regulatory guidance to ensure blood-soaked or soiled personal effects are appropriately treated, disinfected and processed along with the remains.

7. SAPONIFICATION. Human remains found in water or moist soil readily undergo saponification (the hydrolysis of fat and other soft tissues into adipocere, or mortuary wax). This occurs when the amount of fatty tissue is high, the surrounding environment is alkali, and there is an absence or minimal presence of agents of decomposition. Under these conditions, personnel handling remains must wear PPE and be extremely careful when handling remains as skin slippage may occur.

8. TRAINING. The Occupational Safety and Health Administration (OSHA) establishes personal protective and training guidelines in 29 CFR 1910.1030. Under this regulation, personnel handling human remains must receive bloodborne pathogen training within 90 days of employment. This training should include appropriate precautions for personnel, use of personal protective gear (e.g., gloves, Tyvek-type suits, and respirators), use of human remains pouches, and recommended vaccinations (Hepatitis A and B, Typhoid, Tetanus and tuberculosis).

9. REFERENCES. Worker health and safety risks are likely to vary at specific locations, as well as the experience and training among responding health and safety professionals. A trained health and safety professional should be consulted to create site specific worker health and safety plans as directed and required by the incident commander or lead agency.

The following references were reviewed and incorporated into this fact sheet and may prove useful for further review.

- Hoffman PN and TD Healing. 2022. International Society for Infectious Diseases, *Guide to Infection Control in the Healthcare Setting: The Infection Hazards of Human Cadavers. The Infection Hazards of Human Cadavers - ISID*
- Morgan O. 2004. *Infectious Disease Risks from Dead Bodies Following Natural Disasters. Pan Am J Pub Health* 15(5):307-12. <https://scielosp.org/pdf/rpsp/2004.v15n5/307-312/en>
- Pan American Health Organization. 2004. Disaster Manuals and Guidelines Series, N° 5. *Management of Dead Bodies in Disaster Situations*. Washington, D.C. www.eird.org/isdr-biblio/PDF/Management_of_dead_bodies.pdf
- Pan American Health Organization. 2016. *Management of dead bodies after disasters: a field manual for first responders*. Geneva. icrc.org/sites/default/files/topic/file_plus_list/0880_002_management-of-dead-bodies.pdf
- U.S. Army Public Health Center. 2015. Technical Guide 195A, *Safety and Health Guidance for Mortuary Affairs Operations: TG 195A Safety and Health Guidance for Mortuary Affairs Operations: Infectious Materials*
- Department of Defense. 2011. Joint Publication 4-06, *Mortuary Affairs*. [JP 4-06, Mortuary Affairs](http://www.dod.mil/jp4-06)