



Association for Professionals in
Infection Control and Epidemiology



Infection Prevention and Control for Shelters During Disasters*

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2023 APIC Emerging Infectious Diseases Task Force

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**This document is not intended for existing shelters used for identified populations (unhoused, abused individuals, refugees, etc). These recommendations should only be used for declared disaster situations during which there are large numbers of displaced individuals who require shelter.*

Photos from FEMA Photo Library:
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FEMA/Andrea Booher

Original version of this document was published by:
2007/2008 APIC Emergency Preparedness Committee

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Introduction

During a major emergency, large numbers of individuals may be displaced and require shelter within the community. While shelters are not expected to administer healthcare services in the traditional sense (such as surgery), triage and surveillance are vital for identifying potentially contagious individuals and others requiring health support. Some shelters may provide limited healthcare services, which can introduce the risk of infection transmission. In addition, the proximity of displaced individuals and staff in conjunction with a decrease or lack of routine sanitary services can increase the risk of disease transmission. Overcrowded living conditions can also contribute to the spread of communicable diseases as occurred following Hurricane Katrina.

To reduce the risk of secondary disease transmission in shelters, shelter staff must implement appropriate infection prevention and control (IPC) measures. These measures must become part of the emergency preparedness planning and training scenarios for communities. Whenever possible, standard IPC practices should be employed at all types of facilities, even though traditional healthcare services may not be provided at the site.

Even during disasters, facilities and communities must strive for ideal conditions to further decrease the risk of disease spread, but that may not always be possible. In the interim, emergency response procedures must be implemented to protect displaced individuals and staff in shelters.

This document consists of planning recommendations/guidance that disaster planners can use to prepare and respond to potential emergencies involving IPC issues in shelters. The document is designed to be used as a planning and reference document for disaster planners setting up and/or running a shelter. It is hoped that IPC professionals will be involved in community shelters, but resources may not allow this. Therefore, APIC wrote this document assuming that a non-IPC professional would be implementing the recommendations. However, infection preventionists may still be able to leverage the resources within this document to augment their shelter preparation efforts.

Recommendations are divided into sections based on components of an IPC program. Disaster planners may read through the entire document when planning a shelter or use the Table of Contents to go to a specific section to use as a reference guide during a disaster.

Sheltering individuals involves many disciplines, of which IPC is only one. As part of the planning process, community disaster planners should coordinate with local, state, and federal planning agencies, including but not limited to emergency management, public health, Red Cross, etc. Many planning agencies have developed guidelines that address aspects of setting up and running a shelter. These APIC recommendations assist with addressing the unique IPC needs of shelters and should be used in conjunction with planning documents for shelters developed by the Centers for Disease Control and Prevention (CDC), the Department of Homeland Security, and other local, state, and federal agencies. This multidisciplinary approach must include local medical professionals to ensure proper medical care can be administered during a disaster, including treatment of chronic conditions and assessment of acute illnesses on-site at the shelter or through transfer to a medical facility. Whenever possible, communities should attempt to have medical professionals available on-site to assist with triage and provision of medical care.

This document does not replace, nor should it be used as a substitute for, a community disaster plan for shelters. The document should be incorporated into or used as the basis for, the community disaster plan section that addresses shelters. The community's Emergency/Disaster Plan must be coordinated with local, regional, and state plans. Communities should use a multi-disciplinary approach, including IPC professionals, healthcare epidemiologists, public health professionals, facility engineering professionals, and others, in applying these recommendations to response plans. As with all disaster preparedness initiatives, these IPC interventions should be tested during routine disaster exercises and drills. Exercises should include developing an after-action report that includes strategies to fix gaps identified and timely re-testing of areas of concern.

Overview

The remainder of this document consists of recommendations designed to reduce the risk of transmitting communicable diseases in shelters. Although IPC principles are fundamental, this document is not intended for existing shelters used for identified populations (unhoused, abused individuals, refugees, etc.). The recommendations in this document should only be used for declared disaster situations during which there are large numbers of displaced individuals who require shelter. This document assumes that individuals arriving at the shelter will have been decontaminated prior to their arrival at the shelter if the event necessitates it (such as exposure to anthrax spores during a bioterrorism attack). Other documents address procedures for human decontamination;¹ therefore, procedures for human decontamination will not be addressed in this document.

Shelters that are set up during disasters are considered temporary and are therefore not expected to administer healthcare services in the traditional sense. However, triage and IPC strategies are critical to identify potentially infectious or acutely ill individuals and prevent the spread of disease within a shelter. Ill individuals or those requiring specialty care should be transferred to a medical facility or alternate care site as soon as feasible. In situations in which potentially contagious individuals cannot be transferred, shelter staff must implement IPC interventions to decrease the risk of disease spread within the shelter. Furthermore, environmental conditions can contribute to communicable disease spread within shelters. Water, food, sanitation, and environmental controls are needed to prevent disease emergence and spread. These strategies may need to be in place long-term during large-scale disasters.

This document provides recommendations for handling potentially contagious individuals and implementing environmental controls in shelters to prevent or limit the emergence or spread of communicable diseases. Whenever possible, shelters should implement routine/standard IPC strategies used in healthcare settings to control the spread of disease. However, during disasters, resources may be limited, and normal standards of care may need to be altered. In those

situations, crisis standards of care that outline decreasingly effective interventions can be implemented but should only be used when standard practices cannot be achieved. This document outlines both standard practices and crisis standards of care.

This document serves as the basis for setting up an IPC program in shelters to prevent the spread of common communicable diseases. Keep these considerations in mind when developing an IPC plan for community shelters used during disasters:

- Communicable diseases or conditions, such as smallpox or viral hemorrhagic fever, require more intensive interventions than the standard procedures described in this document.
- IPC recommendations can change during a disaster as more is known about the causative agent and/or situation.
- Humanitarian crises have been associated with outbreaks of communicable diseases. Refugees and/or other individuals displaced due to a humanitarian crisis can present to a community shelter with a communicable disease or infectious condition unrelated to their need for temporary housing in the shelter. The risk of disease outbreak is heightened among shelter clients from outside the U.S. Shelter clients from outside the U.S. may be infected with different pathogens than what are commonly seen domestically. They also are at higher risk for communicable diseases like tuberculosis and diphtheria. Additional screening of clients from outside the U.S. will be needed. See the Screening section for more information.
- Community disaster planners and shelter workers should partner with local public health agencies before and during a disaster and follow recommendations from these agencies that are specific to the event.

Definition of a Shelter

The following is the definition used in this document to describe anticipated activities found in a disaster shelter:

A refuge established for the general population for providing protection, food, clothing, and minor first aid. Shelters may range from community evacuation centers to basic care facilities, including tented areas, in large-scale events. Shelters may be residential sites, such as dormitories or campsites, or non-residential sites, such as churches, schools, or sport stadiums. The shelter may or may not have healthcare professionals on-site to triage individuals or administer care.

Planning for Infection Prevention and Control in Shelters

Communities must plan for disaster scenarios that have infectious disease implications and must involve healthcare and public health organizations in the planning for such events. From an IPC perspective, there are two distinct types of disasters: infectious disease and non-infectious disease disasters. An infectious disease disaster is one in which the event is caused by an infectious agent, such as a bioterrorism attack or a pandemic. A non-infectious disease disaster includes all other types of disasters, such as natural and man-made disasters that do not involve an infectious agent. Examples of non-infectious disease disasters include earthquakes, floods, and terrorism events excluding bioterrorism to name just a few. The approach to the two types of disasters should be different with regard to IPC recommendations for shelters.

During an infectious disease disaster, all possible steps must be taken to prevent the sheltering of individuals. The protection of all individuals is paramount. Crowded conditions, especially in a large shelter would likely increase exposure and contribute to infection transmission in a shelter during an infectious disease disaster. In the very rare event that individuals must be sheltered during an infectious disease disaster (such as a hurricane or flood occurring in a community at the same time as a pandemic), community planners should

aim to house potentially contagious/ill displaced individuals in hospitals or alternate care sites that can safely isolate these individuals (see [Appendices F and G](#)). This is most important if the causative agent is believed to be spread via the airborne route, such as chickenpox, measles, avian influenza, and smallpox, due to inherent challenges in trying to implement airborne isolation within a disaster shelter and the risk of infection transmission if appropriate isolation precautions are not in place.

Disaster planners should consider implementing protective measures for airborne isolation within the shelter to prevent the spread of infection while still providing necessary shelter for displaced individuals/families only if all healthcare beds (in both hospitals and alternate care sites) are temporarily unavailable or filled to capacity, and resources allow. These additional IPC measures, namely airborne precautions consisting of negative air flow and the use of high-level respiratory protection, will not be necessary for most disasters. Individuals infected with airborne spread diseases should receive top priority for healthcare beds in any type of a disaster in order to limit disease spread.

This document addresses specific IPC activities that require planning to provide adequate coverage during an emergency. These activities should be identified and referenced in the community's Emergency/Disaster Plan. While this document does not offer solutions for all IPC planning needs, it does offer guidance for providing the most protective environments possible for displaced individuals and shelter workers. During a disaster, ideal situations, such as adequate supplies of personal protective equipment (PPE), isolation rooms/areas, medical equipment, etc., are not likely to exist. Contingency plans must be included to address supply chain shortages, especially during protracted disaster responses. IPC measures must be scalable, based on the circumstances of the event. Disasters require innovative approaches to administering healthcare services that may or may not meet routine standards of practice.

This document is provided in a tiered manner for IPC in shelters; the recommendations start by describing the most protective measures and working towards the least. The appropriate order in which the steps should be instituted to provide the best protection is delineated. Because disaster response is a dynamic process, community disaster plans should include procedures for periodically assessing sustainability and utilization of resources during a disaster.

This document will continue to change and evolve as new lessons are learned and new research findings become available. Updating and implementing the key elements of IPC activities in shelters should continue to be part of the community's preparedness planning efforts. It is important to continue to communicate and update all partners involved in sheltering any time that plans are revised.

Many types of resources are needed to set up and run a community-based shelter. [Appendix A](#) outlines a list of resources/supplies needed to administer IPC strategies in shelters. Other existing documents should be referenced for more general recommendations regarding resources needed to run a shelter.²

IPC Coverage

Whenever possible, an infection preventionist (IP) should be involved in local and regional emergency preparedness planning and thus available to be consulted as part of the disaster planning process due to the potential for infection transmission in shelters. An IP can assist in developing a needs assessment and identifying surveillance needs, performing surveillance, monitoring IPC practices on-site, and intervening during potential infectious disease outbreaks. If IP coverage is not feasible, an IP designee needs to be identified by each shelter and included in the incident command staff of the site as a medical/technical specialist. This should be done in coordination with local public health communicable disease officials who may be aware of additional local/regional resources to assist.

A checklist of IPC considerations for shelters during disasters is outlined in [Appendix B](#). IPs or IP designees can use this checklist to assist with shelter set-up.

Triage and Surveillance Procedures

Syndromic Surveillance

The shelter should develop a communicable disease assessment plan to monitor individuals and staff at the site. An assessment/triage form example is available in [Appendix C](#). Formal assessment/triage should be conducted on sheltered individuals and shelter staff to identify any potential infectious diseases or conditions.

Sheltered individual triage/assessment should occur at the following times:

- Upon arrival/admission to the shelter
- During non-infectious disease disasters: Daily when resources allow
 - › Periodic screenings (every second or third day, for example) may be substituted during times of limited staff resources/time
- During infectious disease disasters (i.e., bioterrorism, epidemics, or pandemics): Daily
- When transferring individuals to a healthcare facility

Formal assessments (see [Appendix C](#)) should be conducted by the following individual(s) in descending order by preference:

- On-site healthcare professionals
- Designated, trained shelter workers
- Sheltered individual who volunteers or is identified by shelter worker as a leader

If a humanitarian crisis coincides with a disaster necessitating deployment of a community shelter, individuals displaced due to the humanitarian crisis need to be screened for communicable diseases or infectious conditions that are endemic to the individual's home. A travel history should be collected as part of the shelter admissions screening process. Shelter workers and/or triage staff should collaborate with local public health officials to identify which symptoms or diseases/conditions would be of top priority for screening, because risk factors vary depending on the individual's home country or region.

Informal/unwritten assessments (i.e., passive surveillance, such as self-reported symptoms between screenings) can be used in lieu of formal written assessments (such as using [Appendix C](#) or another such reporting tool) during disasters that involve extremely limited resources. Informal assessments are not recommended as a substitute for formal assessments during infectious disease disasters (i.e., bioterrorism, an epidemic, or a pandemic).

Shelter staff should be assessed for signs and symptoms of infection every 24 hours. In addition, staff should be encouraged to self-report symptoms between assessments.

Sheltered individuals and shelter workers should be encouraged to report symptoms of infectious diseases between screenings. Posters of reportable signs and symptoms/syndromes of potentially infectious diseases should be strategically located around the shelter. A poster example is provided in [Appendix D](#).³ Community planners should develop and have these signs available as part of their preparedness efforts and should consider having them available in multiple languages depending on the needs of their shelter clients.

Tracking Infection Trends Seen in the Shelter

It is important to systematically track the number and trend of infectious diseases/conditions within the shelter, among staff and clients. Once a day, a shelter worker should summarize data from the formal assessments/triage (i.e., active surveillance) and passive surveillance. The IP/IP designee on-site should review this data for trends, such as a pattern of common infections/conditions or an increase in the number of infections seen. A sample log for reporting and tracking infections within the shelter is provided in [Appendix E](#).

The results of the formal assessments/triage (i.e., active surveillance) and passive surveillance should be reviewed by the IP/IP designee on-site and reported to the Incident Commander or Director of the shelter if deemed necessary. The IP/IP designee should also report the results to the local and state health department as required in the Emergency/Disaster Plan for the community.

Increases in illness rates identified through syndromic surveillance should be investigated by the IP/IP designee on-site and the local health department. In addition, plans should include “trigger points” in which shelter operations and/or changes in staffing must be considered prior to hitting a critical nature.

- Increasing respiratory infection rates should be handled by monitoring for compliance with respiratory etiquette (including hand hygiene) and investigating potential sources of infection.

Immunization

Shelter workers should be assessed for current immunization status (see [Appendix C: Syndromic Surveillance Assessment/Triage Form](#)) upon admittance to the shelter, or on or before their first day of work. They should also be encouraged to receive any disaster-specific vaccines, such as Tetanus or Influenza, offered by the health department. Whenever possible, before starting work in the shelter, shelter workers should be brought up to date on all immunizations according to the adult immunization schedule as outlined by the Centers for Disease Control and Prevention (CDC)’s Advisory Committee on Immunization Practices (ACIP) or in accordance with public health recommendations.

Sheltered individuals should be encouraged to receive any disaster-specific vaccines, such as Tetanus or Influenza, offered by the health department. Immunization administration may occur at the shelter or at a nearby site. If the shelter assists in immunization distribution, vaccine storage should occur per manufacturer’s instruction, vaccine administration should be documented, and proper follow-up of vaccinated individuals should occur in collaboration with local public health officials. During an infectious disease disaster, it may be advantageous to set up an on-site vaccination clinic to provide vaccine to shelter workers and clients. Shelter managers should partner with local public health authorities to coordinate an on-site vaccination clinic.

Issues of immunization management during a disaster must include the Immunizations Programs at the local and state level. Many states have statewide registries that can facilitate accurate and complete documentation mechanisms specific to immunizations. This will be important during post event follow-up, if necessary.

Post-Discharge Surveillance

During an outbreak or a pandemic, shelter staff should work in coordination with local public health agencies to set up post-discharge surveillance for individuals who return to their homes or the community. Post-discharge surveillance should be included in community disaster plans, including identifying agencies (public health, home health, etc.) that will coordinate this process.

IPC Triage

Using sound observational techniques and data from the syndromic surveillance process, individuals should be triaged based on their risk of being contagious. Certain symptoms/signs, e.g., fever, shortness of breath, etc., may indicate that an individual has a communicable disease. These signs/symptoms and corresponding IPC interventions are outlined in [Appendix F](#).

Transfer to a Healthcare Facility

The on-site IP or IP designee should communicate the infected individual's disease status and the need for precautions to the facility lead or incident command. The IP/IP designee maintains responsibility to stay in contact with the receiving facility in relation to the patient's diagnosis for follow-up. The shelter must have a coordinated process that facilitates communication between the shelter and receiving facility in the event a change in the patient's condition has infection transmission implications for the shelter. Any patient with a suspected respiratory infection should be given a face mask to wear. Any patient with a potentially infected wound should have the wound covered with a medical dressing or bandage.

Isolation Precautions

Isolation Precautions are divided into categories based on how diseases are transmitted. For more information on disease transmission, refer to the CDC/HICPAC Guideline for isolation precautions. ⁴ [Appendix G](#) provides a quick reference on isolation categories and interventions that should be implemented in shelters. [Appendix H](#) provides a poster explaining Respiratory Etiquette that can be posted within shelters to help educate sheltered individuals and shelter staff.

Isolation Area

The shelter should have a designated isolation area for potentially contagious individuals. The following guidelines should be used when developing and operating an isolation area within a shelter:

- Choose an area that is physically separated from the rest of the shelter by walls on all sides and a door
 - › A building or area outside or near the actual shelter can be used and may be the best choice for isolation area placement. This could include mobile medical assets/facilities in development as part of state level Department of Health and Human Services Office of the Assistant Secretary for Preparedness and Response (ASPR) Hospital Preparedness Program (HPP) planning. Community shelter planners must remain involved in local, regional, and state HPP.
- If such an area does not exist and cannot be made inside the shelter, an isolation area can be created using plastic or other barrier material
 - › Makeshift walls that are floor to ceiling (if feasible) should be created.
 - › Isolation signs or posters should be placed near the entrance to the isolation area to indicate that individuals should not enter the area without appropriate personal protective equipment.
- Isolation area/space should have dedicated bathroom facilities & equipment.

- In certain situations, such as sheltered individuals infected with diseases spread by respiratory droplet or airborne routes, additional precautions may need to be taken to ensure the isolation area has controlled air movement.
 - › See [Appendix G](#) for information on air handling and ventilation recommendations for isolation areas.
- Limit crossover of shelter staff between the isolation unit and the rest of the shelter occupants
 - › Assign dedicated shelter staff (i.e., staff cohorting) to provide care for potentially contagious individuals and/or work in the isolation area (e.g., healthcare workers when available, housekeeping, custodial), and restrict these staff from working with non-contagious individuals or working in other parts of the shelter.
 - › Dedicate an entrance(s) or passageway(s) for infectious individuals when feasible. This promotes separation as well as the ability to triage those who have been working with potentially contagious patients.

Quarantine

Quarantine is the separation of individuals who have been exposed to a contagious individual to see if they become ill. Quarantine can only be implemented by public health officials for diseases that have been identified as quarantinable under law.

If public health authorities implement quarantine orders while a community disaster shelter is deployed, shelter planners or managers should incorporate this into their shelter plan by having a designated space within the shelter to house those who need to be quarantined. The quarantine space should not be the same space that is used for isolation.

Placement of Individuals

Individual placement within the shelter should be determined by review of the Syndromic Surveillance Assessment/ Triage Form ([Appendix C](#)) and the Infection Prevention Triage results ([Appendix F](#)). Whenever possible, families (especially those with small children) should be placed together within the shelter. Symptomatic individuals should be cohorted based on their isolation precaution category (See [Appendix G](#)). If both quarantine and isolation are required, the shelter should have two separate designated areas to house the individuals requiring these protective public health interventions.

If long-term care (LTC) facilities need to have their patients housed at a community disaster shelter, those LTC residents should be considered a cohort and housed in the same space within the shelter. This will enable LTC staff to provide care to their residents even when housed in the shelter. It may also help reduce the risk of infection transmission between the LTC patients and others in the shelter, as well as providing a level of protection to the LTC patients from exposure to communicable diseases that may be present in other shelter clients.

Arrange all sleeping areas (including cots) so that individuals are separated by putting a minimum of 3 feet between individual sleeping areas (or cots) to prevent the spread of infections. In addition, sheltered individuals should be instructed to sleep head to toe (See [Appendix I](#)). During an infectious disease disaster, physical distancing within the shelter may be necessary. This will limit the number of individuals who can be housed at the shelter and may help reduce the risk of infection transmission. Shelter planners should collaborate with public health officials to determine when physical distancing may be necessary at the shelter.

Ventilation

Airflow and ventilation play an important role in establishing a safe indoor environment and can help prevent the spread of infectious respiratory particles. Infectious respiratory diseases spread more easily indoors than outside, so it is critical to create an environment that is as safe as possible when setting up a community disaster shelter. Shelter planners should take the following into consideration when choosing a shelter site or when deploying a shelter during a disaster:⁵

- Consult with a heating ventilation and air conditioning (HVAC) expert when assessing or modifying a building's HVAC system.
- Improving the HVAC within a building(s) can reduce infection risk but will not eliminate it.
- Ensure that the building that will serve as the shelter meets applicable building occupancy codes at a minimum.
- When feasible, increase the amount of outdoor air brought into the building beyond the minimum required by local codes.
 - › Open air dampers to reduce HVAC air recirculation.
 - › When feasible and when doing so would not result in a health risk, open door(s) and/or windows in the shelter.
- When feasible, use fans to help increase air circulation within the shelter. Set up the fans to move air from clean to less-clean spaces (e.g., from occupied areas of the shelter into medical/first aid, quarantine, and isolation spaces within the shelter).
- Adjust HVAC system to increase airflow to occupied spaces within the shelter when feasible.
- Use the highest efficiency filter that is compatible with the shelter's HVAC system
 - › When feasible, use an HVAC filter efficiency that meets a minimum efficiency reporting value (MERV)-13 or better.
- Use portable high-efficiency particulate air (HEPA) units within the shelter when available. If limited HEPA units are available, prioritize their use for medical/first aid, quarantine, and isolation spaces.

Hand Hygiene

One of the most important measures for preventing the spread of pathogens is effective hand hygiene. Appropriate hand hygiene should be practiced in all shelters. Hand hygiene is defined as any method that removes or destroys microorganisms on the hands. Frequent handwashing using soap and water removes potentially infectious material from the skin and helps prevent transmission of diseases. When hands are not visibly soiled, alcohol-based hand sanitizer is the preferred method for hand hygiene. Alcohol-based hand sanitizer includes a variety of waterless alcohol-based hand hygiene products such as gels, foams, and liquids.

In general, hand hygiene is required whenever significant hand contamination is possible and the spread of pathogens through cross-contamination may occur. This includes activities involving contact with mucous membranes, blood or body fluids, secretions, or excretions. Also, hand hygiene is recommended after touching inanimate sources, which are likely to be contaminated with virulent or epidemiologically important microorganisms such as antimicrobial-resistant organisms. Hand hygiene is crucial following contact with a symptomatic individual. Instructions for performing hand hygiene are included in [Appendix J](#). A process should exist to assess the shelter to determine if adequate hand hygiene capabilities exist, and if not, respond to that assessment.

Most routine contact with individuals in the shelter does not require hand hygiene. Hand hygiene is required with the following activities:

- Before and after eating, drinking, and touching the face or mouth
- Before and after preparing food
- After using the toilet
- After contact with respiratory secretions and facial tissues
- Before and after contact with wounds
- After handling soiled clothes and bed/cot linens
- After cleaning up vomitous, fecal accidents, or other body fluid spills
- After cleaning and disinfecting environmental surfaces
- Before and after removing gloves
- After removing a face shield/eye protection
- Before and after removing respirator or mask

- Before entering and when leaving the common play area (see Toys section)
- After visiting or handling an animal in the pet shelter (see Pet Management section)
- After handling pet food (see Food Safety section)
- After activities in which the hands become visibly soiled
- After playing with shared toys

Hand hygiene facilities (sinks and/or alcohol-based hand sanitizer) should be conveniently located throughout the facility. Hand hygiene stations should be located:

- In or just outside every isolation room/area
 - › More than one station may be necessary if a large room is used for isolating several symptomatic individuals.
- Near the restrooms
- Near the food preparation and/or kitchen area
- Near the eating area
- As needed throughout the shelter

During infectious disease outbreaks and/or whenever resources allow, hand hygiene compliance should be monitored. Shelter staff should be located inside or near the hand hygiene stations and/or restrooms to monitor hand hygiene technique. Monitoring hand hygiene compliance has been shown to increase effectiveness of the procedure and decrease disease transmission.

Hand Hygiene Technique

Instructions for performing hand hygiene are included in [Appendix J](#).

Hand Hygiene Signage

Hand Hygiene notices/signs should be posted at all shelter entrances, wash-rooms, and hand hygiene stations. See Appendix K for samples of appropriate signage for handwashing and use of alcohol-based hand hygiene products. Hand hygiene signage should be used as a supplement to, rather than a substitute for, monitoring hand hygiene compliance.

Personal Protective Equipment (PPE)

Personal protective equipment is gear designed to protect the wearer from exposure to microorganisms. Examples of PPE include gloves, gowns, goggles, face shields, masks, and respirators. Shelter workers should be provided with appropriate PPE and trained on proper use and disposal. Choose PPE based on the procedure you are performing and the mode of transmission of potential agents (see [Appendices D](#) and [E](#)).⁴ For example, if you are performing tasks in which you expect hand exposure to any body fluid—when cleaning a sheltered individual’s wound for example—you should wear gloves. If you expect splashing or spraying, such as when you empty a urine collection bag, you should wear a gown, gloves, and protective eyewear.⁴

Different diseases require different types of PPE based on how the agent is transmitted.⁴ This can range from using gloves only to wearing full PPE. For most encounters with sheltered individuals, when the potential for splashing of blood or body fluids is not present, routine use of gloves and hand hygiene will be sufficient to protect you from infection. For some individuals and some procedures, you’ll need to wear additional PPE. [Appendix F](#) outlines syndromes for which additional precautions are needed. [Appendix G](#) outlines the appropriate PPE for each of the isolation categories.

If PPE is limited, it should be prioritized for staff working in/covering the isolation and/or medical care area(s) within the shelter.

Gloves

Gloves are the most commonly used type of PPE. In shelters, non-sterile gloves should be worn when handling sheltered individuals’ clothing or personal items, or when contact with a sheltered individual’s blood or body fluids, non-intact skin, or mucous membranes is anticipated. If resources allow, a new pair of gloves should be used for each encounter with a symptomatic individual.

Recommendations for glove use:⁴

- Use a new pair of gloves when contact with blood or body fluids, non-intact skin, or mucous membranes is anticipated.
- Change gloves when they are heavily soiled with blood or other potentially infectious material, or if they are torn.
- Change gloves to prevent cross-contamination of body sites. For example, if you clean an individual's wound, you should change your gloves before touching another part of the individual or performing other tasks. Always work from clean areas to dirty or heavily contaminated areas of the body. For example, blood pressure should be taken before cleaning a wound.
- Do not touch your body or surfaces in the shelter environment with contaminated gloves.
- Always change gloves after providing care to each of the sheltered individuals.
- Although gloves keep most microorganisms from getting on your hands, they are not completely protective. Always perform hand hygiene before and after removing gloves.

There are currently no recommendations regarding the reuse of gloves.⁴

Gowns

An isolation/procedure gown should be used when splashing or spraying of clothes or the body with blood or body fluids is anticipated.

Recommendations for gown use:⁴

- Perform hand hygiene.
- Wear an isolation/procedure gown to protect your clothing, arms, and other body areas when splashing or spraying of clothes or the body with blood or body fluids is anticipated
- The isolation/procedure gown should cover your torso area, fit loosely over your body, and have long sleeves that fit snugly at the wrist
- The opening of the gown should always be in the back
- Tie or fasten the gown in the back to keep it in place
- Remove the gown when you are finished providing care or treatment to an individual

- Take the gown off either in the doorway or in the area immediately outside the isolation or triage area in the shelter, depending on where you are during gown use
- Avoid touching the outside of the gown during use and removal because it is contaminated.

If resources allow, a new gown should be used for each encounter with a symptomatic individual. As resources dwindle, gowns may be reused by the same shelter worker for the same symptomatic individual or group of individuals as long as the gown integrity is not compromised. If gowns are reused, consideration should be given to storage or placement between uses to maximize its use, as well as to prevent inadvertent contamination.

Masks and Respirators

It is important to choose the correct respiratory protection to prevent becoming exposed to an airborne or droplet spread disease. The following discussion and recommendations for use of respiratory protection presumes that administrative and environmental controls addressing potential airborne agents, i.e., patient placement, cohorting, etc., as described above, have been implemented to the extent possible.

Respirators are not the same as surgical masks. Surgical or procedure masks are the type of respiratory protection worn most often in healthcare settings. They are loose-fitting and allow air particles to leak in around the edge of the mask.⁶ Surgical or procedure masks are designed to help keep potentially infectious droplets from being spread by the person wearing them, and to keep sprays from coughs and sneezes from reaching the mouth and nose of the wearer. Surgical masks are worn as part of droplet precautions to help prevent exposure to diseases spread by respiratory droplets, such as seasonal influenza. In contrast, respirators (usually an N95 or higher-level respirator) are designed to protect the wearer from breathing in very small particles, which might contain viruses or bacteria. They fit tightly against the face so that inhaled air goes through the filtering material.⁶ Respirators are worn as part of airborne precautions to help prevent exposure to airborne spread diseases, such as measles.

Community disaster plans should include processes for periodically assessing sustainability and utilization of resources during a disaster, including the use of surgical/procedure masks and respirators for shelter staff and sheltered individuals. Surgical/procedure mask and respirator selection depends on the likely route of transmission as noted in the isolation category for an infected individual (see [Appendix G](#)). When resources allow, a new disposable surgical/procedure mask or respirator should be worn for each encounter with an infected individual or entrance into the isolation area within the shelter. Reusable respiratory protection may be used by shelter workers in lieu of disposable surgical/procedure masks or respirators, using the following recommendations:

- If re-useable elastomeric respirators are used, these respirators must be decontaminated according to the manufacturer's instructions after each use.⁷
- Powered air purifying respirators (PAPRs) may be considered for shelter workers stationed in the isolation area.⁸
 - › PAPRs have the advantages of providing eye protection, being comfortable to wear, and not requiring fit testing; however, hearing (e.g., for auscultation) may be impaired, limiting their utility for clinical care.
 - › PAPRs must be decontaminated between uses; see manufacturer's recommendations for instructions.
 - › Training is required to ensure proper use and care of PAPRs.
 - › Power sources within the shelter must be identified for recharging PAPRs between uses.

Regardless of respirator or surgical/procedure mask resource levels, the following guidelines should be used when determining respirator/mask usage:

- Workers should receive training on how to put on and use the respirator or surgical/procedure mask, including how to:
 - › Put on and use the respirator or surgical/procedure mask
 - Perform hand hygiene prior to putting on the respirator or mask.
 - Avoid contamination during use by not touching the outside of the respirator or mask.
 - Use a face shield that can be worn over a respirator or mask to

- protect it from contamination with blood or other body fluids.
 - » The face shield should be removed to prevent respirator/mask contamination.
 - » Decontaminate the face shield between uses.
 - » Perform hand hygiene after removal of the face shield and before removing the respirator or mask.
- › Check the seal of the respirator for adequacy of fit.
 - Seal-check processes are outlined by the manufacturer.
- › Remove and dispose of the respirator or surgical/procedure mask (See [Appendix L](#).)
 - Respirator or surgical/procedure mask should be discarded after use (i.e., after being worn in the presence of an infected individual).
 - Discard respirator or surgical/procedure mask sooner if it becomes obviously soiled or damaged (e.g., creased or torn).
 - Perform hand hygiene after removing the respirator or surgical/procedure mask.

Shortage of Respirators or Masks

In the event of an actual shortage of N95 or higher-level respirators, or masks, follow CDC guidance on optimizing PPE supplies.⁹

Because this is an area of ongoing research and protocol development, shelter planners must remain vigilant about checking the CDC website for updated information regarding best practices and protocols.

Universal Masking

During an infectious disease disaster, public health authorities may implement a public health order for universal masking. When universal masking has been ordered, shelter planners or managers should incorporate this into their shelter plan by doing the following:

- Have mask supplies available on-site.
- Instruct shelter clients and workers to wear a mask at all times and in all shelter areas, except when sleeping, eating, or drinking.
- Post signage indicating that universal masking is in place.

Handling Linens

Soiled linens can lead to infection transmission and should be handled and managed to minimize this risk. Shelter clients' linens may be managed by the clients themselves, but there are likely to be some situations in which shelter workers will handle/manage shelter clients' linens, such as clients in isolation.

When shelter workers will manage shelter clients' linens, the following recommendations should be followed^{10,11}:

- Store clean and soiled linens separately.
- Shelter staff should wear gloves when handling soiled linens.
- Do not shake soiled linens and minimize agitation when handling.
- Linens from shelter clients in isolation should be bagged within the isolation area.
 - › Consider keeping soiled linens from the isolation area separate from clients' linens from the general dormitory/sleeping area, if possible.
- After handling soiled linens, shelter staff should remove their gloves and immediately perform hand hygiene.

Sexually Transmitted Diseases

Sexually transmitted diseases could be spread within the shelter. Consider providing various types of barrier protection to individuals in the shelter, such as condoms. In addition, shelter employees should coordinate with local public health agencies for follow-up or contact tracing when needed.

Water Management

Shelters may experience a large need for water during disaster response. In addition, some disasters, especially a natural disaster such as a flood or hurricane, may result in compromised municipal water supply. Microbial contamination of water poses an extensive health risk; safe water reserves must be identified and available to shelters. Back-up supplies of potable water for human consumption, sanitation, and hygiene will be essential for shelters during a disaster.

Water Usage

Depending on the conditions of the shelter, the water allocation and utilization will vary. Guidelines for supplies of water needed for disasters and shelters have been published by responding agencies and is not an infection control issue.¹² Only IPC issues specific to water management are covered in this document.

Water Collection and Storage

If community disaster planners store water for use in shelters during a disaster, care should be taken to keep the water free from microbes and safe for consumption.

When storing water using old/used containers (cans, jars, bottles, glasses) as receptacles for water, the following recommendations should be followed¹³:

- Do not select containers that previously held chemicals.
- Clean the container surface with soap and water then rinse before use.
- Clean the inside of container with a bleach solution.
 - › Bleach solution: Add 1 teaspoon unscented household chlorine bleach (5.25% sodium hypochlorite) with 1 cup water.
- Cover container and agitate, allowing solution to contact all inside container surfaces.
- Cover and allow to sit for 30 minutes. Rinse with potable water.
- Let empty container air-dry before use.
- Pour clean water into the sanitized container and cover it with a tight lid.

- Label container as “DRINKING WATER” and mark the date prepared on the label.
- Store at ambient temperature, away from heat, direct sunlight and away from toxic substances, such as gasoline or pesticides.
- Change containers every 6 months, if necessary.

If bottled or running water is not available and alternate sources of water are used (melted ice, canned fruit or vegetable juice, etc.), care should be taken to prevent microbial contamination:

- Use melted ice that originated from a commercial source (ice machines or a freezer).
- Melted ice from outdoor sources, such as icicles, should not be used for consumption.
- Use canned fruit or vegetable juice or juice from other canned products.
- Water from a toilet tank (not the bowl) may be used if additional chemicals, such as bluing has not been added.¹³
- Swimming pool or spa water can be utilized for hygienic purposes, but not for consumption.

Rivers, streams, and lakes might be contaminated with livestock waste, human sewage, chemicals, and other contaminants which can lead to illness when used for drinking, bathing, and other hygiene activities. During flood events, well water might be contaminated as well.

Possible sources of water that could be made safe by treatment include:

- Rainwater
- Streams, rivers, and other moving bodies of water
- Ponds and lakes
- Natural springs

Note: DO NOT USE water that has been contaminated by fuel or toxic chemicals.

Water Decontamination

Non-potable water must be decontaminated before use. There are two basic methods for decontaminating water: boiling and chemical treatment. Boiling water is the preferred method for water decontamination. The processes for decontaminating water are outlined in [Appendix M](#).

Water from Local Reservoirs, Lakes, and Rivers

Water from local streams or lakes should be considered contaminated and should be decontaminated before consumed. Let the water stand before beginning treatment to allow suspended particles to settle to the bottom. Remove suspended particles using a straining device, such as a coffee filter or layers of clean cloth. Prior to using a straining device, a decanter can also be used to separate settled particles from the water. After suspended particles are removed, follow procedures for water decontamination.

Well Water

If the shelter will rely on well water during a disaster, especially after a natural disaster such as a flood or hurricane, special precautions must be taken to ensure that the water is safe for consumption. Until you know the water is safe, use bottled water or some other safe water supply. Follow instructions for disinfecting well water based on the type of well: bored, dug and drilled, or driven.¹³

After disinfection, the well water should be sampled before consumption or bathing, using the following¹³:

- Wait at least 7 - 10 days to test the water after disinfection to ensure that the chlorine has been thoroughly flushed from the system. Until well water has been tested, boil it (rolling boil for 1 minute) before using or use another alternative water source.
- Contact your local health department for water sampling and testing information or contact your state laboratory certification officer to find a certified lab near you.
- Sample the water for total coliform and either *E. coli* or fecal coliform bacteria to confirm that the water is safe to drink.

- If results show no presence of total coliforms or fecal coliforms, the water can be considered safe to drink.
- Follow up with two more water tests, one in the next 2 to 4 weeks and another in 3 to 4 months.
 - › If results show the presence of any coliform bacteria, repeat the well disinfection process and test again. If tests continue to show the presence of bacteria, contact your local health department for assistance.
 - › Check the safety of your water over the long term: continue to monitor bacterial quality at least twice per year or more often if you suspect any changes in your water quality.

Food Safety

Food needs to be made available to individuals and their families during emergencies but can pose an infectious disease risk if not stored, prepared, and handled appropriately. Shelter planners should involve registered dietitians and/or licensed sanitarians when developing formal written plans for obtaining, storing, rotating, and dispensing food supplies. Dietitians and sanitarians services should be coordinated and made available through local and state public health agencies and/or community emergency management. Only issues specific to infection-related food safety are covered in this document.

Safe Handling of Human Food

The following are recommendations for safe food storage, preparation, and handling of human food¹⁴:

- Store in a dark, dry, cool site well sealed to the outside to prevent pest and vermin attraction.
- Store human and pet food separately.¹⁵
- Store a minimum of 4 inches above the floor.
- Symptomatic shelter workers should not prepare or serve food (see Syndromic Surveillance section).
- Refrigerate perishable food when possible.
- Monitor refrigerator/freezer temperature daily to ensure proper storage (refrigerator: 38 – 40° F; Freezer: ≤ 0° F).

- Plan for temperature degradation
- Prepared hot food must be kept at 140° F.
- Prepared cold food should be kept at ≤ 40° F.
- Leftovers should be used within 4 days or discarded.¹⁴
- Discard any food that requires refrigeration that has been kept at room temperature for ≥ 2 hours.¹⁴
- Discard any food that has been kept ≥ 1 hour in a room above 90° F.¹⁴

Proper disinfection of work surfaces and utensils should be performed prior to and after food preparation (see Environmental Decontamination section).

Safe Handling of Pet Food

The following are recommendations for safe food storage, preparation, and handling of pet food:¹⁵

- Pet food should be stored similarly to human food.
- Store human and pet food separately.
- Leftover wet pet food should be refrigerated promptly or discarded.
- Pet food bowls, dishes and scooping utensils should be washed with soap and hot water after each use.
- Do not use the pet food bowl to scoop out food; use a clean, dedicated scoop or spoon.
- Perform hand hygiene after handling pet food.

See the [Pet Management section](#) for additional information.

Waste Management

Regular Trash

Adequate trash receptacles should be available, emptied regularly to ensure they do not become overfilled, and cleaned/disinfected. Ensure regulated medical waste (i.e., biomedical waste/body fluids and/or used needles and sharps) is not mingled with regular trash. The holding area for disposal of waste materials should be safe, clean, and free of access by vermin and

insects. All outdoor trash containers should have a covering or lid to keep out pests. After trash is picked-up for disposal, the holding area should be cleaned and disinfected to remove accumulated organic material; this will prevent activity by insects, animals, and vermin.

Regulated Medical Waste

Shelters should prepare for the presence of regulated medical waste (RMW). The Occupational Safety and Health Administration's definition of RMW is as follows:

*Liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi- liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.*¹⁶

Most barrier equipment (gowns, gloves, respirators/masks) and dressings will not be considered RMW unless dripping or caked with blood. RMW should be placed in red bags or containers if available, or the bag/container should be labeled as Regulated Medical Waste (RMW) according to state regulations. A biohazard sticker/label can be used if available.

[Appendix O](#) provides a table of proper disposal for various types of waste, including RMW. All shelters should follow any federal, state, and local requirements regarding the disposal of RMW. In the case of conflicting requirements, follow the more stringent regulations.

Community disaster plans should include provisions for RMW disposal for shelters. Many local jurisdictions have standing arrangements for appropriate trash management during disasters, including handling medical waste. A multidisciplinary approach should be taken to ensure that shelter planners coordinate with local emergency management and public health agencies. If a community disaster plan does not have such provisions, the following emergency disposal/treatment alternatives should be considered:

- RMW should remain at the shelter.

- Store RMW in an enclosed area (a dirty utility room/area) until arrangements for pick-up can be made.
- Sharps may be placed in a rigid plastic container such as a two-liter soda bottle. Add a simple bleach solution to render them non-infectious before disposal as regular solid waste (following consultation with state and local regulators).

Sanitation

It is critical to have adequate toilet facilities and supplies at the shelter. There should be one toilet per every 20 shelter clients.¹⁷ Hand hygiene supplies or stations should be located near the toilets. Bathrooms should be cleaned regularly (see the Cleaning Environmental Surfaces section for details).

Environmental Decontamination

The environment can contribute to infectious disease spread because germs can be spread via hands and equipment when items in the environment become contaminated. Items that are touched most frequently, such as tables, doorknobs, utensils, toys, etc., pose the most risk to disease transmission. The more contaminated the environment, the greater probability that disease transmission to clients and staff may occur. The large number of individuals sheltered together in close quarters will increase the number of germs in the environment. This is especially true during a pandemic or outbreak of an emerging infectious disease when infected individuals shed infectious particles that contaminate the environment and pose a risk to other sheltered individuals and shelter workers.

There is also the potential for sheltered individuals to bring mold into the shelter via contaminated objects or for mold to grow within the shelter if certain environmental objects or surfaces becomes wet, such as ceiling tiles. Shelter workers should monitor for potential environmental contamination of the shelter from internal or external sources.

- The shelter should be evaluated for potential sources of mold; the risk of mold is highest after a flood or hurricane.¹⁸

- Alert the Incident Commander or shelter manager if mold is suspected, so that remediation can be conducted.

Proper cleaning and disinfection of the environment (i.e., the shelter and areas/items in the shelter) are essential to decrease the risk of disease transmission. Shelter workers should receive clear guidance and training regarding the principles of cleaning and disinfection. A summary of the cleaning activities for each shelter area should be developed and provided to the person assigned to clean that area. Guidelines on proper cleaning and disinfection are available through existing documents.¹⁹ Shelter areas may be divided into the following areas (this is not an all-inclusive list):

- Kitchen
- Dining
- Bathroom
- Dormitory/sleeping area
- Common play area
- Medical/First aid area
- Laboratory testing and/or phlebotomy area
- Quarantine area
- Isolation

Shelter workers should be provided with appropriate PPE. Workers must be trained regarding PPE use and disposal to decrease skin exposure to harsh chemicals during cleaning and disinfection activities. Pre-mixed solutions or pre-moistened towelettes/wipes may decrease exposure risk.

Selection of Cleaning/Disinfection Agents

The disinfecting agent used to clean the living areas within shelters should be a household disinfectant with a label stating that it is a sanitizer.¹⁹ For shelters that include a medical/first aid or isolation unit, an EPA-registered hospital disinfectant product, such as a quaternary ammonium compound should be used for cleaning and disinfection of those spaces. Follow manufacturer's recommendations for dilution and contact time when using EPA-registered disinfectants.²⁰

Disinfectant products can be purchased undiluted, diluted in spray bottles, or pre-moistened towelettes. The form of the disinfectant product is less important than the dilution and amount of time the product remains wet on a surface (i.e., contact time) when the product is used. Manufacturer's recommendations should always be followed to ensure proper disinfection of the environment.²⁰

If an EPA-registered disinfectant product is unavailable, a bleach solution can be created by mixing 1 teaspoon unscented household chlorine bleach (sodium hypochlorite) per quart of clean water [metric conversion: 5 ml bleach per liter of clean water]. EPA-registered chemical germicides are preferred over bleach solutions because they are less corrosive to environmental surfaces and there are fewer offensive fumes associated with their use.

Efforts should be made to prevent solutions used for cleaning and disinfection from becoming cross contaminated. Disinfectant/cleaning solution in buckets or one-time use containers should be discarded after each use. Thoroughly rinse and clean housekeeping equipment after use and allow the equipment to dry properly.

Cleaning Body Fluid Spills

All body fluid spills should be cleaned up immediately. If a spill contains large amounts of blood or body fluids, the following procedure should be followed:¹⁶

- Put on gloves.
- Cover the spill with an absorbent material.
- Apply an EPA-registered disinfectant (allow it to sit for the time required by the manufacturer's recommendations).
- Cover the spill with additional absorbent material.
- Dispose of all materials in appropriate waste container (see [Appendix O](#)).
- Moderately moisten paper towels or a cloth with an EPA-registered disinfectant to clean the area.
- Allow surfaces to air dry.

Cleaning Environmental Surfaces

Cleaning frequency should occur as follows:

- Bathroom areas should be cleaned daily and as necessary.
- Food preparation areas should be cleaned after each meal and as needed between food preparation tasks.
- Dining areas should be cleaned after each meal.
- Living and sleeping areas should be cleaned at least weekly and more often if necessary. Traffic flow patterns and use will determine the frequency these areas should be cleaned.
- Cots, cribs, and assorted bedding should be cleaned and laundered between occupants and as needed when contaminated with body fluids or otherwise visibly soiled.
- Other furniture should be cleaned weekly and as needed.
- Medical/First aid or triage areas should be cleaned daily and as necessary.
- Frequency and level of cleaning and disinfection will be determined by the healthcare services being provided.
- Quarantine areas should be cleaned daily.
- Isolation areas should be cleaned daily, upon individual transfer to a medical facility or move to another part of the shelter, and as necessary.

Environmental surfaces frequently touched by hands should be disinfected/cleaned following the cleaning frequencies listed above. If possible, use a vacuum cleaner equipped with a high efficiency particulate air (HEPA) filter for cleaning carpeted floors, upholstered furniture, or other cloth items. Disinfection of the vacuum cleaner is not required when a HEPA filter is properly installed and remains intact during use. Commercially available products may be used to remove visible soil or stains from carpets and upholstery.

Cleaning Cots/Mattresses

When possible, cots or mattresses should be covered with an impermeable barrier (waterproof mat/sheet, absorbent pad, blue pad, plastic, etc.) to prevent them from becoming contaminated. If impermeable barrier resources are limited, barriers should be prioritized to incontinent individuals or those with a draining wound.

If impermeable barriers are not used and cots/mattresses become contaminated, they should be cleaned/disinfected. Disinfection procedures depend on the cot/mattress material:

- Plastic materials should be disinfected using the procedure for cleaning body fluid spills.
- Cloth/canvas materials should be cleaned by scrubbing with soap and water or disinfectant.
- Grossly contaminated cots/mattresses may need to be discarded if resources allow (See [Appendix O](#)).

Toys

In shelters, it is inevitable that toys will be present, shared, and exchanged. While toys are an important tool for distraction, entertainment, and development, they have the potential to spread disease, such as norovirus. If shelters have a designated play area for children, signs should be posted instructing children and parents/guardians to perform hand hygiene before entering and when leaving the common play area.¹⁹ The following recommendations will reduce the risk of disease transmission related to toys in shelters.

- Language appropriate information sheets dealing with basic hygiene surrounding children and toys should be developed in advance and provided at the time of admission to the shelter. See [Appendix P](#) for an example of an educational poster about toys.

Toy Selection

Consider the following if the shelter will be providing toys:

- Give preference to toys with non-porous surfaces that are less likely to become contaminated and can be easily cleaned, disinfected, and dried.²¹
- Soft/stuffed animals and cloth dolls donated to the shelter should only be accepted if they are new or have been cleaned and disinfected prior to delivery or can be laundered in the shelter before distribution.

Frequency of Toy Cleaning and Disinfection²²

- Avoid sharing soft/stuffed animals and cloth dolls between children. If these toys must be shared, clean/laundry them before they are given to another child.
- Clean and disinfect hard toys immediately after a child has put it into their mouth, after they have coughed or sneezed on it, and before and after the toy is shared.

Procedure for Cleaning Toys²²

- Hard toys may be washed with soap and water, or with household disinfectant products appropriate for use on those surfaces.
- If the toy will be mouthed by an infant, it should be rinsed with water after cleaning/disinfection.
- Soft/stuffed animals and cloth dolls should be laundered according to the manufacturer's instructions. Use the warmest appropriate water setting and dry items completely.

Procedure for Cleaning Toys of Infected/Isolated Children

Children with symptoms of contagious diseases (see the Infection Control Triage Form, [Appendix F](#)) should not be allowed in common play areas until they are no longer symptomatic or considered non-contagious per a medical professional. The toy of any child who is visibly ill, or suspected of having an infectious disease, should remain with that child while they are ill. Toys used by ill children should be thoroughly cleaned and disinfected before sharing with other children. Any toy that cannot be cleaned and disinfected should remain the sole property of that child, including being sent with the child when leaving the shelter.

Pest Management

Following a disaster there will likely be an increase in insects and other pests in or around the shelter. Some pests can spread diseases, such as West Nile virus via the bite from an infected mosquito; other pests are just a nuisance. Rain and high-water levels, such as after a hurricane or flood, may lead to an increase in the numbers of mosquitoes and other pests.

Shelters should minimize and attempt to eliminate vermin. Pest control should be included in the community disaster plan for shelters. Recommendations for pest management include the following:²³

- Eliminate food sources for pests (see the [Food Safety section](#)).
- Eliminate areas for nests, burrows, or breeding grounds, such as water pooling areas on the grounds or rooftop.
- Evaluate inside and outside of shelter for potential entrances for vermin, such as windows with torn or missing screens, doors propped open, standing water, etc and seal/eliminate any potential problem areas.
- Work with a community pest control team/company if needed.

Pet Management

Some families may arrive at the shelter with their pets. Close contact between animals and humans can pose an infection risk if the animal bites or scratches a human. Many shelters cannot accept animals because of health and safety regulations.²⁴ Community disaster plans should include provisions for pet shelters adjacent or close to human shelters. Shelter workers should coordinate with local and state animal rescue agencies to provide shelter for pets.

If pets are to be housed in a shelter, the following recommendations should be used:

- Service dogs/animals should be allowed to stay with their owner within the shelter in accordance with the Americans with Disabilities Act of 1990.²⁵
- All pets, except service dogs/animals, should be housed in a separate location.²⁴
- Pets should be screened for current vaccination status.²⁴
- If vaccinations are not up to date, the animal should be physically separated from other animals.
- Dogs and cats should be treated with medication to kill fleas, ticks, and intestinal parasites.²⁴
- Pregnant women or immunocompromised individuals should be instructed to avoid contact with used cat litter, cat feces, and pet rodents (hamsters, gerbils, and guinea pigs).²⁴
- Children ≤ 5 years of age should not handle reptiles without adult supervision and should perform hand hygiene after doing so.²⁴
- Anyone bitten, scratched, or otherwise hurt by an animal should be referred to a healthcare provider for assessment.²⁴
- Sheltered individuals should be instructed to not share food with their pets nor allow pets to lick their faces.²⁴
- Sheltered individuals should perform hand hygiene after visiting their pet in the pet shelter and after handling their pet's waste.²⁴
- Pet food should be stored in a similar manner as human food (see [Food Safety section](#)).¹⁵
- Drinking water for pets should be stored in a similar manner as water for human consumption (see [Water Management section](#)).

Postmortem Care

Procedures for handling of the deceased are dictated by local and state regulations;²⁶ this should be part of community disaster planning that is coordinated with local, regional, and federal disaster plans. In most situations, diseases do not survive long in the deceased; exceptions to this include smallpox and tuberculosis.^{26,27} Standard Precautions (see [Appendix G](#)) should be used when preparing the bodies of dead individuals for mortuary care to decrease the risk of infection transmission.²⁶ Autopsies pose a high risk for infection transmission²⁶ and should not be performed in shelters. Shelter workers should coordinate postmortem care with community, state, and federal disaster planning groups, including Disaster Mortuary Operational Response Teams (DMORT), local medical examiners, and coroners.²⁸

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APPENDIX A: List of IPC Equipment/Supplies Needed for Shelters

Other supplies and equipment will be required for shelter functioning. The items included on this list are specific to IPC and should be supplemental to traditional supplies needed to run a shelter. It is best to keep supplies secured/locked to prevent theft.

- ☐ **Red bags or containers for regulated medical waste disposal**
- ☐ **Biohazard stickers or labels for regulated medical waste disposal**
- ☐ **Sharps containers**
- ☐ **Personal protective equipment (PPE)**
 - ☐ Respirators (N95 or equivalent
Consider powered air purifying respirators (PAPRs))
 - ☐ Masks (surgical/procedure masks)
 - ☐ Gowns (patient care and isolation gowns)
 - ☐ Gloves (non-sterile and sterile procedure gloves)
Eye protection (goggles or face masks)
- ☐ **Hand hygiene products**
 - ☐ Alcohol based hand sanitizer ($\geq 60\%$ alcohol) and dispensing system
 - ☐ Soap (non-antimicrobial and anti-microbial)
 - ☐ Paper towels
 - ☐ Disinfectant products
Towelettes (antimicrobial wipes)
 - ☐ Disinfectant for cleaning the physical environment (EPA-registered chemical germicide)
- ☐ **Water decontamination products**
 - ☐ Chlorine or iodine tablets
 - ☐ Non-scented household bleach (sodium hypochlorite)
- ☐ **Syndromic surveillance supplies**
 - ☐ Thermometers (disposable or supplies for disinfection between individuals)
- ☐ **Sexually transmitted disease prevention supplies**
 - ☐ Barrier methods (condoms, dental dams, etc)
- ☐ **Body fluid management supplies**
 - ☐ Absorbent pads (blue pads) for incontinent individuals
 - ☐ Diapers (adult and child sizes)
 - ☐ Impermeable sheets or pads for cots/sleeping area, when needed (based on ICP/ICP designee's recommendation)
 - ☐ Facial tissues
- ☐ **Environmental controls**
 - ☐ Fans for creating negative pressure
 - ☐ Plastic, drywall, or plywood for barrier creation
- ☐ **Food safety**
 - ☐ Thermometer for monitoring refrigerator/freezer and food temperature
- ☐ **Immunization supplies**
 - ☐ Syringes
 - ☐ Alcohol swabs
 - ☐ Band-aids
 - ☐ Needles
- ☐ **Forms**
 - ☐ Syndromic Surveillance Assessment/Triage Form
 - ☐ Infection Prevention Triage
- ☐ **Informational/Educational Products/ Signage**
 - ☐ Hand Hygiene Techniques
 - ☐ Respiratory Etiquette
 - ☐ Infection Prevention Precautions
 - ☐ Cot or Sleeping Area Configuration
 - ☐ Disposal of Waste in Shelters
 - ☐ Syndromic Surveillance Poster
 - ☐ Putting on and Taking Off Personal Protective Equipment

APPENDIX B: Checklist for Infection Preventionists: IPC for Shelters During Disasters

Item	Yes/No	Comment
Triage & Surveillance		
Designated triage location separate from main population		
IPC posters – See Appendices H, K, and L		
Surveillance posters – see Appendices C and D		
Triage forms available – see Appendix C		
Personal protective equipment (PPE)		
Thermometer (check how cleaned)		
Hand hygiene supplies/station(s)		
Does triage staff need JIT (just in time) training		
Health information sheets or handouts for triage area		
Any special conditions to be aware of (e.g., pregnant persons, etc.)		
Immunizations – May delegate to other healthcare worker		
Community & staff are assessed for relevant event-specific immunizations per current Advisory Committee Immunization Practices (ACIP) recommendations ²⁹		
Vaccines available and properly stored.		
If not administered on site, is off site vaccination coordinated with public health?		
Vaccine supplies including documentation forms -see Appendix A		

Item	Yes/No	Comment
Designated location to administer vaccines that has chairs, table/counter, sharps container, and provision for privacy		
Isolation		
Designated location		
Type of precautions needed. Is negative pressure needed (see environmental section)?		
Appropriate signage		
Door can close		
Designated bathroom		
PPE available		
Waste container(s) in isolation room/area for PPE disposal – See Appendix O .		
Dormitory/Sleeping Area		
Layout of cots/beds – see Appendix I		
Location of handwashing sinks and hand sanitizer		
Any signage needed (e.g., new arrivals, sleeping head to toe illustrations, etc.)		
Designated diaper changing area		
Management of linen		
Separation of clean versus soiled linen		
Gloves available for staff responsible for laundering		
Hand Hygiene		
Signage on how to perform hand hygiene in appropriate languages -- see Appendices J and K		
Location of sinks		

Item	Yes/No	Comment
Are sinks used for other purposes (e.g., washing clothing)? If yes, provision for cleaning afterwards		
Sufficient paper towels and soap		
Adequate number of alcohol-based hand sanitizer containers for: • Entrances and exits, • Dormitory area • Isolation area • Food service areas • Dining areas		
Personal Protective Equipment (PPE)		
What is available? • Gloves • Gowns • Masks • N95 Respirators • Eye protection (goggles/face shield)		
Where is PPE stored? Is it secured/locked?		
PPE donning and doffing instruction poster – Appendix L		
Is JIT training needed for staff?		
Utilities and Environmental/Facilities Considerations – Confer with Incident Commander		
Plan for persons needing airborne pre-cautions: Is negative pressure room/area available if needed?		
Is sufficient potable water available? Confer with Incident Commander and see Water Management section		
Is water available for other uses (e.g., hand hygiene & bathing)		
Alternative provisions for water		
Adequate number of toilets: 1 per 20 clients		

Item	Yes/No	Comment
Assess & eliminate opportunities for pests to enter the shelter (e.g., standing water)		
Municipal power, generator, and appropriate fuel as needed to prevent loss of refrigeration		
Appropriate disinfectant available: • Common areas: household disinfectant with a label stating it is a sanitizer • Medical/first aid area: EPA-registered disinfectant		
Schedule for cleaning specific areas & items including: • Kitchen and dining area • Bathroom • Dormitory; cots, storage bins and other furniture • Common areas; toys and shared objects • Medical areas • Isolation/Quarantine areas		
Appendix P for toy cleaning process		
PPE available for use during cleaning		
Procedure for body fluid spill		
Is JIT training needed for cleaning staff?		
Food Safety -- Confer with Dietary Leader		
Food items stored properly		
Refrigerator and freezer temperatures monitored daily		
Prepared food held at correct temperatures. Hot - 140° F; cold - no greater than 40° F		
Food preparation surfaces are cleaned before and after use with household disinfectant with a label stating it is a sanitizer		
Waste Management		
Designated trash receptacles throughout shelter, including in areas where PPE is used		

Item	Yes/No	Comment
Regulated medical waste container as needed (isolation area, medical area)		
Provision for sharps disposal for staff and community members		
Waste disposal poster – see Appendix O		
Pet Management		
Designated area for animals – other than service animals		
Pet food and water stored properly		
Hand hygiene performed after leaving pet area		
Designated pet relief area		

JIT- Just in time

References for checklist above^{10,12,30,31}

APPENDIX C: Syndromic Surveillance Assessment/Triage Form

Name _____ Temperature: _____ (in °F)

Do you currently have any of the following symptoms?

- | Yes | No | |
|--------------------------|--------------------------|--|
| ☐ | ☐ | Cough. If yes, is your sputum bloody? ☐ Yes ☐ No |
| ☐ | ☐ | Runny nose. If yes, is your nasal drainage bloody? ☐ Yes ☐ No |
| ☐ | ☐ | Loose, watery, explosive, or unformed diarrhea stools |
| ☐ | ☐ | Bloody stools |
| ☐ | ☐ | Rash. If yes, is your rash itchy? ☐ Yes ☐ No |
| ☐ | ☐ | Night sweats |
| ☐ | ☐ | Unexplained weight loss |
| ☐ | ☐ | Stiff/sore neck |
| ☐ | ☐ | Red eye or drainage from eye(s) |
| ☐ | ☐ | Wound or lesion |
| ☐ | ☐ | General feeling of illness |
| ☐ | ☐ | Have you been hospitalized in the past 3 months? |
| ☐ | ☐ | Have you been told that you have a multidrug resistant organism? |
| ☐ | ☐ | Are you currently on any antibiotics/treatment? If yes, list: _____ |
| ☐ | ☐ | Are you a shelter worker? |
| ☐ | ☐ | Have you received any vaccinations in accordance with health department recommendations related to this event? If yes, list: _____ |

Name of person completing the form

Date

The following symptoms/conditions should be reported to a shelter worker as soon as possible:

- Cough
- Bloody nasal drainage
- Runny nose
- Loose or unformed stools
- Watery or explosive stools
- Rash
- Stiff/sore neck
- Red eye or drainage from eye(s)
- Wound or lesion
- Unexplained weight loss
- Night sweats
- General feelings of illness
(tired, body aches, headache, etc.)

APPENDIX E: Daily Infection Log Report

Today's date: _____ Time completed: _____

Completed by: _____

Reviewed by Infection Preventionist (IP)/IP designee: _____

Number of shelter clients with an infection/infectious condition within last 24 hours: _____

Trends in infectious disease-related symptoms or disease/condition:

Number of shelter clients in isolation within the shelter: _____

Number of shelter client(s) that required transfer in the past 24 hours due to an infection or infectious disease: _____

Name (optional) or initials	Age	Symptoms & date of onset	Infection-related labs pending	Disposition/notes

Notes or comments: _____

APPENDIX F: Infection Prevention Triage

This table is intended as a guideline and is not all inclusive. Standard Precautions (see [Appendix E](#)) should be used for all patient encounters.

Individuals with severe or rapidly progressive illnesses should be referred to a medical professional or facility as soon as possible.

Symptoms/Syndrome	Isolation Precaution Category ¹	Individual Placement/ Separation	Requires Medical Professional Assessment
Respiratory			
Cough, runny nose, watery eyes	Standard	None	No
Fever (Temp > 101.1°F) & cough in adults	Droplet	Cohorting; Physical distancing ²	Yes
Fever (Temp > 101.1°F) & cough in children	Droplet Contact	Cohorting; Physical distancing ²	Yes
Fever (Temp > 101.1°F) & cough with bloody sputum, and weight loss	Airborne ³	Cohorting; Physical distancing ²	Yes
Diarrhea or Vomiting			
Vomiting	Standard	Physical distancing ²	Yes
Loose or unformed stool	Standard	None	No
Watery or explosive stools, with or without blood	Contact	Cohorting; Physical distancing ²	Yes
Skin			
Fever (Temp > 101.1°F) & rash	Airborne ³	Cohorting; Physical distancing ²	Yes
Fever (Temp > 101.1°F), upper chest rash, and stiff/sore neck	Droplet	Cohorting; Physical distancing ²	Yes
Eye infections (drainage from eye)	Standard	Physical distancing ²	Yes
Draining wound/lesion	Contact	Cohorting; Physical distancing ²	Yes
Itchy rash without fever	Contact	Cohorting; Physical distancing ²	Yes

¹ If the disaster is an infectious disease disaster (bioterrorism or pandemic) and the causative disease is known, the appropriate isolation precautions for that disease should be used.

² Physical Distancing involves separating the potentially contagious person from others by a distance of at least 3 feet

³ Transfer to medical facility as soon as possible

⁴ Physical Distancing for eye infections and vomiting consists of instructing the symptomatic individual or parent (if the individual is a child) to remain with the family unit and away from other individuals in the shelter, perform frequent hand hygiene, and inform shelter workers if symptoms progress. These actions should continue until symptoms subside.

APPENDIX G: Infection Prevention/Isolation Precautions

Standard Precautions

Standard Precautions are to be used for contact with all sheltered individuals:

1. Wear appropriate personal protective equipment (PPE) when exposure to blood, body fluids, secretions or excretions of individuals is anticipated.⁴
2. Remove all PPE in the room/area that in which it was used.
3. Perform hand hygiene before and after physical contact with each sheltered individual.
4. Follow respiratory etiquette:
 - a. Instruct individuals who are coughing to wear a mask
 - b. Provide tissues for coughing individuals
 - c. Instruct individuals to cough or sneeze into the crook of their elbow or sleeve
 - d. Separate potentially infectious individuals (by at least 3 feet) from others
5. Arrange all sleeping areas (including cots) so that individuals are separated
 - a. Put 3 feet between individual sleeping areas (or cots or cribs) to prevent the spread of infections¹⁹
 - b. Use head to toe sleeping configurations for individuals (See [Appendix G](#))

Airborne Precautions

[Isolation and respiratory protection for airborne spread diseases will be very difficult to implement in shelters and will not be necessary for most disasters. These individuals should be transferred to a medical facility as soon as possible. In the very rare event that individuals must be sheltered during an infectious disease disaster (such as a hurricane or flood occurring in a community at the same time as a pandemic), community planners should consider setting up a temporary negative pressure room/area within the shelter.]

Airborne precautions are to be used for all individuals meeting the criteria for requiring airborne precautions from Appendix D OR individuals known to have a known or potentially airborne disease: Tuberculosis, Chickenpox, Measles, Smallpox, SARS CoV, and Avian Influenza. In addition to Standard Precautions, the following should be implemented:

1. Place the symptomatic individual in a private isolation room/area
 - a. An airborne infection isolation room (AIIR) should be used when available
 - i. A single patient room that is equipped with special air handling and ventilation capacity that meets the American Institute of Architects/Facility Guidelines Institute (AIA/FGI) standards for AIIRs (i.e., monitored negative pressure relative to the surrounding area, 12 air exchanges per hour for new construction and renovation and 6 air exchanges per hour for existing facilities, air exhausted directly to the outside or recirculated through HEPA filtration before return)³²
 - b. Temporary negative pressure rooms/areas can be developed using published guidelines and are permitted by federal and state codes for temporary, emergency needs.³³ Shelter planners should refer to the Minnesota Department of Health's *Airborne Infectious Disease Management: Methods for Temporary Negative Pressure Isolation*³³ manual for detailed instructions and guidance.
2. Keep the door closed/area separated and the symptomatic individual in the isolation area/room
3. Cohort individuals with the same syndrome
4. Wear respiratory protection
 - a. Wear N95 respirator or higher level when working within 3 feet of the symptomatic individual
 - b. See Respirator section for guidance on how to proceed when N95s are limited
5. Perform hand hygiene before and after contact with the symptomatic individual

Droplet Precautions

Droplet precautions are to be used for all individuals meeting the criteria for requiring droplet precautions from Appendix D OR individuals known to have a respiratory droplet spread disease: Meningitis, Seasonal Influenza, Pneumonic Plague, and Pertussis. In addition to Standard Precautions, the following should be implemented:

1. Separate the symptomatic individual
 - a. Place in a private/isolation room/area
 - b. Maintain a spatial separation from non-infected individuals.
 - c. Keep the symptomatic individual in the isolation area/room.
2. Wear respiratory protection
 - a. Wear surgical/procedure mask when working within 3 feet of the symptomatic individual
 - b. See Mask section for guidance on how to proceed when masks are limited
3. Cohort individuals with the same syndrome.
4. Perform hand hygiene before and after contact with the individual
5. Infected individuals should be instructed to wear a surgical/procedure mask if they are outside the isolation room/area and/or around susceptible individuals.

Contact Precautions

Contact precautions are to be used for all individuals meeting the criteria for requiring contact precautions from Appendix D OR individuals known to have an infectious disease spread by direct or indirect contact: infection from a multidrug resistant organism (MRSA, VRE, etc.), *C. difficile* diarrhea, Smallpox, scabies, lice, uncontrollable vomiting/diarrhea, and/or wound drainage that cannot be contained by a dressing. In addition to Standard Precautions, the following should be implemented:

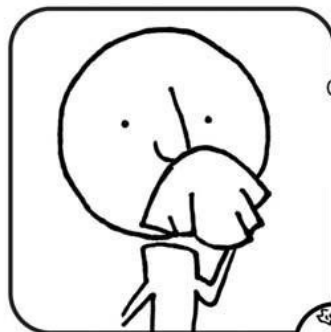
1. Separate the symptomatic individual
 - a. Place in a private room/area
 - b. Maintain a spatial separation from non-infected individuals.
 - c. Keep the symptomatic individual in the isolation area/room.
2. Wear personal protective equipment when entering the room/area to give care to symptomatic individuals.
 - a. A PPE/patient care gown
 - i. See Gown section for guidance on how to proceed when gowns are limited
 - b. Wear gloves when entering the isolation room/area.
 - i. See Gloves section for guidance on how to proceed when gloves are limited
3. Cohort individuals with the same syndrome.
4. Perform hand hygiene before and after contact with the individual

APPENDIX H: Respiratory Etiquette Poster

Available at: <https://www.health.state.mn.us/people/cyc/hcpposter.html>

Stop the spread of germs that make you and others sick!

Cover your Cough



Cover your mouth
and nose with a
tissue when you
cough or sneeze

or
cough or sneeze into
your upper sleeve,
not your hands.

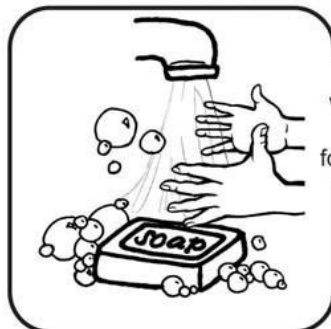


Put your used tissue in
the waste basket.



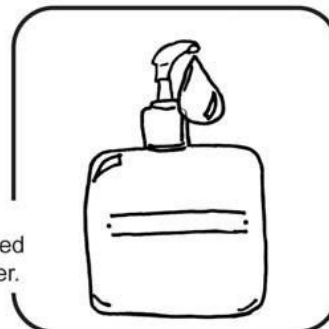
Clean your Hands

after coughing or sneezing.



Wash hands
with soap and
warm water
for 20 seconds

or
clean with
alcohol-based
hand cleaner.



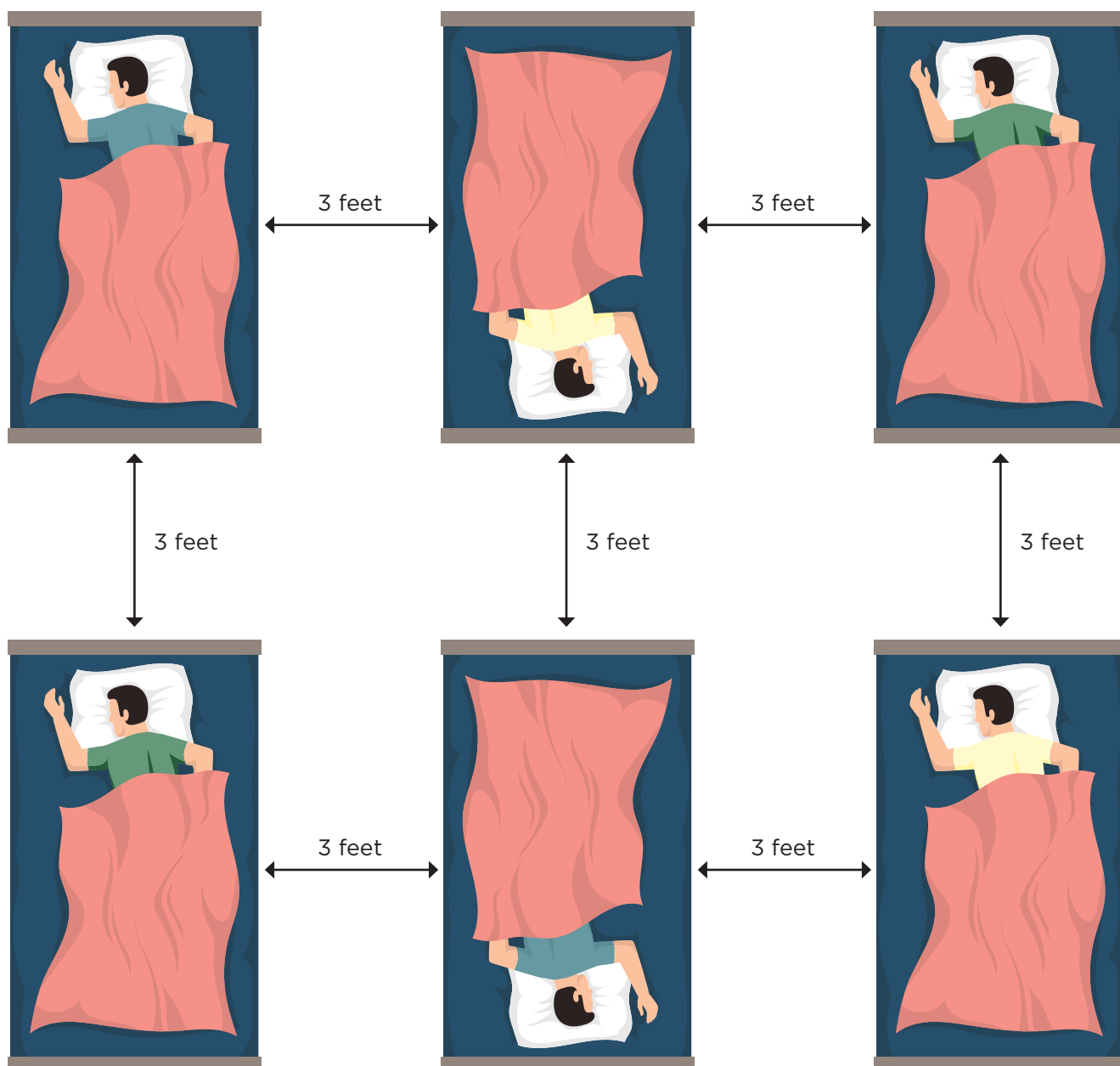
Minnesota Department of Health
717 SE Delaware Street
Minneapolis, MN 55414
612-676-5414 or 1-877-676-5414
www.health.state.mn.us



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Resistance
Collaborative



APPENDIX I: Cot or Sleeping Area Configuration to Reduce the Risk of Disease Spread



APPENDIX J: Hand Hygiene Techniques

Alcohol Based Hand Sanitizer*

Alcohol based hand sanitizer products do not require water for use and are the preferred method of hand hygiene when hands are not visibly dirty.

Procedure for using alcohol-based hand sanitizer:

1. Apply product to the palm of one hand using the following approximate amounts:
 - a. Liquid gel: dime-sized amount
 - b. Foam: egg-sized amount
2. Rub hands together
3. Rub the product over all surfaces of hands and fingers until hands are dry
 - a. Failure to cover all surfaces of the hands and fingers will greatly reduce the efficacy of alcohol-based hand sanitizer

*Alcohol-based products should not be used in situations involving an outbreak of *C. difficile* or after exposure to *Bacillus anthracis*. The physical action of washing and rinsing hands under such circumstances is recommended because alcohols, chlorhexidine, iodophors, and other antiseptic agents have poor activity against spores.³⁴

It should be noted that alcohol-based hand sanitizer products are not effective on hands that are visibly dirty or those contaminated with organic materials. Hands that are visibly dirty or contaminated with organic material must be washed with soap and water, even if alcohol-based hand sanitizer products are to be used as an adjunct measure.

Handwashing

Handwashing involves the use of soap and water.

Procedure for Handwashing:

1. Wet your hands with clean running water and apply soap*
2. Rub hands together to make lather and scrub all surfaces for 15-20 seconds, making sure you clean:
 - a. Under your nails
 - b. Around your wrists
 - c. In between your fingers
3. Rinse hands well under running water
4. Dry your hands with a paper towel or air dryer
5. If possible, use your paper towel to turn off the faucet
6. If possible, use paper towel to open bathroom door
7. Dispose of paper towel

*Plain soap should be used for handwashing unless otherwise indicated. If bar soap is used, it should be kept on racks that allow drainage of water. If liquid soap is used, the dispenser should be replaced or cleaned and filled with fresh product when empty; liquids should not be added to a partially full dispenser.

Hand Hygiene using Antimicrobial-Impregnated Wipes (i.e., towelettes)

Antimicrobial-impregnated wipes are not as effective as alcohol-based hand sanitizer products or hand washing in reducing bacterial counts on the hands; therefore, they are not a substitute for the hand hygiene procedures described above. However, if hand hygiene supplies start to dwindle, antimicrobial-impregnated wipes (i.e., towelettes) may be considered as an alternative or as an adjunct to the use of alcohol-based hand sanitizer or handwashing.

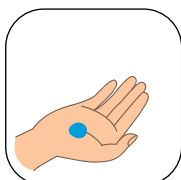
Wash Your Hands: *The Right Way!*



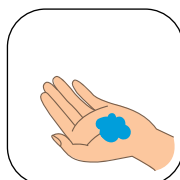
Alcohol-Based Hand Sanitizer*

Procedure for using alcohol-based hand sanitizer:

- 1 Apply product to the palm of one hand using the following approximate amounts:



Gel: dime-sized amount



Foam: egg-sized amount

- 2 Rub hands together until hands are dry, water is not required

**Alcohol-based products are preferred in all cases except for visibly dirty hands, during an outbreak of C. difficile, or after exposure to Bacillus anthracis*

With either method, be sure to cover all surfaces of the hands and fingers including:



Under your nails



Around your wrists



In between your fingers

Handwashing

Procedure for Handwashing:



1

Wet your hands with clean running water and apply soap



2

Rub hands together to make lather and scrub for 15-20 seconds



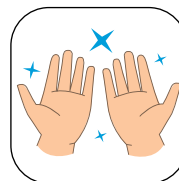
3

Rinse hands well under running water



4

Dry your hands with a paper towel or air dryer



5

If possible, use paper towel to turn off the faucet and open bathroom door

APPENDIX L: PPE Posters from the CDC³⁵

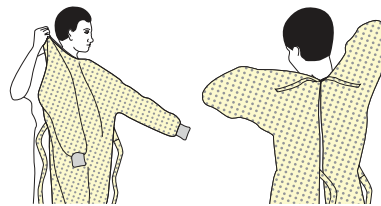
Putting on PPE: Available at: <https://www.cdc.gov/hai/pdfs/ppe/ppe-sequence.pdf>

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



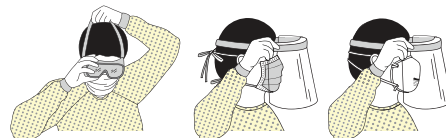
2. MASK OR RESPIRATOR

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator



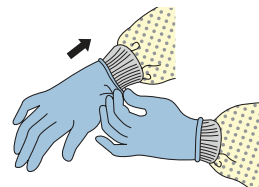
3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit



4. GLOVES

- Extend to cover wrist of isolation gown



USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene



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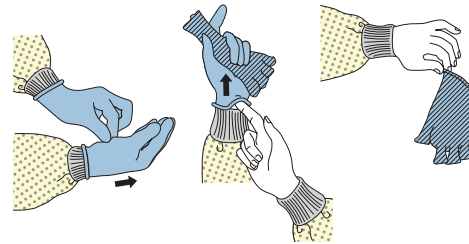
Removing PPE: Available at: <https://www.cdc.gov/hai/pdfs/ppe/ppe-sequence.pdf>
Remove PPE at doorway before leaving patient room or in anteroom; remove respirator outside of room

HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE) EXAMPLE 1

There are a variety of ways to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. Here is one example. **Remove all PPE before exiting the patient room** except a respirator, if worn. Remove the respirator **after** leaving the patient room and closing the door. Remove PPE in the following sequence:

1. GLOVES

- Outside of gloves are contaminated!
- If your hands get contaminated during glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Using a gloved hand, grasp the palm area of the other gloved hand and peel off first glove
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist and peel off second glove over first glove
- Discard gloves in a waste container



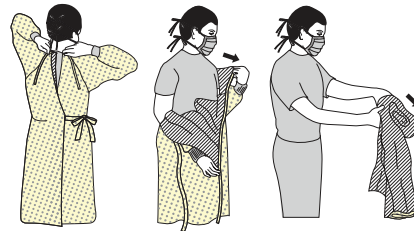
2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield are contaminated!
- If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Remove goggles or face shield from the back by lifting head band or ear pieces
- If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in a waste container



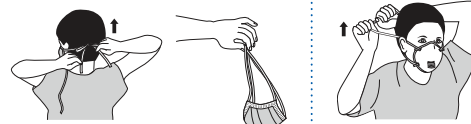
3. GOWN

- Gown front and sleeves are contaminated!
- If your hands get contaminated during gown removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Unfasten gown ties, taking care that sleeves don't contact your body when reaching for ties
- Pull gown away from neck and shoulders, touching inside of gown only
- Turn gown inside out
- Fold or roll into a bundle and discard in a waste container

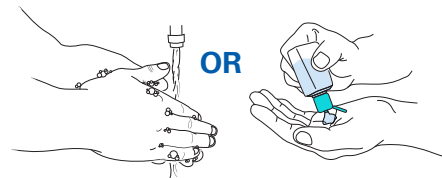


4. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — **DO NOT TOUCH!**
- If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front
- Discard in a waste container



5. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE



**PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS
BECOME CONTAMINATED AND IMMEDIATELY AFTER
REMOVING ALL PPE**



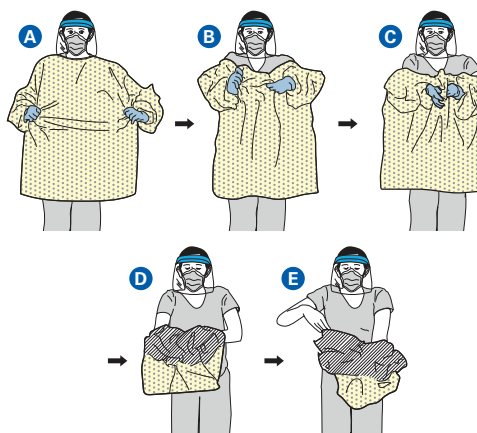
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HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE) EXAMPLE 2

Here is another way to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. **Remove all PPE before exiting the patient room** except a respirator, if worn. Remove the respirator **after** leaving the patient room and closing the door. Remove PPE in the following sequence:

1. GOWN AND GLOVES

- Gown front and sleeves and the outside of gloves are contaminated!
- If your hands get contaminated during gown or glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp the gown in the front and pull away from your body so that the ties break, touching outside of gown only with gloved hands
- While removing the gown, fold or roll the gown inside-out into a bundle
- As you are removing the gown, peel off your gloves at the same time, only touching the inside of the gloves and gown with your bare hands. Place the gown and gloves into a waste container



2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield are contaminated!
- If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Remove goggles or face shield from the back by lifting head band and without touching the front of the goggles or face shield
- If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in a waste container

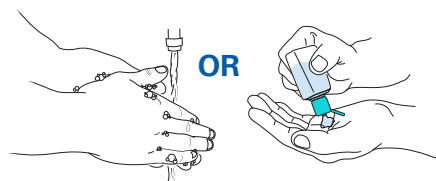


3. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — **DO NOT TOUCH!**
- If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front
- Discard in a waste container



4. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE



**PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS
BECOME CONTAMINATED AND IMMEDIATELY AFTER
REMOVING ALL PPE**



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APPENDIX M: Water Decontamination Methods³⁶

Boiling water

If you don't have safe bottled water, you should boil water to make it safe. Boiling is the surest method to make water safer to drink by killing disease-causing organisms, including viruses, bacteria, and parasites.

You can improve the flat taste of boiled water by:

- Pouring it from one clean, disinfected container to another and then allowing it to stand for a few hours OR
- Adding a pinch of salt for each quart or liter of boiled water

Steps for boiling cloudy water

- Filter it through a clean cloth, paper towel, or coffee filter, OR allow it to settle.
- Draw off the clear water.
- Bring the clear water to a rolling boil for 1 minute (at elevations above 6,500 feet, boil for 3 minutes).
- Let the boiled water cool.
- Store the boiled water in clean, sanitized containers with tight covers.

Steps for boiling clear water

- Bring the clear water to a rolling boil for 1 minute (at elevations above 6,500 feet, boil for 3 minutes).
- Let the boiled water cool.
- Store the boiled water in clean, sanitized containers with tight covers.

Disinfecting water if boiling is not an option

If you don't have clean, safe, bottled water and if boiling is not possible, you often can make water safer to drink by using a disinfectant, such as unscented household chlorine bleach, iodine, or chlorine dioxide tablets. These can kill most harmful organisms, such as viruses and bacteria. However, only chlorine dioxide tablets are effective in controlling more resistant organisms, such as the parasite *Cryptosporidium*.

Note: If the water is contaminated with a chemical, adding a disinfectant will not make it safe to drink.

To disinfect water using bleach:

Bleach comes in different concentrations. Check the container label for information about the concentration of bleach you are using before using it to disinfect drinking water. Typically, unscented household liquid chlorine bleach in the U.S. will be between 5% and 9% sodium hypochlorite, though concentrations can be different in other countries.

If your water is cloudy:

1. Filter water through a clean cloth, paper towel, or coffee filter, OR allow it to settle, then draw off the clear water and follow the steps below.

If your water is clear:

1. Follow the instructions on the bleach label for disinfecting drinking water.
2. If the necessary instructions are not given, add a little less than 1/8 teaspoon (8 drops or about 0.5 milliliters) bleach for each gallon of clear water (or 2 drops of bleach for each liter or each quart of clear water).
3. Stir the mixture well.
4. Let it stand for at least 30 minutes before using.
5. Store the disinfected water in clean, sanitized containers with tight covers.

To disinfect water to control for resistant organisms using chlorine dioxide tablets: Follow the manufacturer's instructions. Store the disinfected water in clean, sanitized containers with tight covers.

Water filters

Many portable water filters can remove disease-causing parasites, such as *Cryptosporidium* and *Giardia* from drinking water.

- If you are choosing a portable water filter, try to pick one that has a filter pore size small enough to remove both bacteria and parasites (absolute pore size of 1 micron or less). Most portable water filters do not remove bacteria or viruses.
- Carefully read and follow the manufacturer's instructions for the water filter. After filtering, add a disinfectant such as iodine, chlorine, or chlorine dioxide to the filtered water to kill any viruses and remaining bacteria.

APPENDIX N: Well Water Disinfection³⁷

Disinfection of Bored or Dug Wells

Bored and dug wells can be difficult to disinfect because their shallow depth and inadequate protection from flood water can allow contaminants to re-enter the well.

IMPORTANT: Bored or dug wells contaminated with fuel or toxic chemicals will not be made safe by disinfection. If your water smells like fuel or has a chemical odor, contact your local, state, or tribal health department for specific advice.

Follow these steps to disinfect bored or dug wells:

1. If the well has an electrical pump, turn off all electricity and clear debris from around the top of the well.
2. Repair the electrical system and pump if needed. Contact a qualified electrician, well contractor, or pump contractor if you are not experienced with this type of work.
3. Start the pump and run water until it is clear. Use the outside faucet closest to the well to drain potentially contaminated water from the well and keep unsafe well water out of the interior household plumbing. If there isn't a pump, bail water from the well with a bucket until water is clear.
4. If the well is connected to interior home plumbing, close valves to any water softener unit.
5. Use Table 1 to determine the amount of liquid household bleach needed to disinfect the well. Use only unscented bleach.
6. Using a 5-gallon bucket, mix the bleach from Table 1 with 3-5 gallons of water (12-19 liters).
7. Add the bleach water mixture to the well. Avoid all electrical connections. Attach a clean hose to an outside faucet and use it to circulate water back into the well for thorough mixing. If there isn't a pump, mix water by pouring it back into the well using a bucket.
8. Rinse the inside of the well casing with a garden hose or bucket for 5-10 minutes.
9. Open all faucets inside the home and run the water until you notice a strong odor of chlorine (bleach) at each faucet. Turn off all faucets and allow the solution to remain in the well and plumbing for at least 12 hours.
10. After at least 12 hours, attach a hose to an outside faucet and drain the chlorinated water onto an area without plants or vegetation, such as a driveway. Continue draining until the chlorine odor disappears. Avoid draining into open sources of water (streams, ponds, etc.).
11. Turn on all indoor faucets and run water until the chlorine odor disappears.

Until well water has been tested, boil it (roiling boil for 1 minute) before using or use another alternative water source. Wait at least 7-10 days after disinfection, then have the water in your well tested. Water testing cannot be done until all traces of chlorine have been flushed from the system.

Table 1: Bored or Dug Well: Approximate Amount of Bleach Needed for Disinfection

Depth of Water	Diameter of Well					
	0.5 foot	1 foot	2 feet	3 feet	4 feet	5 feet
10 feet	1/2 cup	1-3/4 cups	7 cups	1 gal	1-3/4 gal	2-3/4 gal
20 feet	1 cup	3-1/2 cups	14 cups	2 gal	3-1/2 gal	5-1/2 gal
30 feet	1-1/2 cups	5-1/4 cups	1-1/4 gal	3 gal	5-1/4 gal	8-1/4 gal
40 feet	2 cups	7 cups	1-3/4 gal	4 gal	7 gal	11 gal
50 feet	2-1/2 cups	8-3/4 cups	2-1/4 gal	5 gal	8-3/4 gal	13-3/4 gal

Disinfection of Drilled or Driven Wells

Follow these steps to disinfect drilled or driven wells:

1. If the well is equipped with an electrical pump, turn off all electricity and clear debris from around the top of the well.
2. Repair the electrical system and pump if needed. Contact a qualified electrician, well contractor, or pump contractor if you are not experienced with this type of work.
3. Start the pump and run water until it is clear. Use the outside faucet closest to the well to drain potentially contaminated water from the well and keep unsafe well water out of the interior household plumbing. If there isn't a pump, bail water from the well with a bucket or other device until the water is clear.
4. If the well is connected to interior home plumbing, close valves to any water softener units.
5. Use Table 2 to determine the amount of liquid household bleach needed to disinfect the well. Use only unscented bleach.
6. Using a 5-gallon bucket, mix the bleach from Table 1 with 3-5 gallons of water (12-19 liters).
7. Remove the vent cap.
8. Pour the bleach water mixture into the well using a funnel. Avoid all electrical connections. Attach a clean hose to the nearest outside faucet and use it to circulate water back into the well for thorough mixing.
9. Rinse the inside of the well casing with a garden hose or bucket for 5-10 minutes.
10. Open all faucets inside the home and run the water until you notice a strong odor of chlorine (bleach) at each faucet. Turn off all faucets and allow the solution to remain in the well and plumbing for a minimum of 12 hours.
11. After at least 12 hours, attach a hose to an outside faucet and drain the chlorinated water onto an area without plants or other vegetation, such as a driveway. Continue draining until the chlorine odor disappears. Avoid draining into open sources of water (streams, ponds, etc.).
12. Turn on all indoor faucets and run water until the chlorine odor disappears.

Until well water has been tested, boil it (rolling boil for 1 minute) before using or use another alternative water source. Wait at least 7-10 days after disinfection, then have the water in your well sampled. Water sampling cannot be done until all traces of chlorine have been flushed from the system.

Table 2: Drilled or Driven Well: Approximate Amount of Bleach Needed for Disinfection

Depth of Water	Diameter of Well Casing						
	2 Inches	4 Inches	6 Inches	8 Inches	10 Inches	24 Inches	36 Inches
10 feet	3/4 tbsp	3-1/4 tbsp	1/2 cup	3/4 cup	1-1/4 cups	7 cups	1 gal
20 feet	1-1/2 tbsp	6-1/2 tbsp	1 cup	1-1/2 cups	2-1/2 cups	14 cups	2 gal
30 feet	2-1/4 tbsp	9-3/4 tbsp	1-1/2 cups	2-1/4 cups	3-3/4 cups	1-1/4 gal	3 gal
40 feet	3 tbsp	13 tbsp	2 cups	3 cups	5 cups	1-3/4 gal	4 gal
50 feet	3-3/4 tbsp	1 cup	2-1/2 cups	3-3/4 cups	6-1/4 cups	2-1/4 gal	5 gal
100 feet	7-1/2 tbsp	2 cups	5 cups	7-1/2 cups	12-1/2 cups	4-1/2 gal	10 gal

APPENDIX O: Disposal of Waste Generated in a Shelter

Adapted from University of Virginia Health System Checklist*

All Regulated Medical Waste (RMW) should be placed in a red bag or container, or the bag/container should be labeled as RMW.

Type of Waste	Disposal Method
Sharps: Needles, lancets, staples, intravenous catheters, protected sharps, syringes with or without attached needles, scissors, blood vials, etc.	Sharps container 
Non-sharp material or devices: (i.e., bandages, swabs, or gauze) saturated or caked with blood/body fluids that would release blood/body fluid in a liquid or semi-liquid state if compressed or would flake if handled.	Red bag container 
Specimens of blood, body fluids, and their containers	
Urinary catheters/bags with blood	
Typical consumer waste (food packaging, clothing, paper products, cot/mattress)	Regular trash can 
Used personal hygiene products: facial tissues, diapers, blue pads, facial tissues, sanitary napkins, tampons	
Non-sharp disposable surgical instruments and materials/devices without blood contamination (e.g., vaginal speculums)	
IV tubing and bags, without blood or sharps	
Emptied containers: urine or stool cups, Foley & ostomy bags, bedpans, urinals, emesis basins, suction canisters, and tubing, etc.	
Gowns, gloves, masks unless covered with blood that would ooze or flake if compressed	
Isolation Room Waste*: Not meeting other red bag criteria: see footnote	
Liquid Human Waste: urine, sputum, blood, etc.	Toilet/dirty sink – not hand-washing sink (use splash precautions)

When in doubt about non-sharp contaminated waste, place it in the red bag container

If there is no red bag container in the room, place red bag waste in a plastic bag and carry it to the red bag container, typically placed in the soiled utility room/area.

ALL waste from individuals suspected of having exposure to or infection with bioterrorism agents should be managed as red bag waste.

*Isolation status **does not** affect Red Bag Waste protocol: regular trash from an isolation room is still regular trash, unless it involves feces from a patient experiencing gastroenteritis-like symptoms.

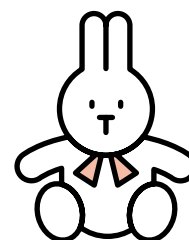
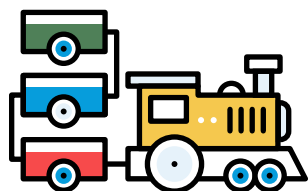
*Note: State disposal methods may vary

APPENDIX P: Toy Cleaning Poster

TOY ALERT: Sharing Toys Can Spread Germs



Reduce the
chances of
your child
becoming ill



Hard Toys:

*Cleaning and
Disinfecting*

What: Electronics,
plastic trucks or
other toys, blocks, or
action figures.

When: Before the toy
is shared.

How: Using soap and
water or a household
cleaning product, make
sure all surfaces are
clean, then wipe or
air-dry.

*Keep disinfectant out of
reach of children.*

Mouthed Toys:

*Toys that children have
placed in their mouths
or were sneezed or
coughed on*

Set aside until the toy
can be cleaned.

How: Using soap and
water, make sure all
surfaces are clean, then
wipe or air-dry. Next,
clean with a household
cleaning product, then
rinse with water. Wipe
or air dry.

*Keep disinfectant out of
reach of children*

Soft or Plush Toys:

*Do not share soft/plush
toys (stuffed animals,
cloth dolls, etc.) unless
they can be cleaned
and disinfected (i.e.,
washed) before sharing.*

How: Launder accord-
ing to manufacturer's
instructions. Use the
warmest appropriate
water setting and dry
items completely.