



Infection Prevention and Control for Shelters During Disasters*

Prepared by:

2007/2008 APIC Emergency Preparedness Committee

Lead Author:

Terri Rebmann, PhD, RN, CIC

Secondary Authors:

Rita Wilson, BS, CLS, MT(ASCP), CIC; Sharon Alexander, MPH, BSN, MT(ASCP), CIC; Michael Cloughessy, BSEH, CIC; Dianne Moroz, RN, MS CIC, CCRN; Barbara Citarella, RN, BSN, MS, CHCE; Barbara Russell, RN, MPH, CIC; Bill Coll, M.Pub.Aff, LP; Sue LaPointe, RN, MEd, CIC; Bill Wagner, ScD, CHCM, CHSP; Michael Olesen, BS, MPHc, CIC; Veronica Urdaneta, MD, MPH

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



Spreading knowledge.
Preventing infection.™

Photos from FEMA Photo Library: Top right & bottom left photo: FEMA/Win Henderson. Left middle photo: FEMA/Andrea Booher. Photos from FEMA Photo Library: Top right & bottom left photo: FEMA/Win Henderson. Left middle photo: FEMA/Andrea Booher.

Table of Contents

Section	Page
Introduction.....	4
Overview.....	5
Definition of a Shelter.....	6
Planning for Infection Prevention and Control in Shelters.....	6
Infection Control Coverage.....	7
Triage and Surveillance Procedures.....	8
Syndromic Surveillance.....	8
Immunization.....	9
Post Discharge Surveillance.....	9
Infection Control Triage.....	9
Transfer to a Healthcare Facility.....	10
Isolation Precautions.....	10
Isolation Area.....	10
Placement of Individuals.....	11
Hand Hygiene.....	11
Hand Hygiene Technique.....	12
Hand Hygiene Signage.....	12
Personal Protective Equipment (PPE).....	12
Gloves.....	13
Gowns.....	13
Masks and Respirators.....	14
Shortage of Respirators.....	16
Shortage of Masks.....	16
Sexually Transmitted Diseases.....	17
Water Management.....	17
Water Usage.....	17
Water Collection and Storage.....	17
Water Decontamination.....	18
Water from Local Reservoirs, Lakes, and Rivers.....	18
Well Water.....	18
Food Safety.....	19
Safe Handling of Human Food.....	20
Safe Handling of Pet Food.....	20
Waste Management.....	20
Regular Trash.....	20
Regulated Medical Waste.....	21
Environmental Decontamination.....	21
Selection of Cleaning/Disinfection Agents.....	22
Cleaning Body Fluid Spills.....	23
Cleaning Environmental Surfaces.....	23
Cleaning Cots/Mattresses.....	24
Toys.....	24

Toy Selection.....	24
Handling and Cleaning Communal Toys	24
Frequency of Toy Cleaning and Disinfection.....	25
Procedure for Cleaning Toys of Non-Infected/Well-Appearing Children	25
Procedure for Cleaning Toys of Infected/Isolated Children.....	26
Handling and Cleaning of Non-Communal Toys.....	26
Pest Management.....	27
Pet Management.....	27
Post-Mortem Care.....	28
References.....	29
Appendices.....	
Appendix A: List of Infection Prevention and Control Equipment/Supplies Needed for Shelters	32
Appendix B: Syndromic Surveillance Assessment/ Triage Form.....	34
Appendix C: Syndromic Surveillance Poster	35
Appendix D: Infection Control Triage	36
Appendix E: Infection Control/Isolation Precautions	37
Appendix F: Respiratory Etiquette Poster.....	40
Appendix G: Cot or Sleeping Area Configuration to Reduce the Risk of Disease Spread	41
Appendix H: Hand Hygiene Techniques.....	42
Appendix I: Hand Hygiene Poster.....	44
Appendix J: PPE Usage Posters from CDC	45
Appendix K: Water Decontamination Methods	47
Appendix L: Well Water Disinfection.....	48
Appendix M: Disposal of Waste Generated in a Shelter Posters	50
Appendix N: Toys in Shelters	52

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 health care services, which can introduce the risk of infection transmission. In addition, the close 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 was seen following Hurricane Katrina.

To reduce the risk of secondary disease transmission in shelters, shelter staff must implement appropriate infection prevention and control measures. These measures must become part of the emergency preparedness planning and training scenarios for communities. Whenever possible, standard infection control 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 be possible. In the interim, emergency response procedures must be implemented to protect displaced individuals and staff in shelters. During planning, communities should select shelter equipment that will be easy to clean and disinfect.

This document consists of planning recommendations/guidance that can be used for preparedness and response to potential emergencies involving infection control issues in shelters. It 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 infection prevention and control professionals will be involved in community shelters, but resources may not allow this. Therefore, this document was written with the assumption that a non-infection prevention and control professional would be implementing the recommendations. Recommendations are divided into sections based on components of an infection prevention and control 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 infection prevention and control 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 are currently developing guidelines that address various aspects of setting up and running a shelter. These APIC recommendations hope to address the unique infection prevention and control needs of shelters and should be used in conjunction with planning documents for shelters developed by the Centers for Disease Control and Prevention, 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 they 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. A multi-disciplinary approach, including infection control professionals, healthcare epidemiologists, public health professionals, facility engineering professionals, and others, should be utilized to apply these recommendations to the response plans. As with all disaster preparedness initiatives, these infection prevention and control interventions should be tested during routine disaster exercises and drills. Exercising includes 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 infection prevention and control principles are fundamental, this document is not intended for existing shelters used for identified populations (homeless, abused individuals, etc). It 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 have been decontaminated, if necessary by the event, prior to arrival. Other documents address procedures for human decontamination and will not be addressed in this document.^{1,2,3}

Shelters that are set up during disasters are considered temporary and are not expected to administer healthcare services in the traditional sense. However, triage and infection prevention and control 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 infection prevention and control 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 infection prevention and control 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, decreasingly effective interventions can be implemented, but should only be used when standard practices cannot be achieved. This document outlines both standard practices and decreasingly effective interventions.

This document serves as the basis for setting up an infection prevention and control program in shelters to prevent the spread of common communicable diseases. Some diseases or conditions, such as smallpox or viral hemorrhagic fever, require more intensive interventions than the standard procedures described in this document. Furthermore, infection control recommendations can change during a disaster as more is known about the causative agent and/or situation. 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 infection prevention and control 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 in regards to infection prevention and control recommendations for shelters. During an infectious disease disaster, all possible steps must be taken to prevent the sheltering of individuals. Crowded conditions in a shelter would likely contribute to infection spread 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 D & E). This is most important if the causative agent is believed to be spread via the airborne route, such as avian influenza, smallpox, and viral hemorrhagic fever agents. 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 full and resources allow. These additional infection prevention and control measures, namely airborne precautions consisting of

negative air flow and the use of high-level respiratory protection (see Appendix E), will not be necessary for the vast majority of 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 infection prevention and control 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 infection control 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. Infection prevention and control 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 infection control in shelters; they 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 be improved as new lessons are learned and new research findings become available. Updating and implementing the key elements of infection prevention and control 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 infection prevention and control strategies in shelters. Other existing documents should be referenced for more general recommendations regarding resources needed to run a shelter.⁴

Infection Control Coverage

Whenever possible, an infection control professional (ICP) 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 ICP can assist in developing a needs assessment and identifying surveillance needs, performing surveillance, monitoring infection control practices on-site, and intervening during potential infectious disease outbreaks. If ICP coverage is not feasible, an ICP 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.

Triage and Surveillance Procedures

Syndromic Surveillance

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

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

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

Formal assessments (see Appendix B) should be conducted by the following individual(s) in descending order by preference:

- Healthcare professional on-site
- Designated, trained shelter worker
- Sheltered individual who volunteers or is identified by shelter worker as a leader.

Informal/unwritten assessments (i.e., passive surveillance) can be used in lieu of formal written assessments (such as using Appendix B 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 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 C.⁵ Community planners should develop and have these posters available as part of their preparedness efforts.

The results of the formal assessments/triage (i.e., active surveillance) and passive surveillance (self-reported symptoms between screenings) should be reviewed by the ICP/ICP designee on-site and reported to the Incident Commander or Director of the shelter if deemed necessary. The ICP/ICP 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 rates of illness identified through syndromic surveillance should be investigated by the ICP/ICP 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 B: Syndromic Surveillance Assessment/ Triage Form) upon admittance to the shelter or on their first day of work and encouraged to receive any disaster-specific vaccines, such as Tetanus or Influenza, offered by the health department or designee. Whenever possible, shelter workers should be brought up to date according to the adult immunization schedule as outlined by the CDC’s Advisory Committee on Immunization Practices or in accordance with public health recommendations on all immunizations before starting work in the shelter.

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 administration should be documented and proper follow-up of vaccinated individuals should occur in collaboration with local public health officials.

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.

Infection Control 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/syndromes may indicate that an individual has a communicable disease. These syndromes and corresponding appropriate infection control interventions for these syndromes are outlined in Appendix D.

Transfer to a Healthcare Facility

The on-site ICP or ICP designee should communicate the infected individual's disease status and the need for precautions to the facility lead or incident command. They maintain 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.

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.⁶ Appendix E provides a quick reference on isolation categories and interventions that should be implemented in shelters. Appendix F provides a poster explaining Respiratory Etiquette that can be posted within shelters to help educate sheltered individuals and shelter staff.⁷

Isolation Area

The shelter should have a designated isolation area for potentially infectious 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
- In certain situations, such as sheltered individuals infected with respiratory droplet or airborne spread diseases, additional precautions may need to be taken to ensure the isolation area has controlled air movement.
 - See Appendix E 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.

- o Assign dedicated shelter staff (e.g., healthcare workers when available, housekeeping, custodial) to provide care for potentially infectious individuals and restrict these staff from working with non-infectious individuals in the shelter (Cohorting)
- o Dedicate an entrance(s) or passageway(s) for infectious individuals when feasible⁸. This promotes separation as well as the ability to triage those who have been working with potentially infectious patients.

Placement of Individuals

Individual placement within the shelter should be determined by review of the Syndromic Surveillance Assessment/ Triage Form (Appendix B) and the Infection Control Triage results (Appendix D). 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 E).

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 G).

Hand Hygiene

The most important measure 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. Alcohol Based Hand Rubs (ABHR), which include a variety of waterless alcohol-based hand hygiene products such as gels, foams, and liquids and are the preferred method for hand hygiene when hands are not visibly soiled.

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. Hand hygiene is crucial following contact with a symptomatic individual. Instructions for performing hand hygiene are included in Appendix H. 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 vomit, fecal accidents, or other body fluid spills
- After cleaning and disinfecting environmental surfaces
- 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 Rubs) 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 H.

Hand Hygiene Signage

Hand Hygiene notices/signs should be posted at all shelter entrances, washrooms and hand hygiene stations. See Appendix I 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. Choose PPE based on the procedure you are performing and the mode of transmission of potential agents (see Appendices D & E).⁶ 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.⁶

Different diseases require different types of PPE based on how the agent is transmitted.⁶ 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 D outlines syndromes for which additional precautions are needed. Appendix E outlines the appropriate PPE for each of the isolation categories.

Gloves

Gloves are the most commonly used type of PPE. In shelters, non-sterile gloves should be worn when handling sheltered individuals’ clothing or 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:⁶

- 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 your 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 and perform hand hygiene immediately after removing your gloves
- 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.⁶

Gowns

An isolation/procedure gown should be used when splashing or spraying of clothes or the body with blood or body fluids is anticipated.⁶

Recommendations for gown use:⁶

- 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 infectious 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.⁹ 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. In contrast, respirators (usually an N95 or higher level respirator) are designed to protect a person from breathing in very small particles, which might contain viruses or bacteria. They fit tightly against the face so that most of the air inhaled goes through the filtering material.⁹

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 E). 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 recommendations⁸:

- If re-useable elastomeric respirators are used, these respirators must be decontaminated according to the manufacturer's instructions after each use
- Powered air purifying respirators (PAPRs) may be considered for shelter workers stationed in the isolation area.
 - 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, use, and take off 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 so as 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 checks processes are outlined by the manufacturer
 - Remove and dispose of the respirator or surgical/procedure mask (See Appendix J)
 - Respirator or surgical/procedure mask should be discarded after use (i.e., after 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

In the event of an actual shortage of N-95 or higher level respirators¹⁰:

- First priority should be given to shelter or healthcare workers performing aerosol-generating procedures (i.e., intubations, nebulizer treatments to asthmatic children, or suctioning for people with chronic respiratory conditions)
- Second priority should be given to shelter or healthcare workers providing direct care involving close contact (within 3 feet) of coughing individuals and cohorted areas.
- Reuse the respirator as long as possible
 - The respirator must be discarded if it becomes obviously soiled or damaged (e.g., creased or torn)
 - The respirator must be discarded if the wearer has difficulty breathing
- Workers assigned to the isolation or cohorting area should be instructed to keep the respirator on while in the isolation area, and avoid removing or manipulating the device
- If supplies of N-95 or higher level respirators become unavailable, an FDA-approved healthcare surgical/procedure mask may be used
 - Choose a tight-fitting surgical/procedure mask
 - Use a surgical/procedure mask that can be tied tightly or have elastic straps
 - Ear loop masks do not form a seal and are therefore less preferred than tight-fitting masks
 - Surgical/procedure masks do not offer appropriate respiratory protection against small infectious particle aerosols (i.e., droplet nuclei) and should only be used if respirators are not available.

Shortage of Surgical/Procedure Masks

In the event of actual shortage of FDA-approved healthcare surgical/procedure masks¹⁰:

- First priority should be given to shelter or healthcare workers performing aerosol-generating procedures (i.e., intubations, nebulizer treatments to asthmatic children, or suctioning for people with chronic respiratory conditions) and cohorted areas¹⁰:
- Reuse the FDA approved healthcare surgical/procedure mask as long as possible
 - The mask must be discarded if it becomes wet or dirty with secretions, obviously soiled, or damaged (e.g., creased or torn)
 - The mask must be discarded if the wearer has difficulty breathing
- Workers assigned to the isolation area should be instructed to keep the surgical/procedure mask on while in the isolation area, not removing or manipulating the device
- If supplies of FDA-approved healthcare surgical/procedure masks become absolutely unavailable there should be recognition that:

- o Controversies exist regarding how to proceed when supplies of N-95 or higher level respirators and FDA-approved healthcare surgical/procedure masks or even FDA-approved respirators for public health emergencies, intended for general public use are depleted/unavailable. This is why these issues should be clearly reviewed, discussed, and planned for prior to setting up a shelter.
- o Review of the scientific literature identified one published letter that details construction of a handmade, reusable cotton mask. This type of mask may provide some level of protection, based on anecdotal and/or limited evidence.^{9,11-13} No recommendation can be made but decision makers should be aware of such potential resources.
- o No evidence about the effectiveness of non-FDA-approved masks (fabric masks or masks intended to filter dust and mist from wood, metal, and masonry work) in preventing infectious disease spread has been found in the literature to date. As such, no recommendation for their use can be made.¹⁰

Because this is an area of ongoing research, shelter planners must remain vigilant about assessing the scientific literature for current findings and share with all disciplines involved in setting up and staffing local, regional, and state shelters.

Sexually Transmitted Diseases

Sexually transmitted diseases could possibly be spread within the shelter. Consideration should be given to provide 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.¹⁴ Only infection control 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 followed¹⁵:

- 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
- 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 added¹⁶
- Swimming pool or spa water can be utilized for hygienic purposes, but not for consumption.

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 K.

Water from Local Reservoirs, Lakes, and Rivers

Water from local streams or lakes should be considered contaminated and water from these sources 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. The well water should be tested before used for consumption. Testing and

decontamination of well water requires at least 48 – 72 hours, so other water sources (see Water Decontamination section) should be used in the interim.¹⁷

- If the water has a chemical or fuel odor, it should not be used until the contamination in the well has been removed
- Remove floating debris from water using a grappling hook, net or long-handled scoop
- If sand or silt are present, remove the well pump and clean it before use
- Scrub the sides of the well using a chlorine solution [1 teaspoon unscented household chlorine bleach (5.25% sodium hypochlorite) with 1 cup water] then rinse with clean water.
- Empty polluted water from well by pumping or bailing until the water is clear
- Decontaminate the well water using a chlorine solution [See Appendix L.] Pour the chlorine solution down the well in a circular pattern, ensuring contact with all sides of the well.
- If possible, place a garden hose that is connected to an outside faucet into the well and run the water for 15 minutes to mix the chlorine solution properly.
- For wells connected to a plumbing system:
 - Open all faucets and pump water until you notice a strong odor of chlorine at each faucet. When chlorine is smelled at each faucet, stop the pump and allow the chlorine solution to sit in the well and plumbing system for the proper time. [See Appendix L.] If no chlorine is smelled after 15 minutes, increase the amount of chlorine used the first time and repeat the procedures.
 - After the chlorine solution has sat in the well for the recommended period, turn on the pump, attach a hose to an outside faucet, and direct the water to a designated area away from the well, water tanks, and streams. Run the water until the chlorine smell disappears.
- For wells with no plumbing system:
 - Pump or remove water in buckets until the chlorine odor disappears.
- Well water from a disinfected well should be tested before consumption. Wait at least 48 hours after well disinfection to test the water. Water testing for coliform and either *E. coli* or fecal coliform bacteria should be performed in conjunction with local health officials.
- Retest the well water 2 – 4 weeks after disinfection.

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. Dieticians and sanitarians services should be coordinated and made available through local and state public health agencies and/or community emergency management. Only infection control issues specific to 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 food¹⁸:

- Store in a dark, dry, cool site well sealed to the outside to prevent pest and vermin attraction
 - Store human and pet food separately¹⁹
- Store off the floor by a minimum of 4 inches
- Symptomatic shelter workers should not prepare or serve food (see Syndromic Surveillance section)
- Refrigerate perishable food when possible
 - Monitor refrigerator/freezer temperature to ensure proper storage (refrigerator: 38 – 40⁰ F; Freezer: ≤ 0⁰ F)
 - Plan for temperature degradation
- Prepared hot food must be kept at 140⁰ F
- Prepared cold food should be kept at ≤ 45⁰ F
- Leftovers should be used within 4 days or discarded²⁰
- Discard any food that requires refrigeration that has been kept at room temperature for ≥ 2 hours²⁰
 - Discard any food that has been kept ≥ 1 hour in a room above 90⁰ F²⁰.

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:

- Pet food should be stored similarly to human food¹⁹
- Store human and pet food separately¹⁹
- Leftover wet pet food should be refrigerated promptly or discarded¹⁹
- Pet food bowls, dishes and scooping utensils should be washed with soap and hot water after each use¹⁹
- Do not use the pet food bowl to scoop out food; use a clean, dedicated scoop or spoon¹⁹
- Perform hand hygiene after handling pet food¹⁹

Waste Management

Regular Trash

Adequate trash receptacles should be available and emptied regularly to ensure they do not become overfilled. 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. 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.*²¹

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 M 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, the more stringent regulation should be followed.

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. In the event that 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 and adding a simple bleach solution to render them non-infectious before disposal as regular solid waste (following consultation with state and local regulators).

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 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 it becomes wet. 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 hurricane²²

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 particular area. Guidelines on proper cleaning and disinfection are available through existing documents.²³ 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
- Isolation.

Shelter workers should be provided 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 disinfection agent used to clean shelters should be an EPA-registered chemical disinfectant.¹¹ EPA-registered disinfectants should be used in accordance with manufacturer's recommendations in regards to dilution and contact time.²³

- In most cases, an EPA-registered quaternary ammonium compound is adequate for cleaning environmental surfaces²⁴

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 contact time when the product is used. Manufacturer's recommendations should always be followed to ensure proper disinfection of the environment.^{23,25}

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 less offensive fumes associated with their use.

If EPA-registered disinfectant and/or bleach solution supplies start to dwindle, commercially available cleaners may be substituted.

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 followed²¹:

- 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 M)
- Clean the area with cloth or paper towels moderately wetted with an EPA-registered disinfectant
- 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 and assorted bedding should be cleaned and laundered between occupants and as needed when contaminated with body fluids
 - 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
- Isolation area 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 M].

Toys

In shelters, 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.¹ Shelters should have a designated play area for children. Children and parents/guardians should perform hand hygiene before entering and when leaving the common play area.²⁶ The following recommendations will reduce the risk of disease transmission related to toys in shelters.

Toy Selection

If toys will be provided by a shelter for use by children, the shelter should have a written plan for toy storage, monitoring and cleaning and shelter staff will need to be trained on these procedures.

- Preference should be given to toys with non-porous surfaces that are less likely to become contaminated and can be easily cleaned, disinfected and dried.^{6,26}
- Avoid crib mobiles, soft/stuffed toys, hand-held electronic games, and wooden and blow toys because they are difficult to clean, disinfect and dry.²⁷
- Avoid bath or other toys that retain water because they can harbor germs.⁶
- 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.²⁶

Handling and Cleaning Communal Toys

The ability to maintain communal toys safely in a shelter demands that staff are assigned to monitor the common play area and toys, and implement cleaning and disinfection protocols. Toys that are able to be cleaned and disinfected between uses may be shared/exchanged between

children in the shelter (i.e., community toys) if cleaned between each use. Soft/stuffed animals and cloth dolls should not be shared/exchanged between children in the shelter.²⁷ The sharing of hand-held electronic games and wooden toys should be discouraged as they are difficult to clean.

Communal/shared toys should be handled using the following recommendations:

- Two toy boxes should be made and labeled appropriately: One box for clean toys and one for dirty toys that need to be cleaned
 - If toy boxes are not available, a clean and dirty area for toys should be designated within the shelter to segregate clean from dirty toys
- After use, toys should be placed in the dirty toy box or segregated area
- All toys in the dirty toy box or dirty toy area should be cleaned before next use
- All toys should be examined by a shelter worker after each use
 - If toy is broken or unable to be cleaned, it should be discarded
- Routine cleaning of books, crayons and board games is impractical. Any of these items that become visibly soiled should be discarded and any child found having contact with the item via mouth should be given the item. The book/crayons/game should not be shared
- Magazines and other dated reading materials should be replaced at least monthly with new materials, or when visibly soiled
- 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 N for an example of an educational poster about toys.

Frequency of Toy Cleaning and Disinfection²⁷

- Communal toys (e.g., wall-mounted and table-mounted toys, computer keyboards, mouse and monitors) should be cleaned at least daily and when obviously soiled²⁸
- Toys of diapered children should be cleaned daily or when visibly soiled
- Toys of nondiapered children should be cleaned weekly or when visibly soiled
- Toys that are routinely placed in children's mouths, or are otherwise contaminated with body secretions, should be placed in the dirty toy box or segregated area after use²⁷

Procedure for Cleaning Toys of Non-Infected/Well-Appearing Children²⁷

- Small toys may be wiped with a 70% alcohol swab and allowed to air dry. Rinsing with water is not necessary.

Toys that will not be damaged by immersion should be cleaned as follows:

- Clean in a dishwasher or the hot cycle of a washing machine²⁷
 - Standard dishwasher or washing machine detergents may be used

If a dishwasher or washing machine is not available:

- Hand wash with a soap and water wash using dishwashing soap
 - Scrub the toy in warm, soapy water
 - Use a brush or dishcloth to reach into the crevices and remove soil

- Rinse with clean water
- Air dry or dry with a clean cloth

After cleaning is accomplished, toys should be disinfected using the following guidelines:

- Spray or wipe the toy with an EPA registered disinfectant, ensuring all surfaces are wet for one minute²⁶
- Allow toys to air dry or dry with a clean cloth
- Toys that are likely to be mouthed by infants and toddlers should be rinsed with clean water after they are disinfected to remove the potential of chemical residue remaining on the toy (and thus be accidentally ingested) and then air dry or dry with a clean cloth.^{26,29}

Toys that would be damaged by immersion (keyboards, computer mice, hand-held electronic games, wind-up toys, etc)²³:

- Wipe with a 70% alcohol wipe/towelette, wiping and keeping the surface wet for 5 seconds
- Allow to air dry
 - Note: Alcohol wipes may damage the outside of electronic toys

Procedure for Cleaning Toys of Infected/Isolated or Ill Children²⁷

Children with symptoms of contagious diseases (see the Infection Control Triage Form, Appendix D) should not be allowed in common play areas until they are no longer symptomatic or considered non-contagious per a medical professional.²⁶ 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 must be thoroughly cleaned and disinfected before sharing with other children. Follow the same procedures to clean and disinfect toys for an infected/ill child that you would cleaning/disinfecting the toys of a non-infected/well-appearing child. 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.

Handling and Cleaning Non-Communal Toys²⁷

Non-communal toys are those that are brought to the shelter by an individual child/family, those that cannot be shared due to the construction of the toy (i.e., fabric), or all toys in shelters that do not have designated communal toy handling and cleaning/disinfection protocols. Non-communal toys should be monitored and cleaned by the parent/guardian of the child possessing the toy.

Non-communal/shared toys should be handled using the following recommendations:

- Parents/guardians should discourage the sharing of toys between children unless the toy has been cleaned

Non-communal toys that will be shared between children should be handled using the following recommendations:

- Follow the same procedures to clean non-communal toys that will be shared between children as you would cleaning the toys of a non-infected/well-appearing child.
- Non-communal toys that will be shared between children do not require disinfection.

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; others 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 following²⁴:

- Eliminate food sources for pests (see the Food Safety section)
- Eliminate areas for nests, burrows, or breeding grounds
- 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.³⁰ 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 1990.²³
- All pets, except service dogs/animals, should be housed in a separate location⁴
 - Pets should be screened for current vaccination status³⁰
 - 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 parasites³⁰
 - 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)³⁰
 - Children ≤ 5 years of age should not handle reptiles without adult supervision and should perform hand hygiene after doing so³⁰
 - Anyone bitten, scratched, or otherwise hurt by an animal should be referred to a healthcare provider for assessment³⁰
 - Sheltered individuals should be instructed to not share food with their pets nor allow pets to lick their faces³⁰
- Sheltered individuals should perform hand hygiene after visiting their pet in the pet shelter³⁰

- Pet food should be stored in a similar manner as human food (see Food Safety section)¹⁹
- Drinking water for pets should be stored in a similar manner as water for human consumption (see Water Management section).

Post-Mortem Care

Procedures for handling of the deceased are dictated by local and state regulations³¹; 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 a dead body; exceptions to this include smallpox and tuberculosis.^{32,33,34} Standard Precautions (see Appendix E) should be used when preparing the bodies of dead individuals for mortuary care to decrease the risk of infection transmission.^{31,35} Autopsies pose a high risk for infection transmission³⁵ and should not be performed in shelters. Shelter workers should coordinate post-mortem care with community, state, and federal disaster planning groups, including Disaster Mortuary Operational Response Teams (DMORT), local medical examiners, and coroners.³⁵

References

- ¹California Emergency Medical Services Authority. (2005). Patient decontamination recommendations for hospitals. Retrieved November 25, 2007 from: http://www.tvfr.com/Dept/em/dnld/EMSA_Recommendations_0705.pdf
- ²WebMD. (2006). CBRNE – chemical decontamination. Retrieved November 25, 2007 from: <http://www.emedicine.com/emerg/topic893.htm>
- ³U.S. Army. (2006). Patient evacuation and decontamination. Chapter X in *Mutliservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination*. Retrieved November 25, 2007 from: <https://atiam.train.army.mil/soldierPortal/atia/adlsc/view/public/22662-1/FM/3-11.5/chap10.htm>
- ⁴International Association of Assembly Managers, Inc. (2006). Mega-Shelters. Planning and activation. Retrieved June 12, 2007 from: http://www.iaam.org/members/Sec_pages/Mega-ShelterPlanning&Activation.pdf
- ⁵Centers for Disease Control and Prevention. (2005). Infection control recommendations for prevention of transmission of respiratory illnesses in evacuation centers. Retrieved November 11, 2007 from: <http://www.bt.cdc.gov/disasters/disease/pdf/respiratoryic.pdf>
- ⁶Siegel, J. D., Rhinehart, E., Jackson, M., Chiarello, L., and the Healthcare Infection Control Practices Advisory Committee. Guideline for isolation precautions: Preventing transmission of infectious agents in healthcare settings 2007. Retrieved July 3, 2007 from: <http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Isolation2007.pdf>
- ⁷Centers for Disease Control And Prevention. (2003). Cover your cough. Retrieved November 27, 2007 from: http://www.cdc.gov/flu/protect/pdf/covercough_school8-5x11.pdf
- ⁸U.S. Department of Health and Human Services. (2006). Interim guidance on planning for the use of surgical masks and respirators in health care settings during an influenza pandemic. Retrieved November 11, 2007 from: <http://www.pandemicflu.gov/plan/healthcare/maskguidancehc.html>
- ⁹U.S. Food and Drug Administration. (2007). Respirators for public health emergencies. J Retrieved June 12, 2007 from: <http://www.fda.gov/consumer/updates/respirators061107.html>
- ¹⁰Association for Professionals in Infection Control and Epidemiology. (In press). Reuse of respiratory protection in prevention and control of epidemic- and pandemic-prone acute respiratory diseases (ARD) in healthcare.
- ¹¹Dato, V. M., Hostler, D., & Hahn, M. E. (2007). Simple respiratory mask. *Emerging Infectious Diseases*, 12(6), 1033-1034.
- ¹²U.S. Department of Health and Human Services. (2007). Interim public health guidance for the use of facemasks and respirators in non-occupational community settings during an influenza pandemic. Retrieved November 11, 2007 from: <http://www.pandemicflu.gov/plan/community/commaskguidance.pdf>
- ¹³World Health Organization. (2004). Advice for people living in areas affected by bird flu or avian influenza. Retrieved November 27, 2007 from: http://www.who.int/csr/disease/avian_influenza/guidelines/advice_people_area/en/index.html
- ¹⁴Federal Emergency Management Agency. (2007). Guidelines for managing water supplies. Retrieved August 30, 2007 from: <http://www.fema.gov/plan/prepare/watermanage.shtm>
- ¹⁵Centers for Disease Control and Prevention. (2005). Keep food and water safe after a natural disaster or power outage. Retrieved November 11, 2007 from: <http://www.bt.cdc.gov/disasters/pdf/foodwater.pdf>

- ¹⁶Centers for Disease Control and Prevention. (2003). Emergency water storage and purification. Retrieved November 11, 2007 from: <http://www.bt.cdc.gov/disasters/earthquakes/food.asp>
- ¹⁷Centers for Disease Control and Prevention. (2006). Disinfecting wells following an emergency. Retrieved November 11, 2007 from: <http://www.bt.cdc.gov/disasters/pdf/wellsdisinfect.pdf>
- ¹⁸U.S. Department of Agriculture. Food Safety and Inspection Service. (2006). Handling food safely. Retrieved November 19, 2007 from: http://www.fsis.usda.gov/fact_sheets/Basics_for_Handling_Food_Safely/index.asp
- ¹⁹U.S. Food and Drug Administration. (2007). Safe handling tips for pet foods and treats. Retrieved February 27, 2008 from: <http://www.fda.gov/consumer/updates/petfoodtips080307.html>
- ²⁰US Department of Agriculture Food Safety and Inspection Service. (2006). Safe food handling. Basics for handling food safely. Retrieved November 20, 2007 from: http://www.fsis.usda.gov/PDF/Basics_for_Safe_Food_Handling.pdf
- ²¹Occupational Safety and Health Administration. Bloodborne pathogens standard: 1910.1030. Retrieved November 11, 2007 from: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051
- ²²Centers for Disease Control and Prevention. (2006). Mold prevention strategies and possible health effects in the aftermath of hurricanes and major floods. *Morbidity and Mortality Weekly Report*, 55(RR08), 1-27.
- ²³Centers for Disease Control And Prevention. (2003). Guidelines for environmental infection control in health-care facilities: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). *Morbidity and Mortality Weekly Report*, 52, 1-43.
- ²⁴Chou, T. (2005). Environmental services. In R. A. Carrico (Ed.). *APIC Text of Infection Control and Epidemiology* (2nd ed., Chapter 102, pp. 102-1 – 102-12). Washington DC: Association for Professionals in Infection Control and Epidemiology, Inc.
- ²⁵U.S. Environmental Protection Agency. (2007). Selected EPA registered disinfectants. Retrieved November 20, 2007 from: <http://epa.gov/oppad001/chemregindex.htm>
- ²⁶Centers for Disease Control and Prevention. (2005). Guidelines for shelter play areas. Retrieved December 11, 2007 from <http://www.bt.cdc.gov/disasters/hurricanes/katrina/shelterplayareas.asp>
- ²⁷American Academy of Pediatrics, American Public Health Association. (2002). Caring for our children. National health and safety performance standards: Guidelines for out-of-home child care. (2nd ed., pp 104-111). Retrieved December 6, 2007 from: <http://nrc.uchsc.edu/CFOC/PDFVersion/National%20Health%20and%20Safety%20Performance%20Standards.pdf>
- ²⁸Rutala, W. A., White, M. S., Gergen, M. F., and Weber, D. J. (2006). Bacterial contamination of keyboards: efficacy and functional impact of disinfectants. *Infection Control and Hospital Epidemiology*, 27, 372-377.
- ²⁹Cordell, R. L., and Solomon, S. L. (2004). Infection acquired in child care facilities. In C.G. Mayhall (Ed), *Hospital Epidemiology and Infection Control* (3rd ed., pp885-909). Philadelphia, PA: Lippincott, Williams and Wilkins.
- ³⁰Centers for Disease Control and Prevention. (2005). Animals in public evacuation centers. Retrieved February 27, 2008 from: <http://www.bt.cdc.gov/disasters/animalspubevac.asp>
- ³¹Pfeiffer, J. (2005). Postmortem care. In R. A. Carrico (Ed.). *APIC Text of Infection*

Control and Epidemiology (2nd ed., Chapter 109, pp. 109-1 – 109-6). Washington DC: Association for Professionals in Infection Control and Epidemiology, Inc.

³²Borio, L., Inglesby, T., Peters, C. J., Schmaljohn, A. L., Hughes, J. M., Jahrling, P. B., et al. (2002). Hemorrhagic fever viruses as biological weapons. Medical and public health management. *Journal of the American Medical Association*, 287(18), 2391-2405.

³³Kirkis, E. J. (2006). A myth too tough to die: The dead of disasters cause epidemics of disease. *American Journal of Infection Control*, 34 (6), 331 – 334.

³⁴Centers for Disease Control and Prevention. (2002). Smallpox response plan and guidelines. Version 3.0. Retrieved April 4, 2003 from: <http://www.bt.cdc.gov/agent/smallpox/response-plan/index.asp>

³⁵Nolte, K. B., Hanzlick, R. L., Payne, D. C., Kroger, A. T., Oliver, W. R., et al. (2004). Medical examiners, coroners, and biologic terrorism: A guidebook for surveillance and case management. *Morbidity & Mortality Weekly Report*, 53(RR-8), 1-27.

³⁶Boyce, J. M. (2002). Guideline for hand hygiene in health-care settings. *Morbidity and Mortality Weekly Report*, 51(RR16), 1-44.

³⁷Centers for Disease Control and Prevention. (2005). Infection control guidance for community evacuation centers following disasters. Retrieved November 11, 2007 from: <http://www.bt.cdc.gov/disasters/pdf/commshelters.pdf>

³⁸Rebmann, T. (2005). Management of individuals infected with airborne-spread diseases: An algorithm for infection control professionals. *American Journal of Infection Control*, 33, 571-579.

³⁹Minnesota Department of Health (MDH). Airborne infectious disease management manual: Methods for temporary negative pressure isolation. Retrieved February 29, 2008 from: <http://www.health.state.mn.us/oep/training/bhpp/isolation.html>

APPENDIX A

List of Infection Prevention and Control Equipment/Supplies Needed for Shelters

Other supplies and equipment will be required for shelter functioning. The items included on this list are specific to infection prevention and control and should be supplemental to traditional supplies needed to run a shelter.

- 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 (N-95 or equivalent)
 - Masks (surgical/procedure masks)
 - Gowns (patient care gowns)
 - Gloves (non-sterile procedure gloves)
 - Eye protection (goggles or face shields)
- Hand hygiene products
 - Alcohol Based Hand Rubs (ABHR) and dispensing system
 - Soap (non-antimicrobial or anti-microbial)
 - Paper towels
- Disinfectants
 - Towelettes (antimicrobial wipes)
 - Disinfectant (EPA-registered chemical germicide)
- Water Decontamination Products
 - Chlorine or iodine tablets
 - Non-scented household bleach (sodium hypochlorite)
- Wound Management Supplies
 - Dressing materials (gauze, absorbent pads, tape, etc)
- 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
 - 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
- Vaccination Supplies
 - Syringes
 - Alcohol swabs

Band-aids
Needles

Forms

Syndromic Surveillance Assessment/ Triage Form
Infection Control Triage

Informational/Educational Products/ Signage

Hand Hygiene Techniques
Respiratory Etiquette
Infection Control Precautions
Cot or Sleeping Area Configuration
Disposal of Waste in Shelters
Syndromic Surveillance Poster
Putting on and Taking Off Personal Protective Equipment

APPENDIX B

Syndromic Surveillance Assessment/ Triage Form

Name _____

Temperature: _____ (in degrees Fahrenheit)

Do you currently have of the following symptoms?

Yes No

- | | | |
|--------------------------|--------------------------|---|
| ☐ | ☐ | Cough |
| ☐ | ☐ | If you have a cough, is your sputum bloody? |
| ☐ | ☐ | Runny nose |
| ☐ | ☐ | Loose or unformed stools |
| ☐ | ☐ | Water or explosive diarrhea stools |
| ☐ | ☐ | Bloody stools |
| ☐ | ☐ | Rash |
| ☐ | ☐ | If you have a rash, is it itchy? |
| ☐ | ☐ | Stiff/sore neck |
| ☐ | ☐ | Red eye or drainage from eye(s) |
| ☐ | ☐ | Wound or lesion |
| ☐ | ☐ | Have you been hospitalized within the past 3 months? |
| ☐ | ☐ | Have you been told that you have a multidrug resistant organism (MRSA, VRE, etc)? |
| ☐ | ☐ | Are you a shelter worker? |
| ☐ | ☐ | Are you currently on any antibiotics/treatment? If Yes, list _____ |
| ☐ | ☐ | 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

APPENDIX C
Syndromic Surveillance Poster for Shelter⁵

**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
- Water or explosive stools
- Rash
- Stiff/sore neck
- Red eye or drainage from eye(s)
- Wound or lesion
- General feeling of illness
(*fatigue, body aches, headache, etc.*)

APPENDIX D

Infection Control 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 ⁰ F) & cough in adults	Droplet	Cohorting; Spatial distancing ²	Yes
Fever (Temp > 101.1 ⁰ F) & cough in children	Droplet Contact	Cohorting; Spatial distancing ²	Yes
Fever (Temp > 101.1 ⁰ F), cough with bloody sputum, and weight loss	Airborne ³	AIIR or negative pressure area/room; Cohorting; Spatial distancing ²	Yes
Diarrhea or Vomiting			
Vomiting	Standard	Social distancing ³	Yes
Loose or unformed stools	Standard	None	No
Watery or explosive stools, with or without blood	Contact	Cohorting; Spatial distancing ²	Yes
Skin			
Fever (Temp > 101.1 ⁰ F) & rash	Airborne ³	Cohorting; Spatial distancing ²	Yes
Fever (Temp > 101.1 ⁰ F), upper chest rash, and stiff/sore neck	Droplet	Cohorting; Spatial distancing ²	Yes
Eye infections (drainage from eye)	Standard	Social distancing ⁴	Yes
Draining wound/lesion	Contact	Cohorting; Spatial distancing ²	Yes
Itchy rash without fever	Contact	Cohorting; Spatial 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 Spatial 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 Social 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 E

Infection Control/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.⁶
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.³⁶
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) to prevent the spread of infections³⁷
 - 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 the majority of 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 implementing the recommendations listed below to the extent possible to create a protective environment 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, viral hemorrhagic fever, 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)¹
 - b. Temporary negative pressure rooms/areas can be developed using published guidelines and are permitted by federal and state codes for temporary, emergency needs.^{38,39}
 - i. Choose an area as far from others as possible or use a naturally segregated area (a hallway or wing separate from the rest of the facility)

- ii. Choose an area that has at least one window (The window must be > 25 feet away from air intakes, other open windows, or be more than 100 yards from another occupied building or high-risk area) to facilitate air flow
 - iii. If walls do not enclose the isolation room/area already, erect some type of enclosure. Materials should be chosen based on their permeability.
 - 1. Potential barrier materials listed in order of preference: Drywall, particle board or other wood, plastic, portable room divider/screens, hanging drapes, or bed linens
 - 2. Secure barrier material to ceiling and floor to the extent possible
 - iv. Bleed air from the isolation room/area to make it negative pressure compared to the rest of the shelter using one of the following methods listed in order of preference:
 - 1. A fixed room-air recirculation system
 - 2. Portable room-air recirculation system
 - 3. Centrifugal blower to exhaust air outside from the isolation room/area (the unit must exhaust air out through a window) [The window must be > 25 feet away from air intakes, other open windows, or be more than 100 yards from another occupied building or high-risk area]
 - 4. A specifically designed air cleaner (the unit must exhaust air out through a window) [The window must be > 25 feet away from air intakes, other open windows, or be more than 100 yards from another occupied building or high-risk area]
 - 5. Use floor and/or window fans to exhaust air outside the isolation room/area
 - a. Consult with a facilities engineer when setting up fans to create negative pressure
 - v. Do not recirculate air from the isolation room/area with the rest of the shelter unless the air is filtered prior to recirculation. Air can be filtered using one of the following methods listed in order of preference:
 - 1. Filter air from the isolation room/area using an in-duct high-efficiency particulate air (HEPA) filter system
 - 2. Filter air from the isolation room/area using a portable HEPA filter unit. The portable HEPA filter unit should be placed as close to the infected person(s) as possible, without interfering with shelter staff work flow or medical equipment in the room
 - a. Shelter workers should be told to avoid standing between the infected person and the portable HEPA unit's air intake because this can increase the shelter worker's exposure risk
- 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 N-95 respirator or higher level when working within 3 feet of the symptomatic individual
 - b. See Respirator section for guidance on how to proceed when N-95s 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:

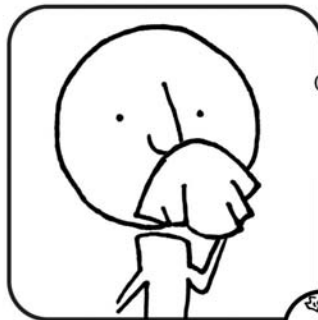
1. Separate the symptomatic individual
 - a. Place in a private room/area
 - b. Maintain a spatial separation from non-infected individuals.
 - c. Keep the symptomatic individual in the isolation area/room.
2. Wear personal protective equipment when entering the room/area to give care to symptomatic 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 F

Respiratory Etiquette Poster⁷

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.

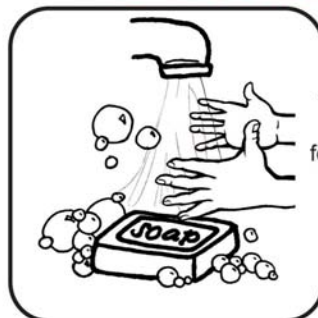


Put your used tissue in
the waste basket.



Clean your Hands

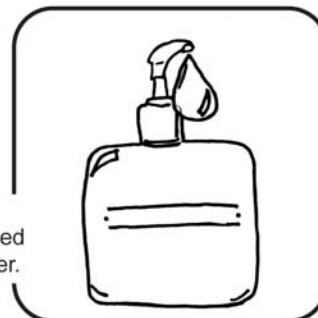
after coughing or sneezing.



Wash hands
with soap and
warm water
for 20 seconds

or

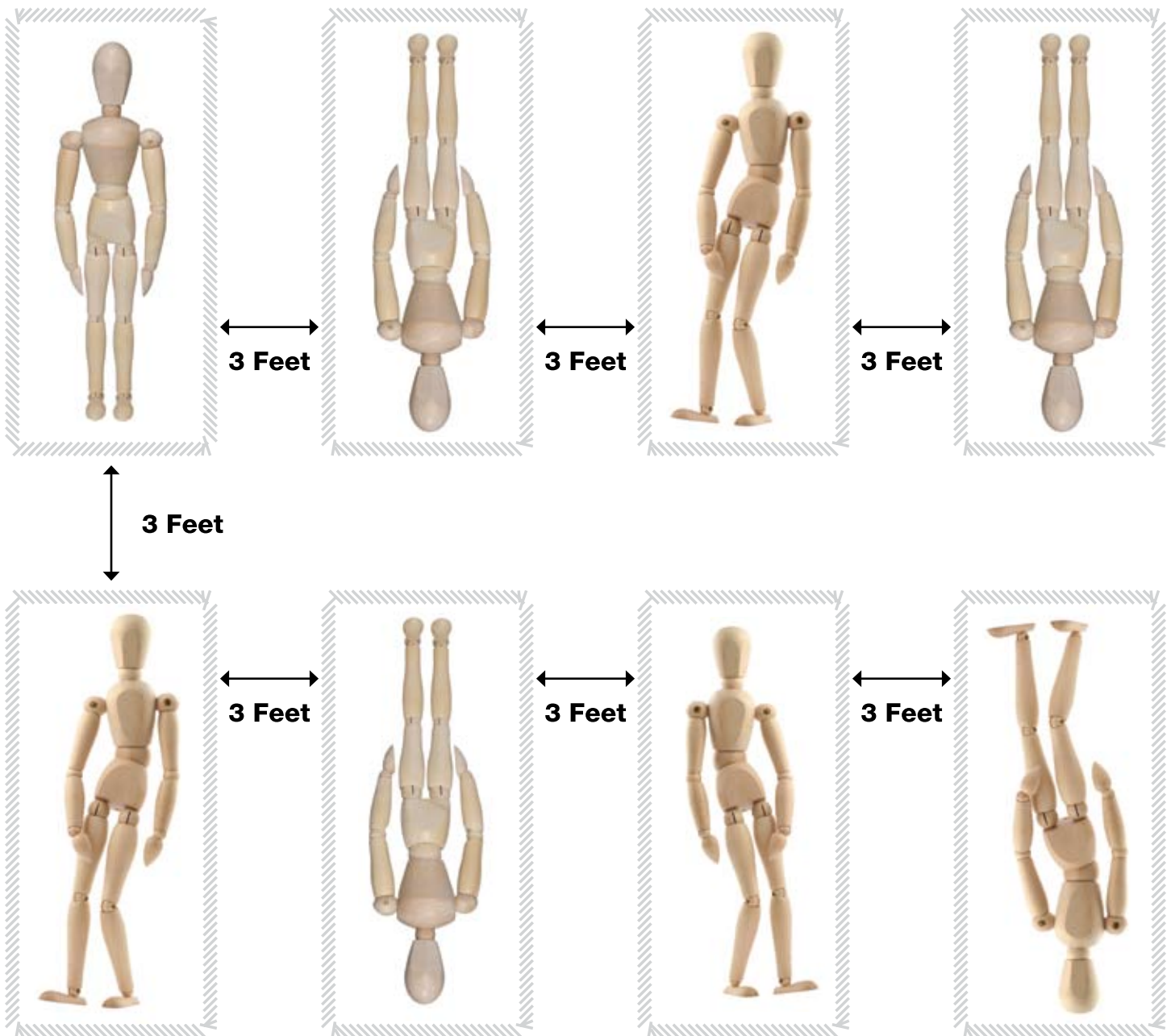
clean with
alcohol-based
hand cleaner.



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



Cot or Sleeping Area Configuration *to Reduce the Risk of Disease Spread*



APPENDIX H

Hand Hygiene Techniques

Alcohol Based Hand Rubs (ABHR)*

Alcohol Based Hand Rubs 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 Rubs:

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

* 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.³⁶

It should be noted that Alcohol Based Hand Rubs 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 Rubs 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 ABHRs 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 ABHR or handwashing.

Wash Your Hands: *The Right Way!*

Alcohol Based Hand Rubs*

Procedure for using Alcohol Based Hand Rubs:

- 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.*



Handwashing

Procedure for Handwashing:



Wet your hands with clean running water and apply soap



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



Rinse hands well under running water



Dry your hands with a paper towel or air dryer



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

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

- a. Under your nails
- b. Around your wrists
- c. In between your fingers

Putting on PPE

Type of PPE used will vary based on the level of precautions required, e.g., Standard and Contact, Droplet or Airborne Isolation Precautions

GOWN

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



MASK OR RESPIRATOR

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



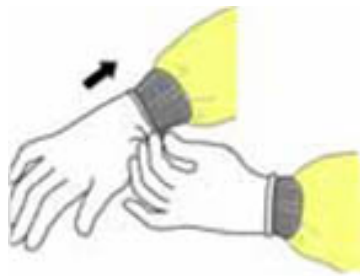
GOGGLES/FACE SHIELD

- Put over face and eyes and adjust to fit



GLOVES

- Extend to cover wrist of isolation gown



SAFE WORK PRACTICES

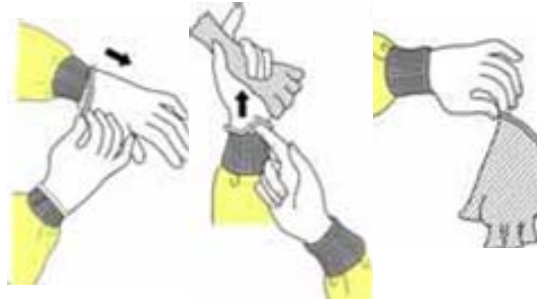
- Keep hands away from face
- Limit surfaces touched
- Change when torn or heavily contaminated
- Perform hand hygiene

REMOVING PPE

Remove PPE at doorway before leaving patient room or in anteroom; remove respirator outside of room

GLOVES

- Outside of gloves are contaminated!
- Grasp outside of glove with opposite gloved hand; peel off
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist



GOGGLES/FACE SHIELD

- Outside of goggles or face shield are contaminated!
- To remove, handle by “clean” head band or ear pieces
- Place in designated receptacle for reprocessing or in waste container



GOWN

- Gown front and sleeves are contaminated!
- Unfasten neck, the waist ties
- Remove gown using a peeling motion; pull gown from each shoulder toward the same hand
- Gown will turn inside out
- Hold removed gown away from body, roll into a bundle and discard into waste or linen receptacle



MASK OR RESPIRATOR

- Front of mask/respirator is contaminated – DO NOT TOUCH!
- Grasp bottom then top ties/elastics and remove
- Discard in waste container



PERFORM HAND HYGIENE

Immediately after removing PPE

APPENDIX K

Water Decontamination Methods

Boiling water*:

- Place water in large kettle or pot.
- Bring to rolling boil then allow to boil for one minute.¹⁵
- Cool water in a covered container before consumption.

*Boiling will not remove chemical contaminants. Water contaminated with chemicals should not be consumed.

Chemical Treatment:

- Chlorine tablets (5.25 – 6% sodium hypochlorite as the only active ingredient)
 - o Follow directions that come with the tablets¹⁵
- Iodine tablets
 - o Follow directions that come with the tablets.¹⁵
- Bleach [Unscented household chlorine bleach (5.25% sodium hypochlorite)]¹⁵:
 - o Clear water:
 - Add 1/8 teaspoon of bleach per gallon of water.
 - Mix thoroughly
 - Allow to sit for 30 minutes before consumption.¹⁶
 - o Cloudy water:
 - Add 1/4 teaspoon of bleach per gallon of water.
 - Mix thoroughly
 - Allow to sit for 30 minutes before consumption.¹⁶

APPENDIX L

Well Water Disinfection^{7**}

Amount of Chlorine Needed Per 10 Feet (3.1 Meters) of Water in Well*

Inside Diameter of Well Casing (Standard/SI)	Amount of 5.25% Sodium hypochlorite (Unscented Laundry Bleach) Standard/SI			Amount of 65% Calcium Hypochlorite (Chlorine Granules) Standard/SI		
	<i>Disinfection time for concentration of disinfectant</i>					
	100 ppm for 2 hours	50 ppm for 8 hours	25 ppm for 24 hours	100 ppm for 2 hours	50 ppm for 8 hours	25 ppm for 24 hours
1¼ inches or 3.18 cm	1/8 fluid ounces or 3.7 mL	¾ tsp or 3.7 mL	1/3 tsp or 3 mL	Not practical to use chlorine granules for these small-diameter well casings		
2 inches or 5.08 cm	½ fluid ounces or 14.79 mL	¼ fluid ounces or 7.39 mL	1/8 fluid ounces or 3.7 mL			
3 inches or 7.62 cm	1 fluid ounces or 29.57 mL	½ fluid ounces or 14.79 mL	¼ fluid ounces or 7.39 mL			
4 inches or 10.16 cm	1½ fluid ounces or 44.36 mL	¾ fluid ounces or 22.18 mL	3/8 fluid ounces or 11.09 mL			
6 inches or 15.24 cm	4 fluid ounces or 118.29 mL	2 fluid ounces or 59.15 mL	1 fluid ounces or 29.57 mL	¼ ounce or 7.09 grams	1/8 ounce or 3.54 grams	1/16 ounce or 1.77 grams
8 inches or 20.32 cm	7 fluid ounces or 118.29 mL	3½ fluid ounces or 103.51 mL	1¾ fluid ounces or 51.75 mL	½ ounce or 14.17 grams	¼ ounce or 7.09 grams	1/8 ounce or 3.54 grams
10 inches or 25.40 cm	10 fluid ounces or 295.74 mL	5 fluid ounces or 146.87 mL	2 fluid ounces or 59.15 mL	¾ ounce or 21.26 grams	3/8 ounce or 10.63 grams	3/16 ounce or 5.32 grams
12 inches or 30.48 cm	2 cups or 473.18 mL	1 cup or 236.59 mL	½ cup or 118.29 mL	1 ounce or 28.35 grams	½ ounce or 14.17 grams	¼ ounce or 7.09 grams

18 inches or 25.72 cm	4½ cups or 1.06 L	2¼ cups or 532.32 mL	1 1/8 cups or 266.16 mL	2½ ounces or 70.87 grams	1¼ ounces or 35.44 grams	¾ ounces or 21.26 grams
2 feet or 60.96 cm	7½ cups or 1.77 L	3¾ cups or	1 7/8 cups	4½ ounces or 127.57 grams	2¼ ounces or 63.79 grams	1 1/8 ounces or 31.89 grams
3 feet or 91.44 cm	17½ cups or 4.14 L	8¾ cups or 7.01 L	4 3/8 cups or 1.04 L	10 ounces or 283.5 grams	5 ounces or 141.75 grams	2 ½ ounces or 70.87 grams

Notes: 1 heaping tablespoon of 65% chlorine powder=½ ounces; 8 fluid ounces=1 cup.
cm=centimeter; L=liter; mL=milliliter; ppm=parts per million; SI=Systeme International
d'Unités (metric).

*If you are unsure about the depth of the well, make an educated guess, then increase the suggested amount of chlorine by 50%.

**Table reproduced in full from CDC (2006). Disinfecting wells following an emergency.
Available at: <http://www.bt.cdc.gov/disasters/pdf/wellsdisinfect.pdf>⁷

APPENDIX M
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	Red bag container
Urinary catheters/bags with blood	Red bag container
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	Regular trash can
Non-sharp disposable surgical instruments and materials/devices without blood contamination (e.g., vaginal speculums)	Regular trash can
IV tubing and bags, without blood or sharps	Regular trash can
Emptied containers: urine or stool cups, Foley & ostomy bags, bedpans, urinals, emesis basins, suction canisters and tubing, etc.	Regular trash can
Gowns, gloves, masks unless covered with blood that would ooze or flake if compressed	Regular trash can
Isolation Room Waste*: <i>Not meeting other red bag criteria: see footnote</i>	Regular trash can
Liquid Human Waste: urine, sputum, blood, etc.	Toilet/dirty sink – not handwashing 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 to have exposure 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

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 container	
Sharps: Needles, lancets, staples, intravenous catheters, protected sharps, syringes with or without attached needles, scissors, blood vials, etc.	
Red bag 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.	
Specimens of blood, body fluids, and their containers	
Foley catheters/bags with blood	
Regular trash can	
Typical consumer waste (food packaging, clothing, paper products, cot/mattress)	
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	
Toilet/dirty sink – not handwashing sink (use splash precautions)	
Liquid Human Waste: urine, sputum, blood, etc.	 Note: “Dirty Sink” - NOT used for handwashing

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 to have exposure 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.

*State Disposal methods may vary

APPENDIX N

TOY ALERT

Sharing Toys Can Spread Germs

To reduce the chances of your child becoming ill:

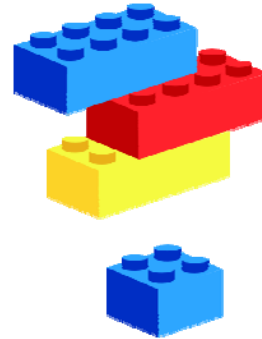
Clean toys before and after your child enjoys them. Ask a shelter manager for guidance.



Hand-held electronics



Planes, cars, trucks, etc



Plastic blocks

You may choose to avoid certain toys that cannot be cleaned

Toys you may have difficulty cleaning:



Crayons



Soft/cloth



Books or magazines



Wooden

Avoid sharing toys that cannot be cleaned

Help your child clean their hands before and after playing with toys



Wash with soap and water



Use alcohol-based hand rub