Infection Prevention for Alternate Care Sites

Prepared by:
2009 APIC Emergency Preparedness Committee
Chair: William Wagner, ScD, CHCM, CHSP, CHEP
Co-Chair: Barbara Russell, RN, MPH, CIC

Lead Authors:
Terri Rebmann, PhD, RN, CIC
Jacie Russell, MPH, CIC, CHEP

Secondary authors:
Sharon Alexander, MPH, BSN, MT(ASCP), CIC; Michael Cloughessy, MS, BSEH, REHS, CIC; Bill Coll, M. Pub.Aff, LP; Steve Hilley, RN; Sue LaPointe, RN, MSED, CIC; Dianne Moroz, RN, MS CIC, CCRN; Debra A. Novak, DSN, RN; Michael Olesen, BS, MPHc, CIC; Patricia Rosenbaum RN,CIC; Barbara Russell, RN, MPH, CIC; Kari Simonsen, MD, FAAP; William Wagner, ScD, CHCM, CHSP, CHEP; Deborah Yokoe, MD, MPH

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Infection Prevention for Alternate Care Sites

Introduction

During a disaster, large numbers of individuals may require medical care in a community. Many hospitals and healthcare agencies are currently operating at or near capacity for routine provision of care and lack the resources necessary to accommodate patient surge generated by a disaster. When hospitals and healthcare agencies cannot absorb patient flux or when the physical structure has been damaged, alternate care sites (ACS) may need to be established to meet medical care needs and permit existing healthcare systems to continue operations. ACSs are temporary healthcare facilities only, however, disasters can have a brief or long-term impact on the community’s healthcare system; ACSs will need to remain operational for as long as the situation requires. Disease transmission is possible in ACSs as it is in any setting where medical care is provided. In addition, some ACSs may provide health care services outside the controlled environment of an existing healthcare facility or in sub-optimal environments, such as warehouses, schools, or other buildings that were not originally intended to function as healthcare facilities. This can increase the risk of infection transmission.

To reduce the risk of disease transmission, ACS staff must implement appropriate infection prevention measures. These measures must become part of the emergency management planning and training scenarios for ACSs. Whenever possible, routine infection prevention practices, such as those used in hospitals, should be employed at all types of ACSs. During disasters, healthcare facilities and communities must strive for ideal conditions to further decrease the risk of disease spread, but that may not be possible. When ideal conditions cannot be met, altered infection prevention standards of care must be implemented to protect ACS patients, staff, and visitors.

This document consists of planning recommendations/guidance that can be used for preparedness and response to potential emergencies involving infection prevention issues in an ACS. It is designed to be used as a planning and reference document for emergency management planners setting up and/or running an ACS. It is hoped that infection prevention professionals will be involved in any ACS, but resources may not allow this. Therefore, this document was written with the assumption that an individual without specific infection prevention expertise would be implementing the recommendations. Recommendations are divided into sections based on components of an infection prevention program. Emergency management planners may read through the entire document when planning an ACS or use the Table of Contents to go to a specific section to use as a reference guide during a disaster.

Establishing and operating an ACS involves many disciplines, of which infection prevention is only one. As part of the planning process, hospital and community emergency management planners should coordinate with local, state, and federal planning agencies, including but not limited to healthcare institutions, emergency management, public health, Red Cross, etc. Many planning agencies are currently developing guidelines that address various aspects of setting up and running an ACS. These APIC recommendations hope to address the unique infection prevention needs of ACS and should be used in conjunction with planning documents for ACS developed by the Agency for Healthcare Research and Quality (AHRQ)¹, Department of
Veterans Affairs\(^2\), and other local, state, and federal agencies.\(^3-6\) This multidisciplinary approach must include local medical professionals to ensure proper medical care can be administered during a disaster, including treatment of chronic condition exacerbation, trauma and assessment of acute illnesses on site at the ACS or through transfer to a hospital or other medical facility.

This document does not replace nor should it be used as a substitute for a community emergency management plan for ACSs. The document should be incorporated into or used as the basis for the community emergency management plan section that addresses ACSs. The community’s emergency management plan must be coordinated with local, regional, and state plans. A multi-disciplinary approach, including infection prevention 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 emergency management initiatives, these infection prevention interventions should be tested during routine emergency management 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.

The recommendations in this document were based on published guidelines from mostly U.S. organizations and agencies, although guidelines from a few international agencies, such as the World Health Organization, were also used. This document is primarily aimed at U.S. communities developing ACSs. However, international organizations and agencies may find this document useful as a beginning framework for developing an infection prevention program for their surge facilities.

Overview

The remainder of this document consists of recommendations designed to reduce the risk of transmitting communicable diseases in ACSs. This document is not intended for existing medical facilities. It should only be used for declared disaster situations during which there are large numbers of injured or ill individuals requiring medical care that cannot be accommodated in the existing healthcare systems that provide routine care.

This document provides recommendations for handling potentially contagious individuals and implementing environmental controls within an ACS to prevent or limit the emergence or spread of communicable diseases and healthcare associated infections (HAI). HAIs are any infection that result from or are associated with obtaining healthcare. Because ACSs will administer healthcare, there is a potential for the development of HAIs. This includes the traditional use of the term HAI, which consists of infections such as catheter-related blood stream infections and ventilator associated pneumonias, as well as the transmission of communicable diseases in healthcare environments, such as the spread of hepatitis A, within the ACS.

Whenever possible, ACSs should implement routine/standard infection prevention strategies used in healthcare settings during non disaster times to control disease spread. 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 program in ACSs to prevent the transmission of HAIs and 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. Some ACSs may involve the provision of medical care in austere environments. Austere is defined as “without excess, luxury or ease; simple; limited; severe” (pg. S278). The term austerity during disasters consists of a continuum of medical care that may be provided by the ACS, depending on the amount of resources available at the facility. Medical care in austere environments has been provided by military and humanitarian relief organizations as well as during past mass casualty events, including Hurricane Katrina.

Medical care in austere environments will pose the greatest challenge for infection prevention because it is the furthest removed from the controlled environment of an established healthcare facility.

It is important to note that infection prevention recommendations can change during a disaster as more is known about the causative agent and/or situation. Community emergency managers and ACS workers should partner with local hospitals and public health agencies before and during a disaster, and follow recommendations from these agencies that are specific to the event.

**Definition of an ACS**

The definition for an ACS that will be used in this document is one developed by AHRQ. An ACS is:

> a location for the delivery of medical care that occurs outside the acute hospital setting for patients who, under normal circumstances, would be treated as inpatients. In addition, the ACS is a site to provide event-specific management of unique considerations that might arise in the context of catastrophic mass casualty events, including the delivery of chronic care; the distribution of vaccines or medical countermeasures; or the quarantine, cohorting, or sequestration of potentially infected patients in the context of an easily transmissible infectious disease (pg. 78).

The level and scope of medical service delivery within an ACS is defined by the range of patient injury or illness due to the disaster. For instance, a natural disaster will likely result in more trauma-related victims or chronic illness exacerbation as opposed to a pandemic, which would result in patients with communicable diseases. In addition, the scope of medical care provided by an ACS will depend upon the capabilities of the ACS in terms of resources available and the type of trained staff on-site. Lam et al. (2006) describe the various types of ACSs that may be used in communities during influenza pandemics. These include the following: a) overflow sites that could provide a level of care comparable to acute care hospitals, b) isolation facilities in a motel-like environment that administer little to no medical care, c) expanded ambulatory care centers for less critically ill patients than those requiring hospitalization or highly specialized treatment, d) facilities for patients recovering from illness who require care equivalent to a “step-down” unit (i.e., those who are stable and recovering well, but are not yet ready to be discharged home),
e) triage and screening sites, and f) quarantine stations/sites.\textsuperscript{11} In addition, highly specialized ACSs can be used during disasters, such as mobile surgery facilities\textsuperscript{12} and temporary dialysis centers.\textsuperscript{13} This document is based on the assumption that most ACSs will provide a middle range level of care, such as triage and screening, isolation without the need for extensive medical intervention, and care for ambulatory patients or those who are stable and recovering from illness, but are not yet ready to be discharged home. Surgery, dialysis, ventilatory support, and other procedures that require more extensive medical intervention and oversight will not be performed at the majority of ACSs. However, because some ACSs will have the capability to provide a high level of care, the recommendations in this document address the continuum between an austere setting and an ACS that can provide care similar to a hospital intensive care unit. ACSs should not attempt to perform procedures that exceed their capabilities. Individuals whose medical needs exceed that which can be provided at the ACS or those requiring specialty care should be transferred to a hospital or other appropriate medical facility as soon as feasible.

\textbf{Infection Prevention Program and Plan}

ACSs need to have an infection prevention program to monitor for communicable diseases and HAIs and prevent the spread of diseases/infection within the facility. The infection prevention program needs to include a written infection prevention plan that outlines the scope of authority (see Appendix A), infection prevention coverage for the facility, and infection prevention policies and procedures. The infection prevention plan should be based on an exposure risk assessment and taking into account the capabilities and scope of practice for the ACS. Infection prevention strategies should be included in ACS planning documents and incorporated into pre-event and/or just-in-time training opportunities for ACS staff (see the Infection Prevention Education section). Many types of resources are needed to set up and run an ACS. Appendix B outlines a list of resources/supplies needed to administer an infection prevention program in ACSs. Other existing documents should be referenced for more general recommendations regarding resources needed to run an ACS.\textsuperscript{3-6}

\textbf{Infection Prevention Coverage}

An infection preventionist should be involved in local and regional emergency management planning and thus available to be consulted as part of the planning process for an ACS. If IP coverage is not feasible, an IP designee should be identified by each ACS. The IP/IP designee should be 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. It is critical for the IP or IP designee to assist with the emergency management planning process due to the potential for infection transmission in the ACS. An IP/IP designee will be an important component of this clinical team and can assist in developing a surveillance plan, performing surveillance, monitoring infection prevention practices, and intervening during potential infectious disease outbreaks.

The IP/IP designee shall oversee the entire infection prevention program for the ACS including development of the infection prevention plan and implementation of interventions such as environmental cleaning, isolation, personal protective equipment (PPE) use, surveillance, and
Triage and Surveillance

Screening/Identifying Potentially Contagious Individuals

ACSs should develop a HAI/communicable disease assessment plan to monitor patients, visitors and staff at the site. Triage and screening will need to be much more involved for an infectious disease disaster (i.e., bioterrorism, outbreak of an emerging infectious disease, or pandemic). Natural disasters and terrorist events that do not involve a biological agent may require very little screening for infectious diseases; however, ACSs should have a program for HAI surveillance for all types of disasters. Formal assessment/screening should be conducted on patients, visitors and ACS staff to identify any potential infectious diseases or conditions before the person enters the general registration/waiting area whenever feasible. A generic assessment/screening form example to identify potentially contagious individuals is available in Appendix C. In addition, event-specific screening tools should be developed to help identify potentially contagious individuals who require isolation, such as a screening tool to identify potentially infected individuals during an influenza pandemic. Event-specific screening tools should be based on the case definition for the disease/condition involved in the incident.

Formal screening/assessment (see Appendix C) should be conducted by the following individual(s) in descending order by preference:

- Healthcare provider/professional on-site
- Designated, trained ACS worker or volunteer

Informal/unwritten assessments (i.e., passive surveillance) can be used in lieu of formal written assessments (such as using Appendix C or another such reporting tool) during disasters that involve extremely limited resources or during disasters that do not involve a biological agent (i.e., natural disasters, radiological terrorism, etc). Informal screening/assessments are not recommended as a substitute for formal assessments during infectious disease disasters (i.e., bioterrorism, an epidemic, or a pandemic).

Patients, visitors, and ACS staff should be encouraged to report symptoms of infectious diseases between formal screenings. Posters of reportable signs and symptoms/syndromes of potentially infectious diseases should be strategically located around the ACS. A poster example is provided in Appendix D. Community planners should develop and have these posters available as part of their preparedness efforts.

Frequency of Screening for Infectious/Communicable Diseases/Conditions

Patient and Visitor Screening for Infectious/Communicable Diseases/Conditions

More frequent and extensive screening for contagious diseases/conditions will be needed during an infectious disease disaster (i.e., bioterrorism, outbreak of an emerging infectious disease, or pandemic) compared to during a natural disaster or terrorist event that does not involve a
biological agent. The ACS screening protocol should be flexible and scalable to accommodate the event.

Patient and visitor screening/assessment during infectious disease disasters should occur at the following times:

- Upon arrival/admission to the ACS
- For ACSs that will provide extended care (i.e., “admission”)
  - Daily screening should be considered for all patients admitted to the ACS when resources allow
  - Periodic screenings (every second or third day, for example) may be substituted during times of limited staff resources/time
- When transferring individuals to another healthcare facility

During non-infectious disease disasters, patient and visitor screening frequency will depend upon the event. Very little screening may be required during a natural disaster unless an outbreak is identified. When an outbreak occurs during any type of disaster, patient and visitor screening should be increased to identify rapidly potentially contagious individuals and implement appropriate control measures. During outbreaks, the frequency of screening protocols outlined above for infectious disease disasters should be followed.

**ACS Staff Screening for Infectious/Communicable Diseases/Conditions**

During infectious disease disasters, ACS staff should be assessed before every shift. In addition, staff should be encouraged to self report symptoms between assessments. Symptomatic staff should be sent for a formal medical evaluation at the ACS and/or sent home. The ACS worker should cease patient care activities until they have been medically cleared to work. During non-infectious disease disasters, ACS staff screening frequency will depend upon the event (see the Patient and Visitor Screening for Infectious/Communicable Diseases/Conditions section).

**Infection Prevention Triage**

Using data from the syndromic surveillance program, screening process, patient history, and physical exam, individuals should be triaged based on their risk of being contagious. Certain symptoms/syndromes may indicate that an individual has a communicable disease/condition. These syndromes and corresponding appropriate infection prevention interventions for these syndromes are outlined in Appendix E.

**Triage Area**

A triage area with a screener (i.e., individual performing triage/assessment of incoming patients and visitors) should be set up outside the ACS or very near the entrance to the ACS. This is necessary to identify potentially contagious individuals before or as quickly as possible after they enter the actual facility. The best location for the triage area (i.e., outside the facility or just inside the entrance) will depend upon the physical layout of the ACS. For instance, tented areas set up in parking lots would benefit from conducting triage before individuals enter the tent/treatment area and would likely have the space to do so. Some buildings or spaces used as
ACSs may not be able to physically accommodate a triage area outside. In addition, environmental factors, such as weather, may necessitate indoor triage. Determining the location for the triage area should be part of the ACS’s emergency management planning process.

Infection prevention interventions for the triage area consist of the following:

- The screener should wear appropriate PPE
- PPE should be available in the triage area for the screener to distribute to patients and visitors as they enter the ACS as dictated by the infection prevention triage (see Appendices C and E)
  - PPE should be chosen based on the disease/event\(^{14,15}\)
  - Infectious disease disasters will likely require the use of more PPE than a natural disaster
- In addition to PPE, other respiratory hygiene supplies (i.e., facial tissues, trash can, and hand hygiene supplies) should be located within the triage area
- At least 3 – 6 feet should be placed between chairs in the waiting room/triage area whenever possible
- Every attempt should be made to have two separate areas for patients/visitors to keep non-infected/asymptomatic individuals apart from infected/symptomatic individuals
  - It would be best if each area had its own doorway/entrance to the ACS treatment area, but this may not be feasible in all facilities. An example might include the “well” and “sick” entrances common in pediatric medical clinics
  - If the ACS building/structure does not have two separate rooms for this, an open area/space can be physically divided into separate areas with curtains, screens, or other barriers; these types of engineering controls have been identified by the CDC as being a critical component of infection prevention
  - If no physical barrier is available, signs can be used to identify which area/space is for non-infected/asymptomatic individuals versus infected/symptomatic individuals
- The “well” and “sick” areas should be separated by at least 6 feet whenever possible
- ACSs with a single doorway/entrance to the ACS treatment area should locate the “well” side of the triage/waiting room on the side with the treatment area doorway/entrance

See Appendix F for an illustrative example of how to set up a triage area in a space that does not consist of two separate rooms for “well” versus “sick” individuals.

**Post Discharge Surveillance**

During a disaster, ACS staff should be prepared for the possibility that local public health agencies may request post-discharge surveillance for individuals who return to their homes/the community or are transferred to another healthcare facility. Post discharge surveillance should be included in community emergency management plans and should be coordinated with local response agencies, such as public health.
**Surveillance Data Analysis**

The results of the formal assessments/screening (i.e., active surveillance) and passive surveillance (self-reported symptoms between screenings) should be reviewed by the IP/IP designee on-site and reported to the Incident Commander or Director of the ACS if deemed necessary. The IP/IP designee should also report the results to the local and state health department as required in the emergency management plan for the community. Surveillance data analysis should be performed by the IP/IP designee on-site and/or reported to the local health department at least daily or more often if the situation escalates.

Increases in rates of illness identified through syndromic surveillance should be investigated by the IP/IP designee on-site and the local health department. Increasing infection rates should be handled by monitoring for compliance with sentinel measures (including hand hygiene and isolation precautions) and investigating potential sources of infection.

**Occupational Health Issues**

Healthcare staff working in an ACS may be at risk from communicable diseases and occupational exposures that can lead to infections.\(^{16}\) It may not be feasible for an ACS to have an occupational health department in the same way that hospitals would. However, ACSs need occupational health policies and procedures to prevent the spread of diseases from patients and visitors to healthcare personnel. The ACS manager should identify a trained individual who can manage occupational health services for the ACS. It may be necessary to coordinate occupational health services through a local hospital or other organization in the community. If the ACS is affiliated with a local hospital, the hospital’s occupational health policies should cover ACS staff.

**Staff Immunization, Anti-Infective Therapy, and Prophylaxis**

ACS workers should be assessed for current immunization status related to the on their first day of work. Whenever possible, ACS workers should be brought up to date according to the adult immunization schedule as outlined by the Centers for Disease Control and Prevention’s (CDC) Advisory Committee on Immunization Practices (ACIP) or in accordance with public health recommendations on all immunizations before starting work in the ACS. When resources allow, ACS staff who are not immune to vaccine preventable diseases should not care for patients with those diseases/conditions. In addition, ACS staff must receive any event-specific vaccines, such as Tetanus or Influenza, when medically appropriate and when available from the health department or designee (see the Anti-Infective Therapy, Immunization, and Prophylaxis for ACS Patients and Visitors section). The CDC indicates that these types of administrative controls are essential in preventing disease spread.

ACS staff who develop symptoms of contagious diseases should be medically evaluated and offered anti-infective therapy when indicated. Staff who have an exposure during work hours should be medically evaluated, monitored for signs/symptoms of illness, and their activity may need to be limited (activity restriction should be a joint IP or occupational health and public health decision) [See Furloughing Staff]. Staff exposures may also require the use of post-exposure
prophylaxis, depending on the event and the disease involved. Post-exposure prophylaxis guidelines should be based on information that is specific to the event/disease provided by the CDC or other organization. For some events, such as an influenza pandemic, the US Department of Health and Human Services currently recommends considering offering pre-exposure prophylaxis to high-risk healthcare workers (those with direct high-risk exposures) if resources allow. If anti-infective therapy or pre- or post-exposure prophylaxis is to be provided to ACS staff, the ACS protocols should outline who will receive it and how follow-up for these staff will be conducted. Protocols must also be developed that delineate prioritization plans for limited doses of anti-infective therapy, prophylaxis, or vaccination.

Vaccines, anti-infective therapy, and/or prophylaxis should be offered (when medically indicated) free of charge to ACS staff. Community emergency management planners/ACS managers should consider offering these measures to ACS staff’s family members free of charge, if resources allow. Healthcare workers have reported that this type of incentive may increase staff’s willingness to report to work during a disaster. For additional information on anti-infective therapy, prophylaxis, and immunization, see the Anti-Infective Therapy, Immunization, and Prophylaxis for ACS Patients and Visitors section.

**Furloughing Staff**

ACS staff should not work while ill because they can contribute to disease transmission. This is important for all disasters, but will be essential during infectious disease disasters because infected staff can contribute to disease transmission to patients and other staff. ACS staff with symptoms of contagious diseases should be furloughed (if they have not yet started their shift) or should cease patient care activities (if symptoms develop during a shift). In addition, ACS staff may need to be medically cleared before being allowed to return to work. Criteria about when and how long to furlough staff, including how to decide when to allow staff to return to work, will depend upon the specific disease with which the ACS worker has or is suspected of having. Event-specific guidelines related to furloughing and procedures for deciding criteria to allow staff to return to work should be developed by the ACS IP/IP designee or infection prevention team in conjunction with occupational health and public health officials. These guidelines should be based on information that is specific to the event/disease provided by the CDC or other organization. A list of suggested work restrictions for healthcare workers with a known or suspected contagious disease/condition are provided in Appendix G.

**Vulnerable Staff**

ACS staff who may have an increased risk from infection (i.e., pregnant, immunocompromised individuals, staff who are non-immune to the agent/disease involved the event, and those performing high-risk procedures, such as aerosolizing procedures during an outbreak of a droplet or airborne spread disease) should be identified as part of emergency management planning and verified when the plan is activated to assure it is up to date. Staff who meets the criteria for being high risk for infection should be screened and/or followed per state health department or CDC event/disease-specific protocols/information.
Cohorting Staff

During infectious disease disasters or communicable disease outbreaks that follow a disaster, it will be important to minimize the number of ACS personnel who are exposed to potentially contagious individuals. An important administrative control to accomplish this includes dedicating a cadre of healthcare personnel to work with patients who are known or suspected of being infected (i.e., cohorting staff). Whenever feasible, vulnerable staff at an increased risk from infection (i.e., staff who are non-immune to the agent/disease involved the event) should not be part of the cohort who will care for potentially contagious individuals. Disease-specific guidelines should be consulted during infectious disease disasters when determining the definition of "vulnerable staff".

Blood/Body Fluid Exposures

ACSs must have infection prevention policies and procedures to reduce the risk of occupational exposure to blood and body fluids, including the use of Standard Precautions [See the Isolation section]. Because ACSs are healthcare settings, they need to follow the Occupational Safety and Health Administration (OSHA) bloodborne pathogen standard. Protocols must also be developed that outline procedures for following up on staff work exposures (including testing and the potential use of post-exposure prophylaxis) and for allocating PPE when supplies become insufficient or depleted. The ACS manager in cooperation with occupational health should monitor employee work-related exposures, such as needlestick or sharps injuries or from not wearing PPE correctly. The exact follow-up needed for staff exposures will depend upon the disease/agent involved and the type of exposure. Protocols need to be developed regarding source testing following staff occupational exposures. ACSs should always follow state and federal laws related to source testing. ACSs should keep anti-infective therapies, vaccines, and prophylaxis medications on-site or have procedures in place for directing staff to another healthcare facility to receive timely post-exposure follow-up.

Anti-Infective Therapy, Immunization, and Prophylaxis for ACS Patients and Visitors

Mass casualty events may require the use of pharmacological interventions for ACS patients and visitors, including the use of anti-infective therapy, prophylaxis, or vaccination. This is most likely to be an issue after an infectious disease disaster, such as a bioterrorism attack, outbreak of an emerging infectious disease, or a pandemic. Protocols should be in place to administer anti-infective therapy, post-exposure prophylaxis (PEP), and/or vaccination to ACS patients or visitors with symptoms of infection or a known exposure to a potentially contagious patient/person or agent when medically indicated and when these modalities are available on-site. Case definitions of infection and what constitutes an exposure (for PEP and contact tracing) are event/disease-specific and are part of the epidemiological investigation. This information should be coordinated with medical professionals and local public health officials during a disaster. ACS patients and visitors should be encouraged to receive any event-specific prophylaxis, such as tetanus or influenza vaccine, antibiotics, or antivirals, offered by the health department. The ACS must follow local and state immunization program guidelines, including documentation mechanisms.
Anti-infective therapy, prophylaxis, or vaccination should be administered as soon as possible after exposure or the onset of symptoms, as delays in administration can decrease medication or vaccine efficacy and result in increased morbidity and mortality. ACSs should not function as a point of dispensing (POD) for mass prophylaxis or vaccination\textsuperscript{21}, but they may administer anti-infective modalities to patients, visitors, and staff. ACSs should keep anti-infective therapies, vaccines, and prophylaxis medications on-site for patients and visitors or have procedures in place for directing patients and visitors to another healthcare facility to receive rapidly the appropriate medical follow-up.

ACSs need to coordinate with local and regional emergency management agencies when attempting/planning to stockpile or administer pharmacological measures. Written protocols are needed for prioritizing allocation of anti-infective therapy, prophylaxis, or vaccine during times of limited or depleted resources.

ACSs need to have procedures for safe storage, handling, and administration of medications and vaccines. Unsafe and/or improper practices when handling medications and vaccines can lead to healthcare associated infections or outbreaks.\textsuperscript{22,23} Some medications and vaccines may require cold chain techniques; therefore the ACS must have refrigeration or cold storage units available to accommodate medication/vaccine storage. The cooling system for medications/vaccines must be separate from refrigeration used for food and the temperature of the cooling system must be maintained to ensure the efficacy of the vaccine/medication. Infection prevention techniques related to handling pharmaceuticals need to be practiced in ACSs. Examples include the safe re-packaging and preparation of medication solutions and suspensions, careful labeling, documentation, and procedures for accessing multi-dose vials/containers, and following cold chain techniques. ACS staff should be educated on these procedures (see the Infection Prevention Education section).

**Visitor Management**

Visitors should be limited to persons who are necessary for the patient’s emotional well-being and care. Visitors, including family members, can be a source of infection and should be screened for symptoms of infection appropriate to the situation before each visit and instructed to limit their movements within the ACS. Visitors who are ill should be instructed to return home until symptoms have resolved as this has been identified by the CDC as one of the most important interventions in eliminating potential occupational exposures. Asymptomatic/well visitors accompanying ill patients should be directed to the “sick” side/area of the triage waiting room and instructed to wear appropriate PPE; disease-specific guidelines should be consulted during infectious disease disasters when choosing PPE. ACS managers should consider making an exception if the symptomatic visitor is a parent, legal guardian, or other household caregiver of a pediatric patient, assuming that the visitor is able to wear PPE, perform hand hygiene, and adhere to other infection prevention practices; this will be most critical when the ACS is short-staffed and the adult visitor is able to assist in the patient’s care or provide comfort to the child. Educational materials that are language and reading-level appropriate should be made available to the family and other visitors regarding symptoms that need to be reported (Appendix D), respiratory etiquette procedures (Appendix H), and how to perform hand hygiene procedures (Appendix I).
**Reporting Procedures**

The results of the formal assessments/triage (i.e., active surveillance) and passive surveillance (self-reported symptoms between screenings) should be reviewed by the IP/IP designee on-site. The results should be reported to the Incident Commander or ACS Director if deemed necessary. The IP/IP designee should also report the results of the surveillance program, including reportable diseases, to the local and state health department as required in the emergency management plan and according to state and federal law. This should be done at least daily or more often if the situation escalates.

**Standard Precautions**

Standard Precautions are the fundamental practices used to prevent the transmission of infectious agents during healthcare personnel interactions with patients in any healthcare setting. This includes the prevention of infection spread from healthcare personnel to patients and from patients to healthcare staff. Standard Precautions should be implemented by all healthcare workers for each patient encounter, regardless of the patient’s diagnosis. Standard Precautions consist of:

- Wearing appropriate PPE when exposure to blood, body fluids, secretions or excretions of individuals is anticipated (see the PPE section)
- Following safe injection practices
- Handling medical equipment that is potentially contaminated with bodily fluids in a manner that prevents transmission
- Performing hand hygiene when indicated (see Hand Hygiene section)
- Follow respiratory hygiene/cough etiquette. Respiratory hygiene/cough etiquette consists of practices aimed at identifying and people with signs/symptoms of respiratory illness at the point of entry to all healthcare facilities. Respiratory hygiene/cough etiquette consists of:
  - Educating staff, patients and visitors about the spread of respiratory illnesses
  - Posting signs on how to follow respiratory hygiene/cough etiquette in public areas (See Appendix H)
  - Instructing individuals who are coughing and/or sneezing on the proper use facial tissues (i.e., covering the mouth/nose with a tissue, immediate disposal of tissue, and hand hygiene)
  - Providing a mask to coughing individuals
  - Healthcare staff should wear a mask when examining a patient or visitor with signs/symptoms of respiratory illness
  - Instructing individuals to cough or sneeze into the crook of their elbow or sleeve
  - Separating potentially contagious individuals by at least 3 – 6 feet from others
Transmission-Based Precautions/Isolation

Isolation precautions must be implemented if a patient has a disease or condition that is communicable and transmission may not be prevented using Standard Precautions alone. Another name for isolation precautions is transmission-based precautions. There are three categories of transmission-based/isolation precautions: Contact, Droplet and Airborne Precautions. Patient placement in isolation is an essential administrative control used to decrease the risk of disease transmission in healthcare facilities. The isolation category/precautions should be decided based on current recommendations from local and staff health departments, the CDC, and other organizations, such as the World Health Organization. A poster or other instructions outlining proper isolation procedures should be posted on the isolation door/area. Isolation sign examples are provided in Appendix J.

During most disasters, airborne isolation will not be needed except for hospitalized patients. It is not feasible for most ACSs to implement airborne precautions due to the stringent environmental controls needed for this type of isolation. However, during an infectious disease disaster involving an airborne spread disease, such as smallpox, ACSs may need to consider implementing protective measures for airborne isolation within the facility while still providing medical care for clients if all hospital beds are full and resources allow. Individuals infected with airborne spread diseases should receive top priority for hospital isolation rooms/areas in any type of a disaster in order to limit disease spread.

Airborne Precautions

Airborne Precautions are used for patients who have diseases that are spread by the airborne droplet nuclei route. Airborne droplet nuclei are tiny droplets that can travel long distances in the air. Airborne isolation will be very difficult to implement in ACSs. Whenever possible, individuals with known or suspected airborne spread diseases should be transferred to a hospital or other medical facility that has appropriate isolation capabilities (i.e., an airborne infection isolation room [AIIR]). Airborne Precautions should be used for all individuals meeting the criteria for requiring airborne isolation from Appendix E and/or individuals suspected of having a known or potentially airborne spread disease, such as tuberculosis, chickenpox, measles, smallpox, Severe Acute Respiratory Syndrome (SARS), and viral hemorrhagic fever. In addition to Standard Precautions, the following should be implemented:

- Provide a mask to individuals who have symptoms of an airborne spread disease (see Appendix E)
- Separate the individual
  - Place in a private room/area. An AIIR should be used when available. AIIRs are rooms that have specific engineering controls as outlined by the American Institute of Architects/Facility Guidelines Institute (AIA/FGI) standards. Engineering controls for AIIRs include being negative pressure (i.e., the air flows from the adjacent corridor into the patient’s room), having a minimum of 6 to 12 air changes per hour, and exhausting room air directly to the outside or filtering it through a high-efficiency particulate air (HEPA) filter before recirculation.
Temporary negative pressure rooms/areas can be developed using published guidelines and are permitted by federal and state codes for temporary, emergency needs; facilities engineering professionals should be consulted when attempting to institute temporary negative pressure in an ACS because the process is highly complex.25,26

- 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)
- Choose an area that has at least one window (The window must be > 25 feet away from air intakes or other open windows) to facilitate air flow
- If walls do not enclose the isolation room/area already, erect some type of enclosure. Materials should be chosen based on their permeability
  - Potential barrier materials listed in order of preference: Drywall, particle board or other wood, plastic, portable room divider/screens, hanging drapes, or bed linens
  - Secure barrier material to ceiling and floor to the extent possible
- Bleed/exhaust air from the isolation room/area to make it negative pressure compared to the rest of the ACS using one of the following methods listed in order of preference:
  - A fixed room-air ventilation system
  - Portable room-air ventilation system
  - 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 or other open windows]
  - Use floor and/or window fans to exhaust air outside the isolation room/area
    - Consult with a facilities engineer when setting up fans to create negative pressure
- Do not recirculate air from the isolation room/area with the rest of the ACS unless the air is filtered through a high efficiency particulate air (HEPA) filter prior to recirculation. Air can be filtered using one of the following methods listed in order of preference:
  - Filter air from the isolation room/area using an in-duct HEPA filter system
  - 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 ACS staff work flow or medical equipment in the room
    - ACS workers should be told to avoid standing between the infected person and the portable HEPA unit’s air intake because this can increase the worker’s exposure risk
- Contingency planning should include plans for loss of electricity when a patient is in an AIIR or other protected environment for airborne isolation
Individuals with the same disease/condition may be cohorted if isolation room/space is limited

- Keep the symptomatic individual in the isolation area/room
- Limit visitors to parents/guardians or other primary caregivers who are immune to the disease in question. Parents/guardians or primary caregivers who are susceptible to the disease may be incubating the disease in question and are not permitted to visit during the incubation period for the disease in question
  - ACS managers should consider making an exception if the symptomatic visitor is a parent, legal guardian, or other household caregiver of a pediatric patient, assuming that the visitor is able to wear PPE, perform hand hygiene, and adhere to other infection prevention practices; this will be most critical when the ACS is short-staffed and the adult visitor is able to assist in the patient’s care or provide comfort to the child
- Patient transport is limited to essential purposes only
  - Patients should wear a surgical/procedure mask whenever they are out of their room. Infants and/or uncooperative patients may be covered with a sheet or blanket
- Healthcare staff and visitors should wear an N95 respirator or higher level respiratory protection (or masks if respirators are not available; see PPE section) for each patient encounter/when entering the patient’s room and/or when within 3 – 6 feet of the infected individual
  - The respirator should be put on before entering the room and removed after leaving the room
    - Discard respirator in general trash unless grossly contaminated with blood or bloody body fluids; if grossly contaminated, discard in appropriate bio-hazardous waste container
- Perform hand hygiene before and after contact with the individual

**Contact Precautions**

Contact Precautions are to be used in addition to Standard Precautions with all patients meeting the criteria for requiring Contact Isolation from Appendix E and/or individuals known to have an infectious disease spread by direct or indirect contact with the patient or the patient’s environment. These diseases/conditions include: infection from a multidrug resistant organism (Methicillin Resistant Staphylococcus aureus MRSA, Vancomycin Resistant Enterococcus VRE, etc), *C. difficile* diarrhea, smallpox, scabies, lice, uncontrollable vomiting/diarrhea, fecal incontinence, and/or wound drainage that cannot be contained by a dressing. In addition to Standard Precautions, the following should be implemented:

- Separate the individual
  - Place in a private room/area
  - Maintain a spatial separation from non-infected individuals (> 3 – 6 feet between beds)
  - Individuals with the same disease/condition may be cohorted if private room/space is limited
  - Keep the symptomatic individual in the private area/room
Patient transport is limited to essential purposes only. Transporters should follow good hand hygiene practices and use gloves (and gowns if direct contact of transporter clothing is anticipated)

- Healthcare staff should wear a gown and gloves (see PPE section) for each patient encounter/when entering the patient’s room; visitors who will provide patient care (i.e., bathing, feeding, etc) or will have close contact with a patient on contact isolation should wear a gown and gloves (see PPE section) for each patient encounter/when entering the patient’s room
  - PPE should be put on before entering the room and removed before leaving the room
    - Discard PPE in general trash unless grossly contaminated with blood or bloody body fluids

- Dedicated medical equipment/items should be used whenever possible
  - Reusable medical equipment must be cleaned and disinfected before being used for another patient

- Perform hand hygiene before and after contact with the individual

Droplet Precautions

Droplet Precautions are to be used in addition to Standard Precautions for all individuals meeting the criteria for requiring Droplet Isolation from Appendix E and/or individuals known to have a respiratory droplet spread disease, such as *N. meningitidis*, pneumonic plague, seasonal influenza, and pertussis. In addition to Standard Precautions, the following should be implemented:

- Separate the individual
  - Place in a private room/area
  - Individuals with the same disease/condition may be cohorted if private room/space is limited
    - If patients are cohort, keep > 3 – 6 feet between beds and draw curtains between beds (if available)
  - Keep the symptomatic individual in the private area/room
  - Patient transport is limited to essential purposes only
    - Patients should wear a surgical/procedure mask whenever they are out of their room. Infants and/or uncooperative patients may be covered with a sheet or blanket

- Healthcare staff and visitors should wear a surgical/procedure mask (see PPE section) for each patient encounter/when entering the patient’s room and/or when within 3 – 6 feet of the infected individual
  - The mask should be put on before entering the room and removed after leaving the room
    - Discard mask in general trash unless grossly contaminated with blood or bloody body fluids

- Perform hand hygiene before and after contact with the individual
Isolation Area

Whenever possible, the ACS should utilize a designated isolation area for potentially contagious individuals. The following guidelines should be used when developing and operating an isolation area:

- Choose an area that is physically separated from the rest of the ACS by walls on all sides and a door
  - A building or area outside or near the ACS can be used. If an area outside the ACS is used, it will be necessary to ensure that appropriate medical care is given to these individuals, in spite of their separation from the main treatment area
- If such an area does not exist and cannot be made inside the ACS, an isolation area can be created using plastic or other barrier material, such as curtains or large solid screens
  - 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 (see Appendix J)
- In certain situations, such as 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 Airborne Isolation Section for information on air handling and ventilation recommendations for isolation areas
- Limit crossover of ACS staff between the isolation unit and the rest of the ACS occupants
  - Whenever possible assign dedicated ACS staff (e.g., healthcare workers, housekeeping, custodial) to provide care for potentially infectious individuals and restrict these staff from working with non-infectious individuals in the ACS (Cohorting)
  - Dedicate an entrance(s) or passageway(s) for infectious individuals when feasible. This promotes separation as well as the ability to triage those who have been working with potentially infectious patients27

Placement of Individuals

Individual placement within the ACS should be determined by review of the Syndromic Surveillance Assessment/ Triage Form (Appendix C) and the Infection Control Triage results (Appendix E). Symptomatic individuals should be cohorted based on their isolation precaution category (See Appendix E).

Arrange all sleeping areas (including beds/cots) so that individuals are separated by putting a minimum of 3 – 6 feet between individual sleeping surfaces to prevent the spread of infections.
**Patient Transfer**

Patient transfer can occur internally within the ACS or externally with local healthcare facilities. When a patient requires internal transport, isolation status must be communicated to the receiving department/area. In the event a patient needs to be transferred to a healthcare facility, the on-site IP or IP designee should communicate the infected individual’s disease status and the need for precautions to the ACS director and personnel at the receiving facility. The IP or IP designee should maintain responsibility to stay in contact with the receiving facility in relation to the patient’s diagnosis for follow-up. The ACS must have a coordinated process that facilitates communication between the ACS and receiving facility in the event a change in the patient’s condition has infection transmission implications for the ACS. Precautions to take during transport are outlined in the Isolation section.

**Quarantine**

Quarantine involves restricting the movement of individuals as a means of preventing infection spread. Quarantine differs from isolation in the type of individual being physically separated from others. Isolation is used when a person has symptoms of a communicable disease. Quarantine is implemented when individuals or groups are suspected of having been exposed to an infectious disease or contagious individual, but are not yet showing signs of infection. Quarantine will likely only be needed during infectious disease disasters, and even then, only rarely will it likely be used.

Quarantine may be voluntary or involuntary, and can be implemented as a home, work, or community-based quarantine. ACSs may serve as a community-based or work quarantine site, or both. A community-based quarantine site would involve quarantine of non-workers only; work quarantine would involve quarantine of ACS workers. The decision regarding what type of quarantine, if any, will be implemented at an ACS will be made by the ACS manager in conjunction with local healthcare and public health officials.

Regardless of the type of quarantine implemented, ACS staff should monitor each quarantined person for signs and symptoms of disease at least daily, or more frequently if resources allow. If a quarantined individual develops symptoms suggestive of the disease, it would be assumed that they are infected and they would need to be evaluated immediately, offered anti-infective therapy when clinically appropriate, and isolated (see Isolation section). The duration of quarantine depends upon the disease to which the person was exposed, and generally is equal to the length of the disease’s incubation period (i.e. the time between exposure to disease and symptom onset). ACSs staff should educate quarantined individuals about the need for quarantine. In addition, quarantined individuals should be educated about how and when they will be monitored for illness and procedures for reporting symptoms between monitoring periods (see Infection Prevention Education section).

Effective implementation of quarantine at an ACS will require planning. Logistical plans for implementing quarantine are not an infection prevention issue and have been covered in other documents; they will not be addressed here. It is important to note that quarantine is a legal action. Therefore, it should only be implemented in collaboration with local public health and must follow state and federal laws.
Hand Hygiene

One of the most important measures for preventing the spread of pathogens is effective hand hygiene, and this should be practiced in all healthcare settings. Hand hygiene is defined as the process of removing or destroying microorganisms on the hands. It consists of handwashing (using soap and water) and alcohol-based hand rubs (ABHR; using a waterless, alcohol-based hand hygiene product such as gels, foams, and liquids). When hands are visibly dirty or soiled, handwashing is required because the mechanical action removes potentially infectious material from the skin. When hands are not visibly soiled, ABHRs are the preferred method for hand hygiene because they are more effective, less drying to the skin, and faster/more convenient compared to handwashing. ABHRs will likely play a significant role in hand hygiene during disasters when water resources may be limited.

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 epidemiological important microorganisms. Hand hygiene is crucial following contact with any patient. A process should exist to assess the adequacies of the hand hygiene capabilities. Based on the assessment, appropriate measures should be instituted. If water becomes limited during a disaster, staff, patients, and visitors should be encouraged to use ABHRs rather than handwashing with soap and water except when hands are visibly soiled.

Hand hygiene should be performed for the following activities:

- Before and after patient care
- During patient care, when moving from dirty tasks to clean tasks
- Before and after eating, drinking, and touching the face or mouth or eyes
- After contact with the patient’s environment
- Before and after preparing food
- After using the toilet or changing a diaper
- 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 vomitus, fecal accidents, or other body fluid spills
- After cleaning and disinfecting environmental surfaces
- After removing gloves, gowns and face shield/eye protection
- Before and after removing respirator or mask
- Before entering and when leaving the common activity area, i.e. children recreation area (see Toys section)
- After handling shared medical equipment or toys
- After visiting or handling an animal (see Animal Management section)
- After handling pet food (see Food Safety section)
- After activities in which the hands become visibly soiled
Hand hygiene products/areas should be conveniently located throughout the facility. In areas where sinks/running water are not available, ABHR hand hygiene stations can be used. ABHR hand hygiene stations consist of ABHR products, facial tissues, a trash can, and hand hygiene signage. Hand hygiene products/areas should be located:

- At or near every entrance to the ACS
- In or just outside every isolation room/area, which may require more than one station in a large room used for isolating several symptomatic individuals
- In or near every patient room
- Near the restrooms
- Near the food preparation and/or kitchen area
- Near the eating area
- As needed throughout the facility

During infectious disease outbreaks and/or whenever resources allow, hand hygiene compliance should be monitored. Hand hygiene educational posters should be located inside or near the hand hygiene stations and/or restrooms. Staff should instruct patients and visitors on hand hygiene, as part of patient education (see Infection Prevention Education Section).

**Hand Hygiene Technique**

Instructions for performing hand hygiene are outlined in Appendix K.

**Hand Hygiene Signage**

Hand Hygiene notices/signs should be posted near all washrooms and hand hygiene stations. Appropriate signage should be used as a reminder for hand hygiene compliance. See Appendix I for samples of appropriate signage for handwashing and use of ABHR.

**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 being performed and the mode of transmission of potential agents (see Appendix E).

For example, if performing tasks in which hand exposure to any body fluid is expected —when cleaning an individual’s wound for example—gloves should be worn. If splashing or spraying is expected, such as when a urine collection bag is emptied, a gown, gloves, and protective eyewear should be worn.

Different diseases require different types of PPE based on how the agent is transmitted. This can range from using gloves only to wearing full PPE. For most encounters with patients, 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 an individual from infection. For some individuals and some procedures, additional PPE will need to be worn. Appendix E outlines syndromes for which additional precautions are needed. The Isolation section outlines the appropriate PPE for each of the isolation categories. Donning and doffing procedures for PPE are shown in Appendices L.
and M. The CDC indicates that PPE is the last line of defense in preventing infection transmission in healthcare settings. Other important interventions, such as eliminating potential exposures, and implementing engineering and administrative controls are also essential to prevent disease transmission; these actions will be vital during disasters when shortages of PPE are likely to be present.

**Gloves**

Non-sterile latex free procedure gloves should be used when contact with blood or body fluids, non-intact skin, contaminated surfaces and medical devices, or mucous membranes is anticipated. Gloves must be worn to perform venipuncture or other vascular access procedures, and as required for the practice of medical asepsis. A new pair of gloves should be used for each patient encounter, including between tasks and procedures on the same patient, when moving from a dirty task to a clean task, and after interaction with a symptomatic individual during screening.

Gloves should not be worn:
- For the care of more than one patient
- Away from the bedside or lab bench
- At the nursing station
- To handle charts, clean linen, clean patient equipment or patient care supplies
- In hallways or elevators, unless providing patient care in transit

Recommendations for glove use:
- Use a new pair of gloves when contact with blood or body fluids, non-intact skin, or mucous membranes is anticipated
- Change gloves when they are heavily soiled with blood or other potentially infectious material, or if they are torn
- Change gloves to prevent cross-contamination of body sites. For example, if when cleaning an individual’s wound, gloves should be changed 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 ACS environment with contaminated gloves
- Always change gloves after providing care to each individual and perform hand hygiene immediately after removing gloves
- Although gloves keep most microorganisms from getting on hands, they are not completely protective. Always perform hand hygiene before and after removing gloves
- Do not wash gloves

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

An isolation/procedure gown should be used when splashing or spraying of clothes or the body with blood or body fluids is anticipated. Gowns worn to prevent splashing or spraying of clothing must be made of an impervious material. 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 ACS worker for the same symptomatic individual or group of cohorted 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.

Recommendations for gown use:

- Wear an isolation/procedure gown to protect 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 the torso area, fit loosely over the 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 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 ACS, depending on where the gown was used/worn
- Avoid touching the outside of the gown during use and removal because it is contaminated
- Discard gowns in the regular trash after use unless they are soaked with blood or other body fluids; grossly contaminated gowns should be discarded as regulated medical waste in a red/biohazard container (see Waste Management section)

Eye Protection

Eye protection is designed to protect the wearer from damage or exposure to the eye. Various types of eye protection devices exist for a number of occupational settings. For healthcare infection prevention purposes, eye protection is used to prevent exposure to infectious agents through the mucous membranes of the eye. Infectious agents can be introduced to the eye either directly (e.g., blood splashes, respiratory droplets generated during coughing or suctioning) or from touching the eyes with contaminated fingers or other objects. The eye protection chosen should be based upon the task being performed, other PPE being used, and personal vision needs. Prescription eye glasses (including safety glasses) and contact lenses do not provide adequate eye protection from infectious agents and are not considered eye protection in healthcare settings, including ACSs. Infection prevention eye protection devices are as follows:

Goggles

- Goggles must fit snugly, particularly around the corners of the eye and across the top of the goggles by the eyebrow
• Indirectly vented goggles are the preferred type of goggles for preventing exposure to infectious agents
• Directly vented goggles should not be used for infection prevention purposes because they can allow fluid penetration leading to an exposure

Face Shields

• Face shields provide protection to eyes as well as other facial areas
• Whenever possible, choose a face shield that has full facial coverage, including the crown and chin, and one that stretches from the front of one ear to the other.24,29
• Re-usable face shields are preferable to disposable ones because they provide better protection for the wearer.29
• Light-weight disposable face shields that attach to the front of a surgical mask are the least protective form of eye protection.29

Full-face Respirators

• Respirators that cover the entire face, such as full face-piece elastomeric respirators and powered air-purifying respirators (PAPRs), provide highly effective eye protection as well as respiratory protection
• Selection of this type of PPE should be based on an assessment of the exposure hazard and availability of resources in an ACS

Removal and Reprocessing of Eye Protection

Eye protection should be removed by grasping the cleanest part of the item, which consists of the part that holds the device to the head (i.e., ear pieces, ties, elasticized bands, headbands, etc).24,29 Do not remove eye protection by grasping the front or sides of the device because these surfaces are considered contaminated. Proper PPE removal is illustrated in Appendix L.

Light-weight disposable face shields that attach to the front of a surgical mask are considered single-use items and should be discarded after use. There are no recommendations for re-use of disposable face shields. Re-usable goggles should be assigned to a single worker to ensure proper fit and prevent transmission to another person. All types of re-usable eye protection, such as goggles, elastomeric respirators and PAPRs, must be disinfected between uses and when shared between users; see manufacturer’s recommendations for instructions on decontamination/disinfection of re-usable eye protection.29 Re-usable eye protection should be cleaned and disinfected in a dirty utility room and gloves should be worn during the cleaning process.29

Respirators and Masks

Respirators and masks are used to protect the wearer from exposures to droplet and airborne spread diseases. It is important to choose the correct respiratory protection. 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 loose-fitting and allow air particles to leak in around the edge of the mask. 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.

A respiratory plan should be in place for the ACS. This plan should include fit testing of N95 respirators as required under OSHA’s Respiratory Protection standard (29 CFR 1910.134). The fit testing program should include testing the fit of the respirator, instructing the wearer on proper fit checking, and informing the wearer of the limitations of the respirator. It may be necessary in disasters to allow ACS staff to provide evidence of previous fit testing at other facilities. If the ACS is providing a different model of respirator than the one for which the staff member is fit tested, they must be re-fit tested for the respirator provided by the ACS. During times of severe shortages of respirators, fit-testing may be temporarily waived for staff who are not at risk from severe infection complications when the personnel are performing tasks that are low risk for infection transmission (i.e., not aerosol-generating procedures). The ACS staff should be instructed to perform a seal check when using the non-fit-tested N95 respirator and the facility should conduct fit-testing on the employees as soon as possible.

ACS plans should include processes for periodically assessing sustainability and utilization of resources during a disaster, including the use of respirators and surgical/procedure masks for ACS staff, patients and visitors. Respirator and surgical/procedure mask 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 respirator or surgical/procedure mask should be worn for each encounter with an infected individual or entrance into the isolation area within the ACS. Reusable respiratory protection may be used by ACS workers in lieu of disposable respirators or surgical/procedure masks, using the following recommendations:

- Reusable respirators include elastomeric respirators and powered air purifying respirators (PAPRs)
- If re-useable elastomeric respirators are used, these respirators must be decontaminated according to the manufacturer’s instructions after each use
- PAPRs may be considered for ACS 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 ACS must be identified for recharging PAPRs between uses.

Regardless of respirator or surgical/procedure mask resource par 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 (see Appendices L and M)
    - 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
      - Remove the face shield 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 check processes are outlined by the manufacturer
  - Remove and dispose of the respirator or surgical/procedure mask (See Appendices L and M)
    - 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

Masks and respirators are only one strategy for preventing infection spread. The CDC has outlined a hierarchy of control measures to prevent disease spread, with respiratory protection and other PPE as the last line of defense. During infectious disease disasters (i.e., bioterrorism, outbreaks of emerging infectious diseases, or pandemics), ACSs should implement source control, engineering, and administrative controls as well as eliminating potential exposures as methods of decreasing the need for respirators among health care personnel. This will aid in the conservation of respirators for staff most at risk from severe complications from infection and those performing high-risk procedures, such as aerosol-generating procedures. Examples of interventions to eliminate potential exposures and implement engineering and administrative controls include control methods outlined in other parts of this document, such as screening.
patients and visitors for illness, promptly isolating potentially contagious individuals, and offering vaccinations to healthcare personnel.

**Shortage of Respirators and Masks**

Guidance on developing a strategy/protocol for extending the use and/or reusing respiratory protection during disasters has been outlined by APIC. The following section is quoted directly from that document:

“Extended use of respiratory protection is defined as the wearing of a disposable respirator during serial patient encounters without the removal or re-donning of the device between encounters. Reuse of respiratory protection consists of removing and re-donning the device between encounters. Both of these actions pose a transmission risk to healthcare personnel due to potential respirator contamination. This transmission risk can be minimized if healthcare personnel adhere stringently to hand hygiene before and after handling the respiratory protection device.

If supplies are likely to be limited, healthcare organizations should conserve supplies as follows, considering vaccine availability for the specific pathogen:

1. Strongly encourage healthcare personnel to be vaccinated against the agent involved in the infectious disease disaster (such as influenza vaccine during an influenza pandemic), when such vaccine is available. This will create an immunized cadre of healthcare personnel for whom respiratory protection will be less critical.

2. Extending the use or reusing respiratory protection is preferred over prioritizing the allocation of masks and N-95 respirators based on exposure risk

3. Extended use is preferred over reuse

Practices for extending the use and/or reusing a respirator:

- The respirator should only be worn and/or reused by a single wearer
- The respirator should not be removed, adjusted, or touched during patient care activities
- Avoid contamination during use by not touching the outside of the respirator
- Care should be taken to prevent touching the inside of the respirator
- The respirator should be discarded after being used during an aerosol-generating procedure
- The respirator should be discarded if it becomes grossly contaminated with the patient’s body fluids, including blood or respiratory secretions. Note: this may be difficult for the wearer to discern. Healthcare personnel should be aware that even if not visibly soiled, the external surface of the respirator is considered to be contaminated
- The respirator must be discarded if it becomes obviously soiled or damaged (e.g., creased, torn, or saturated) or if breathing through the device becomes difficult
Consider using a surgical/procedure mask\textsuperscript{35} or face shield\textsuperscript{32} over the respirator to reduce/prevent contamination of the device. If masks are also in short supply, face shield use should be encouraged to help conserve masks

- Care should be taken during removal of the mask or face shield to ensure the respirator is not contaminated
- The surgical/procedure mask must be discarded after a single use. If reusable, the face shield must be decontaminated between uses
- Hand hygiene should be performed after removing the face shield or mask and before removing the respirator

Perform hand hygiene before and after handling/touching the respirator

The following are examples of situations/locations in which extended use may be both practical and feasible when supplies are limited: triage clinics/areas, in-patient units that house large numbers of infected patients, or isolation units dedicated to patients with known or suspected infections. Each facility should conduct a risk assessment and develop a contingency plan that includes examination of their patient population, healthcare personnel immune/vaccination status, and physical structure in terms of the feasibility of implementing an extended and/or reuse protocol.

In addition to the above, the following recommendations should also be followed when reusing a respirator:

- The respirator should be removed carefully to avoid cross-contamination
- Personnel should be instructed to use hand hygiene after putting the respirator on and following removal/placement in a storage location
- The respirator should be stored in a clean, dry location that prevents it from becoming contaminated and maintains its physical and functional integrity\textsuperscript{36}
  - Store the respirator in a breathable container, such as a paper bag, or hang the respirator in a designated area\textsuperscript{32,36}
    - If the respirator is to be stored in a container, the container/bag should be labeled with the user’s name
    - The container/bag is a single use item because the inside can become contaminated due to storing a used respirator; therefore, the container/bag should be discarded after the respirator is re-donned\textsuperscript{37}
  - Consider labeling the respirator with the user’s name to prevent staff from reusing another’s respirator; labeling should be written on the straps to prevent damage to the respirator\textsuperscript{36}
- The respirator should be inspected before each use to ensure its physical integrity is intact and a seal-check should be performed by the healthcare personnel to ensure an adequate fit
  - Respirators that are damaged or cannot achieve an adequate fit during the seal check should be discarded
Prioritize allocation of N-95 respirators and masks based on exposure risk

If respirator/mask supplies are scarce or insufficient even after the facility has obtained additional supplies from local, regional, or national sources, examined the feasibility of reusable respirators (PAPRs, elastomeric respirators, etc.), and implemented extended use and/or reuse procedures, protocols should be followed to prioritize healthcare personnel to receive respirators/masks based on their exposure risk; exposure risk should be determined based on the healthcare facility’s exposure risk analysis that is part of emergency management planning, including personnel’s immune status.

Healthcare organizations should develop prioritized respirator use protocols as follows:

1. Facilities should maintain a reserve stock of respirators/masks that will be used during aerosol-generating procedures and/or with patients who are known or suspected of being infected with an airborne microorganism, such as Mycobacterium tuberculosis. Consider a contingency plan wherein reusable respiratory protection, such as PAPRs, is available for personnel who need to care for those with suspected or active TB disease.

2. Airborne-transmitted diseases: Priority for respirator use should be given to healthcare workers providing care for patients with obligate and preferential airborne-transmitted diseases, such as active tuberculosis disease

   - Laboratory studies indicate that surgical and procedure masks do not offer appropriate respiratory protection against small particle aerosols (i.e., airborne droplet nuclei) and should not be used unless particulate respirators are not available when dealing with diseases transmitted by the airborne route; if a particulate respirator is not available, use a tightly-fitting surgical/procedure mask

3. Aerosol-generating procedures: Priority for respirator use should be given to healthcare personnel performing aerosol-generating procedures

   - During disasters involving an airborne spread disease, aerosol-generating procedures should only be performed by staff wearing an N95 respirator or other respirator protection that is at least as protective as an N95 respirator

     o If the healthcare facility is completely out of respirators (disposable or reusable) and aerosol-generating procedures must be performed on a patient with an airborne spread disease, the healthcare personnel involved in the procedure should wear a surgical/procedure mask. Use of a surgical/procedure mask in this type of dire situation is preferable to using no facial protection at all. It is important to note that this scenario should never occur; healthcare facilities should use contingency planning to ensure they have adequate respiratory protection supplies for staff through obtaining additional respirators, utilizing reusable respirators, extending the use and/or reusing disposable respirators, and implementing control measures (such as vaccinating personnel) to decrease the need for respirators. In addition, healthcare personnel in this situation should follow infection prevention
strategies to decrease their risk of infection, including following Standard Precautions and performing hand hygiene.

Aerosol-generating procedures that pose a higher risk of exposure than routine patient care activities consist of the following:

- Intubation, extubation, bronchoscopy, sputum induction, cardiopulmonary resuscitation, open suction of airways, and autopsy\textsuperscript{33,37,40}

Other medical procedures have been identified as having the potential to generate limited amounts of respiratory aerosols, although the risk of infection transmission associated with these procedures varies, depending on the disease involved.\textsuperscript{33,41} Disease-specific guidelines should be consulted when determining if the following aerosol-generating medical procedures should be considered high risk for infection transmission and thus receive priority for respirator usage:

- Administering nebulizer treatments, collecting nasopharyngeal samples, use of high-flow oxygen, positive pressure ventilation via face mask (e.g., BiPAP, CPAP), and high-frequency oscillatory ventilation
- When feasible, it is preferred that staff who have not been immunized against the specific agent be given priority for respirators over immunized staff when conducting aerosolizing procedures on patients who are known to be infected with the agent involved in the infectious disease disaster during times of limited supplies (i.e., non-immunized personnel should be provided a respirator; non-immunized would be provided a surgical/procedure mask)

4. Healthcare personnel at risk of infectious complications: Allocating limited supplies of respirators should be prioritized for healthcare staff who are at greatest risk from complications of infections

- The risk analysis will vary from event to event, depending on the infectious agent involved, but should include assessing the task being performed in terms of the duration and intensity of the encounter (i.e., personnel exposure risk), personnel immune/vaccination status, and personnel health status that may affect their risk of infection (such as being immunocompromised, pregnant, etc.)

5. Healthcare staff who are not in the high-exposure/priority groups (i.e., those who are not assigned to care for patients who are known or suspected of being infected with an airborne transmissible disease, involved in routine patient care that does not involve aerosol-generating procedures, and/or those who do not meet the criteria for being at high risk of complicated infection) should be provided with FDA-cleared surgical/procedure masks\textsuperscript{32}

- Switching to an FDA-cleared surgical/procedure mask for healthcare staff who are not in the high-exposure/priority groups during prioritized respirator use mode is considered a temporary measure only. Every effort should be made to obtain additional respirators as soon as possible
6. If the facility is unable to obtain or conserve N95 respirators per the prioritized respirator use protocols above and/or supplies of N95 respirators are depleted despite conservation efforts:

- Surgical/procedure masks can provide benefits against large droplet exposure, and should be worn by healthcare personnel when providing care to patients who have signs/symptoms of a respiratory illness.\(^{42}\) In time of such dire shortages, they should be used in order to reduce some exposure.
- Select surgical/procedure masks that can be tied tightly or have elastic straps (not ear loop masks that do not form a seal)
- Disposable surgical/procedure masks should fit the user's face tightly and be discarded immediately after use. If the mask gets wet or dirty with secretions, it must be changed immediately\(^{39}\)
- Perform hand hygiene before and after touching/handling the mask

7. If supplies of surgical/procedure masks are insufficient or unavailable:

- If supplies of FDA-cleared healthcare surgical/procedure masks become depleted:
  - Consider the use of full face shields that protect the wearer’s eyes and mouth for staff who have been immunized against the specific agent involved in the infectious disease disaster rather than having them use a respiratory protective device when caring for a patient who is known to be infected with the agent involved in the infectious disease disaster; this will help conserve the supply of respirators/masks for personnel at high risk from complications of infection (i.e., non-immunized personnel)
  - Respirators that are FDA-cleared for general public use during public health emergencies can be used in healthcare settings, but do not provide the same level of protection as N-95 or higher level respirators; it is not known if FDA-cleared respirators are more protective than FDA-cleared surgical/procedure masks.\(^{42}\) Respirators that are FDA-cleared for general public use during public health emergencies should only be used in healthcare settings in dire circumstances. All other efforts at conserving and obtaining NIOSH-certified respirators or FDA-cleared surgical/procedure masks should be made before proceeding with this type of respirator in healthcare settings
  - Controversies exist regarding how to proceed when supplies of N-95 or higher level respirators, FDA-cleared healthcare surgical/procedure masks, and masks/respirators that are FDA-cleared for general public use during public health emergencies are depleted/unavailable\(^{40}\)
  - Review of the scientific literature identified a published letter detailing construction of a handmade, reusable cotton mask. This type of mask is currently available in Asia and may be constructed quickly during a pandemic if all other resources have been exhausted. Cloth/woven masks may provide some level of protection based on anecdotal and/or limited evidence.\(^{43-45}\) APIC hesitates to discourage their use if all other mask/respirator options have been exhausted by the healthcare facility, but cautions that these masks are not as
protective as NIOSH-certified respirators or FDA-cleared surgical/procedure masks

- Dust masks, such as those commonly sold at home improvement stores, have been shown to be less protective than NIOSH-certified N95 respirators and therefore should not be used in healthcare settings to prevent the transmission of infectious agents. There is no evidence regarding dust mask performance versus an FDA-cleared surgical/procedure mask in preventing infection transmission; therefore, no recommendation can be made regarding their use in healthcare facilities.

Regardless of the availability of respirators or surgical/procedure masks, environmental control measures, respiratory hygiene/cough etiquette, and extreme vigilance with proper hand hygiene are critical in minimizing the likelihood of exposure.

Research into respiratory protection is continuing and infection preventionists should keep abreast of developments from CDC, FDA, and IOM concerning the use of masks and respirators developed for the public in the likelihood of a pandemic or other conditions requiring respiratory protection.

Recommendations on conserving respirators through extending the use and/or reusing respirators are changing rapidly as new scientific evidence is discovered. ACS managers should consult APIC, CDC, OSHA, and other professional agencies when developing respiratory protection protocols to ensure that accurate, up-to-date information is being used.

Specimen Collection, Handling and Transport

ACS staff should regard all patient specimens as potentially infectious, and continue to collect, handle, and transport specimens following standard infection prevention precautions whenever feasible during disasters. The following procedures should be used when collecting, handling, and/or transporting specimens for laboratory testing:

- ACS staff who collect specimens from patients should wear PPE as indicated by disease-specific precaution recommendations.
- Collection of respiratory specimens that might lead to aerosol generation should be performed with environmental controls in place, including the use of AIIR/negative pressure or well-ventilated areas that are isolated or cohorted away from other patients and staff. Recommendations for environmental controls should follow disease specific recommendations.
- Specimens for transport must be placed in leak-proof bags/containers, with separate sealed sections for the specimen and identifying paperwork to prevent contamination of paperwork while keeping specimen and paperwork together.
  - Consider the use of specimen transport bags that have a red biohazard symbol to indicate that the bag contains potentially infectious material.
- When high risk pathogens or time sensitive specimens are being transported, the laboratory should be notified by telephone or other means that the specimen is en route.
• Chain of custody procedures must be followed during bioterrorism events for specimen collection and handling.  
• Specimen tests that are beyond the scope of the ACS laboratory should be coordinated with local and state health departments.  
• ACS staff responsible for collecting, transporting, and handling specimens should be trained in safe handling and spill decontamination procedures. Be aware that some pathogens will require very specialized handling procedures. ACSs should consult disease specific recommendations from CDC and state health departments for specimen collection, handling and transport guidelines.  
• If proper storage and/or transport of specimens to another facility for processing cannot be guaranteed due to the circumstances of the disaster, ACS staff should carefully consider the safety and utility of collecting potentially infectious material from patients prior to obtaining specimens. Patients may require transport to a hospital or other medical facility if the ACS cannot safely accommodate laboratory collection and handling.

**Water Management**

ACSs 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 ACSs. Back-up supplies of potable water for human consumption, sanitation, cleaning and disinfection of medical equipment, hygiene, and necessary medical treatments will be essential for ACSs during a disaster. Having adequate supplies for water for hand hygiene purposes is especially important during all disasters. Recommendations for hand hygiene protocols when water supplies are insufficient are outlined in the Hand Hygiene section.

**Water Usage**

Depending on the focus of the ACS, water allocations and utilization will vary. The type of patients housed at the ACS will help guide determination of the amount of water needed. Sites performing dialysis and surgery will have a greater need for water than those handling non-dialysis patients or surgical procedures. Guidelines for estimating the amount of water needed for disasters have been published by responding agencies.  

**Water Collection and Storage**

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

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

• The containers should be dated and the water replaced every 6 months  
• Clean the container surface with soap and water then rinse before use.
• Clean the inside of container with a bleach solution
  o Bleach solution: Add 1 teaspoon household chlorine bleach (5.25% sodium hypochlorite) with 1 cup water
    ▪ Scented, color-safe and/or bleach containing soap should not be used to treat water for human consumption\(^{51}\)
• Cover container and agitate, allowing solution to contact all inside container surfaces
• Keep the container covered and allow it 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

If bottled or running water is not available, alternate sources of water/fluids may be utilized. Melted ice, canned fruit or canned vegetable juice can be excellent sources of fluids but care must be taken to prevent microbial contamination.

• Water from the melted ice from a clean commercial source, such as an ice machine or a freezer, can be used
  o Melted ice from outdoor sources, such as icicles should not be used for consumption
• Juice from canned fruit, vegetables, or other canned products are potential sources of liquids; expiration dates on the cans should be checked before the food or liquid is consumed
• Water from a toilet tank (not the bowl) may be used if additional chemicals, such as bluing, have not been added\(^{34}\)
• Swimming pool or spa water can be used for hygienic purposes, but cannot be consumed

**Water Decontamination**

Attention should be paid to Public Service Announcements (PSAs) regarding the compromise of the municipal water supply. Should this occur, 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 N.

**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 being consumed. Avoid water with floating material, an odor or dark color.\(^{49}\) 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 ACS 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 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.52

- 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 N). 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:
  o 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 O). If no chlorine is smelled after 15 minutes, increase the amount of chlorine used the first time and repeat the procedures
- For wells with no plumbing system:
  o 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
- 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 ACS patients and staff, but can pose an infectious disease risk if not stored, prepared, and handled appropriately. ACS planners should involve registered dieticians and/or licensed sanitarians when developing formal written plans for obtaining, storing, rotating, and dispensing food supplies. Dietician and sanitary services should be coordinated and made available through local and state public health agencies and/or community emergency management. Only infection prevention 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 food: 53

- Symptomatic ACS workers should not prepare or serve food (see Syndromic Surveillance section)
- Store in a dark, dry, cool site well sealed to the outside to prevent pest and vermin attraction
  - Store human food separately from medications
- Store off the floor by a minimum of 4 inches to allow for cleaning under the pallet and to minimize contamination
- Refrigerate perishable food or discard if refrigeration is not available/feasible
  - Monitor refrigerator/freezer temperature to ensure proper storage (refrigerator: 38 – 40°F; Freezer: ≤ 0°F). Appendix P consists of a monitoring log for refrigerator temperatures
- Plan for temperature degradation due to loss of electricity
- Prepared hot food must be kept at 140°F
- Prepared cold food should be kept at ≤ 45°F
- Leftovers should be dated and used within 4 days or discarded54
  - Discard any food that requires refrigeration that has been kept at room temperature for ≥ 2 hours54
  - Discard any food that has been kept ≥ 1 hour in a room above 90°F54

Proper disinfection of work surfaces and utensils should be performed prior to and after food preparation (see Environmental Decontamination section). Food service workers should perform hand hygiene before and after working with food or contaminated food service areas (see Hand Hygiene section).

Waste Management

Regular Trash

Adequate trash and recycling 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 and recycling items are picked-up for disposal, the holding area should be cleaned and disinfected to remove accumulated organic material; this will prevent infestation by insects, animals, and vermin.

During a disaster, increased amounts of trash and regulated medical waste will be generated and can produce potential hazards. Routine waste management services may not be available during a disaster, so the ACS must have a plan for waste containment and storage.
Regulated Medical Waste

ACSs 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 semiliquid 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.*

Most PPE (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 Q provides a table of proper disposal for various types of waste, including RMW. All ACSs 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 emergency management plans should include provisions for RMW disposal for ACSs. Many local jurisdictions have standing arrangements for appropriate trash management during disasters, including handling RMW. A multidisciplinary approach should be taken to ensure that ACS planners coordinate with local emergency management and public health agencies. In the event that a community emergency management plan does not have such provisions, the following emergency disposal/treatment alternatives should be considered:

- RMW should remain at the ACS
  - Store RMW in an enclosed area (a dirty utility room/area) until arrangements for pick-up can be made
- If the ACS does not have or the supply of sharps containers becomes depleted, sharps may be placed in a rigid plastic container, such as a two liter soda bottle, and treated by adding a simple bleach solution to render them non-infectious before disposal as regular solid waste (following consultation with state and local regulators)

Human Waste

Every effort should be made to dispose of human waste products directly into the sanitary sewer system. However, incontinent patients and those with health conditions that preclude their ability to individually access facilities for personal waste elimination will require assistance. Such patients should be provided the necessary supplies and assistance for bedside management of waste elimination, including appropriate collection devices, skin cleaning, and hand hygiene.

Facility design may require that human waste be collected and transported to a separate/dirty utility area, such as when toilets or hoppers are not available in patient rooms/areas. If human waste is to be collected and transported, care must be taken not to spill the contents. Human
waste collection devices, such as urinals and bedpans, must be cleaned and disinfected between uses and should not be shared between patients. At a minimum, a gown and gloves should be worn when transporting human waste from the bedside to a dirty utility area; staff should consider donning eye protection if they anticipate a splash or spray into the eyes during waste disposal and/or cleaning of human waste collection devices. The dirty utility area should have adequate space to ensure sufficient separation between each component of the disposal and cleaning process, so as to minimize cross contamination between dirty and clean functions.

If the ACS does not have the capability/capacity for properly cleaning and disinfecting human waste collection devices, ACS managers should consider the use of disposable devices or outsourcing the cleaning/disinfection process. Disposable devices can consist of small buckets/containers or small bags for single use. Outsourcing consists of commercial disposable urinals or cleaning/disinfection of waste containments by an outside vendor. Trenches are not considered acceptable means of human waste disposal.

If sewage system disruption is a possibility, the ACS manager should assign someone to assess its function immediately. This is most likely to occur following a natural disaster, such as an earthquake or flood, but can occur after any event. If sewage lines break, ACS staff, patients, and visitors should be notified immediately that toilets must not be flushed, as this will result in a flood of heavily contaminated water. If any part of the ACS is flooded with potentially contaminated water/liquid, immediate steps must be implemented to prevent infection spread. This may consist of extensive environmental decontamination and/or closure of the affected area (see the Environmental Decontamination and Physical Plant sections and Appendix R).

### Patient Decontamination

Patient decontamination is the process of physically removing chemical, physical, or biological contamination from a person’s body. This process is not needed in most disasters and is usually not an infection prevention issue. This document will only address infection prevention issues related to patient decontamination. Patient decontamination is only an infection prevention issue when the disaster involves the release of a biological agent (i.e., bioterrorism or contaminated liquid agent in a flood). Furthermore, patient decontamination is not needed after all bioterrorism attacks; it is only necessary after an announced attack. Patient decontamination will not likely be needed after an unannounced bioterrorism attack because by the time the incident is recognized—days to weeks later—patients will have decontaminated themselves by showering and changing their clothes.

The purpose of patient decontamination in relation to infection prevention is two-fold: to protect individuals from exposure to the biological agent and to protect the facility from becoming contaminated with infectious particles. If a contaminated patient or item breeches the ACS, it may be necessary to evacuate the ACS or contaminated area temporarily until environmental decontamination can occur (see the Environmental Decontamination and Physical Plant sections).

Patient decontamination should ideally occur near the incident site, but this may not always be feasible. In rare events, the ACS staff may serve as a site for mass patient decontamination or
may need to decontaminate a small number of individuals who arrive at the ACS with biological contamination on their skin and/or clothing. Performing patient decontamination at an ACS is not likely for multiple reasons: In most communities, activating an ACS will take more time than the process of decontamination or transport of victims, and ACSs would need to have already been established in order to decontaminate patients in a timely manner. ACSs should consider having patient decontamination policies and procedures in place and training staff on these practices, to address the possibility of needing to perform these protocols. Procedures for decontaminating individuals will not be covered in this document; other documents address these procedures and should be used as the basis for developing ACS patient decontamination protocols.56-58

**Physical Plant/ Facility Needs Related to Infection Prevention**

ACSs will administer medical care during disasters, and as such, will have unique physical plant needs that must be addressed in order to provide care in a safe environment. The decision when choosing a site for an ACS is complex and involves multiple factors, many of which are not infection prevention-related issues (such as the ability to provide oxygen and having adequate parking spaces). Infection prevention issues should also be a consideration when choosing a site for an ACS. A list of infection prevention physical plant issues is included in Appendix S. AHRQ has developed a tool to aid communities in choosing sites for ACSs59; this tool should be used as the basis for identifying potential ACS sites. An ACS can be established within a hospital (such as in the cafeteria, auditorium or hallways), outside the hospital in a portable or mobile facility, or repurposing an existing healthcare building/structure (such as a shuttered hospital or long-term care facility). Non-medical structures (such as hotels, recreation centers, churches, airport hangars, etc) can also be used as an ACS to provide medical care59,60, but will pose a bigger challenge in addressing infection prevention issues. Once a site has been chosen, it is vital that ACS managers/planners examine the building/space relative to infection prevention issues and implement strategies to decrease the risk of infection spread on-site. These considerations should include an assessment of entrance and exit points to properly facilitate the flow of personnel, patients, medical equipment and waste within the facility. This should be done by the IP/IP designee in conjunction with the facility emergency manager, facility/healthcare engineering personnel, safety officer, and executive staff.

During a disaster, the physical structure of the ACS may be damaged and need to be repaired or closed in whole or in part. If the physical damage can affect infection transmission, such as a flood or a sewage line break, the IP/IP designee will need to implement environmental controls, including the potential temporary closure of any area within the boundaries or grounds of the ACS until environmental decontamination can occur. Appendix R outlines risk assessment and infection prevention strategies for environmental decontamination following a flood. Temporary evacuation of the ACS may be necessary if the contamination is extensive. Mold can be brought into the ACS via contaminated objects or it can grow within the ACS if the physical structure becomes wet. The ACS should be monitored for mold growth because it can contribute to excess morbidity and mortality. Care should be taken to recognize and monitor any areas with moisture due to flooding or leaks. Mold growth within an ACS may require temporary closure, in whole or in part, until environmental decontamination can occur.
It is vital that ACSs have designated room(s)/area(s) that can be used or converted to isolation room(s)/space(s) (see the Isolation section). ACSs should also utilize social distancing strategies when designing waiting rooms/areas and screening areas to prevent the spread of disease. Whenever possible, ACSs should attempt to create airborne infectious isolation rooms (AIIR) or a negative pressure room/area on-site in case airborne isolation is required. Guidelines for developing/setting up AIIRs and/or negative airflow protective environments have been published and should be used by ACS managers.

One aspect of the physical plant that needs to be considered is the number of toilets available onsite for patients, staff and visitors. Most ACSs will not have sufficient toilets on site and planners should work with portable toilet vendors in advance to ensure that adequate sanitary facilities will be available.

**Environmental Decontamination**

Contamination of the environment can contribute to infectious disease spread within the ACS. The patient care environment has been associated with infection transmission in healthcare settings. Medical equipment and items used in invasive procedures pose the greatest risk for disease transmission. However, frequently touched items, such as tables, doorknobs, utensils, and toys also pose a risk. The more contaminated the environment, the greater probability that disease transmission to patients and staff may occur. 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 individuals and workers at the ACS.

ACS workers should receive clear guidance and training regarding the principles related to environmental and equipment decontamination. Guidelines on proper cleaning and disinfection for healthcare facilities are available through existing documents. If mold is detected within the ACS, mold remediation is required. Environmental decontamination protocols relevant to the ACS should be developed and provided to the person(s) assigned to perform these duties. For example, procedures for mold remediation and patient care room cleaning need to be developed.

ACS workers should be provided appropriate PPE. Workers must be trained regarding PPE use and disposal to decrease exposure to infectious agents during cleaning and disinfection activities.

**Selection of Cleaning/Disinfection Agents**

The disinfection agent used to clean an ACS should be an EPA-registered chemical disinfectant.

- In most cases, an EPA-registered quaternary ammonium compound is adequate for cleaning environmental surfaces.
- During outbreaks of certain infectious organisms, such as norovirus, C difficile, VRE, or other agents that are spread by direct or indirect contact, the ACS should consider substituting a bleach solution or other appropriate EPA-registered disinfectant that is specific to the agent involved in the event.
Disinfectant products can be purchased undiluted, diluted in pour/spray bottles, or in 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.\textsuperscript{62}

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 are unavailable, commercially available cleaners may be substituted.

**Cleaning and Disinfection Supplies**

Cleaning and disinfection supplies can contribute to infection spread in healthcare environments if they become contaminated or are used inappropriately.\textsuperscript{47} Therefore, steps must be taken to prevent contamination of cleaning supplies in ACSs. The following recommendations should be used to prevent cross-contamination of cleaning supplies:

- Single- or multiple-use containers of cleaning solution may be used
  - Multiple-use containers of cleaning solution should be mixed fresh daily or as needed by the ACS
    - If a multiple-use container is used, the container must be cleaned and dried between mixing batches of cleaning solution
  - Small amounts of disinfectant/cleaning solution should be poured from the multiple-use container into buckets or small containers for individual use, making sure to keep the chemical disinfectant at the correct dilution
    - Dirty mop heads and cleaning cloths should never be put into the multiple-use container of cleaning solution as this can cause cross-contamination
  - Single-use cleaning solution containers should be discarded after each use
- Mopping solution should be changed after every three rooms or at least every 60 minutes\textsuperscript{62}
  - If the ACS does not have traditional rooms (i.e., hallways, open areas in convention centers, etc), a three-patient space/area should be approximated when determining how often to change mopping solution
- Mop buckets should be cleaned and allowed to air dry at the end of each day
- Mop heads should be replaced at least once daily or more frequently if needed because of high contamination in the ACS or after cleaning up a blood or body fluid spill\textsuperscript{47}
  - Mop heads should be replaced after cleaning the floor of an isolation room/area\textsuperscript{62}
  - A new mop head should be used to clean the floor of an ACS surgical area after each surgical procedure\textsuperscript{63}
- Disposable mop heads and cleaning rags/cloths are single-use items that should be discarded after use
• Cleaning cloths should be used to work from cleaner to dirtier areas
  ○ A new cleaning cloth should be used after cleaning up a blood or body fluid spill, a highly dirty/contaminated area/item, and/or an isolation room/area.
  ○ The same cleaning cloth should not be used for bathrooms and patient care areas unless laundered between uses
• Reusable mop heads and cleaning cloths should be cleaned/laundered and dried at 170°F for 2 hours between uses.

Cleaning Body Fluid Spills

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

• Put on gloves
• Cover the spill with an absorbent material
• If glass or sharp objects are present in the spill, the material should be picked up using mechanical means (i.e., a brush and dust pan, tongs, forceps, etc), and placed in an appropriate container
• Apply an EPA-registered disinfectant in the correct dilution and 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 Q)
• Clean the area with cloth or paper towels moderately wetted with an EPA-registered disinfectant
• Allow surfaces to air dry

Cleaning Environmental Surfaces

EPA-registered disinfectants should be used in accordance with manufacturer’s recommendations in regards to dilution and contact time when cleaning environmental surfaces. Daily cleaning of a patient room/area should include disinfection of all horizontal surfaces, allowing for adequate contact/dwell time (i.e., the amount of time the product remains wet on the surface) according to the manufacturers’ recommendations for the disinfectant being used. Environmental cleaning should focus on surfaces that are frequently touched by hands, such as bed rails, bedside tables, etc. Additional cleaning may need to be performed if the environment becomes contaminated, such as a body fluid splash or spray to a wall or curtains. During outbreaks of agents spread by direct or indirect contact, more extensive cleaning may be required to stop the outbreak. Cleaning/disinfection and inspection of a previously closed area of the ACS should be performed before re-opening the area.

Whenever possible, clean carpeted floors, upholstered furniture, or other cloth items with a vacuum cleaner equipped with a HEPA filter. Disinfection of the vacuum cleaner is not required when a HEPA filter is installed properly and remains intact during use. Commercially available products may be used to remove visible soil or stains from carpets and upholstery. Sweeping and dry mopping of carpets and upholstery should be avoided.

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
• Patient rooms/areas should be cleaned daily and as necessary
  ○ Other furniture should be cleaned weekly and as needed
• Medical or triage areas should be cleaned daily and as necessary
• Isolation area should be cleaned daily, upon individual transfer to a medical facility or moved to another part of the ACS, or when necessary
• Reusable medical equipment should be cleaned/disinfected in between uses

Cleaning Beds/Cots/Mattresses

Patient beds/cots should be cleaned daily as part of routine environmental decontamination with a special emphasis on cleaning of bedrails, when present. Beds/cots or mattresses of incontinent patients or those with a draining wound should be covered with an impermeable barrier (waterproof mat/heet, absorbent pad, blue pad, plastic, etc) to prevent them from becoming contaminated. If impermeable barriers are not used and beds/cots/mattresses become contaminated, they should be cleaned/disinfected. Disinfection procedures depend on the bed/cot/mattress material:
• Plastic materials should be disinfected using the procedure for cleaning body fluid spills
• Non-cloth mattress covers should be cleaned/disinfected between patients using an EPA-registered disinfectant
• Beds or cots made of cloth/canvas materials should be cleaned by scrubbing with soap and water or disinfectant
  ○ Grossly contaminated beds/cots/mattresses may need to be discarded, if resources allow [See Appendix Q]

Linen/Laundry Management

ACSs will require laundry/linens for patient care. Linens can transmit infections in healthcare settings unless they are handled carefully. Standard Precautions should be utilized to handle all linens, including those from potentially contagious patients. Safe handling of healthcare linens includes:
• Appropriate PPE should be worn when handling used patient linens
• Laundry workers should perform frequent hand hygiene
• Package, transport, and store clean linens in a way that protects them from dust/dirt
• Sterile linens must be used for sterile procedures, such as surgery
• Bed/cot bedding should be cleaned and laundered between occupants and as needed when contaminated with body fluids
• Cloth mattress covers should be laundered between patients
• Pillow covers and washable pillows should be laundered between patients or when contaminated with blood or body fluids using a hot-water wash cycle
• If routine laundering of linens is not available or feasible during a disaster, ACSs should consider using disposable linens or extending the time between washing of linens
Priority should be given to washing linens that are contaminated with blood or body fluids.

- Minimize linen agitation to prevent re-aerosolization of infectious particles.
  - Consider utilizing water soluble or reusable laundry bags that can be washed with the linens.
- Bag linens/laundry at the point of use.
- Use a leak-resistant container/system for linens that are contaminated with blood or body fluids.
- Have a separate dirty and clean laundry area.
  - Dirty laundry area should be negative pressure compared to clean laundry area.

Additional infection prevention interventions may be needed for certain infectious agents, such as variola (i.e., smallpox). Disease-specific guidelines should be consulted during infectious disease disasters.

**Washing Healthcare Linens**

The following guidelines should be used when washing linens from healthcare settings, including ACSs:

- If hot water washing is used: Wash with detergent in water that is \( \geq 160^\circ F \) for \( \geq 25 \) minutes.
- If cold water (\( < 160^\circ F \)) washing is used: Choose chemicals suitable for low-temperature washing and use at concentrations designated by the manufacturer.

**Cleaning, Disinfection, and Sterilization of Medical Equipment**

Medical equipment and surgical instruments can lead to HAI transmission if proper infection prevention procedures are not followed. Single use items are considered disposable and should not be reused between patients. If disposable equipment is not available and/or feasible for the task being performed, the item must be reprocessed between uses. Medical equipment and surgical instruments are classified into categories based on risk of infection transmission. The categories include non-critical, semi-critical and critical. Non-critical items consist of equipment/items that only have contact with intact skin and therefore pose a very minor risk of infection transmission. Semi-critical equipment/items include those that come in contact with mucous membranes and non-intact skin. Critical equipment/items are those that enter into sterile body sites or the vascular system.

Consult the manufacturer’s recommendations for cleaning, disinfecting and sterilizing of medical equipment and surgical instruments if possible. These instructions should include information about a) the equipment’s risk of infection transmission, b) the equipment’s compatibility with chemical germicides, c) whether the equipment is water-resistant or can be safely immersed for cleaning, and d) how the equipment should be decontaminated if servicing is required. In the absence of manufacturers’ instructions, non-critical medical equipment usually only requires cleansing followed by low- to intermediate-level disinfection, depending on the nature and degree of contamination (see Appendix T). Semi-critical items require high level disinfection.
Critical items require sterilization between uses. Procedures and chemical disinfectant/sterilants for performing low, intermediate, and high level disinfection and sterilization are outlined in Appendix T.

The ACS may reprocess medical equipment and surgical instruments on-site if proper equipment and procedures are used. If resources do not allow this, reprocessing of equipment may be out-sourced to a vendor or local hospital. Plans and protocols for these procedures should be in place before the ACS opens to facilitate fast response during an event. If sterilization of reusable critical equipment/instruments cannot be performed on-site or out-sourced due to limited resources, crisis standards of care should outline when the ACS should consider high-level disinfection to temporarily replace sterilization for re-usable equipment.55

Medical equipment surfaces that may become contaminated with blood or body fluids, or those that are difficult to disinfect, may require the use of physical barriers. Impervious-backed paper, aluminum foil, and plastic or fluid-resistant covers can be used as barrier protection. Coverings should be removed and discarded after each use and done so while the worker is still wearing gloves. A new barrier must be used for each patient encounter.47

**Dialysis**

In a disaster, individuals with chronic kidney disease will have a continued need for regular dialysis treatment. The Kidney Community Emergency Response Coalition and other organizations have developed networks to ensure that dialysis care can still be provided during disasters.65 In addition, the Centers for Medicare and Medicaid Services (CMS) indicate that dialysis centers should have emergency management plans that address how dialysis services will be provided during disasters.13 Community emergency management plans must include protocols for redirecting patients to dialysis centers that remain open during a disaster and/or have procedures for setting up an ACS that is designed to and capable of providing dialysis services for patients. In addition, some hospitals may choose to set up an ACS that can provide dialysis services, such as an off-site intensive care unit that can provide dialysis if needed. For most ACSs, it will not be feasible to provide dialysis services due to the logistics involved in administering this level of care (i.e., having dialysis machines and equipment, trained staff, etc). Individuals who require dialysis during disasters should be referred to an ACS that has the capability to provide dialysis.

ACSs that will provide dialysis services during disasters (including both dialysis-specific ACSs and hospital-based ACSs that have the capability of providing dialysis services) must incorporate infection prevention protocols into their emergency management plan. Dialysis patients are at high risk for acquiring infections due to chronic underlying conditions and recurring access to normally sterile areas, such as the peritoneal cavity and the circulatory system. Common infections in dialysis patients include access site infections, blood stream infections and infections of the peritoneal cavity.66 Guidelines for dialysis centers have been published by the National Kidney Foundation Kidney Dialysis Quality Outcome Initiative and are a necessary resource for infection prevention planning for an ACS.67 Guidelines on preventing infection transmission during dialysis are also provided by APIC.66
Event-specific challenges may affect dialysis-related infections. For instance, natural disasters that involve a loss of clean water and/or electricity will require different interventions than an infectious disease disaster, such as a bioterrorism attack or pandemic. ACSs that will provide dialysis services should plan for all contingencies.

Water purity standards have been established by the Association for the Advancement of Medical Instrumentation (AAMI)\textsuperscript{68} and the CDC\textsuperscript{47} and should be followed when designing a water system for dialysis treatment. The lack of clean water will most commonly occur after a natural disaster, such as a flood or hurricane.

Important infection prevention considerations for dialysis:\textsuperscript{66}
- Use of aseptic technique during dialysis treatments and related procedures
- Use antimicrobial ointment for hemodialysis catheter insertion sites
- Disinfection procedures and maintenance schedules for dialysis equipment
- Staff should wear appropriate PPE when accessing patient dialysis access sites
- Segregation of Hepatitis BsAg positive patients by room or area
- Careful monitoring of water treatment systems and water distribution
- Staff education related to PPE use, hand hygiene, and infection prevention for dialysis surgery

Surgery

Depending on community needs following a disaster and the scope of practice for a facility, ACSs may need to provide surgical services. An ACS may also be established to serve as a surgical center. Surgery poses a risk of infection transmission, even in the best of circumstances. The risk of surgical site infections will likely be higher during disasters if resources become limited and crisis standards of care are implemented. Because of this, attention to infection prevention will be critical for any ACS that provides surgical services.

There are many organizations that have developed surgical site infection prevention guidelines for perioperative services, including the CDC\textsuperscript{69}, American Association for the Advancement of Medical Instrumentation (AAMI)\textsuperscript{70}, Association of Perioperative Registered Nurses (AORN)\textsuperscript{63}, and the Surgical Care Improvement Project. ACS planners/managers should consult these guidelines and implement practices outlined by these organizations. A summary of infection prevention strategies used to prevent surgical site infections are provided in Appendix U.\textsuperscript{63,69-71}

Miscellaneous Medical Procedures

ACSs will likely need to perform a number of invasive medical procedures to care for high acuity patients during disasters. Examples of invasive medical procedures include giving injections, suturing wounds, debridement, insertion and maintenance of central venous catheters, urinary catheters, endotracheal tubes, chest tubes, nasogastric tubes, and other medical devices that are inserted into the body. Invasive medical procedures can range from those that have a low risk of infection transmission, such as giving an injection, to those with a high risk of infection, such as inserting an endotracheal tube and putting the patient on a mechanical ventilator. The risk of HAIs is higher in patients requiring these interventions due to the patient’s increased severity of illness necessitating the procedure and providing a portal of entry into the body for
pathogens. Aseptic technique should be used when performing any invasive medical procedure unless the procedure requires more stringent infection prevention strategies. Adherence to infection prevention techniques specific to each medical procedure is critical. The Institute for Healthcare Improvement and APIC have developed guidelines for decreasing the risk of healthcare associated infections related to the use of ventilators, central venous catheters, and urinary catheters, among other medical devices. These guidelines should be included when developing the infection prevention plan for the ACS. Summaries of infection prevention strategies related to ventilator-associated pneumonia, central line-associated bloodstream infections, and catheter-related urinary tract infections are outlined in Appendices V – X.

**Toys**

In ACS settings where pediatric patients are present, it is highly likely that toys will be present, shared, and exchanged. This may occur whether or not the parents/guardians bring in toys with their child (non-communal toys). It will definitely occur if the ACS has chosen in advance to provide toys (communal toys).

While toys are an important tool for distraction, entertainment, and development, they have the potential to spread disease. If the facility is to provide communal toys, the play area should consist of a designated area/space (whenever possible) within the “well” side of the triage/waiting room (see the Triage Area section). Sick/symptomatic children should not visit the “well” play area. The ACS should work with facility-associated leadership (if part of hospital network) or local media to communicate to parents/guardians that children’s personal toy(s) should be brought to the ACS if the child is sick/symptomatic. Staff, children and parents/guardians should perform hand hygiene before entering and when leaving any designated play area. Whether or not a play area is provided, hand hygiene products should be readily available at a designated location in waiting areas.

The following recommendations are designed to reduce the risk of disease transmission related to toys in an ACS setting.

**Toy Selection**

During infectious disease disasters (such as bioterrorism, outbreak of an emerging infectious disease, or pandemic) and outbreaks that occur after other types of disasters, the ACS should consider eliminating communal toys. If the ACS will provide communal toys, a written and readily accessible procedure for the storage, monitoring and cleaning of toys should be developed. ACS staff/volunteers who will be assigned to monitor toys in the ACS need to be trained on these procedures. When procuring toys in advance, administrative leadership of the ACS should:

- Give preference to obtaining toys with non-porous surfaces that are less likely to become contaminated and can be easily cleaned, disinfected and dried
- Avoid crib mobiles, soft/stuffed toys, hand-held electronic games, and wooden and blow toys because they are difficult to clean, disinfect and dry
• Accept only soft/stuffed animals and cloth dolls if they are new or have been cleaned and disininfected prior to delivery.\textsuperscript{78}
• Avoid bath or other toys that retain water because they can harbor germs.\textsuperscript{24}

\textbf{Handling and Cleaning Communal Toys}

The ability to maintain communal toys safely in an ACS requires staff assigned to monitor the common play area and toys to implement cleaning and disinfection procedures for those toys. The sharing of hand-held electronic games and wooden toys should be discouraged as they are difficult to clean. Soft/stuffed animals and cloth dolls should not be shared/exchanged between children.\textsuperscript{24,78}

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 ACS to segregate clean from dirty toys whenever feasible
• 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
• If a 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/crayon/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 and signs dealing with basic hygiene surrounding children and toys should be developed in advance and be visible within the ACS. See Appendix Y for an example of an educational poster about toys

\textbf{Frequency of Toy Cleaning and Disinfection}

• All toys need to be cleaned at least daily and when obviously 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 use.\textsuperscript{24}

\textbf{Procedure for Cleaning Toys of Non-Infected/Well-Appearing Children} \textsuperscript{78}

• Small toys may be washed with soap and water and then disinfected using an EPA-registered disinfectant that is non-toxic to children, a 1:100 dilution of household bleach, or a 70% alcohol swab and allowed to air dry. Rinsing with water is not necessary when disinfecting with alcohol, but should be performed when using an EPA-registered disinfectant or bleach solution.\textsuperscript{77}

Toys that will not be damaged by immersion should be cleaned as follows:
• Clean in a dishwasher or the hot cycle of a washing machine
- 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 that is non-toxic to children or a 1:100 dilution of household bleach
- Allow toys to air dry
- 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

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

- 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 Children**

- Children with symptoms of contagious diseases (see the Infection prevention Triage Form, Appendix E) should not be allowed in common play areas until they are no longer symptomatic or considered non-contagious per a medical professional
- The toy of any child who is visibly ill, or suspected of having an infectious disease, should remain with that child while they are ill
- Toys used by ill children 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 would be followed for 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 ACS

**Handling and Cleaning Non-Communal Toys**

Non-communal toys are those that are brought to the ACS by an individual child/family or those that cannot be shared due to the construction of the toy (i.e., fabric). Non-communal toys should be handled using the following recommendations:

- Non-communal toys should be monitored and cleaned by the parent/guardian of the child possessing the toy
• Parents/guardians should discourage the sharing of these types of toys

Pest Management

Following a disaster, there will likely be an increase in insects and other pests in or around the facility. Some pests can spread diseases, such as West Nile virus via the bite from an infected mosquito; others pests may invade food supplies or medical supplies. Rain and high water levels, such as after a hurricane or flood, may lead to an increase in the numbers of mosquitoes, ants and other pests.

Facilities should minimize and eliminate vermin. Pest control should be addressed by the ACS, preferably before the site is opened and then monitored during its operation. Environmental management of pests and/or vermin should be instituted as soon as possible. Recommendations for pest control include the following:

• Eliminate food sources for pests (see the Food Safety section)
  o All garbage and medical waste should be stored away from the facility in closed containers
• Eliminate areas for nests, burrows, or breeding grounds such as open pipes or boxes
• Evaluate the physical structure of the ACS for potential vermin entrances, such as windows with torn or missing screens, doors left propped open, standing water, etc and seal/eliminate any potential problem areas
• Work with a community pest control team/company if needed

Rodents, such as rats and mice, can spread disease by contaminating food and the environment or by biting/scratching humans. In natural disasters, the rodent population is often reduced as these creatures relocate in search of food, water and shelter. However, in a situation where municipal workers are ill and garbage collection is compromised, rodent control may become a very important issue for ACSs. The following steps should be taken to reduce the risk of having the site become overwhelmed with rats and mice:

• Food and water should be kept covered and stored in a rodent proof container (i.e., a glass, thick plastic or metal container with a tight-fitting lid)
• Pet food should be handled in such a way as to prevent rodents from getting to it (See Safe Handling of Pet Food section)
• Garbage should be disposed of in a rodent proof container on a frequent basis in an area removed from the ACS (see Waste Management section)

In the event rodents invade an ACS, spring–loaded traps should be used to catch them. The traps should be placed in a “T” shape against the wall where there are rodent marks. Glue traps are not recommended because they can scare mice and cause them to urinate, contaminating the ACS. If rodents have entered an ACS, care must be taken when cleaning droppings, urine or nesting materials so as not to aerosolize germs excreted from the rodents. Recommendations include the following:
• The area should not be swept or vacuumed until it has been properly disinfected. Disinfection should take place by spraying the area and the droppings/urine with a solution of 1 part bleach to 10 parts water until the area is moist to prevent dust/re-aerosolization of infectious particles.
• The area should be sprayed thoroughly and paper towels should be used to absorb the bleach solution.
• The paper towels should be placed in a sealed container outside the ACS and the area re-sprayed with a 1:10 bleach solution.
• Gloves made of latex, vinyl or rubber should be worn when coming in contact with rodent excrement or dead rodents.
• If a rodent has been trapped, the dead animal should be sprayed with a 1:10 bleach solution, then carefully removed from the spring loaded trap and allowed to drop into a plastic bag.
  o Alternatively, the animal and the trap can be placed in a plastic bag.
• The bag should be sealed and placed in a second plastic bag, which should also be sealed before placing it in a covered garbage container.
• If the trap is to be re-used, it should be disinfected with bleach solution and rinsed thoroughly before re-use.
• After clean-up of rodents or rodent contaminated materials, gloves should be removed and hand hygiene should be performed.
• Traps should continue to be set for one week after the last rodent is caught.

**Animal Management**

Given the nature of the ACS, only service animals should be allowed in an ACS. The animal does not have to be licensed or certified by a state or local government as a service animal, but they must meet the definition of a “service animal” according to the 1990 Americans with Disabilities Act (ADA). According to the ADA, a service animal is “any animal individually trained to do work or perform tasks for the benefit of an individual with a disability, including, but not limited to, guiding individuals with impaired vision, alerting individuals who are hearing impaired to intruders or sounds, providing minimal protection or rescue work, pulling a wheelchair or fetching dropped items” (pg. 1).82

The ACS manager should coordinate with local community emergency management agencies to know the location of emergency kennels for pets. This information should be made available to the screener and/or at the triage/screening area (i.e., at the facility entrance) in case a patient or visitor arrives with a pet that is not a service animal.

The ACS needs to have supplies available to clean up any potential urine or fecal elimination from the service animal within the ACS. When cleaning up animal elimination within the ACS, gloves should be worn and hand hygiene should be performed after the gloves are removed.83

**Post-Mortem Care**

Following a disaster, local and state authorities should be prepared for the possibility of deaths over and above the number of fatalities from all causes typically expected during that period. To
prepare for the possibility of mass fatalities, non-traditional sites must plan for more rapid processing of the deceased. ACSs should work with the local health department and local coroner to ensure they have access to additional supplies and can expedite the steps, including the completion of required documentation, necessary for efficient management of the deceased during a disaster. The National Association of Medical Examiners (NAME) has developed a guide for mass fatality plans and recommendations for handling contaminated deceased bodies.

ACSs should consider the following when developing an infection prevention plan related to mass fatalities:

- Assess current capacity for a temporary morgue and/or refrigeration of deceased persons. Discuss possible storage plans in the event that refrigeration is not feasible
- Discuss local and state mass fatality plans with public health officials and medical examiners
  - Incorporate Disaster Mortuary Operational Response Teams (DMORT) into ACS Plans as dictated by regional emergency management plans
- Determine the scope and volume of supplies (e.g. body bags) needed to handle an increased number of deceased persons

Procedures for handling of the deceased are dictated by local and state regulations. Most infectious agents/diseases do not survive long in a dead body; exceptions to this include smallpox and tuberculosis. In addition, victims of a bioterrorism attack can have residual infectious agent on their body that could pose a risk to medical examiners or coroners during autopsy procedures. The following precautions should be taken during postmortem care:

- Observe Standard Precautions for all contact with the body
- Remove all invasive medical devices according to local and state regulations unless the body is scheduled for autopsy
- Pack and bandage wounds and natural openings with absorbent material to decrease possibility of exposure to body fluids
- Consult state health codes for morgue refrigerator temperatures and body bag requirements for transport
- Consider limiting contact with the body to close family members and ensure Standard Precautions and hand hygiene are observed if the deceased had a communicable disease that is known or suspected of being able to be spread from a dead body to others

Autopsies pose a high risk for infection transmission and should not be performed in ACSs unless the ACS meets the NAME requirements for being an autopsy room, the ACS has biosafety policies in place that specifically address performing autopsies, and staff are trained on infection prevention autopsy precautions.

**Infection Prevention Education/Training**

Infection prevention education is essential for ACS staff, patients, and visitors. There are a variety of ACS worker groups who need infection prevention training; these groups are outlined in Appendix Z. Infection prevention competencies have been developed for hospital-based
healthcare workers, but do not currently exist for ACS staff. However, these competencies can be used for education development for ACS healthcare workers and may serve as a starting point for creating training for other groups.

Infection prevention education/training topics needed for ACS staff, patients, and visitors are outlined in Appendix AA. This training includes general infection practices that apply to all disasters, such as how and when to perform hand hygiene and respiratory etiquette, isolation precautions, PPE use, how to safely reuse respiratory protection, and screening procedures. In addition, event or disease-specific infection prevention information will need to be communicated/taught to ACS staff, patients, and visitors. This will include information such as specific isolation and PPE recommendations for a novel strain of influenza during an influenza pandemic or other disease-specific guidelines. It would be best if ACS personnel are provided pre-event training on basic infection prevention practices. During a disaster, just-in-time (JIT) training should also be offered that describes event/disease-specific information. Whenever possible, the IP/IP designee should keep JIT training materials on hand to distribute during disasters. Signage, such as Appendices H, I, L, M, Q, and Y, can also assist in JIT training.
References:


APPENDIX A
Statement of Authority for Infection Prevention at the Alternate Care Site

**Philosophy:** The infection preventionist/infection prevention designee is aware that infections, whether brought into the facility (i.e., community acquired) or obtained on-site (i.e., healthcare-associated), represent a potential hazard to all persons having contact within the alternate care facility. Therefore effective measures must be implemented to prevent infections.

**Description:** The infection preventionist/infection prevention designee shall be responsible for the Alternate Care Site infection prevention program to include the implementation of a well designed infection prevention plan. The plan will include surveillance and infection prevention measures.

The infection preventionist/infection prevention designee shall have authority over the infection prevention plan to include the responsibility of implementation, maintenance, and evaluation.

**Goal:** This authority statement for the infection preventionist/infection prevention designee is designed to allow immediate implementation measures deemed necessary to prevent infections. The infection preventionist/infection prevention designee shall have the authority to immediately institute any and all appropriate control measures where there are any indications or risk to alternate care site patients, visitors, or staff.

1. The infection preventionist/infection prevention designee is authorized to make the final decision regarding the infection prevention plan.
2. The infection preventionist/infection prevention designee is authorized to make the final decision regarding questions of isolation and use of personal protective equipment, including patient placement and disposition.
3. The infection preventionist/infection prevention designee is authorized to make the final decision regarding environmental controls, including the potential closure of any area within the boundaries or grounds of the alternate care site.

Alternate Care Site Director: Date:

---------------------------------------------------------------

Infection preventionist/infection prevention designee: Date:

---------------------------------------------------------------
APPENDIX B
List of Infection Prevention Equipment/Supplies Needed for an ACS

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

Waste Disposal Supplies
- Trash cans for regular trash
- Red bags or containers for regulated medical waste disposal
- Biohazard stickers or labels for regulated medical waste disposal
- Toilets or portable waste elimination systems
- Urinals
- Bedpans
- Small buckets/containers or bags for human waste elimination
- Sharps containers

Safety devices for giving injections or handling medication

Medication/vaccines for treatment and prophylaxis of infectious diseases

Refrigerator for storing medications and vaccines

Personal Protective Equipment (PPE)
- Respirators (N95 or Powered air purifying respirators (PAPR)/PAPR Supplies)
- Masks (surgical/procedure masks)
- Gowns (patient care gowns)
- Gloves (non-sterile and 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)
- Chemicals for medical equipment cleaning, disinfection, and sterilization (when applicable)

Water Decontamination Products
- Chlorine or iodine tablets
- Non-scented household bleach (sodium hypochlorite)
- Commercial-grade water filters
- Coffee filters

Syndromic Surveillance Supplies
- Thermometers (disposable or supplies for disinfection between individuals)
- Facial tissues

Environmental Controls
- Fans for creating negative pressure
- Plastic, drywall, or plywood for barrier creation
Sinks and/or hand hygiene stations
Portable HEPA Filter units

Food Safety
Thermometer for monitoring refrigerator/freezer and food temperature

Forms
Syndromic Surveillance Assessment/ Triage Form
Infection Control Triage

Informational/Educational Products/ Signage
Hand Hygiene Techniques
Respiratory Etiquette
Infection Control Precautions
Disposal of Waste in an ACS
Syndromic Surveillance Poster
Putting on and Taking Off Personal Protective Equipment

Patient Decon Supplies*
Level C Suits
Chem Tape
Portable Decon Shower or equivalent
Morgue Bags

*Only needed if patient decontamination is going to occur at site.
APPENDIX C
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
☐ ☐ Watery 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 an ACS 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 and give date administered __________________

Name of person completing the form _____________________________ Date _____________________________
<table>
<thead>
<tr>
<th>The following symptoms/conditions should be reported to a worker as soon as possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fever</td>
</tr>
<tr>
<td>• Cough</td>
</tr>
<tr>
<td>• Bloody nasal drainage</td>
</tr>
<tr>
<td>• Runny nose</td>
</tr>
<tr>
<td>• Loose or unformed stools</td>
</tr>
<tr>
<td>• Watery or explosive stools</td>
</tr>
<tr>
<td>• Rash</td>
</tr>
<tr>
<td>• Stiff/sore neck</td>
</tr>
<tr>
<td>• Red eye or drainage from eye(s)</td>
</tr>
<tr>
<td>• Wound or lesion</td>
</tr>
<tr>
<td>• General feeling of illness (fatigue, body aches, headache, etc)</td>
</tr>
</tbody>
</table>
APPENDIX E
Infection Control Triage

This table is intended as a guideline and is not all inclusive. Standard Precautions (see Standard Precautions section) should be used for all patient encounters.

Individuals with severe or rapidly progressive illnesses should receive a medical evaluation immediately and may need to be transferred to a hospital or other type of healthcare facility.

<table>
<thead>
<tr>
<th>Symptoms/Syndrome</th>
<th>Isolation Precaution Category</th>
<th>Individual Placement/ Separation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cough, runny nose, watery eyes</td>
<td>Standard</td>
<td>None</td>
</tr>
<tr>
<td>Fever (Temp &gt; 100.4°F) &amp; cough in Adults</td>
<td>Droplet</td>
<td>Cohorting; Spatial distancing²</td>
</tr>
<tr>
<td>Fever (Temp &gt; 100.4°F) &amp; cough in children</td>
<td>Droplet</td>
<td>Cohorting; Spatial distancing²</td>
</tr>
<tr>
<td>Fever (Temp &gt; 100.4°F), cough with bloody sputum, and weight loss</td>
<td>Airborne³</td>
<td>AIIR or negative pressure area/room; Cohorting; Spatial distancing²</td>
</tr>
<tr>
<td><strong>Vomiting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loose or unformed stools</td>
<td>Standard</td>
<td>Social distancing³</td>
</tr>
<tr>
<td>Watery or explosive stools, with or without blood</td>
<td>Contact</td>
<td>Cohorting; Spatial distancing²</td>
</tr>
<tr>
<td>Fever (Temp &gt; 100.4°F) &amp; rash</td>
<td>Airborne³</td>
<td>Cohorting; Spatial distancing²</td>
</tr>
<tr>
<td>Fever (Temp &gt; 100.4°F), upper chest rash, and stiff/sore neck</td>
<td>Droplet</td>
<td>Cohorting; Spatial distancing²</td>
</tr>
<tr>
<td>Eye infections (drainage from eye)</td>
<td>Standard</td>
<td>Social distancing³</td>
</tr>
<tr>
<td>Draining wound/lesion</td>
<td>Contact</td>
<td>Cohorting; Spatial distancing²</td>
</tr>
<tr>
<td>Itchy rash without fever</td>
<td>Contact</td>
<td>Cohorting; Spatial distancing²</td>
</tr>
</tbody>
</table>

¹If 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.

²Spatial Distancing involves separating the potentially contagious person from others by a distance of at least 3 – 6 feet which should include placement in a private room when available.

³Transfer to a hospital or other medical facility with an AIIR as soon as possible, unless the ACS has the ability to create an AIIR or negative pressure onsite.

⁴Social 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 ACS, perform frequent hand hygiene, and inform ACS workers if symptoms progress. These actions should continue until symptoms subside.
APPENDIX F
Example of Alternate Care Site Triage/Waiting Area Layout

- Safe-Zone-----
-6 Feet--

3 – 6 feet separation between chairs if possible

Well Patients

Sick Patients

Entrance to ACS

Door to Treatment Area

Restroom Facilities
(Male)
(Female)

Play Area
Clean Toys
Dirty Toys

Triage desk/area

Entrance to ACS

Well Patients

Sick Patients
## APPENDIX G
Suggested Work Restrictions for Healthcare Workers with a Known or Suspected Contagious Disease/Condition

<table>
<thead>
<tr>
<th>Disease/Condition</th>
<th>Work Restriction</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conjunctivitis</td>
<td>Restrict from patient care activities</td>
<td>Until eye discharge ceases</td>
</tr>
<tr>
<td>Cytomegalovirus infection</td>
<td>No restriction</td>
<td>NA</td>
</tr>
<tr>
<td>Diarrheal illness</td>
<td>Restrict from patient care activities and food handling</td>
<td>Until symptoms resolve; consult with public health about need for negative stool cultures</td>
</tr>
<tr>
<td>- Acute stage (i.e., symptomatic)</td>
<td>Restrict from care of high-risk patients</td>
<td>NA</td>
</tr>
<tr>
<td>- Convalescent stage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diphtheria</td>
<td>Exclude from duties</td>
<td>Until antimicrobial therapy completed &amp; 2 cultures obtained ≥ 24 hrs apart are negative</td>
</tr>
<tr>
<td>Enteroviral Infections</td>
<td>Restrict from care of infants, neonates, and immunocompromised patients</td>
<td>Until symptoms resolve</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>Restrict from patient care activities and food handling</td>
<td>Until 7 days after onset of jaundice</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Assign to non exposure-prone procedures</td>
<td>NA</td>
</tr>
<tr>
<td>- Staff with acute or chronic Hep B surface antigenemia</td>
<td>Exclude from duties</td>
<td>Until hepatitis B e antigen is negative</td>
</tr>
<tr>
<td>- Staff with acute or chronic Hep B e antigenemia</td>
<td>Exclude from duties</td>
<td>Until hepatitis B e antigen is negative</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>No recommendation</td>
<td>NA</td>
</tr>
<tr>
<td>Herpes simplex</td>
<td>No restriction</td>
<td>NA</td>
</tr>
<tr>
<td>- Genital</td>
<td>Restrict from patient care activities</td>
<td>Until lesions heal</td>
</tr>
<tr>
<td>- Hands (herpetic whitlow)</td>
<td>Restrict from care for high risk patients</td>
<td>NA</td>
</tr>
<tr>
<td>- Orofacial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Immunodeficiency Virus</td>
<td>Restrict from patient care activities</td>
<td>Until 5 days after the onset of symptoms</td>
</tr>
<tr>
<td>Influenza</td>
<td>Restrict from patient care activities</td>
<td>Until 24 hours after resolution of fever without the use of antipyretics</td>
</tr>
<tr>
<td>- Seasonal</td>
<td>Restrict from patient care activities</td>
<td>Until 24 hours after resolution of fever, unless an alternative diagnosis is established or diagnostic tests are negative for influenza A virus</td>
</tr>
<tr>
<td>- Avian</td>
<td>Restrict from patient care activities</td>
<td></td>
</tr>
<tr>
<td>- Novel H1N1 or other pandemic strain</td>
<td>Restrict from patient care activities</td>
<td></td>
</tr>
<tr>
<td>- Those working with non- immunocompromised patients</td>
<td>Restrict from patient care activities</td>
<td></td>
</tr>
<tr>
<td>- Those working with severely</td>
<td>Restrict from patient care activities</td>
<td></td>
</tr>
<tr>
<td>Disease</td>
<td>Status</td>
<td>Restriction Details</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>immunocompromised patients</strong></td>
<td></td>
<td>Reassignment or work restriction for 7 days or until symptoms have resolved, whichever is longer</td>
</tr>
<tr>
<td><strong>Measles</strong></td>
<td>Active</td>
<td>Exclude from duties</td>
</tr>
<tr>
<td></td>
<td>Post-exposure</td>
<td>Exclude from duties</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Until 7 days after rash appears</td>
</tr>
<tr>
<td><strong>Meningococcal infections</strong></td>
<td></td>
<td>Exclude from duties</td>
</tr>
<tr>
<td><strong>Mumps</strong></td>
<td>Active</td>
<td>Exclude from duties</td>
</tr>
<tr>
<td></td>
<td>Post-exposure</td>
<td>Exclude from duties</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Until 24 hrs after start of therapy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Until 5th day after 1st exposure through 21st day after last exposure and/or 4 days after rash appears</td>
</tr>
<tr>
<td><strong>Pediculosis (lice)</strong></td>
<td></td>
<td>Restrict from patient care activities</td>
</tr>
<tr>
<td><strong>Pertussis</strong></td>
<td>Active</td>
<td>Exclude from duties</td>
</tr>
<tr>
<td></td>
<td>Post-exposure (asymptomatic)</td>
<td>No restriction; prophylaxis recommended</td>
</tr>
<tr>
<td></td>
<td>Post-exposure (sym ptomatic)</td>
<td>Exclude from duties</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Until 9 days after onset of parotitis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>From 9th day after 1st exposure through 26th day after last exposure or until 9 days after onset of parotitis</td>
</tr>
<tr>
<td><strong>Respiratory infections, viral</strong></td>
<td></td>
<td>Restrict from care for high risk patients</td>
</tr>
<tr>
<td><strong>Rubella</strong></td>
<td>Active</td>
<td>Exclude from duties</td>
</tr>
<tr>
<td></td>
<td>Post-exposure (susceptible personnel)</td>
<td>Exclude from duties</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Until 5 days after rash appears</td>
</tr>
<tr>
<td></td>
<td></td>
<td>From 7th day after 1st exposure through 21st day after last exposure</td>
</tr>
<tr>
<td><strong>Scabies</strong></td>
<td></td>
<td>Restrict from patient care activities</td>
</tr>
<tr>
<td><strong>Severe Acute Respiratory Syndrome</strong></td>
<td>Active</td>
<td>Exclude from duties</td>
</tr>
<tr>
<td></td>
<td>Post-exposure (asymptomatic following high-risk exposure)</td>
<td>No restriction, but person should be monitored for 10 days past exposure</td>
</tr>
<tr>
<td></td>
<td>High-risk procedure for SARS: being present in room during an aerosolizing procedure when not wearing appropriate PPE</td>
<td>Until symptoms resolve and/or 10 days after resolution of fever, provided respiratory symptoms are absent or improving</td>
</tr>
<tr>
<td></td>
<td>Post-exposure (asymptomatic following low-risk exposure)</td>
<td>Monitor for 10 days past exposure</td>
</tr>
<tr>
<td></td>
<td>Low-risk procedure for SARS: Caring for SARS patient without proper PPE during any activities except</td>
<td>Until 10 days after the date of the last high-risk exposure</td>
</tr>
<tr>
<td>Aerosolizing Procedures</td>
<td></td>
<td>Until cleared by medical evaluation as being non-contagious</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>- Post-exposure (symptomatic)</td>
<td>Exclude from duties</td>
<td></td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em> infection</td>
<td></td>
<td>Until lesions have resolved</td>
</tr>
<tr>
<td>- Active, draining skin lesions</td>
<td>Restrict from patient care activities</td>
<td></td>
</tr>
<tr>
<td>- Carrier state</td>
<td>No restriction unless person is epidemiologically linked to infection transmission</td>
<td></td>
</tr>
<tr>
<td>Streptococcal infection, Group A</td>
<td>Restrict from patient care activities and food handling</td>
<td>Until 24 hrs after adequate treatment started</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Active disease</td>
<td>Exclude from duties</td>
<td>Until cleared by medical evaluation as being non-contagious</td>
</tr>
<tr>
<td>- PPD converter</td>
<td>No restriction</td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td></td>
<td>Until all lesions dry and crust</td>
</tr>
<tr>
<td>- Active</td>
<td>Exclude from duties</td>
<td></td>
</tr>
<tr>
<td>- Post-exposure (susceptible personnel)</td>
<td>Exclude from duties</td>
<td>From 10th day after 1st exposure through 21st day (28th day if VZIG is given) after last exposure</td>
</tr>
<tr>
<td>Zoster</td>
<td></td>
<td>Until all lesions dry and crust</td>
</tr>
<tr>
<td>- Localized in healthy person</td>
<td>Cover lesions; restrict from care of high-risk individuals</td>
<td></td>
</tr>
<tr>
<td>- Generalized or localized in immunosuppressed person</td>
<td>Restrict from patient care activities</td>
<td>Until all lesions dry and crust</td>
</tr>
<tr>
<td>- Post-exposure (susceptible personnel)</td>
<td>Restrict from patient care activities</td>
<td>From 10th day after 1st exposure through 21st day (28th day if VZIG is given) after last exposure or, if varicella occurs, until all lesions dry and crust</td>
</tr>
</tbody>
</table>

*If the facility has the resources available, a formal review should be conducted on a case by case basis to evaluate what procedures, if any, the worker can perform.


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.
APPENDIX I
Hand Hygiene Poster

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:

1. Wet your hands with clean running water and apply soap

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

3. Rinse hands well under running water

4. Dry your hands with a paper towel or air dryer

5. If possible, use 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:
- Under your nails
- Around your wrists
- In between your fingers
APPENDIX J
Isolation Signs

CONTACT ISOLATION

Visitors, contact the nurse’s station before entering area

GOWN & GLOVES + HAND HYGIENE

REQUIRED TO ENTER AREA

- Gown and gloves required to enter area
- Hand hygiene before and after patient contact
- Remove gown and gloves and discard before leaving patient area
DROPLET ISOLATION

Visitors, contact the nurse’s station before entering area

Surgical/Procedure Mask

HAND HYGIENE

REQUIRED TO ENTER AREA

- Surgical/Procedure mask required to enter area
- Hand hygiene before and after patient contact
- Remove mask and discard before leaving patient area
AIRBORNE ISOLATION

Visitors, contact the nurse’s station before entering area

N95 Respirator + HAND HYGIENE

REQUIRED TO ENTER AREA

- Fit tested N95 respirator required to enter area
- Hand hygiene before and after patient contact
- Do not remove respirator until after leaving the patient room/isolation area
- Door to area should remain closed
APPENDIX K

Hand Hygiene Techniques

Alcohol Based Hand Rubs
Alcohol Based Hand Rubs (ABHR) do not require water for use and are the preferred method of hand hygiene when hands are not visibly dirty.
Procedure for using ABHRs:
1. Apply product to the palm of one hand using the following approximate amounts:
   a. Liquid gel: dime-sized amount
   b. Foam: egg-sized amount
2. Rub hands together
3. Rub the product over all surfaces of hands and fingers until hands are dry
   a. Failure to cover all surfaces of the hands and fingers will greatly reduce the efficacy of ABHRs
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.

It should be noted that ABHRs 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 ABHRs 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 or antimicrobial 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 hand washing with soap and water or the use of ABHRs at reducing infectious organisms on the hands. These wipes should not be used for healthcare worker hand hygiene.
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

GOOGLES/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 M
Respirator Usage Sign

**General Procedures for Properly Putting on and Taking Off a Disposable Respirator**

- Before handling the respirator, wash hands thoroughly with soap and water.
- If you have used a respirator before that fit you, you should use the same make, model, and size.
- Inspect the respirator for damages. If your respirator has been damaged – DO NOT USE IT. Get a new one.
- Anything that comes between the respirator and your face will make the respirator less effective. Do not allow facial hair, hair, jewelry, glasses or clothing to come between your face and the respirator, or interfere with the placement of the respirator on the face.

If respirators are used for people performing work-related duties, employers must comply with the Occupational Safety and Health Administration's (OSHA) Respiratory Protection Standard, 29 CFR 1910.134. Consult www.OSHA.gov for more information.

**Put the respirator on correctly:**

1. Position the respirator in your hands with the nosepiece at your fingertips.

2. Cup the respirator in your hand, with the nosepiece at your fingertips, allowing the headband to hang freely below your hand.

3. Position the respirator under your chin with the nosepiece up. The top strap goes over your head, resting high at the top back of your head. The bottom strap is positioned around the neck and below the ears. The straps do not cross over one another. If there is only 1 headband, it should rest high at the back of your head.

4. Most disposable respirator models have a metal nose clip. Place your fingertips from both hands at the top of the metal nose clip. Slide your fingertips down both sides of metal nose strap to mold the nose area to the shape of your nose.

**Always check your fit when you wear a respirator.** There are two steps to assessing the fit:

1. First, place both hands completely over the respirator, then take a quick breath in to check whether the respirator seals tightly to the face. Be careful not to disturb the position of the respirator.

2. Next, place both hands completely over the respirator and exhale.

3. If during either step, air leaks around the nose, readjust the nosepiece as described above. If air leaks at the mask edges, work the straps back along the sides of your head until a proper seal is achieved.

**When taking off a respirator:**

1. Front of respirator may be contaminated — DO NOT TOUCH.

2. Grasp bottom strap and pull over back of head without touching respirator, then with top strap and carefully remove.

3. Discard in waste container and wash your hands thoroughly after removing the respirator.

**WASH YOUR HANDS THOROUGHLY AFTER REMOVING THE RESPIRATOR**
General Procedures for Properly Putting on and Taking Off a Disposable Respirator

- Wash your hands before handling the respirator
- If you have used a respirator before that fit you, you should use the same make, model, and size
- Inspect the respirator for damage. If your respirator has damages, DO NOT USE IT. Get a new one.
- Anything that comes between the respirator and your face will make the respirator less effective. Do not allow facial hair, hair, jewelry, glasses, or clothing to come between your face and the respirator, or interfere with the placement of the respirator on the face.

If respirators are used for people performing work-related duties, employers must comply with the Occupational Safety and Health Administration’s (OSHA) Respiratory Protection Standard, 29 CFR 1910.134. Consult www.OSHA.gov for more information.

Put the respirator on correctly: NOTE: Follow the instructions that come with the respirator. Manufacturer instructions for many NIOSH approved disposable respirators can also be found at: http://www.cdc.gov/NIOSH/nptl/topics/respirators/disp_part/

Always check your fit when you wear a respirator. There are two steps to assessing the fit.

1. Position the respirator in your hands with the nosepiece at your fingertips.
2. Cup the respirator in your hand, with the nosepiece at your fingertips, allowing the headbands to hang freely below your hand.
3. Position the respirator under your chin with the nosepiece up. The top strap goes over your head, resting high at the top back of your head. The bottom strap is positioned around the neck and below the ears. The straps do not cross over one another. If there is only 1 headband, it should rest high at the back of your head.
4. Most disposable respirator models have a metal nose clip. Place your fingertips from both hands at the top of the metal nose clip, slide your fingertips down both sides of the metal nose strip to mold the nose area to the shape of your nose.

First, place both hands completely over the respirator, then take a quick breath in to check whether the respirator seals tightly to the face. Be careful not to disturb the position of the respirator.
Next, place both hands completely over the respirator and exhale.
If during either step, air leaks around the nose, readjust the nosepiece as described above. If air leaks at the mask edges, work the straps back along the sides of your head until a proper seal is achieved.
If you cannot achieve a proper fit and seal, ask for help from someone else, try a different size in that respirator model, or try a different respirator model. Different models of respirators may fit faces differently. Do NOT attempt to get a better fit by tying the straps into “knots” to shorten them.

When taking off a respirator

1. Front of respirator may be contaminated. DO NOT TOUCH!
2. Grasp bottom strap and pull over back of head without touching respirator, then with top strap and carefully remove.
3. Discard in waste container and wash your hands thoroughly after removing the respirator.

WASH YOUR HANDS THOROUGHLY AFTER REMOVING THE RESPIRATOR
Boiling water *
- Place water in a large kettle or pot
- Bring to rolling boil then allow to boil for one minute\textsuperscript{50}
- Cool water in a covered container before consumption

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

Chemical Treatment:
- Chlorine tablets (5.25% - 6% sodium hypochlorite as the only active ingredient)
  - Follow directions that come with the tablets\textsuperscript{50}
- Iodine tablets
  - Follow directions that come with the tablets\textsuperscript{50}
- Bleach (Unscented household chlorine bleach (5.25% sodium hypochlorite)
  - Clear Water:
    - Add 1/8 teaspoon of bleach per gallon of water
    - Mix thoroughly
    - Allow to sit for 30 minutes before consumption\textsuperscript{51}
  - Cloudy water:
    - Add 1/4 teaspoon of bleach per gallon of water
    - Mix thoroughly
    - Allow to sit for 30 minutes before consumption\textsuperscript{51}
### APPENDIX O
Well Water Disinfection

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

<table>
<thead>
<tr>
<th>Inside Diameter of Well Casing (Standard/SI)</th>
<th>Amount of 5.25% Sodium hypochlorite (Unscented Laundry Bleach)</th>
<th>Amount of 65% Calcium Hypochlorite (Chlorine Granules)</th>
<th>Disinfection time for concentration of disinfectant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard/SI</td>
<td>Standard/SI</td>
<td></td>
</tr>
<tr>
<td>1¼ inches or 3.18 cm</td>
<td>1/8 fluid ounces or 3.7 mL</td>
<td>½ fluid ounces or 7.39 mL</td>
<td>Not practical to use chlorine granules for these small-diameter well casings</td>
</tr>
<tr>
<td>2 inches or 5.08 cm</td>
<td>½ fluid ounces or 14.79 mL</td>
<td>¼ fluid ounces or 7.39 mL</td>
<td></td>
</tr>
<tr>
<td>3 inches or 7.62 cm</td>
<td>1 fluid ounces or 29.57 mL</td>
<td>½ fluid ounces or 14.79 mL</td>
<td></td>
</tr>
<tr>
<td>4 inches or 10.16 cm</td>
<td>1½ fluid ounces or 44.36 mL</td>
<td>¾ fluid ounces or 22.18 mL</td>
<td></td>
</tr>
<tr>
<td>6 inches or 15.24 cm</td>
<td>4 fluid ounces or 118.29 mL</td>
<td>2 fluid ounces or 59.15 mL</td>
<td></td>
</tr>
<tr>
<td>8 inches or 20.32 cm</td>
<td>7 fluid ounces or 118.29 mL</td>
<td>3½ fluid ounces or 103.51 mL</td>
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</tr>
<tr>
<td>10 inches or 25.40 cm</td>
<td>10 fluid ounces or 295.74 mL</td>
<td>5 fluid ounces or 146.87 mL</td>
<td></td>
</tr>
<tr>
<td>12 inches or 30.48 cm</td>
<td>2 cups or 473.18 mL</td>
<td>1 cup or 236.59 mL</td>
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<tr>
<td>Depth</td>
<td>18 inches</td>
<td>2 feet</td>
<td>3 feet</td>
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<tr>
<td>Or 25.72 cm</td>
<td>4½ cups</td>
<td>7½ cups</td>
<td>17½ cups</td>
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<tr>
<td>Or 1.06 L</td>
<td>2¼ cups</td>
<td>3¼ cups</td>
<td>8¼ cups</td>
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<tr>
<td>Or 532.32 mL</td>
<td>1 1/8 cups</td>
<td>1 7/8 cups</td>
<td>4 3/8 cups</td>
</tr>
<tr>
<td>Or 266.16 mL</td>
<td>2½ ounces</td>
<td>4½ ounces</td>
<td>10 ounces</td>
</tr>
<tr>
<td>Or 70.87 grams</td>
<td>1 1/8 ounces</td>
<td>2½ ounces</td>
<td>5 ounces</td>
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<tr>
<td></td>
<td>1¼ ounces</td>
<td>4½ ounces</td>
<td>2 ½ ounces</td>
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<tr>
<td></td>
<td>¾ ounces</td>
<td>1 1/8 ounces</td>
<td>2½ ounces</td>
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<tr>
<td></td>
<td>or 70.87 grams</td>
<td>or 31.89 grams</td>
<td>or 70.87 grams</td>
</tr>
<tr>
<td></td>
<td>or 21.26 grams</td>
<td>or 31.89 grams</td>
<td>or 70.87 grams</td>
</tr>
</tbody>
</table>

Notes: 1 heaping tablespoon of 65% chlorine powder = ½ ounces; 8 fluid ounces = 1 cup.

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

## Daily Refrigerator / Freezer Temperature Log

**Instructions:** This log must be maintained for all refrigerators and freezers (both walk-in and reach-in units) in the facility. A designated food service employee should record the time, air temperature and their initials each day. It is not necessary to check temperatures of food products but touch several products to be sure they are cold and frozen items are solid to the touch. The food service supervisor for each facility will verify that food service employees have taken the required temperatures by visually monitoring food service employees and reviewing, initialing, and dating a sample of logs each week. Maintain this log for a minimum of the duration of the center activation or until given permission to discard it. If corrective action is required on any day, circle the date in the first column and explain the action taken on the back of the chart or on an attached sheet of paper. Refrigerators should be between 38 - 40°F. Freezers should be between ≤ 0°F.

Month: [ ]

Year: [ ]

<table>
<thead>
<tr>
<th>Date</th>
<th>Refrigerator #1</th>
<th>Refrigerator #2</th>
<th>Freezer #1</th>
<th>Freezer #2</th>
<th>Employee’s Initials</th>
</tr>
</thead>
<tbody>
<tr>
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<td>31</td>
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</tbody>
</table>

APPENDIX Q
Disposal of Waste Generated in an Alternate Care Site
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.

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

*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*
APPENDIX R
Environmental Response Strategies for Floods and/or Sewage Spills or Malfunctions

• Move patient(s), staff, and supplies out of the area
• Redirect traffic away from the area/restrict area
  o Close the door(s) or use a barrier (such as plastic sheeting or tall screen) to isolate area prior to clean up
• Stop or mitigate the flood or sewage spill, if possible
• Determine whether the flood is from a clean or contaminated source
  o A clean source would be a water pipe; contaminated sources include sewage pipes, flood due to rain, or water/liquid from unknown sources. When in doubt, consider the flood to be from a contaminated source
• Remove all furniture from flooded area prior to cleaning and disinfecting the floor and/or wall surfaces
  o Furniture may be returned after cleaning/disinfection if it can be placed on blocks until surfaces dry
  o Chair mats and furniture that cannot be placed on blocks should remain out of the area until the floor is dry
• Remove sewage and other solids present in the floodwater, drain and remove surface water, and let dry
  o Extract water/ fluid from all carpets and surfaces
• Cleaning/disinfecting surfaces:
  o Hard environmental surfaces (such as floors, countertops, etc): Clean with EPA-registered disinfectant after the area has been drained/dried
  o Carpeting: Use carpet cleaning solution in machine to disinfect (use manufacturer’s recommendations for disinfectant dilution), then extract liquid from carpet. Next, shampoo the carpet
    • Remove and replace carpeting if it cannot be dried within 72 hours. Allow the underlying structure (i.e., carpet padding, floor, or sub-floor) to dry before installing new carpeting; if the carpet padding cannot be dried within 72 hours, it should be removed and replaced
  o Loose tiles or buckled flooring should be removed when feasible and allowed to dry before replacing the item
  o Wallboard, wallpaper, and/or other porous structural materials: Remove and replace if it cannot be cleaned/disinfected and dried within 72 hours*
  o Metal or plastic furniture: Clean with soap and water then disinfect using EPA-registered disinfectant and allow to dry
  o Cloth furniture: Extract water and salvage, then evaluate condition for repair and/or replacement using moisture meter*
  o Wood furniture: Let dry and then evaluate condition for repair and/or replacement using moisture meter*
  o Cloth partition panels, curtains, and other cloth/woven items: If cloth is wet, evaluate for extent of damage and ability to be cleaned, disinfected, and dried. Replace if cleaning/disinfection is not feasible due to extensive damage.
  o Electrical equipment: Replace if the item cannot be easily dismantled, cleaned, and reassembled
• A final inspection should be conducted before an area is re-opened to ensure that no moisture remains and no mold is present; this inspection should be conducted by a multidisciplinary group, including the infection preventionist/designee, facilities engineering professional, administrator, etc
  ○ Consult facilities engineering personnel if mold is present; mold must be remediated before the area can be re-opened

*Moisture meter readings should be ≤ 20% moisture content.

Sufficient toilet facilities

HVAC system
   - Develop a floor plan indicating rooms/areas served by each air handler and by each ventilation exhaust fan

Determine patient, visitor, medical supply, and waste flow/transportation patterns that decrease the risk of infection transmission

Area/room(s) that can be converted to isolation room(s)/space
   - Identify existing airborne infection isolation room (AIIR) or negative airflow environments and determine capacity
     - Develop a schematic for each air handling unit/system showing air flow to each room, return airflow, associated exhaust system, and any recirculation pattern
     - Consider buying portable HEPA filter units for creation of protective environments

Patient decontamination area, if appropriate to the ACS

Separate clean and dirty utility rooms/areas
   - Have designated area for regular trash and biohazard waste storage

Area for specimen handling/processing

Food preparation area

Room/area for reprocessing or sterilization of medical equipment/supplies

Refrigeration for medication or vaccine storage

Clean water for handwashing, processing medical equipment, etc

Adequate sinks for handwashing

Mortuary holding area/ post-mortem care area

# APPENDIX T
Disinfection and Sterilization

Table 21-1. Methods for disinfection and sterilization of patient-care items and environmental surfaces

<table>
<thead>
<tr>
<th>Process</th>
<th>Level of Microbial Inactivation</th>
<th>Method</th>
<th>Examples (with processing times)</th>
<th>Healthcare Application (examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sterilization</td>
<td>Destroys all microorganisms, including bacterial spores</td>
<td>High temperature</td>
<td>Steam (~40 min), dry heat (1–6 hr depending on temperature)</td>
<td>Heat-tolerant critical (surgical instruments) and semicritical patient-care items</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low temperature</td>
<td>Ethylene oxide gas (~15 hr), hydrogen peroxide gas plasma (~50 min)</td>
<td>Heat-sensitive critical and semicritical patient-care items</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liquid immersion</td>
<td>Chemical sterilants*: &gt;2% glut (~10 hr); 1.12% glut and 1.33% phenol (12 hr); 7.35% HP and 0.23% PA (3 hr); 7.5% HP (6 hr); 1.0% HP and 0.08% PA (8 hr); 0.2% PA (~50 min)</td>
<td>Heat-sensitive critical and semicritical patient-care items that can be immersed</td>
</tr>
<tr>
<td>High-level disinfection (HLD)</td>
<td>Destroys all micro-organisms except high numbers of bacterial spores</td>
<td>Heat-automated</td>
<td>Posteriorization (~50 min)</td>
<td>Heat-sensitive semicritical items (respiratory therapy equipment)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liquid immersion</td>
<td>Chemical Sterilants/HLD*: &gt;2% glut (20–45 min); 0.55% OPA (12 min); 1.12% glut and 1.33% phenol (20 min); 7.35% HP and 0.23% PA (15 min); 7.5% HP (30 min); 1.0% HP and 0.08% PA (25 min); 650–675 ppm chlorine (10 min)</td>
<td>Heat-sensitive semicritical items (GI endoscopes, bronchoscopes)</td>
</tr>
<tr>
<td>Intermediate-level disinfection</td>
<td>Destroys vegetative bacteria, mycobacteria, most viruses, most fungi but not bacterial spores</td>
<td>Liquid contact</td>
<td>EPA-registered hospital disinfectant with label claim regarding tuberculocidal activity (e.g., chlorine-based products, phenolics-exposure times at least 30–60 sec)</td>
<td>Noncritical patient care item (blood pressure cuff) or surface with visible blood</td>
</tr>
<tr>
<td>Low-level disinfection</td>
<td>Destroys vegetative bacteria, some fungi and viruses but not mycobacteria or spores</td>
<td>Liquid contact</td>
<td>EPA-registered hospital disinfectant with no tuberculocidal claim (e.g., chlorine-based products, phenolics, quaternary ammonium compounds-exposure times at least 30–60 sec) or 70–90% alcohol</td>
<td>Noncritical patient care item (blood pressure cuff) or surface (bedside table) with no visible blood</td>
</tr>
</tbody>
</table>

* Modified from. Abbreviations: glut-glutaraldehyde; HP-hydrogen peroxide; PA-peracetic acid; OPA-oxy-phenylaldehyde; ppm-parts per million; EPA-Environmental Protection Agency; FDA-Food and Drug Administration; GI-gastrointestinal.
* Consult the FDA-cleared package insert for information about the cleared contact time and temperature, and see text for discussion why one product is used at a reduced exposure time (2% glutaraldehyde at 20 min, 20 °C). Increasing the temperature using an automated endoscope reprocessor (AER) will reduce the contact time (e.g., OPA 12 min at 20°C but 5 min at 25°C in AER). Tubing must be completely filled for high-level disinfection and liquid chemical sterilization. Material compatibility should be investigated when appropriate (e.g., HP and HP with PA will cause functional damage to endoscopes).

The following interventions are recommended to prevent surgical site infections:

- The surgical zone should be demarcated clearly, including the operating room(s) (OR) and all adjacent areas (i.e., supply rooms, offices, hallways, etc)\(^7\)
- Each OR should maintain positive airflow relative to the adjoining areas\(^7\); consult with the facilities engineering department when establishing or verifying air flow within the ACS
- Traffic in the OR should be kept to a minimum
- No ACS staff should enter the surgical zone without proper attire, consisting of surgical scrubs, warm up jacket/lab coat, hair cover, and shoe covers\(^6,7\)
- Surgical staff should perform a 2-5 minute surgical hand antisepsis or use an alcohol-based surgical hand antisepsis product before each new patient/procedure
- In addition to the surgical attire worn throughout the surgical zone, proper PPE should be used for the duration of the surgical procedure
  - For entry into the OR, a surgical/procedure mask is required\(^7\) unless the patient has an airborne spread disease (see Isolation section)
  - Surgical staff need to wear a sterile gown and gloves\(^7\) and eye protection\(^2\)
- All surgical instruments should be sterilized or disinfected at the appropriate level determined for their use (see Cleaning, Disinfection, and Sterilization of Medical Equipment section and Appendix S)
- The patient’s operative site must be disinfected/prepped following established guidelines
- A sterile field should be created and maintained throughout the procedures using sterile drapes and instruments, and staff should follow sterile technique when bringing items into the sterile field\(^6\)
- Provide prophylactic antibiotics when appropriate
  - Choose antibiotic based on the surgical procedure and the most likely pathogens per published recommendations
  - Begin antibiotic administration within 1 hour of incision or 2 hours if vancomycin and fluoroquinolones are used
  - Discontinue prophylaxis within 24 hours after all surgeries except cardiac procedures; stop prophylaxis 48 hours post surgery for cardiac procedures
- Whenever possible, identify and treat all infections remote to the surgical site prior to elective surgery
- Have patient shower/bathe with chlorhexidine-containing products before surgery
- Do not remove hair unless it will interfere with the surgical procedure
  - If hair must be removed, take off as little as possible
  - Do not use a razor to remove hair; hair can be clipped or removed using a depilatory
- Perform proper skin preparation, consisting of washing/cleaning the surgical/incision site using an appropriate antiseptic agent
- Minimize surgery time whenever possible
- Maintenance of postoperative glucose control:
- Implement a glucose control protocol
- Regularly check preoperative blood glucose levels on all patients
- Assign responsibility for blood glucose monitoring and control

- Procedures should be in place for postoperative normothermia (temperature higher than 36.0°C), and maintain perioperative temperatures
  - Use warmed forced-air blankets preoperatively, during surgery, and in the post-anesthesia care unit (PACU)
  - Increase the temperature in the operating area
  - Use warming blankets under patients on the operating table
  - Head cover (cap or hat) and booties can be placed on patients perioperatively

- Post operative dressings should be applied after the closure of skin and prior to the removal of the drape.
  - Aseptic technique should be used when handling the surgical site and/or dressing and the site should be monitored for excess drainage
  - Leave the initial dressing intact for one or two days post surgery

- Scrubs should be laundered at the end of each day. If surgical attire becomes visibly soiled, it should be removed and replaced before contact with the next patient

- The OR/surgical suite must be cleaned/disinfected between cases and more often as needed (see Environmental Decontamination section)
  - The patient care area/OR must be cleaned/disinfected before each new patient/procedure using an EPA-registered disinfectant
  - All anesthesia machines, monitors and carts should be cleaned using an EPA-registered disinfectant when visibly soiled and at the end of each day; follow manufacturer’s recommendations for cleaning/disinfection of anesthesia machines
  - The floor in a surgical area/suite needs to be cleaned at the end of each day with a wet vacuum or single-use mop using an EPA-registered chemical disinfectant
APPENDIX V
Ventilator-Associated Pneumonia Prevention

The following interventions are recommended to prevent medical complications associated with patients requiring mechanical ventilation, including ventilator-associated pneumonia:

- Assessment for readiness-to-wean
  - Adults: Perform daily sedation interruption and assessment for readiness-to-wean
  - Children: “Sedation vacation” not recommended; assess daily for readiness-to-wean via multidisciplinary care rounds or a checklist

- Head of bed elevation:
  - Adults, children, and infants: Keep the head of the patient’s bed/cot elevated 30 - 45°
  - Neonates: Keep the head of the patient’s bed/crib elevated 15 - 30°
  - Implement process to ensure the patient stays elevated, such as a sign above the bed/cot/crib or discussed during multidisciplinary rounds

- Provide deep venous thrombosis (DVT) and peptic ulcer disease (PUD) prophylaxis unless contraindicated by medical history or age

- Perform daily oral/dental care appropriate to the patient’s age
  - Consider using a Chlorhexidine-based product for oral care in those ≥ 2 months old

- Prevent colonization of oropharynx, stomach and sinuses:
  - Use endotracheal tube with dorsal lumen above the cuff for children ≥ 12 yrs old
  - Use frequent hand hygiene when handling the ventilator or ventilator equipment and when assisting the patient with oral care
  - Do not routinely change ventilator circuits; change only when visibly soiled or non-functioning
  - Suction catheter system management:
    - Open catheter systems are considered disposable; use once, then discard
    - In-line suction catheter systems are re-usable. Do not change routinely; change only when visibly soiled or non-functioning
  - Drain ventilator condensate every 2 – 4 hours; condensate should be drained away from the patient
  - Drain ventilator circuit before repositioning the patient
  - Between uses, store oral suction devices in a non-sealed plastic bag near the ventilator
APPENDIX W
Central Line-Associated Bloodstream Infection Prevention

The following interventions are recommended to prevent central line-associated bloodstream infections:

At/during insertion of a central line
- Use a catheter insertion checklist to ensure adherence to infection prevention practices at the time of central venous catheter insertion
- Perform hand hygiene before catheter insertion or manipulation
- Site selection:
  - Adults: Choose the subclavian sites for insertion
    - If the subclavian vein is not feasible, use the internal jugular vein; avoid using the femoral vein
  - Pediatric patients: Site selection depends on the size and condition of the child or infant
- Use an all-inclusive catheter cart or kit
- All healthcare personnel participating in catheter insertion should use maximal sterile barrier precautions during central venous catheter insertion
  - Maximal sterile barrier precautions consist of a surgical mask, cap/hair covering, sterile gown, and sterile gloves
- Cover the patient with a head-to-toe sterile drape (with an opening for the catheter insertion) during catheter insertion
- Use a chlorhexidine-based antiseptic for skin preparation in patients older than 2 months of age, unless contraindicated

After insertion/access/maintenance of a central line
- Perform hand hygiene before and after manipulation central lines or insertion sites
- Disinfect catheter hubs, needleless connectors, and injection ports before accessing the catheter
- Assess the patient daily for continual need for the catheter; remove nonessential catheters as soon as possible
- Change the insertion site dressing regularly:
  - For nontunneled central venous catheters in adults and adolescents:
    - Change transparent site dressing and perform site care with a chlorhexidine-based antiseptic every 5-7 days or more frequently if the dressing is soiled, loose, or damp
    - Change gauze dressings every 2 days or more frequently if the dressing is soiled, loose, or damp
- Replace administration sets not used for blood, blood products, or lipids at intervals not longer than 96 hours.
- Use antimicrobial ointment for hemodialysis catheter insertion sites (see Dialysis section)
The following interventions are recommended to prevent catheter-related urinary tract infections:

- Use urinary catheters only when necessary
  - Use condom or intermittent catheterization when feasible rather than indwelling urinary catheters
- Perform hand hygiene before and after inserting or manipulating a patient’s urinary catheter or urine collection system
- Use aseptic technique when inserting urinary catheters
- Assess the patient daily for the need for the urinary catheter; remove unnecessary catheters as soon as possible
- Obtain a urine culture before initiation of antimicrobial therapy for suspected urinary tract infection
- Indwelling catheter drainage systems should remain closed
APPENDIX Y

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 staff member 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
APPENDIX Z
List of ACS Worker Groups Requiring Infection Prevention Education

Health care Groups

- Nurses and nursing students
- Physicians and medical students
- Patient care technicians/assistants
- Physical and Occupational therapists
- Pharmacists
- Laboratory personnel
- Mental health practitioners
- Medical examiners/morgue employees

Non-clinical healthcare workers

- Support staff (e.g., food services, etc)
- Clergy
- Patient transporters
- Housekeepers
- Health educators
- Administrators
- Environmental services
- Safety/Security
- Medical records
- Risk management
- Volunteers

Screening/triaging procedures

Patient management (patient discharge instructions, when to isolate, etc)

Event or disease-specific information

Self-screening and reporting of symptoms

Isolation & quarantine procedures

PPE use and reuse

Procedures for obtaining and handling patient specimens safely

Safe handling of food, water, and medications/vaccines

Hand hygiene

Respiratory etiquette

Cleaning, disinfection, and sterilization of medical equipment

Cleaning and disinfection of ACS shared/communal toys

Waste management

Post mortem care

Patient decontamination\(^\text{§}\)

\(^\text{§}\)If patient decontamination is to be performed at the ACS