Healthcare-Associated Infection (HAI) Prevention Toolkit

Created by the Nevada State Health Division, Office of Public Health Informatics and Epidemiology (OPHIE)

Objectives

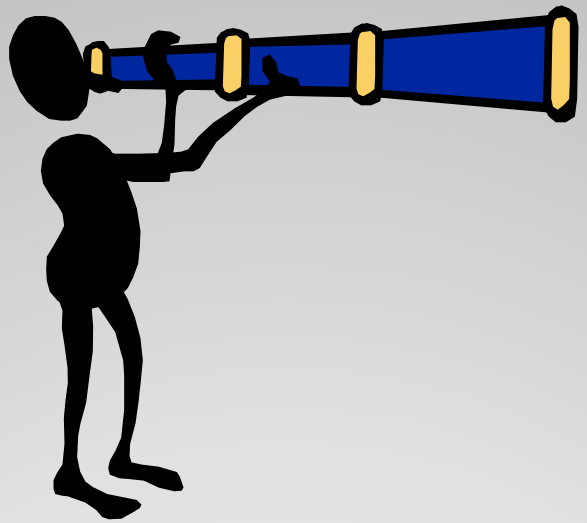
- This toolkit serves as a training resource for healthcare facilities within the state of Nevada
- Topics within the toolkit include:
  - Surveillance
  - Risk Assessments
  - Hand Hygiene
  - Injection safety practices
  - Multi drug resistance organism (MDRO) education (Clostridium difficile & Methicillin-resistant Staphylococcus aureus (MRSA)
  - Antibiotic Stewardship
  - Sterilization, Disinfection and cleaning
  - Terminal cleaning and disinfection
  - Public health reporting
  - Environmental cleaning
  - Terminal cleaning and disinfection

Terms

- MDRO- Multi-drug Resistant Organism
- CDI- Clostridium difficile Infection
- MRSA- Methicillin-resistant Staphylococcus aureus
- IV- Intravenous
- HCV- Hepatitis C Virus
- HBV- Hepatitis B Virus
- HIV- Human Immunodeficiency Virus
- PPE- Personal protective equipment
- VRE- Vancomycin Resistant Enterococci
- HH- Hand Hygiene

Terms

- CDAD- Clostridium difficile Associated Disease
- FDA- Food and Drug Administration
- MSDS- Material Safety Data Sheet
- SIPC- Safe Injection Practices Coalition
- OSHA- Occupational Safety and Health Administration
- EPA- Environmental Protection Agency
- CDC- Centers for Disease Control and Prevention
- FDA- Food and Drug Administration
- WHO- World Health Organization



Surveillance

Surveillance

- **Definition:** public health surveillance is the continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice.

- **Why is surveillance needed?**
  - to serve as an early warning system, identify public health emergencies
  - to guide public health policy and strategies
  - to document impact of an intervention or progress towards specified public health targets/goals
  - to understand/monitor the epidemiology of a condition to set priorities and guide public health policy and strategies

Types of Surveillance

- **Sentinel Surveillance:** occurs when only selected sites report data. This is rarely representative of a population, but can be used to monitor trends and collect more detailed information.
- **Passive Surveillance:** occurs when data are routinely collected and forwarded to more central levels on a routine basis, i.e. the data does not have to be requested on each occasion.
- **Active Surveillance:** occurs when data are sought out by visiting or contacting a feed-forward site and reviewing the medical records and registers of the site to identify cases.

- **An effective surveillance system has the following functions:**

1. Detection and notification of health events
2. Collection and consolidation of pertinent data
3. Investigation and confirmation (epidemiological, clinical and/or laboratory) of cases or outbreaks
4. Routine analysis and creation of reports
5. Feedback of information to those providing the data feed-forward (i.e. the forwarding of data to more central levels)
6. Reporting data to the next administrative level

Effective Surveillance

Surveillance, as part of infection prevention and control programs in health care facilities, contributes to meeting the program's overall goals to:

- protect the patient
- protect the health care worker, visitors and others in the health care environment
- accomplish the previous two goals in a timely, efficient and cost effective manner whenever possible.

Surveillance Contribution

Quality of Surveillance

- A **written plan** should serve as the foundation of any surveillance program. The plan should outline important goals, objectives, and elements of the surveillance process so that resources can be targeted appropriately. This is commonly integrated into a comprehensive infection control risk assessment process.

- **Thoroughness or intensity of surveillance** for an area of interest must be maintained at the same level over time. Fluctuations of a surveillance rate have no meaning unless the same level of data collection is maintained and potentially misleading unless the systems used have comparable intensity.

- All the elements of surveillance should be used with consistency over time; this includes application of surveillance definitions and rate calculation methods.
- Personnel resources need to be appropriate for the type of surveillance being performed; this includes trained professionals who understand epidemiology and surveillance and who have access to continuing professional education opportunities

Quality of Surveillance

Resources essential to surveillance include:

- Computer support
- Information and technology services
- Clerical services
- Administrative understanding and support to maintain a quality program
- Special infection control software, or self-formatted spreadsheets or databases

Quality of Surveillance

The checklist should be used:

1. To ensure that the facility has appropriate infection prevention policies and procedures in place and supplies to allow healthcare personnel to provide safe care.

2. To systematically assess personnel adherence to correct infection prevention practices.

- Assessment of adherence should be conducted by direct observation of healthcare personnel during the performance of their duties.

- http://www.cdc.gov/HAI/settings/outpatient/checklist/outpatient-care-checklist-observations.html

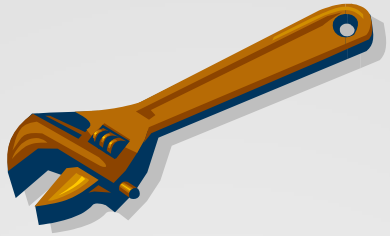
HAI prevention checklist

- The next few slides will help you develop a risk assessment plan for your healthcare facility
- These tools will aid in determining your facility's risks, health concerns, and common procedures in order to develop an action plan and your expected outcomes

Risk Assessment Tool

A **risk assessment plan** should be reviewed yearly and updated as needed

Ensure that all items stated in plan are followed as you will be held responsible for items that are in the assessment plan, but are not implemented.



Risk Assessment Tool

XYZ ASC

Infection Control Risk Assessment

Date_____ City, State_____

Participants_____

Brief Description of Your Community:_____

Types of Patient Served_____

Most Common Diagnoses_____

Most Common Procedures Performed_____

Types of Health Concerns that Exist in the Community_____

Risk Assessment Tool

Patients at an Increased Risk of Infection_____

Patients that Increase Liability for the Center_____

Based on this Data, what Patients and Procedures are Highest Risk for Infections_____

Plan of Action

- Strategies to Reduce Infection Risk
- Interventions to Reduce Infection Risk
- Goals Identified
- Resources Needed to Accomplish Goals

Risk Assessment Tool

Year End Review of Plan of Action and Outcomes Date_____

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Risk Assessment Tool

Hand Hygiene

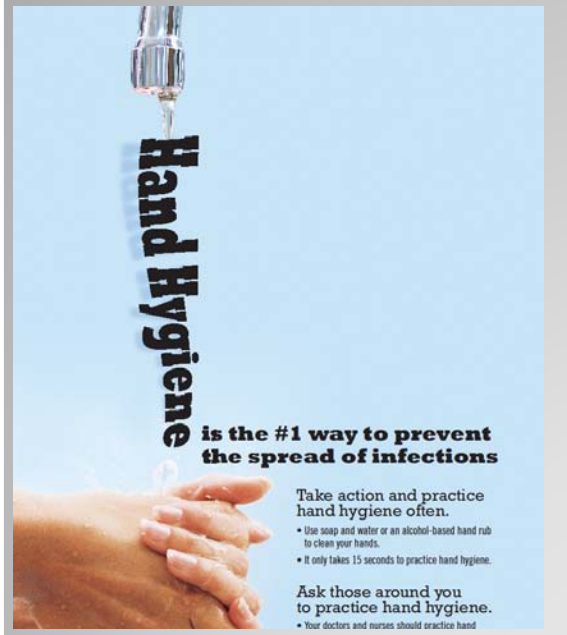
Hand Hygiene

- Healthcare providers should practice **hand hygiene** at key points in time to disrupt the transmission of microorganisms to patients including:
  - Before patient contact; after contact with blood, body fluids, or contaminated surfaces (even if gloves are worn);
  - Before invasive procedures; and after removing gloves
  - Wearing gloves is not enough to prevent the transmission of pathogens in healthcare settings

- Below are links for hand hygiene education and posters that can be used within your facility for staff and visitors.

1. http://www.cdc.gov/handhygiene/Patient_materials.html
2. http://www.cdc.gov/handhygiene/Resources.html

Hand Hygiene: Patient Admission Video



Posters are available in Spanish

Name of person being observed	Position 1. Nurse 2. MD 3. Other	Unit	Before clean and/or aseptic procedures		Before resident contact		After resident contact		After contact with contaminated equipment		After handling objects and devices such as soiled linen, trash, equipment		After removing gloves or other PPE used to prevent contact with body substances	
			Y	N	Y	N	Y	N	Y	N	Y	N	Y	N

Hand Hygiene Assessment Tool

Instructions for use

1. The purpose of this tool is to collect baseline data about current compliance with hand hygiene.
2. The data collection needs to be done as discreetly as possible – by personnel who are on the unit normally.
3. The rationale for discretion is to not influence and/or change the behavior being observed.
4. This tool is being used for quality improvement purposes only not to grade or punish anyone.

Completing the tool

1. Be sure to identify your unit, the date and time of the observation.
2. Identify the job category of the person(s) being observed.
3. Make a hash mark(s) for each yes or no observation. You may have multiple hash marks – each hash mark representing one observation.

Hand Hygiene Assessment Tool

Hand Hygiene Compliance Criteria Involves Washing:

1. Before each resident contact/encounter

   - Hand washing with alcohol hand gel or with soap & water if hands are visibly soiled

   - Use of gloves as appropriate

2. After each patient contact/encounter

   -Hand washing with alcohol hand gel or with soap & water if hands are visibly soiled

   -If gloves were used, hand hygiene after removal of gloves

3. After contact with contaminated equipment or environment

   -Hand washing with alcohol hand gel or with soap & water if hands are visibly soiled

   -If gloves were used, hand hygiene after removal of gloves

Hand Hygiene Assessment Tool

Injection Safety Practices

What is Injection Safety?

- **Injection safety**, or safe injection practices, is a set of measures taken to perform injections in an optimally safe manner for patients, healthcare personnel, and others.

  A safe injection does not harm the recipient, does not expose the provider to any avoidable risks, and does not result in waste that is dangerous for the community (e.g., through inappropriate disposal of injection equipment).

- **Injection safety** includes practices intended to prevent transmission of infectious diseases between one patient and another, or between a patient and healthcare provider, and also to prevent harms such as needlestick injuries.

- **Myth #1**. Contamination of injection devices is limited to the needle and removing the needle makes the syringe safe for reuse.
  - **FALSE! The TRUTH is that once used, both the needle and the syringe are contaminated and must be discarded. A new sterile needle and a new sterile syringe should always be used for each patient and to access medications**.

- **Myth #2**. Intravenous (IV) tubing or valves can prevent backflow and contamination of injection devices.
  - **FALSE! The TRUTH is that everything from the syringe or medication bag to the patient's IV catheter is a single interconnected unit. Distance from the patient, gravity, or even positive infusion pressure do not ensure that small amounts of blood won't contaminate the syringe and needle. The temptation to economize by reusing this equipment simply isn't worth the risk.**

- **Myth #3**. If you don't see blood in the IV tubing or injection equipment, there is no risk of cross-contamination.
  - **FALSE assumption. The TRUTH is that pathogens, including hepatitis C and B viruses, and HIV, can be present in sufficient quantities to produce infection without any visible blood.**

- **Myth #4**. Single-dose vials that appear to contain multiple doses may be used for more than 1 patient.
  - **FALSE AGAIN! The TRUTH is that single-dose vials are intended for use in a single patient for a single procedure and should not be used for more than 1 patient, regardless of the vial size. To ensure that you are not inadvertently mistaking a larger single-dose vial for a true multidose vial you should check the medication label or package insert**

Injection Safety Practice Myths

Aseptic Technique

- **What is aseptic technique?**

In this context, aseptic technique refers to the manner of handling, preparing, and storing of medications and injection equipment/supplies (e.g., syringes, needles and IV tubing) to prevent microbial contamination.

Unsafe injection practices result in transmission of pathogens such as hepatitis C (HCV), hepatitis B (HBV).

NEVER:

- Use the same syringe to administer medication to more than one patient, even if the needle was changed or the injection was administered through an intervening length of intravenous (IV) tubing
- Access a medication vial or bag with a syringe that has already been used to administer medication to a patient, then reusing contents from that vial or bag for another patient
- Use medications packaged as single-dose or single-use for more than one patient
- Fail to use aseptic technique when preparing and administering injections

Unsafe Injection Practice Consequences

Injection Safety

- Recent investigations undertaken by state and local health departments and the CDC have identified improper use of syringes, needles, and medication vials during routine healthcare procedures, such as administering injections. These practices have resulted in one or more of the following:
  - Transmission of blood borne viruses, including HCV to patients
  - Notification of thousands of patients of possible exposure to blood borne pathogens and recommendation that they be tested for HCV, HBV, and HIV
  - Referral of providers to licensing boards for disciplinary action
  - Malpractice suits filed by patients

Providers should ensure that staff:

- Never administer medications from the same syringe to more than one patient, even if the needle is changed
- Never enter a vial with a used syringe or needle

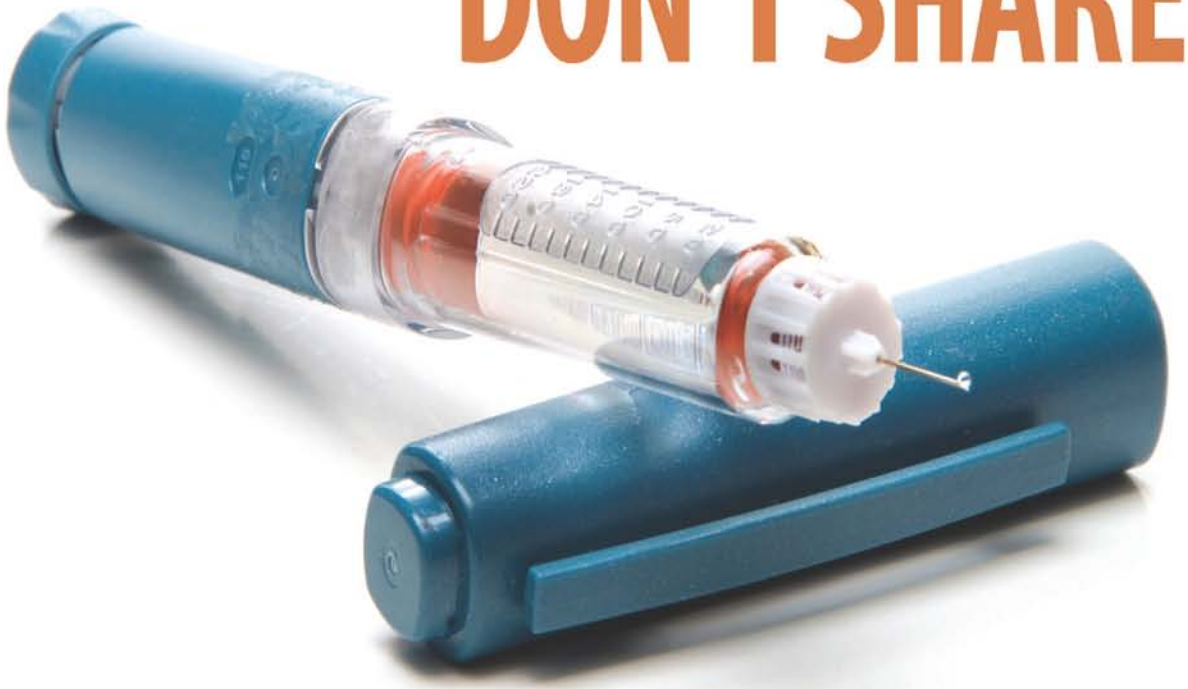
HCV, HBV, and HIV can be spread from patient to patient when these simple precautions are not followed!

Additional protection occurs when medication vials are dedicated to a single patient. It is important that:

- Medications packaged as single-use vials are never used for more than one patient
- Medications packaged as multi-use vials are assigned to a single patient whenever possible
- Bags or bottles of intravenous solution are not used as a common source of supply for more than one patient
- Absolute adherence to proper infection control practices is maintained during the preparation and administration of injected medications

Injection Safety Practices

BE AWARE
DON'T SHARE



Insulin pens that contain more than one dose of insulin are only meant for one person.

They ***should never be used for more than one person***, even when the needle is changed.

ONE INSULIN PEN, ONLY ONE PERSON

The One & Only Campaign is a public health campaign aimed at raising awareness among the general public and healthcare providers about safe injection practices.

For more information, please visit:
www.ONEandONLYcampaign.org

THE IMPACTS OF UNSAFE MEDICAL INJECTIONS IN THE U.S.

Unsafe Injection Practices Have Devastating Consequences[1]

Syringe reuse and misuse of medication vials have resulted in dozens of outbreaks and **THE NEED TO ADVISE MORE THAN 150,000 PATIENTS...**

...to seek testing for bloodborne pathogens such as **HEPATITIS B, HEPATITIS C AND HIV**[2] and have led to...

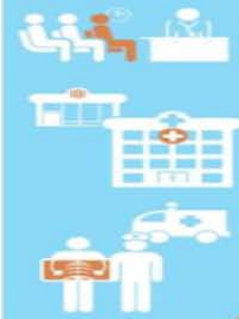
- Patient illness and death
- Legal charges/ malpractice suits
- Loss of clinician license
- Criminal charges

In just one clinic, syringe re-use to access medication vials for multiple patients resulted in an outbreak and one of the largest public health notifications in U.S. history.

50,000 PEOPLE EXPOSED TO INFECTION

$16 - $20 MILLION IN COSTS

Outbreaks Occur in a Variety of Medical Settings



- Primary care clinics
- Pediatric offices
- Ambulatory surgical centers
- Pain remediation clinics
- Imaging facilities
- Oncology clinics
- Health fairs

Injection Safety is Every Provider's Responsibility

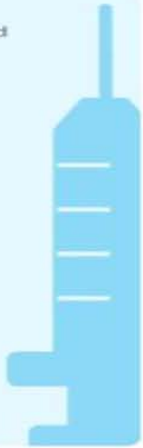
Steps Every Healthcare Provider Should Take

Needles and syringes should not be used for more than one patient or reused to draw up additional medication.

Do not administer medications from a single-dose vial or IV bag to multiple patients.

Limit the use of multi-dose vials, and dedicate them to a single patient whenever possible.

Speak up if you see a colleague not following safe injection practices.



1 ONE NEEDLE, ONE SYRINGE, ONLY ONE TIME.

Safe Injection Practices Coalition
www.ONEandONLYcampaign.org

The ***One & Only Campaign*** aims to eradicate outbreaks from unsafe medical injections by raising awareness among patients and healthcare providers about proper practices. The campaign is a public health effort led by the Centers for Disease Control and Prevention (CDC) and produced by the Safe Injection Practices Coalition (SIPC), a collaboration of several medical societies, state health departments, patient advocates, and private medical companies.

FACEBOOK.COM/ONEANDONLYCAMPAIGN

@INJECTIONSAFETY

Use the links below to view videos of proper and improper injection safety methods

1. http://www.youtube.com/watch?v=mscJA9WFMCM&feature=player_embedded

2. http://www.youtube.com/watch?feature=player_embedded&v=6D0stMoz80k

Injection Safety

Wearing gloves and other infection control precautions protect providers and patients.

- The SIPC created this training to remind healthcare providers that the measures they take to protect themselves from blood borne pathogens and other infection exposures, as required by the Occupational Safety and Health Administration (OSHA), also protect patients from healthcare associated infections.

- Injection safety and other basic infection prevention and control practices are central to patient and healthcare provider safety.

The link below provides a training regarding safe injection practices.

- http://www.oneandonlycampaign.org/content/bloodborne-pathogens-training

Safe Injection Practice Training

The One and Only Campaign

- Professional groups, healthcare systems, provider groups, private companies and others partner with the One & Only Campaign to promote and distribute the Campaign materials and messages to healthcare professionals, patients and/or the public.

- To become a One & Only Campaign Member, please visit http://www.oneandonlycampaign.org/about/the-campaign

- **Nevada Contact**

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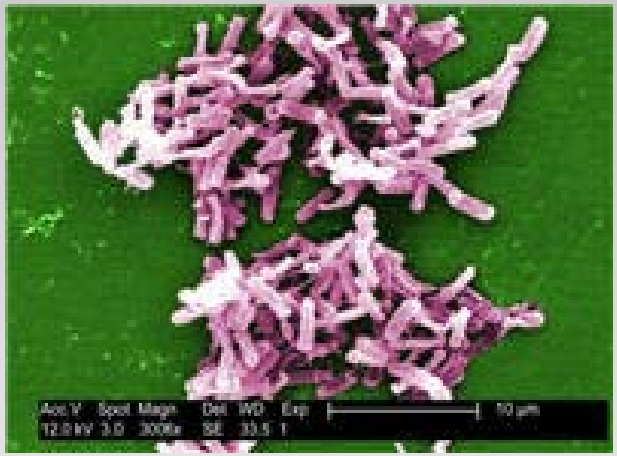
Become a Campaign Member



Clostridium difficile

What is Clostridium difficile infection?

Clostridium difficile, also known as “C. diff”, is a germ that can cause diarrhea. Most cases of C. diff infection occur in patients taking antibiotics. The most common symptoms of a C. diff infection include:

- Watery diarrhea
- Fever
- Loss of appetite
- Nausea
- Belly pain and tenderness

Who is most likely to get C. diff infection?

- The elderly and people with certain medical problems have the greatest chance of getting C. diff.
- C. diff spores can live outside the human body for a very long time and may be found on things in the environment such as bed linens, bed rails, bathroom fixtures, and medical equipment.
- C. diff infection can spread from person-to person on contaminated equipment and on the hands of doctors, nurses, other healthcare providers and visitors.

Clostridium difficile

- **C. diff infection is treatable**

  Antibiotics are used to treat C. diff.

  In some severe cases, a person might require surgery to remove the infected part of the intestines.

  This surgery is relatively uncommon (1-2/100 persons with C. diff.

Clostridium difficile

What are hospitals doing to prevent C. diff infections?

- Cleaning hands with soap and water before and after caring for every patient with C. diff can prevent C. diff and other germs from being passed from one patient to another on their hands.
- Carefully clean hospital rooms and medical equipment that have been used for patients with C. diff. using a bleach/water mixture.

How to prevent C. diff infections?

- **Use Contact Precautions to prevent C. diff from spreading to other patients. Contact Precautions mean:**
  - Whenever possible, place patients with C. diff in a single room, or share a room only with someone else who also has C. diff.
  - Healthcare providers will wear gloves and a gown over their clothing while caring for patients with C. diff.
  - Visitors may also be asked to wear a gown and gloves.
  - When leaving the room, hospital providers and visitors remove their gown and gloves and clean their hands with soap and water.

How to prevent C. diff infections?

Patients on Contact Precautions are asked to stay in their hospital rooms as much as possible.

They should avoid common areas, such as the gift shop or cafeteria. They can go to other areas of the hospital for treatments and tests.

Antibiotics should be used only when necessary.

Use antibiotics judiciously

How to prevent C. diff infections?

- Perform Hand Hygiene after removing gloves.
- Because alcohol does not kill Clostridium difficile spores, use of soap and water is more effective than alcohol-based hand rubs.
- Early experimental data suggest that even when using soap and water, the removal of C. difficile spores is more challenging than the removal or inactivation of other common pathogens.

C. diff Prevention Methods

- Consider using an Environmental Protection Agency (EPA)-registered disinfectant with a sporicidal claim for environmental surface disinfection after cleaning in accordance with label instructions; generic sources of hypochlorite (e.g., household chlorine bleach) also may be appropriately diluted and used.
- Note: Standard EPA-registered hospital disinfectants are not effective against Clostridium difficile spores.
- Hypochlorite-based disinfectants may be most effective in preventing Clostridium difficile transmission in units with high endemic rates of Clostridium difficile infection.

C. diff Prevention Methods

- Surfaces should be kept clean, and body substance spills should be managed promptly as outlined in CDC's "Guidelines for Environmental Infection Control in Health-Care Facilities"
- http://www.cdc.gov/hicpac/pdf/guidelines/eic_in_HCF_03.pdf
- Routine cleaning should be performed prior to disinfection.
- EPA-registered disinfectants with a sporicidal claim have been used with success for environmental surface disinfection in those patient-care areas where surveillance and epidemiology indicate ongoing transmission of Clostridium difficile.
- Note: EPA-registered disinfectants are recommended for use in patient-care areas. When choosing a disinfectant, check product labels for inactivation claims, indications for use, and instructions.

C. diff Prevention Methods

Summary of Prevention Measures

Core Measures

- Contact Precautions for duration of illness
- Hand hygiene in compliance with CDC
- Cleaning and disinfection of equipment and environment
- Laboratory-based alert system
- CDI surveillance
- Education

Supplemental Measures

- Prolonged duration of Contact Precautions*
- Presumptive isolation
- Evaluate and optimize testing
- Soap and water for HH upon exiting CDI room
- Universal glove use on units with high CDI rates*
- Bleach for environmental disinfection
- Antimicrobial stewardship program

*Not included in CDC/HICPAC 2007 Guideline for Isolation Precautions

- **The risk for disease increases in patients with:**
  - Antibiotic exposure
  - Proton pump inhibitors
  - Gastrointestinal surgery/manipulation
  - Long length of stay in healthcare settings
  - A serious underlying illness
  - Immuno-compromising conditions
  - Advanced age

Patients at Increased Risk for C. diff infection

Clostridium difficile colonization

- patient exhibits **NO** clinical symptoms
- patient tests positive for Clostridium difficile organism and/or its toxin
- more common than Clostridium difficile infection

Clostridium difficile infection

- patient exhibits clinical symptoms
- patient tests positive for the Clostridium difficile organism and/or its toxin

C. diff Colonization vs. C. diff Infection

Transmission of C. diff

- ***Clostridium difficile spores are transferred to patients mainly via the hands of healthcare personnel who have touched a contaminated surface or item.***

- Clostridium difficile is shed in feces. Any surface, device, or material (e.g., commodes, bathing tubs, and electronic rectal thermometers) that become contaminated with feces may serve as a reservoir for the Clostridium difficile spores.

- Approximately 20% of patients with Clostridium difficile infection will resolve within 2-3 days of discontinuing the antibiotic, according to the Centers for Disease Control and Prevention (CDC)
- The infection can usually be treated with an appropriate course (about 10 days) of antibiotics, including metronidazole, vancomycin (administered orally), or recently approved fidaxomicin.
- After treatment, repeat Clostridium difficile testing is not recommended if the patients' symptoms have resolved, as patients may remain colonized.

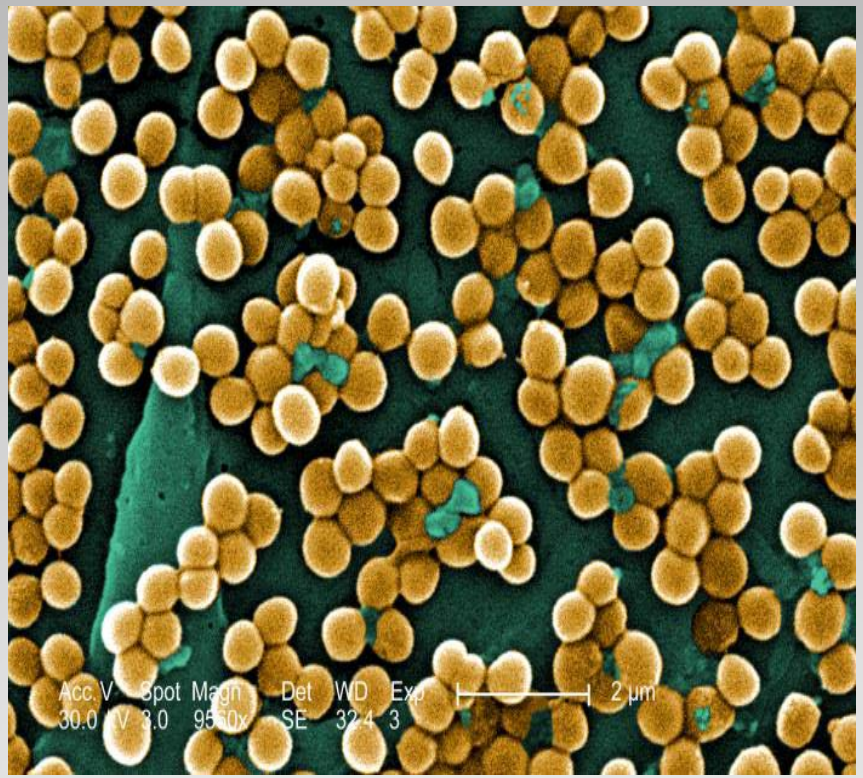
C. diff Treatment

- Because Clostridium difficile-infected patients continue to shed organism for a number of days following cessation of diarrhea, some institutions routinely continue isolation for either several days beyond symptom resolution or until discharge, depending upon the type of setting and average length of stay.

- **Implement an environmental cleaning and disinfection strategy:**

  - Ensure adequate cleaning and disinfection of environmental surfaces and reusable devices, especially items likely to be contaminated with feces and surfaces that are touched frequently.

C. diff Treatment



Methicillin-resistant Staphylococcus aureus bacteria, (MRSA)

- Definition: Methicillin-resistant Staphylococcus Aureus (MRSA) is a type of staph bacteria that is resistant to certain antibiotics called beta-lactams.
- These antibiotics include methicillin and other more common antibiotics such as oxacillin, penicillin, and amoxicillin. In the community, most MRSA infections are skin infections.
- More severe or potentially life-threatening MRSA infections occur most frequently among patients in healthcare settings. While 25% to 30% of people are colonized in the nose with staph, less than 2% are colonized with MRSA

Methicillin-resistant Staphylococcus aureus

Who is at risk?

- Patients in healthcare facilities with weakened immune systems
- Patients who undergo procedures (such as surgery)
- Patients withy catheters inserted into the skin that make it easier for MRSA to get into the body.

Healthcare personnel must follow infection control procedures such as hand hygiene and proper catheter care to prevent patients from acquiring MRSA infections.

Severe Infections vs. Skin Infections

Severe Infections

- MRSA in healthcare settings usually causes more severe and potentially life-threatening infections
- Examples of severe infections are bloodstream infections, surgical site infections, or pneumonia.
- The signs and symptoms will vary by the type and stage of the infection.

Skin Infections

Most MRSA infections outside healthcare facilities are skin infections that may appear as pustules or boils which often are red, swollen, painful, or have pus or other drainage.

- They often first look like spider bites or bumps that are red, swollen, and painful.
- These skin infections commonly occur at sites of visible skin trauma, such as cuts and abrasions, and areas of the body covered by hair (e.g., back of neck, groin, buttock, armpit, beard area of men).

Hand Hygiene

- Perform hand hygiene after touching blood, body fluids, secretions, excretions, and contaminated items, whether or not gloves are worn.
- Perform hand hygiene immediately after gloves are removed, between patient contacts, and when otherwise indicated to avoid transfer of microorganisms to other patients or environments.
- When hands are visibly soiled with blood or other body fluids, wash hands with soap and water. It may be necessary to perform hand hygiene between tasks and procedures on the same patient to prevent cross-contamination of different body sites.

- Wear gloves (clean nonsterile gloves are adequate) when it can be reasonably anticipated that contact with blood or other potentially infectious materials, mucous membranes, nonintact skin, or potentially contaminated intact skin (e.g., of a patient incontinent of stool or urine) could occur.

- Remove gloves after contact with a patient and/or the surrounding environment (including medical equipment) using proper technique to prevent hand contamination.

- Do not wear the same pair of gloves for the care of more than one patient. Do not wash gloves for the purpose of reuse since this practice has been associated with transmission of pathogens.

MRSA Gloving

- Use personal protective equipment (PPE) to protect the mucous membranes of the eyes, nose and mouth during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions and excretions.

- Select masks, goggles, face shields, and combinations of each according to the need anticipated by the task performed.

MRSA Mouth, Nose, & Eye Protection

- Wear a gown, that is appropriate to the task, to protect skin and prevent soiling or contamination of clothing during procedures and patient-care activities when contact with blood, body fluids, secretions, or excretions is anticipated.

MRSA Gowning

- Handle used patient-care equipment soiled with blood, body fluids, secretions, and excretions in a manner that prevents skin and mucous membrane exposures, contamination of clothing, and transfer of microorganisms to other patients and environments.

- Ensure that reusable equipment is not used for the care of another patient until it has been appropriately cleaned and reprocessed and that single-use items are properly discarded.

MRSA Appropriate Device Handling

- Clean and disinfect surfaces that are likely to be contaminated with pathogens, including those that are in close proximity to the patient (e.g., bed rails, over bed tables) and frequently-touched surfaces in the patient care environment.
- Examples are: door knobs, surfaces in and surrounding toilets in patients' rooms.
- On a more frequent schedule compared to that for other surfaces (e.g., horizontal surfaces in waiting rooms).

MRSA Appropriate Device Handling

- Handle, transport, and process used linen to avoid contamination of air, surfaces and persons.

MRSA: appropriate handling of laundry

- Ensure that rooms of patients on contact precautions are prioritized for frequent cleaning and disinfection (e.g., at least daily)
- Focus on frequently-touched surfaces (e.g., bed rails, overbed table, bedside commode, lavatory surfaces in patient bathrooms, doorknobs, etc.) and equipment in the immediate vicinity of the patient.

MRSA Environmental Measures

- In acute care hospitals and long-term care and other residential settings, limit transport and movement of patients outside of the room to medically-necessary purposes.
- When transport or movement in any healthcare setting is necessary, ensure that infected or colonized areas of the patient's body are contained and covered.
- Remove and dispose of contaminated PPE and perform hand hygiene prior to transporting patients on contact precautions. Use clean PPE to handle the patient at the transport destination

MRSA Patient Transport

MRSA Contact Precautions

- CDC recommends contact precautions when the facility (based on national or local regulations) deems MRSA to be of special clinical and epidemiologic significance.
- In hospitals and long term care facilities, use single-patient rooms when available; assign priority for these rooms to patients with known or suspected MRSA colonization or infection.
- Give highest priority to those patients who have conditions that may facilitate transmission, e.g., uncontained secretions or excretions.
- When single-patient rooms are not available, cohort patients with the same MRSA in the same room or patient-care area.
- Another option is to place an infected patient with a patient who does not have risk factors for infection.

Group Activities for MRSA Patients

- It is extremely important to maintain the patients' ability to socialize and have access to rehabilitation opportunities. Infected or colonized patients should be permitted to participate in group meals and activities if draining wounds are covered, bodily fluids are contained, and the patients observe good hygienic practices
- The following are recommended for prevention of VRE and MRSA in hospitals and may be adapted for use in non-hospital healthcare facilities:
- Obtain rectal swab cultures of roommates of patients newly found to be infected or colonized with VRE, and nasal swabs for MRSA.

- Adopt a policy for deciding when patients can be removed from isolation, e.g., VRE-negative results on at least three consecutive occasions, one or more weeks apart.
- Consult health departments regarding discharge requirements for patients with MRSA or VRE.

Group Activities for MRSA Patients

Antimicrobial Stewardship

Antibiotic Stewardship

- Antimicrobial stewardship interventions have been proven to improve individual patient outcomes, reduce the overall burden of antibiotic resistance, and save healthcare dollars.
- Implementation of an antimicrobial stewardship program in a healthcare facility – regardless of inpatient setting – will help ensure that hospitalized patients receive the right antibiotic, at the right dose, at the right time, and for the right duration.
- As a result, there is reduced mortality, reduced risks of Clostridium difficile-associated diarrhea, shorter hospital stays, reduced overall antimicrobial resistance within the facility, and cost savings.
- Despite all of these benefits, antimicrobial stewardship programs and interventions are far from the norm in U.S. hospitals today.

- **Antibiotics are misused in a variety of ways**
  - Given when they are not needed
  - Continued when they are no longer necessary
  - Given at the wrong dose
  - Broad spectrum agents are used to treat very susceptible bacteria
  - The wrong antibiotic is given to treat an infection

Antibiotic Stewardship

Antibiotic Stewardship

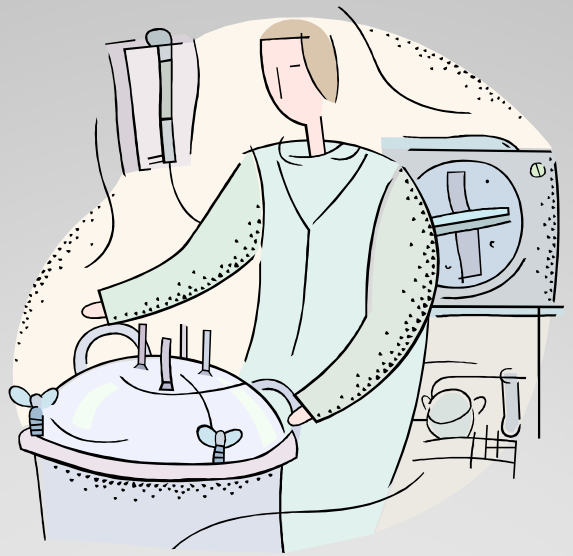
- Antibiotic misuse adversely impacts patients (e.g.-C. difficile)
- Antibiotic exposure is the single most important risk factor for the development of Clostridium difficile associated disease (CDAD).
- Up to 85% of patients with CDAD have antibiotic exposure in the 28 days before infection.

Antibiotic Stewardship

- View the link below to review statistics on antibiotic use, resistance and development
- http://www.cdc.gov/getsmart/healthcare/learn-from-others/factsheets/gsw-2012.html#nh2

Antibiotic Stewardship

- View the link to review facts regarding antibiotic use in nursing homes
- http://www.cdc.gov/getsmart/healthcare/learn-from-others/factsheets/nursing-homes.html



Sterilization

Sterilization

- **Sterilization** means the use of a physical or chemical procedure to destroy all microbial life, including highly resistant bacterial endospores. The major sterilizing agents used in hospitals are:
  - a) moist heat by steam autoclaving
  - b) ethylene oxide gas
  - c) dry heat.
- In general, reusable medical devices or patient-care equipment that enters normally sterile tissue or the vascular system or through which blood flows should be sterilized before each use.
- There are a variety of chemical germicides (sterilants) that have been used for purposes of reprocessing reusable heat-sensitive medical devices and appear to be effective when used appropriately, i.e., according to manufacturer's instructions.
- These chemicals are rarely used for sterilization, but appear to be effective for high-level disinfection of medical devices that come into contact with mucous membranes during use (e.g., flexible fiber optic endoscopes).

- Separate clean and dirty functions
- Set up traffic flow to avoid re-contamination
  - Physical facilities – 3 separate areas
    - Cleaning/decontamination
    - Packaging
    - Sterilization and storage
  - Cleaning
  - Packaging
    - Inspection: remove items not adequately cleaned, broken, needing repair
  - Loading
    - All surfaces must be directly exposed to disinfecting/sterilizing agent
  - Storage

Sterilization and Disinfection Process

- **Of all methods available for sterilization, moist heat in the form of saturated steam under pressure is the most widely used and the most dependable.**
  - Steam sterilization is nontoxic, inexpensive, rapidly microbicidal, sporicidal, and rapidly heats and penetrates fabric. Like all sterilization processes, steam sterilization has some deleterious effects on some materials, including corrosion and combustion of lubricants associated with dental hand pieces; reduction in ability to transmit light associated with laryngoscopes; and increased hardening time (5.6 fold) with plaster-cast 829.

- The basic principle of steam sterilization, as accomplished in an autoclave, is to expose each item to direct steam contact at the required temperature and pressure for the specified time. Thus, there are four parameters of steam sterilization: steam, pressure, temperature, and time.

- The ideal steam for sterilization is dry saturated steam and entrained water (dryness fraction ≥97%). Pressure serves as a means to obtain the high temperatures necessary to quickly kill microorganisms.

Steam Sterilization

- Specific temperatures must be obtained to ensure the microbicidal activity.
  - The two common steam-sterilizing temperatures are 121ºC (250ºF) and 132ºC (270ºF).
  - These temperatures (and other high temperatures) must be maintained for a minimal time to kill microorganisms.
- Recognized minimum exposure periods for sterilization of wrapped healthcare supplies are 30 minutes at 121ºC (250ºF) in a gravity displacement sterilizer or 4 minutes at 132ºC (270ºC) in a pre-vacuum sterilizer.
- At constant temperatures, sterilization times vary depending on the type of item (e.g., metal versus rubber, plastic, items with lumens), whether the item is wrapped or unwrapped, and the sterilizer type

Steam Sterilization

Steam Sterilization

- Steam sterilization should be used whenever possible on all critical and semi critical items that are heat and moisture resistant
- Examples include:
  - Steam sterilizable respiratory therapy
  - Steam sterilizable anesthesia equipment, even when not essential to prevent pathogen transmission.
- Steam sterilizers also are used in healthcare facilities to decontaminate microbiological waste and sharps containers
  - Additional exposure time is required in the gravity displacement sterilizer for these items.

- Steam will “cook” the microorganism in a very short period of time <u>but</u>
  - Autoclave must be brought to temperature
  - Temperature must be maintained throughout the process
  - Safety Factor {just in case} (1/2 of the scientific kill time at temperature)
  - Generally 20 minutes

It takes longer than you think!

- Pre-vacuum – (132°C x 4 minutes)
  - 1 minute to heat up
  - 2 minutes to kill
  - 1 minute Safety factor

- Gravity (121°C x 12 minutes)
  - 12 minutes to heat up
  - 12 minutes to kill
  - 6 minutes Safety factor

Examples

- Steam can be too wet (>4% humidity)
- Altitude of hospital (sea level vs. ?)
- Steam can be too hot (superheated) [no moisture]
- Steam can contain other chemical (chloramines used to clean steam generators) that can stain or damage instruments.

Steam Issues

Potential Areas of Risk

- Monitoring of disinfection/sterilization
- Documentation on sterilizers
  - Equipment maintenance
  - Justification for minimal flash sterilization
  - Endoscope reprocessing
- Separation of clean vs. dirty functions; clean vs. dirty devices
  - Physical separation; clean supply, dirty utility rooms
  - Traffic pattern
  - Dirty to clean in sterilization/disinfection areas
  - Physical location, tagging system for devices

Sterilization Monitoring

- *Loading:* arrange such that all surfaces are directly exposed to the sterilizing agent
- *Physical*: cycle time, temperature, pressure
- *Chemical*: heat or chemical sensitive inks that change color indicating when parameters for sterilization met
- *Biological*: Bacillus spores

NOTE: combined results from multiple process controls are necessary to ensure sterility

Disinfection is:

- The use of a chemical procedure that eliminates virtually all recognized pathogenic microorganisms, but not necessarily all microbial forms (e.g., bacterial endospores) on inanimate objects.
- There are three levels of disinfection: high, intermediate, and low.
  - High-level disinfection kills all organisms, except high levels of bacterial spores, and is effected with a chemical germicide cleared for marketing as a sterilant by the FDA.
  - Intermediate-level disinfection kills mycobacteria, most viruses, and bacteria with a chemical germicide registered as a "tuberculocide" by the EPA.
  - Low-level disinfection kills some viruses and bacteria with a chemical germicide registered as a hospital disinfectant by the EPA.

Disinfection

Disinfection

- Unlike sterilization, disinfection is not sporicidal. A few disinfectants will kill spores with prolonged exposure times (3–12 hours); these are called chemical sterilants.
- At similar concentrations but with shorter exposure periods (e.g., 20 minutes for 2% glutaraldehyde), these same disinfectants will kill all microorganisms except large numbers of bacterial spores; they are called high-level disinfectants.
- Low-level disinfectants can kill most vegetative bacteria, some fungi, and some viruses in a practical period of time (<10 minutes).
- Intermediate-level disinfectants might be cidal for mycobacteria, vegetative bacteria, most viruses, and most fungi but do not necessarily kill bacterial spores.
- Germicides differ markedly, primarily in their antimicrobial spectrum and rapidity of action

Cleaning

- The removal of visible soil (e.g., organic and inorganic material) from objects and surfaces and normally is accomplished manually or mechanically using water with detergents or enzymatic products.
- Thorough cleaning is essential before high-level disinfection and sterilization because inorganic and organic materials that remain on the surfaces of instruments interfere with the effectiveness of these processes.
- Decontamination removes pathogenic microorganisms from objects so they are safe to handle, use, or discard.

How should cleaners and disinfectants be used?

- Read the label first. Each cleaner and disinfectant has instructions on the label that tell you important facts:
  - How to apply the product to a surface.
  - How long you need to leave it on the surface to be effective (contact time).
  - If the surface needs to be cleaned first and rinsed after using.
  - If the disinfectant is safe for the surface.
  - Whether the product requires dilution with water before use.
  - Precautions you should take when applying the product, such as wearing gloves or aprons or making sure you have good ventilation during application.

Cleaning

CMS Cleaning Expectations

- Cleaning of patient care equipment
- Privacy Curtains – cleaning schedule and precaution rooms
- Environmental services procedures
- Use of disinfectants and germicidal wipes (contact times)
- Laundry handling procedures
- Cleaning of blood spills
- Facilities
  - HVAC system, refrigeration, ice machines, scrub sinks, faucet aerators, eye washes

- Area around the patients' environment that maybe reasonably expected to be contaminated
  - Area around IV
  - Area around tracheostomy/head and neck
  - Area around Foley catheter drainage bag
  - Rectal tube

Patient Zone

- These areas are frequently missed or not properly cleaned in the patient's room:
  - Light switches
  - Toilet flush handle
  - Toilet room door knobs
  - Telephone
  - TV remote

Missed Cleaning Areas

Critical Items

- **Critical items**: Confer a high risk for infection if they are contaminated with any microorganism. Thus, objects that enter sterile tissue or the vascular system must be sterile because any microbial contamination could transmit disease.

- This category includes surgical instruments, cardiac and urinary catheters, implants, and ultrasound probes used in sterile body cavities. Most of the items in this category should be purchased as sterile or be sterilized with steam if possible.

Semicritical Items

- **Semicritical:** Items contact mucous membranes or nonintact skin. This category includes respiratory therapy and anesthesia equipment, some endoscopes, laryngoscope blades, esophageal manometry probes, cystoscopes, anorectal manometry catheters, and diaphragm fitting rings.
  - These medical devices should be free from all microorganisms; however, small numbers of bacterial spores are permissible.
  - Intact mucous membranes, such as those of the lungs and the gastrointestinal tract, generally are resistant to infection by common bacterial spores but susceptible to other organisms, such as bacteria, mycobacteria, and viruses.
  - Semicritical items minimally require high-level disinfection using chemical disinfectants.
  - Cleaning followed by high-level disinfection should eliminate enough pathogens to prevent transmission of infection.

Semicritical Items

- *Laparoscopes and arthroscopes entering sterile tissue ideally should be sterilized between patients. However, in the United States, this equipment sometimes undergoes only high-level disinfection between patients.*

- As with flexible endoscopes, these devices can be difficult to clean and high-level disinfect or sterilize because of intricate device design (e.g., long narrow lumens, hinges). Meticulous cleaning must precede any high-level disinfection or sterilization process.

- *Although sterilization is preferred, no reports have been published of outbreaks resulting from high-level disinfection of these scopes when they are properly cleaned and high-level disinfected. Newer models of these instruments can withstand steam sterilization that for critical items would be preferable to high-level disinfection*

Semicritical Items

- Rinsing endoscopes and flushing channels with sterile water, filtered water, or tap water will prevent adverse effects associated with disinfectant retained in the endoscope (e.g., disinfectant-induced colitis).
- Items can be rinsed and flushed using sterile water after high-level disinfection to prevent contamination with organisms in tap water, such as nontuberculous mycobacteria, Legionella, or gram-negative bacilli such as Pseudomonas. Alternatively, a tap water or filtered water (0.2µ filter) rinse should be followed by an alcohol rinse and forced air drying.
- Forced-air drying markedly reduces bacterial contamination of stored endoscopes, most likely by removing the wet environment favorable for bacterial growth. After rinsing, items should be dried and stored (e.g., packaged) in a manner that protects them from recontamination.

Noncritical Items

- Noncritical items are those that come in contact with intact skin but not mucous membranes. Intact skin acts as an effective barrier to most microorganisms; therefore, the sterility of items coming in contact with intact skin is "not critical.“
- In this guideline, noncritical items are divided into noncritical patient care items and noncritical environmental surfaces. Examples of noncritical patient-care items are bedpans, blood pressure cuffs, crutches and computers.
- In contrast to critical and some semicritical items, most noncritical reusable items may be decontaminated where they are used and do not need to be transported to a central processing area. Virtually no risk has been documented for transmission of infectious agents to patients through noncritical items when they are used as noncritical items and do not contact non-intact skin and/or mucous membranes.

Noncritical Items

- Most Environmental Protection Agency (EPA)-registered disinfectants have a 10-minute label claim.
- Federal law requires all applicable label instructions on EPA-registered products to be followed (e.g., use-dilution, shelf life, storage, material compatibility, safe use, and disposal).

- *If the user selects exposure conditions (e.g., exposure time) that differ from those on the EPA-registered products label, the user assumes liability for any injuries resulting from off-label use and is potentially subject to enforcement action under Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) 65.*

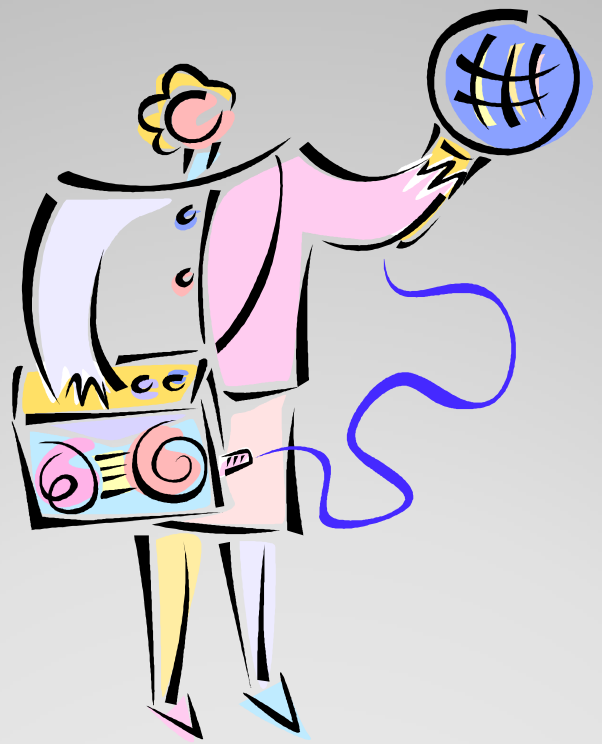
Noncritical Items

Infection Prevention

- Develop and maintain infection prevention and occupational health programs
- Assure sufficient and appropriate supplies necessary for adherence to Standard Precautions (e.g., hand hygiene products, personal protective equipment, injection equipment)
- Assure at least one individual with training in infection prevention is employed by or regularly available to the facility
- Develop written infection prevention policies and procedures appropriate for the services provided by the facility and based upon evidence-based guidelines, regulations, or standards

Recommendations for Infection Prevention

- **Educate and Train Healthcare Personnel**
  - Ongoing education and training of healthcare personnel (HCP) are critical for ensuring that infection prevention policies and procedures are understood and followed.
  - Education on the basic principles and practices for preventing the spread of infections should be provided to all HCP. Training should include both HCP safety (e.g., OSHA blood borne pathogen training) and patient safety, emphasizing job- or task-specific needs.
  - Education and training should be provided upon orientation to the facility and should be repeated regularly (e.g., annually) to maintain competency, including anytime policies or procedures are updated/revised. Competencies should be documented initially and as appropriate for the specific HCP positions



Public Health Reporting

Public Health Reporting

- Why should I report?
  - CDC states reporting of cases of infectious diseases is important in the planning and evaluation of disease prevention and control programs, in the assurance of appropriate medical therapy, and in the detection of common-source outbreaks .
- When should I report a disease?
  - Most disease reports should be submitted within five (5) working days of diagnosis, treatment, or detection. However, some conditions must be reported within 24 hours or only during outbreaks.
- Who should I report to?
  - Reports should be sent to the local health agency (county or state health department) by telephone or email.

Public Health Reporting

- **What information is required?**
  - Reports should include:
    - The patient's name and phone number (if applicable) and complete street address
    - The patient's date of birth, race, sex, ethnicity
    - The date of onset, diagnosis, date of diagnosis, laboratory results and date
    - The facility name and phone number
    - The name of reporter, and the reporter's telephone number and complete address.
  - Required information is specific to the disease being reported

Public Health Reporting

- Use the links below to review reportable diseases for Nevada.
  - http://southernnevadahealthdistrict.org/disease-reporting/disease-reporting.php
  - http://www.health.nv.gov/Epidemiology/DiseaseNVRept.pdf

Public Health Reporting

- To report during normal hours call:
  (775) 684-5911
- After hours emergency duty officer:
  (775) 400-0333
- Report by email:
  nshdepi@health.nv.gov

Carson City Health & Human Services
900 East Long Street
Carson City, NV 89706
http://www.carson-city.nv.us
Phone: (775) 887-2190
After-Hours Phone: (775) 887-2008
Confidential Fax (775) 887-2138

Southern Nevada Health District
330 S. Valley View Blvd.
Las Vegas, NV 89107
http://www.southernnevadahealthdistrict.org/
Phone: (702) 759-1000 (24 hours)
Confidential Fax: (702) 759-1414

Nevada State Health Division
4150 Technology Way
Carson City, Nevada 89706
http://health2k.state.nv.us/
Phone: (775) 684-5911 (24 Hours)
Confidential Fax: (775) 684-5999

Washoe County Health District
1001 E. Ninth St., Building B
P. O. Box 11130
Reno, Nevada 89520-0027
http://www.co.washoe.nv.us/health
Phone: (775) 328-2447 (24 hours)
Confidential Fax: (775) 328-3764

Contacts for reporting diseases in Nevada

- Use the link below to access State of Nevada Confidential Morbidity Report Form

- http://www.health.nv.gov/Epidemiology/MorbidityForm-interactive.pdf

Public Health Reporting Form

Environmental Cleaning

- Every healthcare facility must provide a clean and safe environment
- Sources of infection can come from: personnel, the operating and/or patient's room, tools, instruments, supplies etc.
- Pathogenic organisms have the ability to survive on or be transferred to many surfaces

Environmental Cleaning

- There should be no visible dust, debris, soil or body substances
- Staff should be dedicated to cleaning and disinfecting surfaces within the facility (environmental staff, perioperative nurses, etc.)

Environmental Cleaning

- Clean, lint free cloth moistened with an EPA-registered detergent/ disinfectant should be used on damp dust
- Do not use cleaning and disinfection agents that produce mist, aerosols, or dust
- EPA registered disinfectants should be used to clean floors and noncritical equipment

Environmental Cleaning Methods/Materials

- The following materials are acceptable for gloves that are used for environmental cleanings: natural rubber latex, nitrile, chloroprene blends or butyl rubber
- Vinyl gloves are known to have a high failure rate in barrier protection and should not be used for environmental cleaning
- Material safety data sheets (MSDSs) should be available and reviewed for each disinfectant used

Environmental Cleaning Methods/Materials

- Reusable string, microfiber mops and cleaning cloths should be changed after each use
- Once used, mops should not be returned to the cleaning solution in order to prevent contamination
- Single use/disposable mop heads and cloths can be used
- Mops that dispense cleaning EPA-registered disinfectant can be used

Environmental Cleaning

- Prevent vermin infestation by removing food sources and any environment that attracts pest.
- If these measures are ineffective, contact a licensed professional

Environmental Cleaning

- Disposable items, contaminated with blood and/or tissue that would release blood or other infectious materials in a liquid or semi-liquid state if compressed, or items that are caked with dried blood and other potentially infectious materials must be placed in closable containers or bags that are leak proof and labeled as infectious.

- These containers or bags should be color coded, labeled , or tagged for easy identification as biohazardous waste.

Hazardous Materials

- Disposable hazardous items include but are not limited to:
  - Gowns
  - Gloves
  - Sponges
  - Procedural drapes
  - Suction tubing
  - Liners and canisters
  - Open or used supplies

Hazardous Materials

- Use the link below to access CDC's terminal cleaning checklist

- http://www.cdc.gov/HAI/toolkits/Environmental-Cleaning-Checklist-10-6-2010.pdf

Terminal Cleaning Checklist

- Terminal cleaning: to decrease the amount of pathogens, dust and debris

- When terminal cleaning and disinfecting, areas of focus include but are not limited to:
  - Surgical lights and external tracts
  - Fixed and ceiling-mounted equipment
  - All furniture including wheels and casters
  - Equipment
  - Handles on cabinets and push plates
  - Ventilator faceplates
  - Horizontal surfaces (tops of counters, sterilizers, fixed shelving)
  - The entire floor
  - Kick bucket and scrub sinks

Terminal Cleaning and Disinfection

- Surgical and invasive procedure rooms and scrub/utility areas should be terminally cleaned and disinfected daily

- Operating and invasive procedure rooms should be terminally cleaned and disinfected
  - Upon the completion of scheduled procedures for the day and
  - Everyday during the week

- Operating and invasive procedure rooms that are not in use should be terminally cleaned and disinfected daily
  - Personnel should move equipment and supplies in and out of rooms when cleaning and disinfecting

Terminal Cleaning and Disinfection

- After scheduled cases are completed, floors should be wet-vacuumed with an EPA-registered disinfectant
- Always disassemble, clean, and disinfect cleaning equipment with an EPA-registered disinfectant
- Ensure all equipment is properly dried before storage and reuse

Terminal Cleaning and Disinfection

- Single use soap dispensers should be used in surgical and invasive procedure rooms
- The use of refillable liquid hand soap dispensers can become a reservoir for microorganisms

Terminal Cleaning and Disinfection

- Provide a cleaning schedule for items in the facility that should be cleaned on a daily, weekly, and monthly basis.
- Utilize the healthcare staff members (environmental services, infection preventionist, etc.) to create an effective cleaning schedule.

Cleaning Schedules

Cleaning Schedules

- Make a “cleaning matrix” showing:
  - Who cleans post discharge, e.g., environmental services (EVS)
  - Who cleans when in use
  - How often “general use equipment” is cleaned
  - Who cleans “general use equipment”
- Identification of cleaned items
  - Rags, tags and bags

“You can clean without disinfecting, but you cannot disinfect without cleaning”

Dr. Earle Spaulding

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