Infection Control
Self-Study Syllabus

The content of this training curriculum established by the New York State Department of Health and the New York State Department of Education, meets the requirements for mandatory infection control training for health-care professionals in the State of New York.

This self-study syllabus was developed by the Infection Control Professionals from Chapter 118, the Heart of New York Chapter, of the Association for Professionals in Infection Control and Epidemiology.
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ELEMENT I

PROFESSIONAL RESPONSIBILITY FOR INFECTION CONTROL

All health-care professionals share responsibility to adhere to scientifically accepted principles and practices of infection control, and to monitor the performance of those for whom they are responsible.

Learning Objectives:

• Recognize benefits to patients and health-care workers of adhering to scientifically accepted principles and practices of infection control;

• Recognize the professional’s responsibility to adhere to these practices, and the consequences of failing to comply;

• Recognize the professional’s responsibility to monitor infection control practices of persons for whom he/she is responsible

Definitions:

• Standard Precautions: precautions that are applicable to all patients, including use of barriers, such as gloves, gowns, masks, and/or protective eye wear, and proper disposal of sharps, to prevent skin and mucous membrane exposure to blood borne pathogens from blood, all body fluids, secretions and excretions regardless of whether or not they contain visible blood.

• Standard of Care: established criteria for the performance of individuals in similar circumstances.

• OSHA: Occupational Safety and Health Administration, a branch of the U.S. Department of Labor

I. Standards of care in infection control

A. Standard Precautions are used to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources in hospitals; this is the first level of precautions for all patients.

B. Transmission based precautions, the second level of precautions used for caring for patients with or suspected to have certain communicable diseases.
   1. Airborne
   2. Contact
   3. Droplet

C. Hand washing and aseptic technique, practices to prevent contact spread of most bacterial infections (e.g. staph and strep) and some viruses (herpes, cold viruses, CMV) in health-care settings.
D. Appropriate cleaning, disinfection, and sterilization processes of medical devices and equipment to prevent transmission of infection.

E. Occupational health practices used for the prevention and control of communicable diseases in health-care workers.

II. Standards of professional conduct as they apply to infection control

A. Mandated NY State and Federal standards of professional conduct
   1. New York State: 1992 legislation formally established scientifically accepted infection control practices as standards of professional conduct. The New York state Department of Health and New York State Education Department require that all licensed health care professionals in New York must complete mandatory course work in infection control before July 1, 1994 and every 4 years thereafter. Documentation of this training is required for hospital-credentialing of physicians, and for state licensing or registration of non-physicians.
   2. OSHA (US Department of Labor): in 1991 the OSHA Blood borne Pathogens Standard took effect, requiring enforcement of Universal/Standard Precautions and training of all personnel (with potential blood or body fluid exposure) in infection control techniques. The Standard also mandates the availability of appropriate protective equipment and barriers, and requires procedures for follow-up after an exposure.

B. Implications of professional conduct standards
   1. All health care professionals bear responsibility to adhere to infection control standards. By law in New York State, unprofessional conduct includes “failing to use scientifically accepted infection prevention techniques appropriate to each profession for the cleaning and sterilization or disinfection of instruments, devices, materials, and work surfaces, utilization of protective garb, use of covers for contamination-prone equipment and the handling of sharp instruments”.... and “failure to sue scientifically accepted infection control practices to prevent transmission of disease pathogens from patient to patient, professional to patient, employee to patient, and patient to employee...”
   2. All health-care professionals have a responsibility to monitor the practices of others to assure the safety of all patients and personnel.
   3. Consequences of failure to follow accepted standards of infection control include:
      a. Subjecting self, co-workers, and/or patients to increased risk of communicable disease.
      b. Subjecting oneself to charges of unprofessional conduct.
         1) Mechanisms for reporting unprofessional conduct: patients, family members, or co-workers can file charges against a health professional through their institution (e.g., hospital or employer) or directly to the New York State Department of Health, Office of Health Systems Management (OHSMS);
         2) Investigation of the complaint is carried out by the hospital, employer, or OHSMS;
3) Possible outcomes, depending on the severity of misconduct, include:
   • disciplinary action,
   • revocation of professional license, or
   • professional liability: since infection control practices are considered standard of care, failure to adhere to these standards may be grounds for professional liability.
ELEMENT II
TRANSMISSION AND CONTROL OF INFECTION IN HEALTH CARE SETTINGS

Learning Objectives:

• Describe how pathogenic organisms may be spread in health care settings;
• Identify the factors which influence the outcome of an exposure;
• List strategies for prevention of transmission of pathogenic organisms;
• Describe how infection control concepts are applied in practice.

Definitions:

• Pathogen or Infectious Agent: a biological agent or a microorganism capable of causing disease.
• Transmission: any mechanism by which a pathogen is spread by a source or reservoir to a person.
• Reservoir: any person, animal, insect, plant, soil, or substance, (or combination of these), in which an infectious agent normally lives and multiplies, on which it depends for survival, and where it reproduces itself in such a manner that it can be transmitted to a susceptible host.
• Susceptible Host: a person or animal lacking effective resistance to a particular infectious agent.
• Healthcare Associated Infection (HAI): any infection which is acquired in a health care setting: manifestation of clinical illness may occur during or after discharge from the hospital or other health care facility, depending on the incubation period of the infection.
• Incubation Period: the time between exposure to an infectious agent and the onset of disease.
• Colonization: presence of an infectious agent on skin, mucous membranes (nose, throat, vagina, intestinal tract), or wounds, or in urine, stool or secretions, without signs or symptoms of infection. The colonizing agent may later cause disease, or may be transmitted to other persons.
• Carrier: a person who is colonized or infected by an infectious agent for an extended time, often without symptoms, and who may transmit infection to others.
• Fomites: an inanimate object or substance such as clothing, furniture, soap, or mouthwash, that is capable of transmitting infectious agents from one individual to another.
I. Transmission of infections

A. “The Chain of Infection”: the pattern of spread of infection from one host to another susceptible host, or from the environment to a susceptible host. This chain requires a pathogen, a source or reservoir, a portal of exit, a mode of transmission, a portal of entry, and a susceptible host.

B. Presence of a pathogen:
   1. Bacteria: examples are Staph, Strep, E. Coli, Pseudomonas, Anaerobes, Rickettisia, Mycoplasma, Chlamydia, and Mycobacteria such as TB.
   2. Viruses: examples are influenza, common cold viruses, measles, mumps, chickenpox (varicella), hepatitis A, B, and C, and HIV.
   3. Fungi: include yeasts (e.g., Candida) and molds (e.g., Aspergillus).
   4. Parasites: include protozoa (e.g., malaria, toxoplasmosis, pneumocystis), worms, and insects (e.g., lice and scabies).
   5. Prions: (e.g., Creutzfeldt-Jakob disease, kuru, human bovine spongiform encephalitis also known as mad cow disease) Proteinaceous infectious particles; different from viruses because of apparent lack of nucleic acid; made of glycoproteins, prions collect in the brain tissue as deposits in patients with prion disease.

C. Reservoirs include:
   1. Animate
      a) People: Persons may be asymptomatic but capable of transmitting infection.
      Examples: 40% of health-care workers carry Staph aureaus in their noses and may transmit it to patients; chicken pox and hepatitis A can be transmitted during their incubation periods, before illness occurs; hepatitis B can be transmitted (via blood, body fluids, sex, or during birth) during an asymptomatic incubation period lasting up to 6 months, and 10% of those infected become chronic carriers who may transmit the infection indefinitely; HIV can be transmitted (via blood, body fluids, sex, or birth) during the asymptomatic incubation period lasting up to 10 or more years.
b) Insects or animals

*Examples:* Skunks, fox, and bats are reservoirs of rabies which is transmitted directly by bites: wild mice and some other small mammals are reservoirs of Lyme Disease, which is transmitted to humans from these animals by ticks.

2. Inanimate Environment: Water, soil, food, counter tops, sinks, medical equipment.

*Examples:* Soil and water (including home and hospital hot water tanks) are reservoirs of *Legionella*, stagnant water is a reservoir of *Pseudomonas*; soil and dust are reservoirs of *Aspergillus*; soil is a reservoir of *Tetanus*.

D. Portals of exit: Routes and mechanisms by which pathogens exit the body:

1. Pathogens are expelled by coughing or sneezing, respiratory and oral secretions;
2. Draining skin lesions or wounds;
3. Feces (diarrhea or formed stool);
4. Urine;
5. Drainage of blood and other body fluids.

E. Modes by which pathogens are transmitted:

1. Contact
   a) Direct contact: Involves a direct body surface to body surface contact and physical transfer of microorganisms between a susceptible host and an infected or colonized person.
   b) Indirect contact: Involves contact of a susceptible host with a contaminated intermediate object, usually inanimate.

*Example:* MRSA, Scabies, Respiratory Syncytial Virus (RSV)

2. Respiratory droplet: Transmission occurs with exposure to droplets containing microorganisms generating from an infected person propelled a short distance (3 feet) and deposited on the hosts conjunctivae, nasal mucosa and mouth.

*Example:* Influenza, Rubella, and Pertussis, Strep throat, Common colds

3. Respiratory airborne: Infections acquired by inhalation of aerosols composed of small infectious particles which are suspended in the air. Infection may spread widely in a room, corridor, or through a ventilation system.

*Example:* Tuberculosis, Chickenpox, Measles
4. Respiratory airborne plus contact:
   *Example:* SARS (Severe Acute Respiratory Syndrome), Smallpox, Avian Influenza

5. Common vehicle: Contaminated food, water, medication, intravenous fluid or other product which transmits infection to 2 or more persons.

6. Vector-borne: Transmission via an insect or animal carrier.
   *Example:* Mosquitoes are vectors of Malaria; ticks are vectors of Lyme Disease.

F. Portals of Entry: routes and mechanisms by which pathogens are introduced:
1. Entry sites: Non-intact skin, mucous membranes; gastrointestinal, respiratory, and genitourinary tracts; across placenta to fetus.
2. Mechanisms: Via ingestion, inhalation, endotracheal tube, bladder catheter, percutaneous injury (e.g., needlestick), vascular access, surgical incision, etc.

G. Factors which influence the outcome of an exposure:
1. Host susceptibility: Immunity from past infection or immunization (e.g., measles, rubella) decreases susceptibility. Impairment of host defenses, (e.g., due to advanced age, prematurity, chronic disease, malignancy, malnutrition, pregnancy, occupation, life style, presence of a foreign body/invasive device, immunization status, genetics, trauma, chemotherapy, and other medications) increases susceptibility.
   Impairment of defense is mediated by alteration in:
   a) Natural barriers to infection, e.g., intact skin, stomach acid, respiratory tract cilia, and cough mechanism;
   b) Immune system, e.g., humoral immunity (antibodies), cell-mediated immunity (lymphocytes, macrophages), inflammatory response.
2. Virulence of the pathogen: Invasiveness, ability to cause disease;
3. Inoculum’s size: Amount of the infectious agent in the exposure;
4. Route of exposure: Some routes are more likely to cause infection;
5. Duration of exposure.

II. Prevention: Breaking the “Chain of Transmission”

A. Recognition and control of reservoirs:
1. Recognize, diagnose, and treat persons with transmissible disease. 
   *Examples:* tuberculosis, whooping cough, meningococcal meningitis.
2. Eliminate or control inanimate reservoirs of pathogenic organisms. *Example:* eliminate stagnant water sources in health care setting, treat hot water systems for *Legionella*.
3. Laboratory, radiologic, and other diagnostic testing or procedures assist in identifying the cause of the infection.
B. Interrupt routes of transmission:
1. Hand Hygiene - a general term that applies to either handwashing, antiseptic handwash, antiseptic hand rub or surgical hand antisepsis. Hand washing is the single most important means of preventing spread of infection:
   a) Handwashing with a non-antimicrobial soap or antimicrobial soap: wet hands with running water, apply hand washing agent to hands and rub hands together vigorously for at least 10 - 15 seconds, covering all surfaces of the hands and fingers. Rinse hands with warm water and dry thoroughly with a disposal towel. Use a clean dry paper towel to turn off faucet.

   b) Waterless antiseptic hand rubs: An antiseptic agent that does not require the use of water. After applying such an agent, rub the hands together until dry. This is the preferred method for handwashing when hands are not visibly soiled, e.g., visible dirt, or visible body substances such as blood, feces or urine.

   c) Decontaminate hands:
      1. After contact with a patient’s intact skin (as in taking a pulse or blood pressure, or lifting a patient).
      2. After contact with body fluids or excretions, mucous membranes, non-intact skin, or wound drainage.
      3. If moving hands from a contaminated body site to a clean body site during patient care.
      4. After contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient.
      5. Before caring for patients with severe neutropenia or other forms of immune suppression.
      7. Before inserting indwelling urinary catheters or other invasive devices.
      8. After removing gloves.
     10. After handling trash.
     11. After sneezing, coughing on hands or using tissue.
d) Hand lotions or creams should be used to minimize the occurrence of irritant contact dermatitis associated with hand antisepsis or handwashing. Solicit information from manufacturers regarding any effects that hand lotions, creams, or alcohol based hand antiseptics may have on the persistent effects of antimicrobial soaps used.

e) Other aspects of hand hygiene:
   • Do not wear artificial fingernails or extenders when providing patient care.
   • Keep natural fingernails less than 1/4 inch long.
   • Wear gloves when it is reasonably anticipated that contact with blood or other potentially infectious materials, mucous membranes and non-intact skin will occur.
   • Remove gloves after caring for a patient. Do not wear the same pair of gloves for the care of more than one patient and do not wash gloves between patients.

2. Use of barriers or Personal Protective Equipment (PPE) (gloves, gowns, masks, goggles): see Element IV.
3. Sterilization and disinfection of patient care equipment: see Element V.
4. Isolation or cohorting:
   a) Private room with negative pressure ventilation system isolation is necessary for diseases transmitted by airborne route, and private room for disease spread by contact when patient hygiene is poor.
   b) Cohorting (sharing a room) may be appropriate when 2 patients are infected or colonized with the same organism.
   c) Transfer of patients within a hospital may be appropriate, e.g., placing a patient with chickenpox away from immuno-compromised susceptible patients.
   d) A private room may be required for preventing transmission of GI tract organisms.

5. Environmental practices:
   a) Housekeeping: Maintaining a clean environment;
   b) Ventilation: Special room ventilation (e.g., negative pressure) is required for patients with known or suspected TB and certain other airborne infections;
   c) Waste management: Proper disposal of sharps and infectious waste;
   d) Linen and laundry management.
   e) Careful selection of safety devices or sharp management: No one medical device is considered appropriate or effective for all circumstances, selection of devices is based on; effectiveness and reliability of safety mechanisms, acceptability to the health care worker and provision that the use of the device does not adversely affect patient care.
6. Protection of the host:

a) Vaccination:
   • Personnel: immunity against measles (rubeola) and rubella is required of health-care workers (HCWs) either by vaccination, history of natural disease or antibody titer. Vaccination against Hepatitis B is highly recommended. Annual influenza vaccination is advised for all HCWs to prevent illness and transmission of influenza to patients. Varicella vaccination is recommended for those without natural immunity to chicken pox.
   • Patients: should receive vaccinations appropriate to their age and risk group.

b) Post-exposure prophylaxis: preventative treatment or vaccination given after exposure to an infectious agent, in order to prevent infection or illness.

Examples:
• antibiotics (Rifampin or Ciprofloxacin) given after exposure to meningococcal disease;
• 1st dose of Hepatitis B vaccine and Hepatitis B immune globulin after exposure of an unvaccinated person to Hepatitis B-infected blood;
• varicella-zoster immune globulin (VZIG) given to a susceptible, immunocompromised host after exposure to chickenpox if individual is not vaccinated.
• anti-retroviral medications given after high risk exposures to HIV infected blood.

c) maintain skin integrity;

d) avoid unnecessary use, or excessive duration of placement, of intravenous lines, bladder catheters, and other invasive devices.

C. System of Precautions:

   a) Hand washing
   b) Gloves: wear gloves (clean, non-sterile gloves are adequate) when touching blood, body fluids, secretions, excretions, and contaminated items. Put on clean gloves just before touching mucous membranes and non-intact skin. Change gloves between tasks and procedures on the same patient after contact with material that may contain a high concentration of microorganisms. Remove gloves promptly after use, before touching non-contaminated items and environmental surfaces, and before going to another patient, and wash hands immediately to avoid transfer of microorganisms to other patients or environments.
   c) Mask, Eye Protection, Face Shield, Gowns
      1. Wear a mask and eye protection or a face shield to protect 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.
2. Wear a gown (a clean, non-sterile gown is adequate) to protect skin and prevent soiling of clothing during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions. Select a gown that is appropriate for the activity and amount of fluid likely to be encountered. Remove a soiled gown as promptly as possible, and wash hands to avoid transfer of microorganisms to other patients or environments.

d) Patient-Care Equipment:
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 cleaned and reprocessed appropriately. Follow your institution’s policy on re-use of single use devices, the FDA has published guidelines concerning the re-use of single use devices.

e) Environmental Control:
Ensure that the hospital has adequate procedures for the routine care, cleaning, and disinfection of environmental surfaces, beds, bedrails, bedside equipment, and other frequently touched surfaces and ensure that these procedures are being followed.

f) Linen:
Handle, transport, and process used linen soiled with blood, body fluids, secretions, and excretions in a manner that prevents skin and mucous membrane exposures and contamination of clothing, and that avoids transfer of microorganisms to other patients and environments.

g) Patient placement:
Place a patient who has a communicable disease and who is unable to maintain appropriate hygiene or environmental control, in a private room. If a private room is not available, consult with infection control professionals regarding patient placement or other alternatives.

D. Transmission-Based Precautions:
1. Airborne Precautions: In addition to Standard Precautions, use Airborne Precautions, or the equivalent, for patients known or suspected to be infected with microorganisms transmitted by airborne droplet nuclei, small-particle residue (5 microns or smaller in size) of droplets containing microorganisms that remain suspended in the air and that can be dispersed widely by air currents within a room or over a long distance, such as tuberculosis, measles, or chickenpox.

2. Droplet Precautions: Use Droplet Precautions, or the equivalent, for a patient known or suspected to be infected with microorganisms transmitted by droplets (larger than 5 microns in size) that can be generated by the patient during coughing, sneezing, talking, or the performance of a procedure.
3. Contact Precautions: Use Contact Precautions for specified patients known or suspected to be infected or colonized with epidemiologically important microorganisms that can be transmitted by direct contact with the patient (hand or skin-to-skin contact that occurs when performing patient-care activities that require touching the patient’s dry skin) or indirect contact (touching) with patient’s environment surfaces or patient-care items used.
ELEMENT III

USE OF ENGINEERING AND WORK PRACTICE CONTROLS TO REDUCE THE OPPORTUNITY FOR PATIENT AND HEALTHCARE WORKER EXPOSURE TO POTENTIALLY INFECTIOUS MATERIAL IN ALL HEALTHCARE SETTINGS

LEARNING OBJECTIVES

Upon completion of course work or training on this element, the learner will be able to:

➢ Define healthcare-associated disease transmission, engineering controls, safe injection practices, and work practice controls;

➢ Describe specific high-risk practices and procedures that increase the opportunity for healthcare worker and patient exposure to potentially infectious material;

➢ Describe specific measures to prevent transmission of bloodborne pathogens from patient to patient, healthcare worker to patient, and patient to healthcare worker via contaminated injection equipment;

➢ Identify work practice controls designed to eliminate the transmission of bloodborne pathogens during use of sharp instruments (e.g., scalpel blades and their holders (if not disposable), lancets, lancet platforms/pens, puncture devices, injections); and

➢ Identify where engineering or work practice controls can be utilized to prevent patient exposure to bloodborne pathogens.
**DEFINITIONS**

**Healthcare-associated infections (HAIs):** Infections associated with healthcare delivery in any setting (e.g., hospitals, long-term care facilities, ambulatory settings, home care).

**Engineering Controls:** Controls (e.g., sharps disposal containers, self-sheathing needles, safer medical devices, such as sharps with engineered sharps injury protections and needleless systems) that isolate or remove the bloodborne pathogens hazard from the workplace.

**Injection safety (or safe injection practices):** 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. Injection safety includes practices intended to prevent transmission of bloodborne pathogens between one patient and another, or between a healthcare worker and a patient, and also to prevent harms such as needlestick injuries.

**Work Practice Controls:** Controls that reduce the likelihood of exposure to bloodborne pathogens by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).

**CONTENT OUTLINE**

I. **High risk practices and procedures (by exposure type) capable of causing healthcare acquired infection with bloodborne pathogens:**
A. Percutaneous exposures

1. Exposures occurring through
   handling/disassembly/disposal/reprocessing of contaminated needles
   and other sharp objects:
   
   a. Manipulating contaminated needles and other sharp objects
      by hand (e.g., removing scalpel blades from holders,
      removing needles from syringes),
   
   b. Delaying or improperly disposing (e.g., leaving
      contaminated needles or sharp objects on
      counters/workspaces or disposing in non-puncture-resistant
      receptacles),
   
   c. Recapping contaminated needles and other sharp objects
      using a two-handed technique.

2. Performing procedures where there is poor visualization, such as:
   
   a. Blind suturing,
   
   b. Non-dominant hand opposing or next to a sharp,
   
   c. Performing procedures where bone spicules or metal
      fragments are produced.

B. Mucous membrane/non-intact skin exposures

1. Direct blood or body fluids contact with the eyes, nose, mouth, or
other mucous membranes via:

a. Contact with contaminated hands,

b. Contact with open skin lesions/dermatitis,

c. Splashes or sprays of blood or body fluids (e.g., during irrigation or suctioning).

C. Parenteral exposures

1. Injection with infectious material may occur during:

   a. Administration of parenteral medication,

   b. Sharing of blood monitoring devices (e.g., glucometers, hemoglobinometers, lancets, lancet platforms/pens),

   c. Infusion of contaminated blood products or fluids.

II. Safe injection practices and procedures designed to prevent disease transmission from patient to patient and healthcare worker to patient.

A. Unsafe injection practices have resulted in one or more of the following:

1. Transmission of bloodborne viruses, including hepatitis B and C viruses to patients;

2. Notification of thousands of patients of possible exposure to bloodborne pathogens and recommendation that they be tested
for hepatitis C virus, hepatitis B virus, and human immunodeficiency virus (HIV);

3. Referral of providers to licensing boards for disciplinary action; and

4. Malpractice suits filed by patients.

B. Pathogens including HCV, HBV, and human immunodeficiency virus (HIV) can be present in sufficient quantities to produce infection in the absence of visible blood.

1. Bacteria and other microbes can be present without clouding or other visible evidence of contamination.

2. The absence of visible blood or signs of contamination in a used syringe, IV tubing, multi-dose medication vial, or blood glucose monitoring device does NOT mean the item is free from potentially infectious agents.

3. All used injection supplies and materials are potentially contaminated and should be discarded.

C. Providers should:

1. Maintain aseptic technique throughout all aspects of injection preparation and administration:
a. Medications should be drawn up in a designated "clean" medication area that is not adjacent to areas where potentially contaminated items are placed.

b. Use a new sterile syringe and needle to draw up medications while preventing contact between the injection materials and the non-sterile environment.

c. Ensure proper hand hygiene before handling medications.

d. If a medication vial has already been opened, the rubber septum should be disinfected with alcohol prior to piercing it.

e. Never leave a needle or other device (e.g. "spikes") inserted into a medication vial septum or IV bag/bottle for multiple uses. This provides a direct route for microorganisms to enter the vial and contaminate the fluid.

f. Medication vials should be discarded upon expiration or any time there are concerns regarding the sterility of the medication.

2. Never administer medications from the same syringe to more than one patient, even if the needle is changed.

3. Never use the same syringe or needle to administer IV medications to more than one patient, even if the medication is
administered into the IV tubing, regardless of the distance from the IV insertion site.

a. All of the infusion components from the infusate to the patient's catheter are a single interconnected unit.

b. All of the components are directly or indirectly exposed to the patient's blood and cannot be used for another patient.

c. Syringes and needles that intersect through any port in the IV system also become contaminated and cannot be used for another patient or used to re-enter a non-patient specific multi-dose vial.

d. Separation from the patient's IV by distance, gravity and/or positive infusion pressure does not ensure that small amounts of blood are not present in these items.

4. Never enter a vial with a syringe or needle that has been used for a patient if the same medication vial might be used for another patient.

5. Dedicate vials of medication to a single patient.

   a. Medications packaged as single-use must never be used for more than one patient:

      1) Never combine leftover contents for later use;

      2) Medications packaged as multi-use should be assigned to a single patient whenever possible;
3) Never use bags or bottles of intravenous solution as a common source of supply for more than one patient.

6. Never use peripheral capillary blood monitoring devices packaged as single-patient use on more than one patient:
   a. Restrict use of peripheral capillary blood sampling devices to individual patients.
   b. Never reuse lancets. Consider selecting single-use lancets that permanently retract upon puncture.

III. Safe injection practices and procedures designed to prevent disease transmission from patient to healthcare worker.


IV. Evaluation/Surveillance of exposure incidents

A. Identification of who is at risk for exposure,

B. Identification of what devices cause exposure,

   1. ALL sharp devices can cause injury and disease transmission if not used and disposed properly.
      a) Devices with higher disease transmission risk (hollow bore),
      and
      b) Devices with higher injury rates (“butterfly”-type IV catheters, devices with recoil action)
c) Blood glucose monitoring devices (lancet platforms/pens).

C. Identification of areas/settings where exposures occur, and

D. Circumstances by which exposures occur.

E. Post exposure management- See Element VI.

V. **Engineering controls**

A. Use safer devices whenever possible to prevent sharps injuries
   1. Evaluate and select safer devices
   2. Passive vs. active safety features
   3. Mechanisms that provide continuous protection immediately
   4. Integrated safety equipment vs. accessory devices
      a. Properly educate and train all staff on safer devices,
      b. Consider eliminating traditional or non-safety alternatives
         whenever possible
      c. Explore engineering controls available for specific areas/settings

B. Use puncture-resistant containers for the disposal and transport of needles and other sharp objects
   1. Refer to published guidelines for the selection, evaluation and use (e.g., placement) of sharps disposal containers
      a. National Institute for Occupational Safety and Health (NIOSH) guidelines – available at
         [http://www.cdc.gov/niosh/topics/bbp/#prevent](http://www.cdc.gov/niosh/topics/bbp/#prevent)
      b. NYSDOH recommendations “Household Sharps-Dispose
of Them Safely”, available at

http://www.health.state.ny.us/publications/0909.pdf

C. Use splatter shields on medical equipment associated with risk prone procedures (e.g., locking centrifuge lids).

VI. Work practice controls

A. General practices

1. Hand hygiene including the appropriate circumstances in which alcohol–based hand sanitizers and soap and water handwashing should be used (see Element II).

2. Proper procedures for cleaning of blood and body fluid spills:

   a. Initial removal of bulk material followed by disinfection with an appropriate disinfectant.

3. Proper handling/disposal of blood and body fluids, including contaminated patient care items.

4. Proper selection, donning, doffing, and disposal of personal protective equipment (PPE) as trained [see Element IV].

5. Proper protection of work surfaces in direct proximity to patient procedure treatment area with appropriate barriers to prevent instruments from becoming contaminated with bloodborne pathogens.
6. Preventing percutaneous exposures:
   a. Avoid unnecessary use of needles and other sharp objects.
   b. Use care in the handling and disposing of needles and other sharp objects,
      1) Avoid recapping unless absolutely medically necessary.
      2) When recapping, use only a one-hand technique or safety device.
      3) Pass sharp instruments by use of designated "safe zones".
      4) Disassemble sharp equipment by use of forceps or other devices.

B. Modify procedures to avoid injury:
   1. Use forceps, suture holders, or other instruments for suturing.
   2. Avoid holding tissue with fingers when suturing or cutting,
   3. Avoid leaving exposed sharps of any kind on patient procedure/treatment work surfaces.
   4. Appropriately use safety devices whenever available:
      a. Always activate safety features.
      b. Never circumvent safety features.
ELEMENT IV

SELECTION AND USE OF BARRIERS AND PERSONAL PROTECTIVE EQUIPMENT

Learning Objectives:

- Describe the circumstances which require the use of barriers and personal protective equipment (PPE) to prevent patient and health-care worker (HCW) contact with potentially infectious material;

- Identify specific barriers and/or PPE for patient and HCW protection from exposure to potentially infectious material.

Definitions:

- **Personal Protective Equipment (PPE):** specialized clothing or equipment (e.g., gloves, gowns, masks, goggles) worn by a health-care worker (HCW) for protection against a hazard, (toxic or infectious).

- **Barrier:** an object that physically separates a person from a hazard (e.g., dressing or drape).

I. Types of PPE and barriers and criteria for selection

A. Gloves

1. When to be worn: gloves must be worn for all anticipated hand contact with blood, potentially infectious body fluids, mucous membranes (oropharynx, GI, respiratory, and genitourinary tracts), non-intact skin, or wounds, and when handling items contaminated with blood or body fluids. Gloves must be worn during all invasive procedures and all vascular access procedures, including all phlebotomies and insertion of IV’s or other vascular catheters. Gloves are not to be washed, disinfected, or sterilized for reuse (except utility gloves). Gloves must be changed between patients, and hands must be washed after gloves are removed.
2. Sterile and non-sterile gloves:
   a. Sterile gloves are required to prevent transmission of infection from HCW to patient in surgery and in other procedures associated with a high risk of infection due to interruption of normal host defenses. (Examples: insertion of central venous catheters and urinary catheterization).
   b. Non-sterile gloves are used to reduce transmission of infection in situations where sterility is not required (examples: oral or vaginal examination, cleaning a spill, emptying suction containers, urine drainage bags, or bedpans) or where sterile technique does not necessitate sterile gloves (Examples: phlebotomy, peripheral IV catheter insertion).

3. Glove Material:
   a. Latex, nitrile or vinyl gloves are used for most medical, dental, and laboratory procedures discussed above. Since gloves can be torn, they should be inspected prior to use. Disposable, single use gloves must be replaced as soon as practical if contaminated, punctured, or damaged during use. Double-gloving or puncture-resistant liners can be used to decrease the risk of percutaneous injury and exposure to blood/body fluids. Latex gloves - usually tan in color, more pliable with a tighter fit, but contains proteins that can cause HCW and patient allergies, also often powdered which can contribute to dermatitis. Vinyl gloves - usually white in color, less irritating, not associated with allergy reactions, but are less pliable and do not fit as tightly. Nitrile gloves - rubber based nitrile gloves are resistant to punctures, chemicals, blood products, nicks, and abrasions They are not latex and allergy free.
   b. Utility gloves are used for heavy duty housekeeping chores. They may be decontaminated and reused unless they are cracked, peeling, torn, or punctured.
   c. Hypo-allergenic gloves, glove liners, or powderless gloves are available.

B. Cover garb: protective attire to prevent contamination of skin, mucous membranes, work clothes, and undergarments. (Regular work clothes, uniforms, surgical scrubs are not considered protective attire.)
1. Types of cover garb:
   a. Gowns (with sleeves) are worn:
      • in surgery and obstetrics,
      • when splashing, spraying, spattering of blood/body fluids is anticipated,
      • when blood/body fluid contamination of arms is anticipated
   b. Aprons (no sleeves) may be worn for lesser degrees of exposure.
   c. Laboratory coats are worn in laboratory setting.

2. Permeability characteristics/definitions:
   a. Impervious: fluids will not pass through
   b. Fluid resistant: resists penetration of fluids under most circumstances
   c. Permeable: easily penetrated by fluids

3. Choice of gown or apron depends on the level of blood or body fluid exposure anticipated. Fluid resistant gowns are suitable for most situations; extra fluid resistant sleeves can be worn over a gown, and/or an impervious apron can be worn under a gown, to improve protection against soak-through during prolonged or high-blood-loss surgical procedures. Impervious gowns may be preferable for procedures with the highest risk of blood exposure. Impervious gowns may be less comfortable since the material does not breath well.

C. Masks
1. Types of masks:
   a. Surgical mask: purpose is to protect the patient by preventing discharge of contaminated nasal and oral secretions from the wearer during a procedure, and thereby reduce risk of wound infection.
   b. Surgical or procedure mask with face shield: purpose is to protect the wearer’s eyes, nose and mouth from exposure to splattered or splashed blood or body fluids.
   c. Particulate respirator: purpose is to filter out, and protect wearer from inhalation of airborne infectious particles of very small size. An OSHA class, N-95 respirator is an acceptable respirator for protection from small droplet inhalation such as with tuberculosis. Positive Air Purifying Respirators (PAPRs) may also be worn by those unable to be fitted with an N-95 type respirator.
2. Characteristics of masks:
a. Filtration characteristics of the material: surgical masks may effectively block discharge of large droplets into the air, but the material is not an effective filter to prevent inhalation of very small, aerosolized particles characteristic of TB and airborne viral diseases. Particulate respirators provide an increased level of filtration. A wet mask is generally less effective and should not be used.
b. Face seal: a tight seal around the edges of a particulate respirator is essential to its effectiveness. If loose fitting, contaminated air is drawn in around the edges of the mask with each inhalation, instead of the air being drawn through the filter. If face seal is not achieved or not possible, a PAPR can be used as an alternative.

D. Face shields protect eyes, nose, and mouth from exposure to blood or body fluids via splash, splatter, or spray. Protection against airborne pathogens requires the addition of a respirator mask.

E. Eye protection (goggles, safety glasses, or face shield) should be worn during all major surgical procedures and whenever splashes/sprays of blood or body fluid may be generated. Ordinary glasses are not acceptable unless a solid side shield is added to the eye wear.

F. Shoe covers, leg covers, boots, and head covers are appropriate attire whenever heavy exposure to blood/body fluids is anticipated, usually in surgery. Most situations such as these involve surgical procedures in which caps or hoods are already required for sterility. Shoe/leg and head covers should be removed and discarded before leaving the operating room suite.

G. Other barriers, e.g., application of wound dressings to reduce risk of exposure to blood/body fluids.

II. Choice of PPE and barriers is based on reasonably anticipated exposure of the HCW and on need for the patient to be protected

A. Selection of PPE/barriers based on anticipated exposure of the HCW
1. Contact with any bleeding or drainage: use gloves plus impervious gown or apron.
2. Blood/body fluid splashes, sprays, splatters: use gloves, (fluid resistant) gown, mask, and eye protection or face shield. These are appropriate for general surgery, obstetrics, and dentistry.

3. Large droplet vs. airborne (aerosol) pathogen: gown, a face shield, or surgical mask plus eye protection, will protect against inoculation of large droplets or splatter into mouth, nose, and eyes. Optimal protection against airborne disease (e.g., TB, influenza, measles, chickenpox) requires a particulate respirator (such as N-95 or PAPR).

B. Selection of PPE/barriers based on need for the patient to be protected during surgical procedure
   2. Select surgical masks for prevention of droplet contamination to patients’ wounds from health care workers. The mask provides a fluid barrier to protect the health care worker from mucous membrane exposure.

III. Proper and effective use of PPE and barriers

A. Proper fit
   1. Gloves: too small may tear; too large are clumsy.
   2. Mask: must fit snugly around mouth and nose, with metal band molded across bridge of nose, and straps or ties in place.
   3. Gowns: impervious or fluid resistant according to it’s use should cover skin and clothes.

B. Integrity of barrier: check for holes, tears, or damage before use
   1. Inspect gloves for tears or holes before use. Replace gloves as soon as practical if damaged during use.
   2. Masks should be replaced if damaged or wet.

C. Disposable vs. reusable barriers and PPE
   1. Disposable items should not be reused.
   2. Reusable items must be properly cleaned and reprocessed before reuse.
   3. Surgical masks are replaced after each use, and between patients. Particulate respirators are often used for longer periods of time, but should be replaced if damaged, soiled, or wet.
   4. All PPE, whether disposable or reusable, must be removed after the user completes the procedure they were intended for, before leaving the work area, and hands must be washed after removing gloves.

D. Potential for cross-contamination if PPE is not changed between patients
   1. Gloves, gowns, aprons, and surgical masks must be changed between patient contacts. Never wear the same gloves or other PPE from patient-to-patient.
   2. Hands must be washed before putting gloves on and after gloves are removed. Gloves do not completely prevent penetration of bacteria and viruses, and the moist environment inside a glove can promote growth of bacteria on the skin.
E. Under- and over-utilization of barriers and PPE
1. Under-utilization places HCWs and patients at unnecessary risk.
2. Over-utilization of barriers wastes resources, may intimidate patients, and may interfere with patient care.
ELEMENT V

PRINCIPLES AND PRACTICES FOR CLEANING, DISINFECTION, AND STERILIZATION

Learning Objectives:

a. Recognize the importance of the correct application of reprocessing methods for assuring the safety and integrity of patient care equipment.

b. Identify the individual’s professional responsibility for maintaining a safe patient care environment.

c. Recognize strategies for effective pre-cleaning, chemical disinfection, and sterilization of instruments and devices.

Definitions:

V. Cleaning: The removal of all foreign material (e.g., soil, organic debris) from objects.

VI. Contamination: The presence of microorganisms on inanimate objects (e.g., clothing, surgical instruments) or in substances (e.g., water, food, milk).

VII. Decontamination: The process of removing disease-producing microorganisms and rendering the object safe for handling.

VIII. Disinfection: A process that results in the elimination of many or all pathogenic microorganisms on inanimate objects, with the exception of bacterial endospores.

IX. High-level disinfection - kills bacteria, Mycobacteria (TB), fungi, viruses, and some bacterial spores.

X. Intermediate-level disinfection - kills bacteria, Mycobacteria (TB), most fungi, and most viruses. Does not kill bacterial spores.

XI. Low-level disinfection - kills most bacteria, some fungi, and some viruses. Will not kill bacterial spores and is less active against some gram-negative rods (e.g., Pseudomonas) and Mycobacteria.

XII. Sterilization: A process that completely eliminates all forms of microbial life.

I. General Information:
A. Cleaning, disinfection, and sterilization play an important role in prevention of infections related to exogenous introduction of microorganisms.

B. The major risk from breaks in infection control practice is to patients.
   1. Infections may occur at any body site when medical supplies or equipment are contaminated.
   2. The infection potential is greatest when invasive procedures are performed.

C. Additional risk exists for personnel who may become colonized/infected during processing of equipment.

D. Every health care setting should establish policies for the disposal and/or reprocessing of supplies, to include:
   1. Procedure for reprocessing reusable equipment or supplies appropriate for each type of material and its intended use in patient care.
   2. Work flow patterns from soiled/contaminated to clean/sterile areas.
   3. Procedure for receiving and storing clean/sterile supplies and to provide for rotation to avoid outdating of supplies.
   4. Procedure for recall of products from commercial suppliers and from in-house preparations.

E. Every health care setting should develop monitoring systems to include:
   1. Monitoring of the sterilization process with results recorded in a permanent log or record.
   2. Recall of items if monitors indicate sterilization is not complete.
   3. Designated shelf life by date or event related system of each sterilized item.
   4. Checking and recalling outdated or damaged supplies to reprocess or discard as required.

II. Potential for Contamination

A. Evidence of disease transmission by contaminated equipment is well documented. The composition/material of the device or equipment may be a factor in the level of contamination (i.e., upholstery).

External contamination occurs when devices such as BP cuffs, oximeters, electronic thermometers are used from patient to patient.

Internal contamination occurs when the inner lumen of a device has exposure to blood and body fluids.

Examples:
Vascular access devices (IV cannulas, arterial pressure monitors, cardiac and vascular prostheses, A-V shunts for hemodialysis): contamination of devices at
time of insertion, or subsequent contamination, may result in blood stream infection, site of entry infection, or remote infection.

Genito-urinary tract devices: contaminated urinary drainage systems or cystoscopes can cause nosocomial urinary tract infection and subsequent blood stream infection.

Respiratory tract devices: contaminated fluid nebulizers, ventilators, in-line temperature probes or bronchoscopes may cause nosocomial pneumonia and tuberculosis.

B. Degree of frequency of hand contact: The more a device is handled with unwashed hands the higher the degree of contamination.

C. Potential for contamination with body substance of environmental source microorganisms is a recognized potential source of cross-contamination in the health care environment.

D. Identification of surfaces or equipment which require between patient cleaning is essential.
1. All items having contact with mucous membranes must be cleaned and disinfected between patient use. Example: reusable thermometers.
2. Items having contact with intact skin, such as blood pressure cuffs and stethoscopes, need periodic cleaning and decontamination.
3. Any environmental surface, equipment, or device contaminated with blood or body fluids should be cleaned and disinfected immediately.
4. Dedicated patient equipment such as infusion pumps is to be cleaned and disinfected between patients.

E. Identification of practices which contribute to touch contamination and the potential for cross-contamination:
1. Clean and dirty work areas should be separated to reduce cross-contamination of supplies.
2. Environmental cleaning must be performed on a regular basis to reduce microbial load on surfaces (e.g., commodes contaminated with feces may be a vehicle for spread of C. difficile between patients).
3. Gloves must be removed and hands washed after touching contaminated surfaces or equipment (e.g., urinary collection devices, bedpans, dressings).

F. Level of contamination
The level of contamination is dependent on:
1. Types of microorganisms, bacteria, viruses, spores
2. The number of microorganisms
III. Factors that have contributed to contamination in reported cases include:

A. Inadequate cleaning. Examples: inadequately cleaned commodes contributing to transmission of Clostridium difficile colitis; inadequate clean-up of blood spills contributing to transmission of Hepatitis B.

B. Inadequate disinfection/sterilization processes. Example: inadequately sterilized instruments increasing post-operative wound infection rates.

C. Contamination of disinfectant or rinse solution. Example: Pseudomonas contaminated disinfectant causing contamination of bronchoscopes; C. difficile or Hepatitis C contaminated endoscopes.

D. Reuse of disposable equipment. Example: reuse of disposable platforms on glucometers linked with transmission of Hepatitis B.

E. Failure to reprocess or dispose of equipment between patients. Example: transmission of S. aureus, Hepatitis B, vancomycin resistant enterococci and numerous other pathogens.

IV. Points to reprocessing or handling where breaks in infection control practices can compromise the integrity of the equipment of devices:

A. General principles of cleaning:
   1. Soil protects microorganisms from contact with lethal agents (disinfectants, sterilants) and may directly inactivate these agents.
   2. Physical cleaning eliminates large numbers of organisms associated with gross soil.
   3. Sound cleaning practices, in addition to their aesthetic benefits, reduce the microbial load on environmental surfaces.
   4. Manufacturer’s recommendations for operation of cleaning equipment and use of cleaning supplies must be followed carefully.

B. Handling and cleaning contaminated items:
   1. Purpose:
      a. Remove soil, debris, lubricants on internal and external surfaces.
      b. Allow disinfection or sterilization process to be effective.
   2. Methods:
      b. Mechanical: (e.g., washer sterilizer, ultrasonic cleaner, dishwasher,
utensil washer sanitizer, etc.)

3. Timing:
   a. Rinse/pre-soak. Pre-soaking in detergent-disinfectant solution if preferred when delays in reprocessing are unavoidable.
   b. Immediate transport to central reprocessing area.

C. Thoroughness of internal and external physical cleaning is vital to the process. Adequate disinfection cannot be achieved without first completing thorough cleaning and rinsing of the item, since organic debris and residual detergent may inactivate the disinfectant. More complex equipment creates opportunities for breaks in this process. Example: multiple internal channels in endoscopic equipment must be thoroughly washed and rinsed prior to disinfection.

D. Choice of reprocessing method:
   1. Level of reprocessing method based on intended use
      a. Critical devices:
         1. Enter sterile tissue or the vascular system
         2. Pre-cleaning is critical
         3. Require sterilization:
            · steam under pressure
            · dry heat
            · if heat labile, low temperature sterilization process, e.g., ethylene oxide gas, plasma sterilization, prolonged contact with sterilization agents
         4. Maintain sterility until use
      b. Semi-critical devices:
         1. Contact mucous membranes
         2. Contact non-intact skin
         3. Most instruments require cleaning and high level disinfection
      c. Non-critical equipment
         1. Contact intact skin
         2. Cleaning and low level disinfection
   2. Disinfection and sterilization
      a. Sterilization
      b. High level disinfection
      c. Intermediate level disinfection
      d. Low level disinfection
   3. Manufacturer’s recommendations for reprocessing
      a. Compatibility with equipment components and materials
      b. Heat and pressure tolerance
c. Time requirements for reprocessing
d. Temperature requirements for reprocessing

4. Effective of disinfection process
   a. Section and use of disinfectants
      • surface products
      • immersion products
      • presence of organic matter
      • presence of biofilm
   b. Ability to monitor activity of disinfectant
   c. Stability of disinfectant over time
   d. Stability of the product during in use conditions
      c. Ability to monitor contact with internal components

5. Post-disinfection and handling and storage
   a. All items must be thoroughly rinsed and dried after disinfecting.
      Care must be taken not to re-contaminate the items.
   b. Limited access to storage area and/or closed cabinets
   c. Area must be clean, dry, dust free and at least off the floor

E. Different types of disinfectants:
   1. Alcohol (ethyl or isopropyl): intermediate level disinfectant
   2. Gluteraldehyde (2% and 4% solutions): high level disinfectant
   3. Hypochlorites (e.g., chlorine bleach) at 1:10 to 1:100 dilutions:
      intermediate level disinfectant
   4. Iodophors: intermediate disinfectant. Note this is not the antiseptic
      formulation.
   5. Phenolics: intermediate disinfectant
   6. Quaternary ammonium compound: low level disinfectant

F. General principles regarding use of any chemical disinfectant include:
   1. Read the label for activity and use instructions
   2. All items must be thoroughly cleaned before disinfecting
   3. Only surface in direct contact with the solution will be disinfected
      (instruments must be opened, disassembled and completely submerged for
      the required period of time)
   4. Items should be dry before submerging to avoiding diluting the solution to
      inactive levels
   5. Disinfectants are designed for inanimate objects and are damaging to the
      skin. Gloves should always be worn to protect the hands. Protective
      eyewear maybe advisable to protect eyes from splashes. Generally, the
      more effective against microorganisms, the more toxic to humans.
   6. Disinfectants should be used in well ventilated rooms
7. Keep records on employee training procedure manual and record/log books to document process.

G. Effectiveness of sterilization process is dependent on three factors
1. Selection and use of sterilization methods
2. Monitoring the sterilization process
3. Post sterilization handling and storage
   a. Selection and use of sterilization methods
      • compatibility with equipment components and materials
      • heat and process tolerance
      • time requirements for reprocessing
      • temperature requirements for reprocessing
      • methods of sterilization
         Thermal (heat):
            • Moist heat (steam autoclave)
            • Dry heat (hot air oven)
         Chemical
         Ethylene oxide (gas)
         Liquid chemicals
   c. Sterrad (Plasma)

---

**Sterilization Methods Advantages and Disadvantages**

<table>
<thead>
<tr>
<th>STEAM STERILIZATION</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantages</td>
<td>Disadvantages</td>
</tr>
<tr>
<td>Highly effective</td>
<td>Items must be heat and moisture resistant</td>
</tr>
<tr>
<td>Rapid heating and</td>
<td></td>
</tr>
<tr>
<td>rapid penetration</td>
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</tbody>
</table>
textiles  Will not sterilize powders and oils
Non toxic
Inexpensive
Can be used to sterilize liquids

**DRY HEAT STERILIZATION**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can be used for powders and anhydrous oils and glass</td>
<td>Penetrates materials slowly and unevenly</td>
</tr>
<tr>
<td>Reaches surfaces of instruments that cannot be disassembled</td>
<td>Long exposure times necessary</td>
</tr>
<tr>
<td>No corrosive or rusting effect on instruments</td>
<td>High temperatures required causes damage to rubber goods and some fabrics</td>
</tr>
<tr>
<td>Low cost</td>
<td>Limited packaging material</td>
</tr>
<tr>
<td></td>
<td>Temperature and exposure times vary depending on the article being sterilized</td>
</tr>
</tbody>
</table>

**ETHYLENE OXIDE (EO)**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly effective</td>
<td>Difficult to monitor EO sterilization</td>
</tr>
<tr>
<td>Items unable to tolerate the thermal method can be processed with ethylene oxide</td>
<td>Requires EO permeable packaging materials</td>
</tr>
<tr>
<td></td>
<td>Lengthy cycle time</td>
</tr>
<tr>
<td></td>
<td>Higher cost</td>
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<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Toxic to patients and personnel - aeration of EO sterilized items allows dissipation of EO - metal items do not require aeration but the packaging materials do</td>
</tr>
<tr>
<td></td>
<td>Toxic to the environment</td>
</tr>
</tbody>
</table>

**STERIS**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid processing time</td>
<td>Equipment with lumens limited to 400 mm in length and 3 mm or greater in diameter</td>
</tr>
<tr>
<td>Low temperature</td>
<td>Items are not packaged</td>
</tr>
<tr>
<td>Reduced employee exposure to hazardous chemicals, noxious fumes, chemical residues and toxic gases</td>
<td></td>
</tr>
<tr>
<td>No environment controls or monitors required</td>
<td></td>
</tr>
</tbody>
</table>

**STERRAD (Plasma)**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact</td>
<td>Trays cannot have paper or absorbable material, ie., gauze, cotton, towels</td>
</tr>
<tr>
<td>Rapid processing time</td>
<td>Instruments with lumens are limited to lengths of 400 mm or 15 inches and lumen diameters of 3 mm or greater</td>
</tr>
</tbody>
</table>
a. Monitoring the Sterilization Process
   - Biologic monitors
   - Indicator strips
   - Pressure, temperature gauges
Sterilization monitoring systems are meant to assure that equipment and devices labeled sterile are in fact sterile. This system takes on or two forms; they are product control and process control.
   A. Product control = sterility testing; use of biological indicator (e.g., spore samples placed in sterilizer to document sterilization)
   B. Process control = assessing the sterilization process; e.g.,
      a. mechanical indicator (time/temperature charts and pressure gauges)
      b. chemical indicators of temperature/humidity
2. Post sterilization handling and storage:
   Post sterilization handling and storage procedures are important to prevent contamination:
   a. Provide sterile storage in procedure areas (closed cabinets, wrappers) to avoid:
      1. contamination from patient secretions or body fluids
      2. hand contamination by employees obtaining extra supplies
      3. contamination from supplies being returned to stock after use
   b. Store packages to prevent disruption of package integrity:
      1. covered storage to prevent moisture damage
      2. keep storage off the floor
      3. protect from insects and other pests
   c. Designate separate area for mixing of medications or solutions
   d. Refrigerate products according to manufacturer’s requirements. Keep thermometer in refrigerator and monitor quality.
   e. Appropriate storage conditions for sterile packs include:
      - limited access to storage area
      - clean supplies should be stored separately from sterile supplies
• area must be clean, dry, dust free, lint free and at least 6 inches off the floor
• temperature 18 - 22 degrees C (65 - 72 F)
• relative humidity 35 - 50%

d. Check package integrity
  • Is the package free of tears, dampness, excessive dust, gross soil?
  • Is there a chemical indicator on the outside of the package?
  • Has the expiration date been reached or passed?
  • If heat sealed, has the seal been maintained?

Recognizing differing levels of disinfection/sterilization methods and agents based on the area of professional practice setting and scope of responsibilities.

a. Choice of reprocessing method should be based on the:
   Intended use of the equipment or device
   Desired level of antimicrobial activity (high, intermediate, low)
   Manufacturer’s recommendations for reprocessing

The CDC recommendations for reprocessing are presented in TABLE 1.

<table>
<thead>
<tr>
<th>Risk of Infection</th>
<th>Use of Device</th>
<th>Examples of Devices</th>
<th>Procedure Before Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level</td>
<td>Description</td>
<td>Examples</td>
<td>Disinfection Method</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Non-Critical</td>
<td>Does not ordinarily touch the patient or touches only intact skin</td>
<td>Crutches; bed board; blood pressure cuffs</td>
<td>Intermediate to low-level disinfection</td>
</tr>
<tr>
<td>Semi-Critical</td>
<td>Contacts intact mucous membranes, does not ordinarily penetrate body surfaces</td>
<td>Non-invasive flexible and rigid fiberoptic endoscopes, endotracheal tubes; anesthesia breathing circuits; cystoscopes</td>
<td>Sterilize if feasible or at least high level disinfection</td>
</tr>
<tr>
<td>Critical</td>
<td>Enters normally sterile tissue or vascular system</td>
<td>Surgical instruments, cardiac catheters; implants; pertinent components of heart-lung oxygenators, blood component of hemodialyzers; laparoscopes; bronchoscopes</td>
<td>sterilize</td>
</tr>
</tbody>
</table>

Environmental surfaces - Low to intermediate level disinfectant. Use a good cleaning agent with used acceptance. Have schedule of who does what, when (e.g., after each patient use).

Note: The CDC recommends that scopes be sterilized, if feasible, and if sterilization is not feasible, high level disinfection should be utilized. There are currently no data to prove that sterilization of scopes reduces the risk of infection as compared to proper cleaning and high level disinfection. However, since there are also no data to prove that proper cleaning and high level disinfection eliminates the potential for cross-contamination, sterilization following cleaning is the preferred method.

Health professionals who practice in settings where the responsibility for handling, cleaning, reprocessing equipment or devices is performed elsewhere (Central Sterile Processing) still need to be knowledgeable regarding basic concepts and principles of cleaning, disinfection, and sterilization described above.

Expectations of health professionals with respect to differing levels of disinfection and sterilization methods and agents based on the area of professional practice setting and scope of responsibilities

Professionals who practice in settings where handling, cleaning, and reprocessing equipment, instruments or medical devices is performed elsewhere (e.g., in a dedicated Sterile Processing Department):
• Understand core concepts and principles:

• Standard and Universal Precautions (e.g., wearing of personal protective equipment.

• Cleaning, disinfection, and sterilization described in Sections III and IV above.

• Appropriate application of safe practices for handling instruments, medical devices and equipment in the area of professional practice.

• Designation and physical separation of patient care areas from cleaning and reprocessing areas is strongly recommended by the NYSDOH.

The same practices for safe handling and storing of devices or equipment should be implemented in any area of professional practice.

Any individuals who have primary or supervisory responsibilities for equipment or device reprocessing is required to be knowledgeable regarding the following:

Core concepts and principles of cleaning, disinfection, and sterilization described previously.

Appropriate application of safe practices for handling devices and equipment.

Considerations for the selection of appropriate methods.

a. Antimicrobial efficacy

b. Time constraints and requirements for various methods

c. Compatibility with equipment/materials
    1. Corrosiveness
    2. Penetrability
    3. Heat tolerance
    4. Moisture sensitivity

d. Toxicity
    Occupation health risks
    Environmental hazards
    Abatement methods
    Monitoring exposures if necessary
    Potential for patient toxicity

Residual effect
    1. Antibacterial residual
    2. Patient toxicity

e. Ease of use
    1. Need for special equipment
2. Training requirements
   f. Stability
      1. Concentration
      2. Potency
      3. Efficacy of use
      4. Effect of organic material
   g. Odor
   h. Cost
   i. Ability to monitor process
      1. Methods for monitoring
      2. Current recommendations for monitoring frequency
   k. FDA regulations for reuse of single use devices

CONSTRUCTION, RENOVATION, REPAIR AND DEMOLITION IN HEALTH CARE FACILITIES

V. Establish a multi-disciplinary team that includes infection control personnel to coordinate demolition, construction, and renovation projects and consider proactive preventative measures at the inception of all projects.

VI. Educate both the construction team and the health care staff regarding airborne infection risks associated with construction projects.

VII. Establish and maintain surveillance activities for airborne environmental disease (e.g., aspergillosis).

VIII. Implement infection control measures relevant to construction, renovation, maintenance, demolition, and repair.

IX. Perform a risk assessment for all construction, renovation, and demolition activities.

X. Implement infection control measures for internal and external demolition and construction activities.

XI. Construct barriers to prevent dust migration. Block and seal off return air vents if rigid barriers are used for containment.

XII. Relocate patients as needed.

XIII. Daily surveillance of construction site and surrounding area.

Working closely with Engineering, Environmental Services, Medical Staff, and Construction Team to ensure air quality, cleanliness of the environment and safety for all, requires open communication on a
daily basis while construction, renovation, demolition, and repairs are in progress.

# EXAMPLE OF A CONSTRUCTION SAFETY AND INFECTION CONTROL CHECKLIST

**Date:** ________________  **Project Name or Number:** ______________________

**Building # or Area:** ______________________

**Inspector(s):** ______________________

<table>
<thead>
<tr>
<th><strong>A. General</strong></th>
<th><strong>YES</strong></th>
<th><strong>NO</strong></th>
<th><strong>N/A</strong></th>
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</thead>
<tbody>
<tr>
<td>1. Trash and debris removed promptly?</td>
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<tr>
<td>2. Dust is picked up using a shop vacuum or other dust reducing technique? (Dry sweeping is not performed)</td>
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<tr>
<td>3. Debris covered/dampened prior to being transported outside the construction area?</td>
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<td>4. Tacky mats located at the entrance to the construction area and replaced as needed?</td>
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<tr>
<td>5. All materials leaving and entering the facility and construction zone are securely covered? *very important during demolition phase of any project.</td>
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<tr>
<td>6. Construction crews are using the designated entry and exit points of the facility to the construction zone (if indicated)?</td>
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<tr>
<td>7. Construction crews are NOT using areas within the hospital, but outside of the construction zone for preparation, staging or work?</td>
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<tr>
<td>8. Construction crews clothing are relatively dust free when performing work in a patient occupied space?</td>
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<tr>
<td>9. Construction crews with dusty clothing are provided with gowns and foot coverings when exiting through critical patient care areas?</td>
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<tr>
<td>10. Floor and wall openings properly protected?</td>
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<tr>
<td>11. Construction signs posted?</td>
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<tr>
<td>12. OSHA poster posted?</td>
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<tr>
<td>13. First aid kit available?</td>
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<td>14. Other (list)</td>
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<td></td>
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<tr>
<td>B. Personal Protective Equipment</td>
<td>YES</td>
<td>NO</td>
<td>N/A</td>
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<td>----------------------------------</td>
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<tr>
<td>1. Hard hat in use by personnel?</td>
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<tr>
<td>2. Eye protection in use by all personnel?</td>
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<tr>
<td>3. Hearing protection?</td>
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<tr>
<td>4. Proper footgear and protective clothing?</td>
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<td>5. Fall protection in use?</td>
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<tr>
<td>6. Respirators/face mask in good condition?</td>
<td></td>
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<tr>
<td>7. Other (list)</td>
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<table>
<thead>
<tr>
<th>C. Barriers</th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
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</thead>
<tbody>
<tr>
<td>1. Doors closed, sheetrock or fire resistant sheeting installed to enclose wall openings?</td>
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<tr>
<td>2. Barriers are wiped down prior to being removed?</td>
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<tr>
<td>3. Other (list)</td>
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<table>
<thead>
<tr>
<th>D. Tools and Equipment</th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
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</thead>
<tbody>
<tr>
<td>1. Tools and equipment in good condition?</td>
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<tr>
<td>2. All equipment properly guarded?</td>
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<tr>
<td>3. Electrical equipment connected properly, grounded and in good condition?</td>
<td></td>
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<tr>
<td>4. Ladders in good condition; tied back; extended 3 feet beyond landing?</td>
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<tr>
<td>5. Other (list)</td>
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</table>
### E. Air Handling and HVAC

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
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</thead>
<tbody>
<tr>
<td>1. Negative pressure with respect to the patient occupied space is maintained within the construction area?</td>
<td></td>
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<tr>
<td>2. HVAC exhaust and supply ducts are covered during demolition?</td>
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<tr>
<td>3. Negative air machine(s) running?</td>
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<tr>
<td>4. Negative air discharge hoses intact?</td>
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<tr>
<td>5. Construction debris chutes are not adjacent to open windows or HVAC air intake?</td>
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<tr>
<td>6. Perform airborne testing (if indicated)?</td>
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<tr>
<td>7. Other (list)</td>
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</table>

### F. Hazardous Chemicals/Air Contaminants

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
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</thead>
<tbody>
<tr>
<td>1. List of hazardous materials on job?</td>
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<tr>
<td>2. Personnel are familiar with the program?</td>
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<tr>
<td>3. Proper containers in use with correct labels?</td>
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<td>4. MSDS’s on the job site?</td>
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<tr>
<td>5. Lock out/tag out procedures in place?</td>
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<tr>
<td>6. Permit required confined space procedures in place?</td>
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<tr>
<td>7. Other (list)</td>
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</tbody>
</table>

### G. Fire Alarm, Detection and Suppression Systems

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
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</thead>
<tbody>
<tr>
<td>1. Fire alarm in service?</td>
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<tr>
<td>2. Hot work permit in use?</td>
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<td>3. Are sprinkler heads unobstructed (18&quot; clearance maintained)?</td>
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<td>4. Fire extinguisher available at exit door and hot spots?</td>
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<td>5. Exit signs posted?</td>
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<td>6. All doors and exits are free of debris?</td>
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<td>7. Other (list)</td>
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### H. Scaffolding

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<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
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<tbody>
<tr>
<td>1. Scaffold in good repair; guardrails; toe boards and wire mesh in place?</td>
<td></td>
<td></td>
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<tr>
<td>2. Counter weights marked with weight and proper ratio?</td>
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<tr>
<td>3. Scaffold tied back and tied in?</td>
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<td>4. Passageway under scaffold blocked?</td>
<td></td>
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<td>5. Other (list)</td>
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<table>
<thead>
<tr>
<th>Item #</th>
<th>Deficiency</th>
<th>Corrective Action</th>
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ELEMENT VI

PREVENTION AND CONTROL OF INFECTIOUS AND COMMUNICABLE DISEASES IN HEALTH-CARE WORKERS

Learning Objectives:

- Recognize the role of occupational health strategies in protecting health-care workers (HCWs) and patients;
- Recognize non-specific disease findings which should prompt evaluation of HCWs;
- Identify occupational health strategies for preventing the transmission of bloodborne pathogens, tuberculosis (TB) to health-care workers;
- Identify resources for evaluation of HCWs infected with HIV, HBV, and HCV.

Definitions:

- Infectious Disease: a clinically manifest disease of man or animal resulting from infection.
- Communicable Disease: an illness due to specific infectious agent which is acquired through transmission of that agent from an infected person, animal, or inanimate reservoir to a susceptible host.
- Occupational Health Strategies: as applied to Infection Control, a set of activities intended to assess, prevent, and control infections and communicable diseases in HCWs.

I. Overview of occupational health strategies for infection control

A. Goals of occupational health strategies:
   1. Prevent disease transmission from HCWs to patients and staff.
   2. Protect susceptible HCWs from infectious or communicable diseases.

B. Strategies to assess HCWs for disease risks:
   1. Pre-employment and periodic (annual) health assessments: review of overall health and immunization status, TB testing, administration of necessary vaccinations and assessments based on employee report of illness or exposure to communicable disease.
   2. Immunization/screening programs are targeted at several diseases:
      a. Tuberculosis (TB): at least annual tuberculin skin testing (PPD) is required; more often for high risk positions; annual symptom evaluation of known skin test positive individuals.
      b. Hepatitis B (HBV): HBV vaccination is highly recommended; must be offered at no charge to all HCWs whose work involves risk of exposure to blood/body fluids. This is a series of three shots (initial dose, one month
later second dose, third dose given six months from first dose; recommend titer to be drawn six weeks after final dose).

c. Rubeola (measles): documentation of immunity (2 doses of vaccine, positive antibody titer or history of illness documented by physician) required of all HCWs born in 1957 or later.

d. Rubella (German measles) documentation of immunity (1 dose of vaccine or positive antibody titer) required of all HCWs born in 1957 or later.

e. Tetanus and Diphtheria: Three DTaP doses as a child usually at ages 2, 4, and 6 months. Thereafter, booster every ten years.

f. Varicella (chickenpox): Vaccine is indicated for HCWs who do not have either a reliable history of varicella or serologic evidence of immunity, particularly indicated for HCW who have contact with persons at high risk for serious complications.

g. Influenza: annual influenza vaccination highly recommended.

3. Evaluation of acute or incubating illnesses in HCWs:

a. HCWs exhibiting any of these symptoms should be promptly evaluated for fitness to work (i.e., risk of transmitting to patients, staff, visitors):
   1) fever, chills
   2) cough, sputum production
   3) exanthems (rash), vesicles
   4) skin lesions, weeping dermatitis
   5) draining wounds, sores
   6) diarrhea or vomiting

b. Post-exposure evaluation: susceptible HCWs who have been exposed to the following diseases should also be evaluated:
   1) tuberculosis
   2) varicella (chickenpox or herpes zoster, shingles)
   3) rubeola
   4) rubella
   5) pertussis (whooping cough)
   6) mumps

Example: if a HCW is exposed to a personal family member or patient with active TB, the HCW must be evaluated for symptoms of active TB and tested for TB infection (PPD skin test). If infection is present, a chest x-ray is performed and preventive treatment is begun.

c. Management of ill or exposed HCWs with acute or incubating communicable disease. Goal is to prevent potential transmission to susceptible patients and staff.
   1) Limit contact with susceptibles. Example: temporary job re-assignment.
   2) Furlough from work until HCW is no longer infectious or risk of contracting infection (post-exposure) has passed. Example: a susceptible (non-immune) HCW who has been exposed to chickenpox may be furloughed from work beginning the 10th day
through the 21st day after exposure (the incubation period for chickenpox).

3) Treatment as needed. Examples:
   • HCW with active pulmonary tuberculosis is treated with 3 or more antituberculous drugs, and may return to work after symptoms have resolved and sputum smears show clearing of TB (until proven non-infectious).
   • HCW with a newly positive PPD skin test (indicating TB infection) but no evidence of active TB (TB illness), is treated with isoniazid (INH) for 6 to 9 months to prevent active TB from developing.
   • HCW with draining skin lesions due to staph or strep (impetigo) may be treated with antibiotics until lesions heal.

d. Reportable diseases: the NY State Department of Health requires that cases of certain communicable diseases be reported to county and state health departments so that screening and/or treatment can be provided to contacts, and for epidemiologic analysis. Diseases on the list include TB, rubeola, rubella, mumps, pertussis, syphilis, gonorrhea, and many others. Physicians, infection control practitioners, laboratories, hospitals, nursing homes, school nurses, and day care directors are responsible for reporting these diseases. Call your county health department or Infection Control if you have questions.

II. Prevention and control of blood borne pathogen transmission

A. Risk of blood borne pathogens to HCWs:
   1. Occupational exposure is defined as work-related contact to blood and other potentially infectious material via percutaneous exposure (needlestick, injection, cut), mucous membrane exposure (eye, nose, mouth), or non-intact skin exposure (wound, abrasion, dermatitis).
      Potentially infectious material includes: blood, semen, vaginal secretions, spinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, all fluids contaminated with blood, and any unknown fluid.
   2. Risks of specific pathogens
      a. HIV: the risk of acquiring HIV infection, following a needlestick contaminated with HIV-infected blood, is about 0.3% (approximately 1 in 300). Occupational infections have occurred via mucous membrane or non-intact skin exposures, but the risk from these exposures is much lower. If seroconversion occurs, an individual may be free from symptoms and opportunistic infection but HIV can be transmitted to others via sexual contact, blood contact and perinatally to a new born.
b. Hepatitis B virus (HBV): exposure to HBV results in a 6 - 30% risk of HBV infection. After an asymptomatic incubation period of 2 - 6 months, 35% of infected persons develop clinical hepatitis with jaundice, and the other 65% have mild or no symptoms. 5 - 10% of HBV infected persons become chronic carriers who never clear the infection and can transmit HBV to others indefinitely (via sex, blood contact, or perinatally). 25% of chronic carriers develop chronic hepatitis with associated risk of cirrhosis, liver cancer, and death.

c. Hepatitis C virus (HCV): exposure to HCV via needlestick results in a 1.8% risk (2003 reference) of HCV infection. Some infections will cause clinical hepatitis after an average 45-day incubation period, while others remain asymptomatic. Chronic liver disease is very common following HCV infection. There is no vaccine against HCV.

B. Hepatitis B prevention through vaccination:
1. HBV vaccine is highly effective and safe.
   - Vaccination consists of 3 injections in the arm over a 6 month period.
   - Immunity develops in 80 - 95% of persons vaccinated.
   - Side effects may include soreness, slight swelling, and redness at the injection site; malaise and mild fever are uncommon reactions.
   - HBV vaccine is a recombinant product made from yeast (contains no live virus and no human serum or other human substances).
   - Vaccination is contraindicated in persons allergic to yeast or any component of the vaccine.

2. HBV vaccination is highly recommended and must be offered by employers at no charge to employees whose work involves risk of exposures to blood and body fluids. Consent is required, and persons refusing vaccination must sign a declination statement.

C. Post-Exposure management:
Every step must be executed with complete confidentiality (patient and HCW).

1. HCWs must promptly report blood/body fluid exposures to infection control, occupational health, or a supervisor in accordance with the Exposure Control Plan at their hospital, clinic, or office practice.
2. Evaluation of the exposure includes documentation of:
   a. Date, time, and location of exposure
   b. Route of exposure and type of potentially infectious material
   c. Detail of exposure incident, task being performed, etc.
   d. Identification of the source person, if known

3. The source person is informed of the HCW exposure and the importance of HIV, Hepatitis B, and Hepatitis C testing. HIV, HBV, HCV testing of the source is performed after appropriate consent is obtained; informed, written consent and counseling are required for HIV testing. The rapid HIV test may be available to screen source patients. Persons already known to be HIV, HBV, and/or HCV infected need not be re-tested.

4. Medical evaluation, treatment and follow-up of the exposed HCW includes:
   a. Review of HBV vaccination status;
   b. Baseline serologic testing for HBV, (if necessary) and HIV (after counseling and written consent). When a source is found to be Hepatitis C antibody positive, additional follow-up testing is recommended (such as LFTs and Hepatitis C viral studies);
   c. Counseling about the risk of infection resulting from the exposure, recommended post-exposure treatment and follow-up, and precautions to prevent possible HIV transmission to others;
   d. Post-exposure prophylaxis, Examples:
      • HBV exposure: HBV vaccination and HBV immune globulin (HBIG) are recommended for unvaccinated HCWs and known non-immune individuals. Previously vaccinated HCWs may require HBV vaccine booster.
      • HIV exposure: should consist of a combination of Protease Inhibitors and retroviral prophylaxis. An international CDC case controlled study reported that ZDV post exposure prophylaxis was associated with a decrease of approximately 79% in the risk for HIV seroconversion, after a needle stick injury involving HIV infected blood.
      • HCV exposure: no effective prophylaxis for HCV is available. Immune globulin is no longer indicated but appropriate follow-up for the HCW is indicated.
   e. Post-exposure follow-up:
      • Report acute illness during 12 weeks after exposure, especially if characterized by fever, rash, muscle aches, malaise, or lymph node enlargement, which may signify recent HIV infection;
      • Following a documented or suspected HIV exposure, HIV testing of the HCW is recommended, at baseline, 1, 3 and 6 months post exposure;
      • If the source patient is HCV antibody positive or sero status is unknown, the HCW should have baseline HCV serology and (ALT) obtained and reported at 4-6 and 12 months post exposure.
5. Post-exposure management when the source is a HCW:
   a. When a patient or HCW sustains a blood/body fluid exposure and the source is a HCW, the hospital/clinic/practice has an ethical obligation to notify the exposed patient or HCW.
   b. The exposed patient or HCW, and the source HCW, are approached for counseling, consent, testing, treatment, and follow-up in the same manner as described above for a source patient and exposed HCW.

III. Evaluation of HCWs infected with HIV, HBV, or other blood borne pathogens

A. New York State Department of Health policy on HIV testing of HCWs:
   1. Mandatory HIV screening of HCWs is discouraged;
   2. Voluntary HIV, HBV, and HCV screening of HCWs at risk for infection is encouraged so they may benefit from medical intervention; all HCWs who have been potentially exposed to HIV, HBV, or HCV through personal risk behavior, blood products or occupational accidents should be strongly advised to seek testing;
   3. HCWs are not required to inform patients or employers if they are HIV, HBV, or HCV positive. Employers should be informed if infection results in impairment affecting job performance. A patient should be informed if that patient sustained a significant exposure to the HCWs blood.

B. Evaluation of infected HCWs for risk of transmission
   1. HIV, HBV, or HCV infection alone does not justify limiting a HCWs professional duties.
   2. Limitations, if any, should be determined on a case-by-case basis considering the factors that influence transmission risk, including:
      a. Nature and scope of professional practice;
         • techniques used in invasive procedures which may pose a risk to patients; and
         • compliance with infection control standards.
      b. Presence of weeping dermatitis or skin lesions.
      c. Overall health status: physical and cognitive function.
   3. Expert panel: each hospital or institution must establish an expert panel to confidentially evaluate cases of blood borne disease infected HCWs with respect to work-related issues. An expert panel of the NYS Department of Health can also perform this evaluation. A panel can recommend practice limitations, modifications or restrictions where the evidence suggests there is a significant risk to patients.
   4. Any modification of work practice must seek to impose the least restrictive alternative in accordance with Federal Disability Laws.
CURRENT TOPICS IN INFECTION CONTROL: METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS (MRSA), VANCOMYCIN RESISTANT ENTEROCOCCI (VRE), CLOSTRIDIUM DIFFICILE (C.DIFF), CREUTZFELD JACOB DISEASE AND BIOTERRORISM

Learning Objectives:

• Describe the prevention and control for MRSA, VRE, and C. Diff.

• Identify the type of precautions recommended for MRSA, VRE, and C Diff.

• Describe the procedure for handling neuro-surgical instruments used on a patient with CJD.

• Identify 3 agents that could be used in a bioterrorist attack.

I. Methicillin Resistant Staphylococcus Aureus

A. Characteristics of Staph
   1. Gram stain - gram positive cocci
   2. Family - Micrococcaceae
   3. Genus - Staphylococcus, Species - Aureus
   4. Coagulase (enzyme) positive, produces at least 6 entertoxins
   5. Humans are the reservoir
      a. Organism adheres to nasal mucosal cells
      b. Increased risk of carriage in needle users (IVDU, DM, HD, etc.) and in persons with dermatitis

B. Clinical Syndromes
   1. Direct invasion
   2. Bacteremia
   3. Toxin caused disease
      a. TSS - Toxic Shock Syndrome
      b. Staph food poisoning (gastroenteritis)
      c. SSS - Scalded Skin Syndrome

C. Prevention of Problems
   1. Pay attention or treat “minor” infections
   2. Prophylactic antibiotics
   3. Meticulous aseptic technique

D. History
   1. Late 1930's - Sulfa resistant strains which produced penicillinase (betalactamase)
   2. Early 1950's - Pen G resistant to virtually all systemic antibiotics
   3. Late 1950's - Staph aureus resistant to virtually all antibiotics
   4. 1961 - First methicillin resistant strains
5. 1968 - First major nosocomial outbreak in US hospital (Boston)

E. Introduction in a facility
1. Unrecognized colonized or infected patient source
2. “Outgrowth” of resistant strains
3. Environment may be important in some setting (ICU)

F. Transmission
1. Mode:
   a. By transiently colonized personnel: hands and sometimes nasal carriage,
      MRSA persists on hands for more than 3 hours if not washed.
   b. Carrier “shedder or disseminator” - associated with skin condition.
   c. Air - samples rarely positive except in bum units.

G. Infection Control
1. Surveillance
2. Control
3. Hand washing
4. Gloves
5. Gowns
6. No mask *Mask may be indicated in cases of MRSA infection in lower
   respiratory tract, when working within 3 feet of patient (dependent
   on hospital protocol).
7. Placement is different in acute care vs. long term care
8. Decolonization Therapy
   a. Topical - Mupirocin ointment for a limited time
   b. Chlorhexadine in bath for one week
   c. Use of systemic antibiotics is controversial
9. Personnel cultures ONLY if staff member is linked to cases
10. Need to type strains in outbreak
11. Look for heath care workers with skin problems

H. Long Term Care
1. Primary control is hand washing between patients.
2. Appropriate room placement
3. Precautions only for bed-bound patients with MRSA in urine, wound, heavily
   colonized with MRSA, trachs with secretions
4. Outbreaks
   a. May cohort patients and staff
   b. Type strains
   c. Maintain records of:
      1) date identified
      2) sites of infection/colonization
      3) hospital location
      4) associations with other patients
      5) antibiogram
6) care givers
d. Emphasize all infection control measures

II. Vancomycin Resistant Enterococci

A. Enterococcus
   1. Family - Group D Streptococci
   2. Genus - Enterococcus
   3. Common species
      a. E. Faecalis (85 to 90% clinical problems)
      b. E. Faecium (5 to 10% of clinic problems, most resistant species)
   4. Found in the GI tract including the oral cavity and gall bladder (colon mostly and GYN tract - vagina and urethra).

B. Enterococci can cause
   1. UTI’s - 16% of nosocomial infection
   2. Wound infection - 13% of nosocomial infection
   3. Bacteremia
   4. Endocarditis (special tropism for cardiac valves)
   5. Meningitis
   6. Soft tissue infection

C. History
   1. Fourth most prevalent organism causing nosocomial infection
   2. 1987 - first enterococci with gentamycin resistance
   3. 1988 - vancomycin (and teichoplanin) resistance

D. Outbreaks reported
   1. Large outbreaks of VRE now reported.
   2. Staff can be carriers or spread by hands, rectal probes, or other contaminated items.
   3. Must use antiseptic soap in conjunction with a waterless hand cleaner and appropriate lotion to avoid counteracting antiseptic.

E. Mechanisms of resistance
   1. Mutation - rare
   2. Outgrowth of endogenous resistance - selected out by antibiotic pressure
   3. Plasmid mediated resistance - horizontal spread from organism to organism

F. Patients at risk for VRE
   1. ICU, Oncology, Transplant, Surgery, Prolonged hospitalization/severity of illness.
   2. Patients with a lot of antibiotics (esp. Vancomycin) - directly related to number of antibiotic days.
G. Control of VRE
1. Major reduction in antibiotic use in hospitals especially vancomycin and third generation cephalosporins.
2. Education of health care workers regarding the seriousness of VRE laboratory surveillance for resistance.
3. Stringent isolation procedures with infected and colonized patients, consider using routine barrier precautions in all ICUs for all high risk patients.
4. Improve compliance with infection control practices especially hand washing.

H. In and outbreak situation
1. Cohort staff especially nurses and respiratory care.
2. Screen personnel and remove VRE carriers from patient contact if linked to VRE infections.
3. Emphasize decontamination of the environment around the patient door knobs, bed rails, area around toilet paper holder, etc.

I. Isolation Precautions
1. Same as MRSA (contact)
2. Single room or cohort with Infection Control approval
3. Dedicated equipment
4. Culture exposed roommates (stool or rectal swabs)
5. Notify departments/facilities when moving patients

III. Clostridium Difficile - “The Difficult C. Difficile Disease”

A. History
1. 1893 First patient described
2. 1935 Organism isolated “Bacillus Difficilis”
3. 1950 Seen more frequently
4. 1973 First hospital outbreak of “Clindamycin Colitis”
5. 1977 C. Difficile demonstrated as the cause of pseudomembranous colitis
6. 2000 New strain of C. Difficile emerges - more virulent with the ability to produce greater quantities of toxins A and B

B. Clostridium Difficile
1. Gram positive spore forming organism, anaerobic bacillus
2. 70% of strains produce exotoxins

C. Pathogenesis
1. Alteration of the gut flora
2. Overgrowth of toxigenic C. Difficile
3. Production of toxins progresses to disease

D. C. Difficile toxins
1. Toxin A - lethal enterotoxin causes diarrhea
2. Toxin B - potent cytotoxin
E. Etiology of Altered Flora
   1. Antibiotics especially Clindamycin, Ampicillin and Cephalosporins
   2. Anticancer drugs
   3. Host risk factors:
      I. Older patients (more admissions, compromised colon flora)
      II. Increased severity of illness especially uremia, cancer abdominal surgery, HIV, BM Transplant
      III. Length of hospitalization (more exposure to HCW and hospital environment)

F. Onset
   1. Greater than 80% occur during antimicrobial therapy
   2. Less than 20% occur after cessation of antibiotics

G. Clinical Characteristics
   1. Diarrhea
   2. Nausea and vomiting
   3. Fever
   4. Leukocytosis
   5. Abdominal pain
   6. Fatigue

H. Complications
   1. “Acute Abdomen”
   2. Toxic megacolon progressing to perforation and/or peritonitis
   3. High fever, dehydration, hypovolemia
   4. Chronic diarrhea (sometimes for months)

I. Diagnosis
   1. Clinical presentation
   2. Laboratory tests
      a. Tissue culture
      b. Toxin assay
      c. ELISA
      d. CT Scan
      e. X-ray contrast studies
      f. Endoscopy

J. Infection Control
   1. Transmission - fecal-oral route via the hands of HCWs
   2. Contaminated Environment (can remain viable in the environment for months)

K. Infection Control Measures
   1. Contact precautions
   2. Private room or no high risk roommates
   3. Gloves for patient and environment contact
   4. Gown for patient care especially if patient has diarrhea
5. Handwashing
6. Environmental cleaning
7. No sharing of equipment and bathroom
8. Disinfection of endoscopes
9. Restriction of antibiotics

L. Treatment
1. Early recognition
2. Discontinuing or changing antibiotics
3. Avoid antiperistaltic agents
4. Cholestyramine used to bind toxins
5. Antibiotics - Metronidazole or Vancomycin for 10 days is effective

M. Recurrence
1. Rate of recurrence occurs in 7 to 20% of patients and is due to both relapse and re-infection
2. Time is usually 1 to 4 weeks after treatment (re-infection is later)
3. Action - re-institute initial therapy
4. Repeated relapse - no standard recommendation
5. Repeat testing is not recommended, toxin persists for extended periods even after diarrhea subsides

N. Summary
1. Recognize early
2. Contact precautions
3. Treatment
4. Observe for relapses
5. Wash your hands
6. Environmental disinfection

IV. Multi-Drug Resistant Tuberculosis (MDRTB)

A. History: Tubercle Bacilli are continually undergoing spontaneous mutations that create resistance to individual antituberculosis drugs. Most commonly drug resistance occurs when:
1. There is a large number of TB organisms; such as in pulmonary cavities.
2. When an inadequate drug regimen is prescribed.
   • inappropriate drugs
   • insufficient dosage
3. When there is a combined failure of both the patient and the provider to ensure that an adequate regimen is taken.
4. Rarely, malabsorption of one or more antituberculosis drugs may account for acquired resistance.
5. Epidemiological circumstances in which an exposed person is at increased risk of infection with drug-resistant TB include:
   • exposure to a person who has known drug-resistant tuberculosis;
• exposure to a person with active tuberculosis who has had prior treatment for tuberculosis (treatment failure or relapse) and whose susceptibility test results are not known;
• exposure to persons with active tuberculosis from areas in which there is high prevalence of drug resistance;
• exposure to persons who continue to have positive sputum smears after 2 months of combination chemotherapy;
• travel in an area of high prevalence of drug resistance.

B. Management of the MDRTB patient should include:
1. Airborne precautions until the patient is determined to be non-infectious (refer to Element II). The environment must be monitored for appropriate negative pressure;
2. Healthcare workers must be fit tested to an N-95 or higher respiratory mask. This mask to be used while caring for an infectious TB patient;
3. An infectious TB patient must wear a surgical mask during transport.
4. Patient education shall be give on good hygiene procedures (covering mouth during cough, handwashing, handling secretions, and waste disposal);
5. A single new drug should never be added to a failing regimen;
6. When initiating or revising a failing regimen, always attempt to employ at least three previously unused drugs to which there is in vitro susceptibility. One of these should be an injectable agent;
7. Patients should receive either hospital based or DOT (Direct Observed Therapy).

V. Extended-spectrum Beta-lactamases (ESBLs)

A. History: ESBLs were first reported in 1983. Typically, ESBLs are mutant enzymes produced by certain bacteria that can inactivate all Cephalosporins, Penicillins, and Aztreonam.
• These enzymes are most commonly produced by *Klebsiella* spp. and *Escherichia coli* but may also occur in other gram-negative bacteria, such as *Enterobacter, Proteus, and Pseudomonas Aeruginosa*.

B. Bacteria producing ESBLs are spread by:
1. Poor personal hygiene; especially after using the washroom (bacteria can be spread from the bowel of one carrier or infected person to the mouth of another person).
2. The spread of ESBL bacteria in a facility occurs most commonly through direct contact with another person with the ESBL.
3. A contaminated environment or on the hands of some care providers. Careful cleaning of areas that might be touched by hands is important to reduce the spread of these bacteria in a facility. Faucets, door handles, bedrails, bathrooms, and other surfaces that people touch must be cleaned regularly to prevent the spread of ESBL producing bacteria.
C. Risk factors for ESBL infection for people in hospitals include:
1. Previous antibiotic use,
2. Catheters, length of stay,
3. Frail health,
4. Admission to an intensive care unit.
• The risk of ESBL bacteria to the general public is low.
• Appropriate use of all antibiotics is important to ensure effective treatments are available, should the need arise.

D. Treatment
1. For people who are carriers of ESBL producing bacteria who are not ill, no treatment is needed. Antibiotics should only be taken if someone has symptoms of an infection. Not treating carriers helps prevent further resistance and allows optimum treatment, should the need arise. Carriers can frequently clear these bacteria without any treatment. Treatment should rely on culture and sensitivity of the test. Consultation with an infectious disease specialist should be considered for those with symptoms of infection.

E. Prevention of infection/nosocomial transmission:
(Contact Precautions)
1. Wash hands after going to the washroom and before eating or preparing food.
2. Everyone working or visiting health care facilities must wash their hands prior to entering and upon leaving the resident’s room, and prior to assisting a resident with feeding.
3. All staff in health care facilities must wash their hands before and after every contact with residents.
4. Gloves should be worn when providing direct personal care or cleaning the environment. Gloves must be changed and hands washed between procedures and between resident contact.
5. No masks are required.
6. Gowns are only required if the environment is grossly contaminated and giving care may result in soiling the clothing of staff and family.
7. Good environmental cleaning and infection control procedures must be carried out in all facilities.

VI. SARS (Sudden Acute Respiratory Syndrome)
A. SARS is an acute respiratory disease caused by a virus (Corona Virus).
B. Transmission of SARS occurs predominantly through close interactions with infected persons before implementation of infection control precautions. Infectious respiratory secretions are the most likely source of infection, although fecal/oral transmission may have occurred in some settings.
Transmission can occur by:
1. contact with contaminated body substances, directly (e.g., shaking hands);
2. indirectly (e.g., touching objects contaminated with respiratory secretions or
3. through close contact with respiratory droplets expelled when a patient coughs, or sneezes;
4. during aerosol-generating procedures performed on patients with SARS disease;
5. in some instances, however, true airborne transmission (e.g., via droplet nuclei) cannot be excluded as a possible mode of SARS transmission.

C. Infection control

1. Preparedness planning is essential in preventing a SARS outbreak. Elements of success planning include:
   a. education and training of health care workers on infection control measures;
   b. provision of properly selected PPE and monitoring of PPE use;
   c. most important, re-emphasize the importance of basic infection control measures, including hand hygiene.

2. Visual alerts:
   a. Post visual alerts (in appropriate languages) at the entrance to outpatient facilities (e.g., emergency departments, physicians’ offices, outpatient clinics), instructing patients and the persons who accompany them to:
      • inform health care personnel of symptoms of a respiratory infection when they first register for care;
      • practice respiratory hygiene/cough etiquette
   To contain respiratory secretions, all persons with signs and symptoms of a respiratory infection, regardless of presumed cause, should be instructed to:
      • cover the nose/mouth when coughing or sneezing,
      • use tissues to contain respiratory secretions,
      • dispose of tissues in the nearest waste receptacle after use,
      • perform hand hygiene after contact with respiratory secretions and contaminated objects/materials.
   b. Healthcare facilities should ensure the availability of materials for adhering to respiratory hygiene/cough etiquette in waiting areas for patients and visitors.
   c. Provide tissues and no-touch receptacles (e.g., waste containers with pedal-operated lid or uncovered waste container), for used tissue disposal.
   d. Provide conveniently located dispensers of alcohol-based hand rub.
   e. Provide soap and disposable towels for hand washing where sinks are available.
   f. Provide masking and separation of persons with symptoms of respiratory infection. Offer masks to persons who are coughing. Either procedure masks (e.g., with ear loops), or surgical masks (e.g., with ties), may be used to contain respiratory secretions. Respirators are not necessary.
   g. Encourage coughing persons to sit at least 3 feet away from others in common waiting areas.
h. Droplet Precautions:
   • Health care workers should practice Droplet Precautions (e.g., wear a surgical or procedure mask for close contact), in addition to Standard Precautions, when examining a patient with symptoms of a respiratory infection. Droplet Precautions should be maintained until it is determined that they are no longer needed.

3. Screening and Triage
   a. Only patients requiring hospitalization for radiographically confirmed pneumonia (or acute respiratory distress syndrome) of unknown etiology should be screened for SARS epidemiologic risk factors. The suspicion for SARS disease is raised if, within 10 days of symptom onset, the patient:
      • has a history of travel to SARS affected areas (e.g., mainland China, Hong Kong, or Taiwan), or close contact with an ill person with a history of recent travel to one of those areas, OR had close contact with another person with pneumonia of unknown etiology or spent time in a hospital in which patients with acute respiratory disease were treated;
      • is employed in an occupation associated with a risk for SARS exposure (e.g., healthcare worker with direct patient contact; worker in a laboratory that contains live SARS);
      • is part of a cluster of cases of atypical pneumonia without an alternative diagnosis.

4. Hospitalization
   a. Patients who require hospitalization for radiographically confirmed pneumonia (or acute respiratory distress syndrome) of unknown etiology and who have one of the potential SARS risk factors, should be placed on Droplet Precautions until it is determined that the cause of the pneumonia is not contagious. If the Health Department and clinicians strongly suspect SARS disease, the patient should be placed on Contact and Airborne Infection Isolation Precautions, in addition to Standard Precautions.

5. Reporting
   a. The Institution’s County Health Department should be notified in the event of a confirmed or suspected SARS patient.
Creutzfeldt Jakob Disease

What is Creutzfeldt Jakob Disease?
Creutzfeldt Jakob Disease (CJD) is a rapidly progressive, invariably fatal neurodegenerative disorder believed to be caused by a prion protein. CJD occurs worldwide and the estimated annual incidence is many countries, including the United States, has been reported to be about one case per million population. The vast majority of CJD patients usually die within one (1) year of illness onset. CJD is classified as a transmissible spongiform encephalopathy (TSE) along with other prion diseases that occur in humans and animals. In about 85% of patients, CJD occurs as a sporadic disease with no recognizable pattern of transmission. A smaller proportion of patients (5 to 15%) develop CJD because of inherited mutations of the prion protein gene.

How is CJD diagnosed?
Physicians suspect a diagnosis of CJD on the basis of the typical signs and symptoms and progression of the disease. In most CJD patients there is a typical electroencephalogram (EEG) pattern. A confirmatory diagnosis of CJD requires a brain biopsy.

Have there been any reports of transmission of CJD in the health care setting?
Yes, transmission of the CJD agent has been reported in over 250 patients worldwide. These cases have been linked to the use of contaminated human growth hormone, dura mater and corneal grafts, or neurosurgical instruments. Of six cases linked to the use of contaminated equipment, four were associated with neurosurgical instruments and two with stereotactic EEG depth electrodes. All of these equipment related cases occurred before the routine implementation of sterilization procedures currently used in health care facilities. Surgical instruments that have come into contact with infective tissue should be disposed of if possible or disinfected and sterilized according to published guidelines.

How should surgical instruments used on suspected or confirmed CJD patients be reprocessed?
Inactivation studies have not rigorously evaluated the effectiveness of actual cleaning and reprocessing methods used in health care facilities. Surgical instruments that have come into contact with infective tissue should be disposed of if possible or disinfected according to published guidelines.

How should patient care waste be handled?
Patient care waste contaminated with blood or body fluids from suspect CJD patients should be segregated and incinerated.

How should laboratory specimens be handled?
Laboratory specimens should be placed in bio-hazard bags and handled according to your facilities procedure.

How should a blood or cerebral spinal fluid spill be handled?
Infection Control should be contacted for specific direction for decontamination in the event of a blood or cerebral spinal fluid spill.
What You Should Know About Avian Flu

What is avian influenza (bird flu)?
Avian influenza is an infection caused by avian (bird) influenza (flu) viruses. These flu viruses occur naturally among birds worldwide carry the viruses in their intestines, but usually do not get sick from the. However, avian influenza is very contagious among birds and can make some domesticated birds, including chickens, ducks, and turkeys, very sick and kill them.

Infections with avian influenza viruses in domestic poultry causes two main forms of disease that are distinguished by low and high extremes of virulence. The “low pathogenic” form may go undetected and usually causes only mild symptoms (such as ruffled feathers and a drop in egg production). However, the “highly pathogenic” form spreads more rapidly through flocks of poultry. This form may cause disease that affects multiple internal organs and has a mortality rate that can reach 90 - 100%. Often within 48 hours.

How does avian influenza spread among birds?
Infected birds shed influenza virus in their saliva, nasal secretions, and feces. Susceptible birds become infected when they have contact with contaminated excretions or with surfaces that are contaminated with excretions or secretions. Domesticated birds become infected with avian influenza virus through direct contact with infected waterfowl or other infected poultry or through contact with surfaces (such as dirt or cages) or materials (such as water or feed) that have been contaminated with the virus.

Do avian influenza viruses infect humans?
Bird flu viruses do not usually infect humans, but more than 100 confirmed cases of human infection with bird flu viruses have occurred since 1997. The World Health Organization (WHO) maintains situation updates and cumulative reports of human cases of avian influenza A (H5N1). Please visit these and previous WHO situation updates and cumulative reports for additional information.

How do people become infected with avian influenza viruses?
Most cases of avian influenza infection in humans have resulted from direct or close contact with infected poultry (e.g., domesticated chicken, ducks, and turkeys) or surfaces contaminated with secretions and excretions from infected birds. The spread of avian influenza viruses from an ill person to another person has been reported very rarely, and transmission has not been observed to continue beyond one person. During an outbreak of avian influenza among poultry, there is a possible risk to people who have direct or close contact with infected birds or with surfaces that have been contaminated with secretions and excretions from infected birds.

What are the symptoms of avian influenza in humans?
Symptoms of avian influenza in humans have ranged from typical human influenza-like symptoms (fever, cough, sore throat, and muscle aches) to eye infections, pneumonia, severe respiratory diseases (such as acute respiratory distress syndrome), and other severe and life-threatening complications. The symptoms of avian influenza may depend on which specific virus subtype and strain caused the infection.

How is avian influenza detected in human?
A laboratory test is needed to confirm avian influenza in humans.
What are the implications of avian influenza to human health?
Two main risks for human health from influenza are 1) the risk of direct infection when the virus passes from the infected bird to humans, sometimes resulting in severe disease; and 2) the risk that the virus - if given enough opportunities - will change into a form that is highly infectious for humans and spreads easily from person to person.

How is avian influenza in humans treated?
Studies done in laboratories suggest that the prescription medicines approved for human influenza viruses should work in treating avian influenza infection in humans. However, influenza viruses can become resistant to these drugs, so these medications may not always work. Additional studies are needed to determine the effectiveness of these medicines.

Does the current seasonal influenza vaccine protect me from avian influenza?
No. Influenza vaccine for the 2005 - 06 season does not provide protection against avian influenza.

Should I wear a surgical mask to prevent exposure to avian influenza?
Currently, wearing a mask is not recommended for routine use (e.g., in public) for preventing influenza exposure. In the United States, disposable surgical and procedure masks have been widely used in health-care settings to prevent exposure to respiratory infections, but the masks have not been used commonly in community settings, such as schools, businesses, and public gatherings.

Is there a risk for becoming infected with avian influenza by eating poultry?
There is no evidence that properly cooked poultry or eggs can be a source of infection for avian influenza viruses. For more information about avian influenza and food safety issues, visit the World Health Organization website.

The U.S. government carefully controls domestic and imported food products, and in 2004 issued a ban on importation of poultry from countries affected by avian influenza viruses, including the H5N1 strain. This ban still is in place. For more information, see Embargo of Birds, http://www.cdc.gov/flu/avian/outbreaks/embargo.htm.
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<th>Disease (Causative agent)</th>
<th>Incubation Period</th>
<th>Early symptoms/Prodrome</th>
<th>Highly Suggestive Signs/Clinical Syndrome</th>
<th>Diagnostic Samples (BSL level)</th>
<th>Diagnostic Assay (Characteristic Findings)</th>
<th>Infection Control/Isolation</th>
<th>Adult Treatment *</th>
<th>Post-Exposure Prophylaxis *</th>
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<tr>
<td>Inhalation Anthrax (Bacillus anthracis)</td>
<td>1 - 6 days (up to 42 days reported in literature)</td>
<td>Non-specific: fever, malaise, headache, chills, weakness, vomiting, abdominal and chest pain</td>
<td>Widened mediastinum on chest x-ray in a previously healthy febrile person, brief (0-3 day) improvement after prodrome, then rapid onset of severe respiratory distress, stridor, respiratory failure (due to hemorrhagic mediastinitis and thoracic lymphadenitis), shock, and death within 24-36 hours. Parenchymal infiltrates unusual. Hemorrhagic meningitis may also occur.</td>
<td>Blood, CSF; pleural or ascitic fluid (BSL - 2)</td>
<td>Gram stain (can be done on unspun blood) or Wright stain; culture (positive within 6-24 hours) Antigen detection (DFA, ELISA, and PCR in ref labs only). (Large gram positive encapsulated bacilli, non-hemolytic, non-motile)</td>
<td>No person to person transmission. Isolation not required. Standard precautions. Decontaminate accidental spills of potentially contaminated material using disinfectant 5% hypochlorite.</td>
<td>Penicillin - resistant or unknown sensitivity: Ciprofloxacin 400 mg IV q 12 (alternatives may include other quinolones, though not FDA approved for this use): Doxycycline 200 mg IV then 100 mg IV q 12 Known Penicillin-sensitive: Gentamicin 4 million U IV q 4; Amoxicillin 500 mg IV q 8 Duration: 60 days if vaccinated, then 30 days. Vaccine, if available, on days 0, 14, and 28 (vaccine currently unavailable)</td>
<td>Penicillin - resistant or unknown sensitivity: Ciprofloxacin 500 mg PO bid (alternatives may include other quinolones, or doxycyclines, Known Penicillin-sensitive: Amoxicillin 500 mg PO tid or Doxycycline 100 mg bid Duration: 60 days if vaccinated, then 30 days. Vaccine, if available, on days 0, 14, and 28 (vaccine currently unavailable)</td>
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<td>Smallpox (Variola virus) Note: if smallpox is suspected, report case immediately before obtaining diagnostic samples.</td>
<td>7 - 17 days (average 12 - 14 days)</td>
<td>Non-specific: fever, malaise, headache, prostration, rigors, vomiting, severe backache</td>
<td>Centrifugal, synchronous rash (all lesions at same developmental stage) Maculopapular, vesicular then pustular, begins on face, mucus membranes, hands and forearms, may include palms and soles, spreads to lower extremities and then to trunk lesions deeply seated in dermis. Death in ~ 35%.</td>
<td>Vesicular or pustular fluid, pharyngeal swab, scab material (BSL - 4)</td>
<td>PCR, viral isolation, electron or light microscopy, serology. Diagnostic testing available at CDC only. (200 nm brick-shaped DNA virus [orthopoxvirus])</td>
<td>Highly transmissible: Isolation required. (Negative pressure, HEPA filtration). Contact and airborne precautions for 17 days following exposure. Patient most infectious for the 7-10 days following onset of rash.</td>
<td>Supportive care, antibiotics as indicated to treat secondary infection</td>
<td>Vaccination within 4 days of exposure, VIG (0.6 ml/kg IM within 3 days) for serious complications of smallpox vaccination. Note: neither smallpox vaccine nor VIG are commercially available. Would only be released by CDC if smallpox case(s) confirmed.</td>
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<td>Pneumonic Plague (Yersinia pestis)</td>
<td>1-6 days (avg 2-4 days)</td>
<td>Non-specific: high fever, cough, chills, dyspnea, headache, hemoptysis, GI symptoms common</td>
<td>Fulminant pneumonia, often with hemoptysis, rapid progression of respiratory failure, septicemia and shock. Pneumonic consolidation on x-ray and hemoptysis distinguish plague from inhalation anthrax.</td>
<td>Blood, sputum, lymph node aspirate; serum (BSL - 2/3)</td>
<td>Gram, Wright, Giemsa, Wayson or FA stain; culture; rapid assays (ELISA, DFA, PCR) in ref. labs (Gram negative coccobacilli, “safety-pin” bipolar staining)</td>
<td>Highly transmissible, R. Resp isolation until pt. has been treated with antibiotics for 48-72 hours. Droplet precautions until patient treated for 3 days.</td>
<td>Streptomycin 1 gm IM bid; gentamicin 5 mg/kg IM or IV q 24 or 2 mg/kg loading dose followed by 1.7 mg/kg IM or IV q 8; in mass casualty situation: doxycycline 100 mg PO bid; ciprofloxacin 500 mg PO bid Duration: 7 days</td>
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<td>Tularemia (Francisella tularensis)</td>
<td>2-10 days (avg 3-5)</td>
<td>Non-specific: fever, fatigue, chills, cough, malaise, body ache, headache, chest discomfort, GI symptoms</td>
<td>Penumonitis, ARDS, pleural effusion, hemoptysis, sepsis. Ocular lesions, skin ulcers, oropharyngeal or glandular disease possible.</td>
<td>Blood, serum, sputum, pharyngeal washing, fasting gastric aspirate, ulcer swab, lymph node aspirate (BSL -2/3)</td>
<td>Gram stain, culture (slow growth - use cysteine-enriched media). DFA or IHC staining of biopsy specimens. Small gram negative coccobacilli</td>
<td>Standard precautions in laboratory, handle all specimens in SL-3 environment.</td>
<td>Streptomycin 1 g M bid; gentamicin 5 mg/kg/day IM or IV qd; fluoroquinolones may also be effective for treatment. Duration: 10-14 days</td>
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<td>Botulism (clostridium botulinum toxins)</td>
<td>2 hours - 8 days (avg 1-3 days) Foodborne: 12-36 hours Inhalation: 24-48 hours</td>
<td>Usually none, if foodborne, possibly nausea, vomiting, abdominal cramps or diarrhea</td>
<td>Acute, afebrile, alert, patient symmetrical cranial nerve palsies and descending paresis/ fascicul paralysis Bulbar symptoms; piosis, diplodia, dysarthria, dysphonia, dysphagia, generalized muscle weakness, paralysis, airway obstruction and respiratory failure</td>
<td>Nasal swab (if obtained immediately following exposure), serum (BSL -2)</td>
<td>Clinical diagnosis, Mouse bioassay for toxin (takes 1-2 days). Available at NYCDOH Public Health laboratories only (tel: 212-447-6749)</td>
<td>Standard precautions</td>
<td>Supportive care (long term ventilation may be needed). CDC trivalent equine antitoxin for serotypes A, B, E; DOD heptavalent antitoxin for serotypes A-G. (Need to screen for hypersensitivity prior to administration of antitoxin). Call NYCDOH to request antitoxin. None</td>
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Clues to a possible bioterrorist attack: single cases of disease due to uncommon, non-indigenous agents in patient with no history suggesting an explanation for illness; clusters of patients with similar syndrome with unusual characteristics (e.g., unusual age distribution), or unusually high morbidity and mortality; unexplained increase in the incidence of a common syndrome above seasonally-expected levels (e.g., increase in influenza-like illness during summer). Any unusual disease pattern should be reported immediately to our County Health Department. If you cannot make contact, call the New York State Department of Health Communicable Disease Program at: 518-73-4436 (during normal business hours) or 518-465-9720 (after hours).

- Recommendations are taken from JAMA consensus statements on key bioterrorist agents, published from May 1999 - June 2001 (see http://jama.ama.assn.org). These are not official NYSDOH recommendations; they are provided for information only. The table also does not include specific recommendations for children or pregnant women - suggested therapy/ prophylaxis for these groups may be found in the consensus statements.

New York State Department of Health, 10/17/01
## Patient Management

### Negative Pressure Rooms Are:

### Important Phone Numbers:
- Infection Control:
- ER:
- County Health Dept.:
- State Health Dept.:
- FBI Field Office:
- CDC Emergency Response Office: 770-488-7100

### Isolation Precautions

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<thead>
<tr>
<th>Precautions</th>
<th>Unknown Agents</th>
<th>Bacterial Agents</th>
<th>Anthrax</th>
<th>Brucellosis</th>
<th>Cholera</th>
<th>Glanders</th>
<th>Bubonic Plague</th>
<th>Pneumonic Plague</th>
<th>Tularemia</th>
<th>Q Fever</th>
<th>Viruses</th>
<th>Smallpox</th>
<th>Veneze Equine Encephalitis</th>
<th>Viral Encephalitis</th>
<th>Viral Hemorrhage</th>
<th>Biological Toxins</th>
<th>Botulism</th>
<th>Ricin</th>
<th>T 2 Mycotoxins</th>
<th>Staphylococcus Enterotoxin B</th>
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<tr>
<td>Standard Precautions</td>
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<td>X</td>
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<td>X</td>
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<td>Limit movement to essential medical purposes only</td>
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<tr>
<td>Place mask on patient to minimize dispersal of droplets</td>
<td>X</td>
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<tr>
<td><strong>Cleaning, Disinfection of Equipment</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Routine terminal cleaning of room with hospital approved disinfectant upon discharge</td>
<td>X</td>
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<tr>
<td>Disinfect surfaces with bleach/water sol. 1.9 (10% soln)</td>
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<td>Dedicated equipment (disinfect prior to leaving room)</td>
<td>X</td>
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<tr>
<td>Linen management as with all other patient</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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<td><strong>Discharge Management</strong></td>
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<tr>
<td>No special discharge instructions necessary</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>Not discharged from hospital until determined no longer infectious (under normal circumstances)</td>
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<td><strong>Post-Mortem Care</strong></td>
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<tr>
<td>Follow principles of Standard Precautions</td>
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<td>Droplet precautions</td>
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<tr>
<td>Airborne Precautions (negative pressure room &amp; N-95 masks for all individuals entering the room)</td>
<td>X</td>
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<td>Routine terminal cleaning of room with hospital approved disinfectant upon autopsy</td>
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<td>Disinfect surfaces with bleach/water soln. 1.9 (10% soln)</td>
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ELEMENT VIII

INFECTION CONTROL AS APPLIED TO NURSING HOMES AND LONG TERM CARE FACILITIES

A survey of infection control practices in nursing homes in a Mid-Western State reported in the October, 2005, issue of the “American Journal of Infection Control” (AJIC) found the following:

• A number of facilities had no guidelines or policies in place to control resistant pathogens while others performed routine surveillance and environmental cultures.

• Facilities used differing definitions of infections.

• Average influenza and pneumococcal vaccination rates among residents were 60% and 40% respectively. 16% of the nursing homes did not offer pneumococcal vaccine at all.

• Half of the facilities had a part-time Infection Control Nurse who usually had other jobs as well; sometimes was the Assistant Director Of Nursing.

Infections are the most common cause of acute care hospitalization among nursing home residents. OBRA mandates that NH’s must have an individualized Infection Control Program.

In another study of compliance with hand hygiene in a nursing facility, hands were washed only 27% of the time before resident interactions and 63% of the time after. More worrisome, gloves were changed only 16% of the time between care of residents. There is reason to believe that these findings may occur in many nursing homes.

Since a nursing home is an elderly person’s home and the quality of the person’s life is considered to be a priority, the standards of infection control should be carried out in a general way enabling the resident to have as high a quality of life as practical. However, having said that, it is also important to remember that all elderly are somewhat immune compromised especially the ones that are in Nursing Homes with multiple co-morbidities such as diabetes, PVD, renal, dialysis, organ transplants, have invasive devices such as foley catheters, tracheostomies, or feeding tubes and conditions leaving them bed or chair ridden. These people are not only the most likely to harbor resistant organisms, but also the most at risk of becoming infected and suffering negative outcomes. Since the number of people who are known to have infection or colonization with resistant organisms is rising in spite of our best efforts to apply precautions, it is essential that all residents should be handled as if they have them. This is similar to the thought process adopted many years ago to stop the spread of HIV. It addresses things or places that are always considered potentially infectious.

Note: Organisms can be spread from colonized, as well as, from infected persons to persons who are at risk.

Dr. Joseph Mylotte, MD, CIC at University of Buffalo who oversees infection control programs in several Western New York Nursing Homes and is widely known for his research in this area, wrote “Rates of transmission of MRSA tend to be low in the long-term care setting even among roommates of colonized residents. Transmission of MRSA from resident-to-resident occurs via the contaminated hands of staff who fail to follow appropriate infection control technique including hand hygiene. Airborne or droplet spread of MRSA is rare. Therefore, standard precautions should be effective in preventing transmission of MRSA in the long-term care setting with few exceptions. If standard precautions are followed diligently, there is no need for screening cultures for MRSA in the endemic setting”. 


The following is a suggested Standard of Care for nursing homes that incorporates the “CDC Precaution Guidelines” with minimal actual isolation of the person in a room. This can be adopted as policy and/or carried out by an individual employee in a nursing home as good preventative practice. The basis of this is the availability and use of plenty of alcohol hand sanitizer, soap and water, gloves, other personal protective equipment, and disinfectant. This may not apply to extended care units which maintain the same infection control policies as the attached hospital.

NURSING HOME INFECTION CONTROL STANDARD OF CARE

The following standards will be used at all times by all employees for all residents to reduce the risk of spreading infection from both recognized and unrecognized sources in the facility:

1. Gloves will be worn followed by handwashing for expected contact with all body fluids and rashes. If exposure to a body fluid occurs accidentally on ungloved hands, handwashing with soap and water needs to be done immediately. Otherwise, hand sanitizer is preferred.

2. Gloves are not necessary for casual contact (touching dry skin, taking BP’s, giving medications, or feeding), but handwashing is mandatory before and after these contacts. The DOH mandates that a barrier (napkin/plastic glove) be used between the caregiver’s hand and the food being passed.

3. Gloves may not be worn from person to person even for casual contact. Gloves may not be worn in the hall.

4. Masks with eye protection will be worn when it is likely that body fluid will splash onto face. Gowns will be worn in addition to gloves when there is potential for skin or clothing becoming soiled with body fluids.

5. Carts with above personal protective equipment will be kept on units at designated places for the convenience of employees.

6. Dirty linen will be rolled to contain body fluids and placed in a plastic chair or at the foot of the bed (not on the floor) until the first chance to deposit in the dirty linen receptacle.

7. Dirty linen will be handled with gloves and placed in a covered receptacle with a plastic bag designated for “SOILED LINEN”. Gown may be utilized if linen is contaminated with large amount of blood/body fluids.

8. Incontinence briefs and other odorous waste are to be placed in a receptacle with a plastic bag labeled “WASTE”.

9. Gloves are to be worn to handle garbage and when they are removed, hands are to be washed.

10. All sharps, including razors and needles, are to be placed in designated biohazard sharps containers.

11. Clean linen is to be kept on linen carts or on other clean carts which are covered. It is not to be hoarded in Isolation cart, resident drawers, closets, or any other place that is not a designated linen cart.

12. Residents must be fully dressed, hands washed, and body fluids contained when out of their rooms.
13. All residents and employees hands are to be sanitized with alcohol hand sanitizer or soap and water before meals, PT sessions, OT sessions, and TR group activities.

14. Shared equipment will be disinfected between use on different residents by spraying with approved disinfectant (e.g., shower chairs, soiled toilet seats, etc.). Blood pressure cuffs, ear thermometers, and lift pads may be used between residents as long as not visibly contaminated with body fluids. If contaminated, it must be washed (laundry or with disinfectant and dried before using).

15. All residents in semi-private rooms must have personal items labeled. There is to be no sharing of personal hygiene items including wound cleansers, etc., used by caregivers for residents due to risk of cross-contamination. It is wise to place residents known to have resistant organisms in private rooms if possible and cohort 2 of same organism if necessary. Two residents with high risk status such as indwelling catheters, wounds, or other unnatural openings into body should not share the same room.

16. The Infection Control Nurse will designate residents who need to be on Contact Precautions or Droplet Precautions according to the likelihood of spreading infection when symptoms exist or outbreaks that necessitate specific use of PPE over and above this standard of care. These will include symptomatic C. Diff., or MRSA that is not confinable within dressings or resident with respiratory symptoms has MRSA, also scabies, and disseminated herpes zoster. Use of red bags is not necessary unless body fluids are so copious they are dripping from dressings, etc. If body fluid can be flushed down the toilet, it should be. If resident has C. Diff and wears incontinence briefs, a container with a lid lined with a plastic bag should be in room for briefs. This should be taken to the dirty utility room at the end of every shift and placed in large regular trash barrel. HANDS NEED TO BE WASHED WITH SOAP AND WATER AFTER ANY CONTACT WITH ANYTHING IN A ROOM OF THE RESIDENT WITH C. DIFF.

17. All residents currently colonized with resistant organisms and all residents who have a history of colonization will have a designated color symbol such as a green dot on their chart and an entry on the diagnosis list to indicate that information. It will also be on the nurse roster sheet and the CNA assignment sheet. If a resident is transferred to the ER, hospital, or to any appointment, “Contact Precautions” will be designated on the envelope.

18. Signs will only be used in cases explained and designated in #16, and will read,

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ATTENTION VISITORS - WASH HANDS AFTER VISITING - IF YOU INTEND TO BE INVOLVED IN PERSONAL CARE, SEE NURSE FIRST!!!!!
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19. All visitors and residents will be encouraged to wash their hands before and after visiting by signage at front desk and elevators.

20. Hand sanitizer via wall dispensers and pump containers is to be available at front desk, elevators, on medication carts, and in hallways, to encourage handwashing frequently by all staff and visitors.
21. Pneumonia Vaccine and Flu Vaccine, in season, is to be recommended and offered to all residents and employees per guidelines. All residents should have one pneumococcal vaccine after 65 and a flu shot each year. All employees should have a pneumococcal vaccine if they meet the criteria for high risk and a flu vaccine every fall before flu season.

22. Outbreaks of infectious diseases should be monitored and reported to the DOH by a designated nurse and actions taken to control the spread and the severity of the disease.

23. Active TB should not be accepted in a Nursing Home. Policies need to be in place to carry out the NYS Guidelines to evaluate for TB on admission, do a boosted TB test on all residents starting within 72 hours of admission to be completed by 3 weeks after admission. Positive PPD’s are to be followed up with chest x-ray and symptom screen. If active TB is suspected, resident should be sent to a hospital immediately. Nursing Homes should only re-admit if TB is ruled out by negative AFB sputum test or treatment has begun and is cleared by the local Department of Health.
Agency for Health Care Policy and Research
The AHCPR is a component of the Public Health Service. AHCPR has many publications of interest to ICPs.
AHCPR Publications Clearinghouse
PO box 8547
Silver Spring, MD 20907-8547
1-800-358-9205
www.ahcpr.gov

American Association for Respiratory Care
AARC publish both standards and clinical practice guidelines.
AARC
11030 Ables Lane
Dallas, TX 75229
1-972-243-2272
www.aarc.org

American Social Health Association
Dedicated to stopping sexually transmitted diseases and their harmful consequences to individuals, families and communities. Operates the CDC’s STD hotlines.
1-800-230-6039
www.ashastd.org

American Society for Gastrointestinal Endoscopy
ASGE is committed to furthering the knowledge of the diagnosis and treatment of GI disease through the appropriate use of endoscopic techniques.
American society for Gastrointestinal Endoscopy
Thirteen Elm Street
Manchester, MA 01944-8330
1-978-526-8330
www.asge.org

Association for the Advancement of Medical Instrumentation
AAMI has a goal of increasing the understanding and beneficial use of medical instrumentation. AAMI’s members include: clinical and biomedical engineers and technicians, physicians, nurses, and hospital administrators, to educators and researchers, manufacturers, distributors, government representatives and other professionals with an interest in medical devices. These designers, users, managers, and regulators or medical technology have made AAMI the leading source of essential information on medical devices and equipment for nearly 30 years.

AAMI
3330 Washington Blvd.
Arlington, VA 22201-4598
1-800-332-2264
1-703-525-4890
www.aami.org
Association for Professionals in Infection Control and Epidemiology
APIC
1275 K Street NW, 10th Floor
Washington, DC 20036
1-202-789-1890
www.apic.org

Courses, Products, and Publications
Contact APIC for a current catalog or go to www.apic.org

Resource Line
APIC has assumed the Infection Control portion of the American Hospital Association’s Help Line. Callers receive information and referrals to national experts.
1-202-789-1890

Centers for Disease Control and Prevention
CDC is an agency of the Department of Health and Human Services. CDC includes 11 centers, institutes, and offices, some of which are listed below:
1-404-639-3311
www.cdc.gov

CDC National AIDS Hotline
1-800-342-AIDS (2437)
Spanish: 1-800-344-7432
TTY: 1-800-243-7889
www.cdc.gov/nchstp/hiv_aids/hivinfo/nah.htm

CDC Distance Learning Program
1-800-41-TRAIN (877246)
www.cdc.gov/phtm

CDC National Immunization Program
1-800-232-2522
1-800-232-0233
www.cdc.gov/nip

National Center for Infectious Diseases
www.cdc.gov/ncidod

Emerging Infectious Diseases (EID) is published four times a year by NCED and is available by:
1-404-639-3967
www.cdc.gov/ncidod/eid/index.htm

National Center for HIV, STD, and TB Prevention
1-404-639-1819

The National STD Hotline
1-800-227-8922
www.cdc.gov/nchstp/dstd/hotlines.htm

National Herpes Hotline:
1-919-361-8488
www.ashastd.org/herpes/nhh.html
Hepatitis Foundation International
Seeks to increase awareness of the worldwide problem of viral Hepatitis and to educate the public and healthcare providers about its prevention, diagnosis, and treatment.
Hepatitis Foundation International
30 Sunrise Terrace
Cedar Grove, NJ 07009-1423
1-973-239-1035
1-800-891-0707
mail@hepfi.org

International Executives Housekeepers Association
IEHA answers questions on housekeeping policies and procedures and publishes numerous housekeeping manuals, including *25 Hospital housekeeping procedures*, 1994. ($10.75).
IEHA
1001 Eastwind Drive, Suite 301
Westerville, OH 43081-3361
1-800-200-6342
www.ieha.org

Joint Commission on Accreditation of Healthcare Organizations
One Renaissance Boulevard
Oakbrook, Terrace, Illinois 60181
1-630-792-5000
www.jcaho.org

Latex Allergy Information Service
LAIS’s mission is to provide latex allergy education and to develop policy and procedure.
LAIS
176 Roosevelt Ave
Torrington, CT 06790
1-860-482-6869

National Association for Home Care
NAHC publishes a free resource catalogue of publications, audiotapes, videotapes, software, and other products related to home healthcare.
National Association for Home Care
228 7th St SE
Washington, DC 20003-4306
1-202-547-7424
www.nahc.org

National Coalition for Adult Immunization
Produces *The Resource Guide for Adult Immunization*
National Coalition for Adult Immunization
4733 Bethesda Avenue, Suite 750
Bethesda, MD 20814-5228
1-301-656-0003
www.medscape.com/affiliates/ncai
National Foundation for Infectious Diseases
Mission is to support research that will lead to a better understanding of the causes, cures, and prevention of infectious diseases to encourage and sponsor public and professional education programs; to aid in the prevention of infectious diseases.
4733 Bethesda Avenue, Suite 750
Bethesda, MD 20814
1-301-656-003
http://ID.medscape.com/Home_Topics_ID_InfectiousDiseases.html

National Health Information Center
NHIC is a health information referral service that puts health professionals and consumers with health questions in touch with organizations best able to provide answers.
NHIC, Referral Specialist
PO Box 1133
Washington, DC 20013-1133
1-800-336-4749
nhic-nt.health.org

National Institutes of Health
NIH comprises 24 separate institutes, centers, and divisions and is one of the eight health agencies of the Public Health Service under HHS. NIH is home to the National Library of Medicine. The Library produces Index Medicus, a comprehensive monthly listing of articles appearing in the world’s leading medical journals, and operates MEDLINE.
NIH, Editorial Operations Branch
Office of Communications
Bethesda, MD 20892  www.nih.gov

National Institute of Allergy and Infectious Diseases
NIAID provides pamphlets for the healthcare provider and the general public on infectious disease and immunity.
NIAID Office of Communications, NIH
Building 31, Room 7A50
31 Center Drive, Bethesda, MD 20892
www.niaid.nih.gov

National Technical Information Service
1-703-365-0759
Catalogs and brochures are also available from:
NTIS 5285 Port Royal Road
Springfield, VA 22161
1-800-553-NTIS (6847)
www.fedworld.gov

National Tuberculosis Center
Operates a toll-free information line for healthcare professionals and the public.
National Tuberculosis Center at NJ Med School
University of Medicine and Dentistry of NJ
Executive Office, Suite GBI
65 Bergen Street
Society of Gastroenterology Nurses and Associates, Inc.
Professional organization of nurses and associates dedicated to the safe and effective practice of gastroenterology and endoscopy nursing.
SGNA
401 North Michigan Avenue
Chicago, IL 60611-4267
www.sgna.org

Society for Healthcare Epidemiology of America
SHEA publishes two monthly journals: *Infection Control* and *Hospital Epidemiology and Clinical Performance and Quality Health Care*.
SHEA
19 Mantua Rd.
Mt. Royal, NJ 08061
1-609-423-0087
www.medscape.com/affiliates/she

U.S. Government Printing Office
GPO provides free access to the *Congressional Record, Federal Register*, congressional bills and other important government documents.
1-202-512-1530
www.access.gpo.gov
Questions about the GPO Access Service also can be directed to a nearby Federal Depository Library. At least one such library is located in each congressional district.

World Health Organization
WHO has 44 major program offices. Via the Internet, you can find information on all WHO programs, and listing of regional offices.
WHO
525 23rd Street NW
Washington, DC 20037
1-202-974-3000
www.who.org
New York State Department of Health
Operates and oversees various services, toll free helplines, specific service departments, information regarding diseases, regulations, statistics, etc.
New York State Department of Health
Corning Tower
Empire State Plaza
Albany, NY 12237
General information: 1-518-473-8600
www.health.state.ny.us

National Alliance for the Primary Prevention of Sharps Injuries
NAPPSI is a group of health organizations, medical device manufacturers, healthcare professionals, and others working cooperatively to reduce sharps injuries through primary prevention. Primary prevention means utilizing technologies and practices that either reduce or eliminate the need to use needles and other medical sharps. List of safety devices, bibliography, etc. available:

NAPPSI
1778 Callisia Court
Carlsbad, CA 92009
1-858-350-8751
www.nappsi.org

The National Institute for Occupational Safety and Health
A division of the CDC, NIOSH strives to prevent work related illnesses and injuries. Information on safety and prevention, hazards and exposures, diseases and injuries, and emergency preparedness are just some of the topics available.

NIOSH
Hubert H. Humphrey Bldg.
200 Independence Ave. SW
Room 715 H
Washington, DC 20201
1-202-401-6997
www.cdc.gov/niosh

New York State AIDS Institute - Clinical Education Initiative
CNY Regional source for HIV/AIDS information, education, and clinical guidelines
NYS AIDS Institute
464-5593
www.upstate.edu/cei