Dear Colleague:

The Occupational Safety and Health Administration (OSHA), the Joint Commission (TJC), and the Connecticut Department of Public Health (DPH) and Addiction Services require documentation that all clinical physician staff and ancillary staff, with a potential for exposure to infectious agents or with a potential for transmitting infectious agents to others, be knowledgeable of the Hospital’s Infection Control, Standard Precautions, Bloodborne Pathogens Standards, and TB Control (Airborne Precautions) Policies and Procedures.

Additionally, in 2009, TJC announced three new Healthcare Associated Infection (HAI) National Patient Safety Goals: (1) reduce the incidence and transmission of Multi-drug Resistant Organisms (MDRO), 2) reduce Central Line Associated Blood Stream Infections (CLA-BSI) and 3) reduce Surgical Site Infections (SSI). Education of staff on the essentials of these topic areas and prevention measures is an important component of reducing these HAIs.

The following information must be read, and the “Medical Staff Education Review Questions” completed and returned with your re-appointment. A score of 75% or more is required to pass the test.

Any questions concerning this information should be directed to the Department of Quality Improvement Support Services, formerly Hospital Epidemiology, (tel. 203-688-4634) or Occupational Health Services (tel. 203-688-2462) as applicable.

Please recognize that while we have a need to comply with regulatory agencies, Yale-New Haven Hospital’s overriding concern is the protection of its patients and its health care team. Your cooperation and collaboration in this effort is very much appreciated.

Yours sincerely,

Peter N. Herbert, M.D.
Chief of Staff
STANDARD (BLOODBORNE PATHOGENS) PRECAUTIONS POLICY

Scope: For the purpose of this document, the definition of Health Care Worker (HCW) is any person with patient contact, including but not limited to: attending physicians, postdoctoral fellows, house staff, medical students, physician assistants, nurse-midwives, and their trainees. Similar policies govern the activities of hospital employees and other CDC-defined HCWs.

The Yale-New Haven Hospital Policy for Bloodborne Pathogens is in compliance with CDC/OSHA recommendations and mandates. The YNHH Infection Control Committee endorses the CDC/OSHA recommendations for the application of Standard Precautions (formerly referred to as Universal Precautions) to all patients, regardless of a patient's diagnosis, and to any materials or equipment contaminated by blood or body fluids during medical practice.

All HCWs should be aware of the documented routes of transmission of HIV, HBV, and HCV and protect themselves accordingly. Although nosocomial transmission of bloodborne pathogens is rare, Standard Precautions must be utilized in the care of all patients regardless of their diagnosis. This includes:

1. Hands should be cleansed before and after contact with all patients using antiseptic soap and water or an alcohol-based hand rub. If hands or other body surfaces come in contact with blood or body fluids, wash them immediately with antiseptic soap and water.

2. Gloves should be worn when contact is anticipated with blood or any body fluids except sweat. Gloves need not be worn in other ordinary patient care contact. Gloves should be discarded prior to leaving the patient's room and hands washed immediately after each patient encounter. Double gloving may reduce the risk of blood exposure when performing surgical procedures.

3. Gowns/aprons, masks, and eye protection are indicated when there is a risk of exposure to blood or body fluid through close contact, splashing, or aerosolization, such as in suctioning, endoscopy, surgery, delivery (vaginal or C-section) and catheterization.

4. Do not recap needles/syringes. Discard used, uncapped needles/syringes and sharps (scalpels, forceps, razors, trocars, etc.) in a puncture-resistant container specified for this purpose. Containers (sharps boxes) are located in all patient rooms and treatment rooms.

5. Eating, drinking, applying cosmetics, lip balm, or handling contact lenses is prohibited in clinical patient care areas.

6. When significant exposure to blood or body fluid occurs (e.g. needlestick, mucous membrane splash, or contact with non-intact skin), report the incident IMMEDIATELY to a hospital supervisor, and go to the YNHH Occupational Health Service located in suite 130 of the Grace Building for evaluation and recommendations for post-exposure prophylaxis and follow-up. If the exposure occurs after hours or on a weekend, go to the Yale-New Haven Hospital Emergency Department for evaluation. Bloodborne pathogen exposures should be evaluated immediately so that a decision can be made within 1-2 hours of exposure whether to administer antiretroviral and/or Hepatitis B prophylactic treatment. This includes those persons previously immunized with the Hepatitis B vaccine. A YNHH Supervisor’s Report of Employee Accident/Injury (F1797) form should be completed for all significant exposures. YNHH Occupational Health Services should be notified of each incident REGARDLESS of the health care worker’s usual source of medical care. Questions concerning reporting and follow-up can be directed to YNHH Occupational Health Services (688-2462). Post-exposure evaluation may include periodic blood testing.

In many cases, blood testing of the source patient is also indicated. If the source patient does not consent to such testing, Connecticut State law details a specific process for determining the patient’s bloodborne pathogen infection status. This process includes consultation with a review committee, which is appointed by the Chief of Staff. Questions concerning this procedure should be directed to the Chief of Staff's office or Legal Affairs.

7. Using the above criteria as guidelines, appropriate clinical judgment should be used when determining which protective barriers (i.e. personal protective equipment) are needed. Each area must establish its own standards for consistent use of OSHA-required protective barriers; these unit standards should be based on the health care worker's skills and the reasonable possibility of contact with the patient's blood or body fluids, non-intact skin, and mucous membranes.
BLOODBORNE PATHOGENS AND THE HEALTH CARE WORKER:

HIV(+) HCWs should be under the care of a personal physician for appropriate immunization, prophylaxis, and treatment as indicated. Health care providers who are sero-positive for a bloodborne pathogen (e.g. HIV, Hepatitis BsAg+) should report, in confidence, to a special standing committee chaired by the Chief of Staff of YNHH to receive assistance in determining their fitness to continue to safely provide patient care. The continuing safety of the immuno-compromised health care worker, who may be exposed to infectious disease(s), is among the factors that should be discussed. All medical information will be reviewed with the individual's responsible personal physician, and all proceedings and information will be handled in a strictly confidential manner. PPD testing of HIV(+) HCWs is the same as for other HCWs (see section on TB below).

Any potentially significant patient exposure to the blood of any HCW should be reported, in confidence, to Occupational Health Services, Department of Quality Improvement Support Services (Hospital Epidemiology), or the Chief of Staff for specific advice.

PRE-APPOINTMENT EVALUATION AND IMMUNIZATION STATUS:

Staff with direct patient contact should know their initial immunization or immune status with regard to:
A. Measles, Rubella
B. Hepatitis B
C. Tuberculosis (PPD [Mantoux] skin test)
D. Varicella (Chickenpox) [either by history, antibody titer, or vaccination]

Documentation of the above will be part of the MEDICAL STAFF OFFICE FILE. Employees of Yale-New Haven Hospital will have immunization status, past medical history, and PPD testing as part of their Occupational Health charts.

Varicella-zoster: HCWs without a known history of chickenpox/shingles, without a known positive serology for varicella-zoster antibody, or HCWs previously vaccinated for varicella should exclude themselves from direct care of patients with chickenpox or zoster infections until the patient's lesions have crusted over. Varivax® , a live attenuated vaccine for varicella zoster, is recommended for varicella-negative health care providers and is available free of charge at the YNHH Occupational Health Service.

If a non-immune or vaccinated healthcare worker has a significant exposure to varicella or zoster, he/she should contact Occupational Health Services or Hospital Epidemiology at once and follow the standard protocol(s) as instructed.

Influenza: All healthcare workers are strongly encouraged to receive annual immunization against influenza. Non-immunized healthcare workers with significant exposure to influenza should contact Occupational Health Services, their primary physician, or an ID specialist regarding recommendations for anti-viral prophylaxis.

Any healthcare worker who develops influenza should take a medical leave of absence from direct patient care until symptoms have completely resolved.

Measles/Rubella: All healthcare workers must prove immunity to measles and rubella or receive appropriate immunization. If a HCW who is non-immune or has an unknown immunization status is exposed to a patient with measles or rubella, he/she should report that exposure to Occupational Health Services or Hospital Epidemiology immediately.

Hepatitis: All healthcare workers involved in direct patient care or with exposures to patient specimens must receive Hepatitis B vaccination, and/or have documentation of Hepatitis B surface antibody positivity, or have signed a vaccination declination form. Post-immunization testing is now recommended. The primary physician or YNHH Occupational Health Services may prescribe additional boosters for those who remain sero-negative following evaluation.

GUIDELINES AND STANDARDS FOR TUBERCULOSIS CONTROL:

All patients with suspected or confirmed active pulmonary TB should be placed on Airborne Precautions in negative pressure isolation rooms according to the policies outlined in the Infection Control Manual. HCWs must use an NIOSH-approved respirator until the patient is documented to be non-infectious and Airborne Precautions have been discontinued. Fit testing for use of such respirators is required. You may arrange for fit testing by calling 688-2462. Hospital Epidemiology must be notified of all confirmed TB cases (excluding those from Winchester Chest Clinic). All patients with documented pulmonary TB must be reported to State and Local Health Departments. Patients who fail to continue or complete therapy or are lost to follow-up must also be reported. Connecticut State Law requires notification of the local public health department prior to discharge so appropriate follow-up and treatment can be coordinated. The patient cannot be discharged from the hospital until this requirement is fulfilled (i.e. the local health department must have agreed to the discharge plan).
All HCWs should have PPD testing at least annually as recommended in the 1994 CDC Guidelines for the Prevention and Control of Tuberculosis in Healthcare Facilities. PPD results must be recorded as part of YNHH and Medical Staff required documentation. Healthcare workers who work in certain areas of the hospital may have an increased risk of contact with potentially infectious respiratory droplets and may require PPD testing more frequently as determined by YNHH Occupational Health Services and the Infection Control Committee (depending on the prevalence of TB patients encountered and overall staff PPD conversion rates).

PPD (Mantoux) testing may be done at any site convenient to the individual physician, but test results must be recorded and reported to the Medical Staff Office. Individuals without current PPD tests are not eligible for reappointment.

Healthcare workers with previously documented positive PPDs are not required to complete annual PPD testing. Such persons should be aware of the signs and symptoms of active TB and report such symptoms immediately to YNHH Occupational Health Services should they occur.

All HCWs with newly (or previously unknown) positive PPDs should be evaluated for active pulmonary TB with a chest x-ray and sputum examinations where appropriate. Any PPD skin test positive HCW with pulmonary symptoms (e.g. persistent cough, hemoptysis) must refrain from direct patient care until evaluation for pulmonary TB is complete. Results of this evaluation and/or decision for chemoprophylaxis or treatment must be reported to the Medical Staff Office.

Any HCW with active tuberculosis may NOT resume direct patient care until proven non-infectious by sputum examination and must demonstrate compliance with antituberculous therapy for the entire prescribed duration. HCWs with multi-drug resistant TB infections may require more extensive clinical assessment before returning to work.

OTHER INFECTION CONTROL POLICIES

All other YNHH isolation policies and procedures, injury prevention, decontamination, and hazardous waste handling procedures are defined in the YNHH Infection Control Manual available on the clinical workstations (YNHH intranet) or at http://info.med.yale.edu/ynhh/infection.

Long natural nails and artificial nails have been linked to the transmission of organisms and infections to patients in healthcare settings. A Natural and Artificial Nail Policy is in effect at YNHH as of October 1, 2004. The policy applies to all persons in the healthcare setting who have any contact with patients, patient care equipment, supplies and medications, and those persons involved in the preparation of medication or food. The policy specifies that natural nails are to ¼ inch or less in length, clean and well manicured, and nail polish, if worn, must be of a single color and free of cracks and chips. Artificial nails, nail tips, nail jewelry/foreign bodies, rhinestones and nail sparkles are not permitted.

All HCWs with a potentially transmissible infectious disease (infectious diarrhea, acute respiratory illness, skin infections, etc.) are expected to exercise appropriate clinical judgment in excluding themselves from direct patient care for the duration of the potential transmission period. YNHH Occupational Health Services, the Department of Hospital Epidemiology, or the Student or Occupational Health Services of Yale University should be consulted for individual advice. The Department of Quality Improvement Support Services (Hospital Epidemiology), acting for the YNHH Infection Control Committee, has the ultimate responsibility for recommendations in such cases.

REPORTABLE DISEASES: The Department of Quality Improvement Support Services (Hospital Epidemiology) will assist physicians in the appropriate reporting of communicable diseases in patients at YNHH to the Local and State Health Departments. Please call 688-4634 for assistance. During non-business hours please leave a message with your name, phone number, the patient's name, unit number, ward or clinic and diagnosis.
EMERGENCY PREPAREDNESS

A. TYPES OF DISASTERS

An Internal Disaster is an incident within the Hospital which compromises its structural integrity, results in injuries to staff and/or patients, or otherwise threatens the Hospital’s ability to care for patients. YNHH internal disaster protocols include detailed instructions for the following:

- telephone interruption
- steam interruption
- water interruption
- electricity interruption
- major compressed gas interruption or leak
- fire, smoke or explosion
- major chemical spills
- radiation accidents
- biological accidents
- bomb threat

An External Disaster is an event within the community or region resulting in multiple casualties like fire, explosion, hurricane, transportation accident, or civil disorder.

B. LEVELS OF RESPONSE

There are three levels of response to a disaster. They include:

1. Disaster Alert is the normal operating mode for the Emergency Department. ED staff are aware of the number and status of patients in the ED and the staffing of the ED. A Disaster Alert may also be used to find individuals critical to running a disaster.

2. A Level I Alert is activated when critically injured patients have arrived or are expected. These patients usually come from the same incident and require extensive medical or surgical care. The number of incoming patients associated with the Level I Alert is dependent on the acuity of the incoming patients and the current activity in the Emergency Department.

3. A Level II Alert is designed to modify the Hospital’s operations to accommodate an unexpected, acutely ill or injured patient volume that would otherwise overwhelm institutional resources. A Level II Alert is activated when a confirmed multiple casualty incident has occurred and the Hospital expects to receive severely injured patients. Again, there is no specific number of incoming patients associated with a Level II Alert. A Level II Alert is activated when the incoming patient load would or could compromise hospital resources, not just the Emergency Department.
Level II Alert is activated a Plan D will be put into effect and the following announcement will be made over the paging system: “Attention all Hospital personnel, Plan D is now in effect”. Three chimes precede this announcement.

BE PREPARED TO ACT QUICKLY, CORRECTLY AND CALMLY:
- Be familiar with the basic elements of the Hospital’s Emergency Preparedness Plan found in the Safety Manual. This is a detailed emergency response plan that describes how to report emergencies, assigns responsibilities for coordinating and carrying out evacuations, reviews the level of response to a disaster, examines how we will deal with specific emergencies and reviews the Weather Contingency Plan.
- Know how to recognize and turn on emergency alarms.
- Know what to do in an emergency, including assisting patients, evacuation routes, where fire extinguishers, fire hoses and fire pull stations are located, how to use a fire extinguisher, the Hospital’s emergency phone number (155), who to call, etc.

FIRE SAFETY

Q. What Do You Do In The Event Of A Fire In The Hospital?

A. Follow The R.A.C.E. Protocol:

- R= Rescue anyone in immediate danger
- A= Sound the Alarm - activate a pull station, phone “155” (the Hospital’s Emergency Page Phone Number) to report
- C= Close all doors, chutes, windows, etc. to Confine the smoke/fire
- E= Extinguish the fire by using a handheld fire extinguisher

The overhead paging system will signal with a set of three chimes and announce “Order Number One, (the location - building and floor)” three times. NOTE: Normal overhead paging is suspended during the time of a fire emergency except for Code Blue or Code White emergencies (adult or pediatric respiratory or cardiac arrests).

Never open a door if it is hot to the touch. Keep fire doors closed and automatically closing fire doors, corridors and stairwells free of obstructions.

Patient evacuation is only performed in the event of a large, uncontrollable fire or other widespread disaster where patient care and the infrastructure of the building are compromised. Horizontal evacuation is performed - exit through a set of bi-swing, automatically closing fire doors to the safe area beyond the doors. In the event that further evacuation is necessary, evacuate to a lower floor by using the stairs (never a higher floor). House Staff, Nursing Staff and the New Haven Fire Department control patient evacuation with assistance from the Hospital’s Emergency Response Team (ERT). Elevators cannot be used, except at the discretion of the New Haven Fire Department who take control of the fire situation upon arrival.

Every area and room of the Hospital contain smoke detectors and sprinklers. It is extremely unlikely that patient evacuation will need to be performed in the event of a fire.

There is no smoking in the Hospital. If you smoke, you need to do so in the smoking enclosure that is outside the main entrance to the Hospital. There is no smoking outside any of the entrance doors to the Hospital. All smoking materials are to be disposed of in the appropriate receptacle.

Q. How Do You Use A Handheld Fire Extinguisher?

A. Follow P.A.S.S.:
- Pull the pin at the top of the extinguisher
- Aim at the base of the fire
- Squeeze the top handle to the bottom handle
- Sweep the horn, hose or nozzle from side-to-side as you extinguish the flames
# USE THE RIGHT FIRE EXTINGUISHER FOR THE JOB

<table>
<thead>
<tr>
<th>TYPE OF FIRE</th>
<th>DESCRIPTION</th>
<th>TYPE OF EXTINGUISHER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Normal combustibles such as paper, wood, upholstery, cloth</td>
<td>A *</td>
<td>pressurized water silver cylinder, gauge at top, hose</td>
</tr>
<tr>
<td>B</td>
<td>Flammable liquids such as grease, paints, and oil</td>
<td>BC *</td>
<td>carbon dioxide red cylinder, horn or nozzle</td>
</tr>
<tr>
<td>C</td>
<td>electrical</td>
<td>BC</td>
<td>as above</td>
</tr>
<tr>
<td>A, B, C</td>
<td>as above</td>
<td>ABC</td>
<td>dry chemical red cylinder, gauge at top, hose</td>
</tr>
</tbody>
</table>

* Only pressurized water and carbon dioxide extinguishers are used on patient care units.

Only attempt to extinguish a fire that is no larger than a wastebasket. Always have one other person with you, use the entire contents of the fire extinguisher, and have an exit at your side or back. Even if you successfully extinguish the fire, all phases of the R.A.C.E. protocol must be followed to ensure that proper evaluation of the situation has taken place.

**MEDICAL WASTE**

The following items are medical waste and must be disposed of in leak-proof, biohazard containers or bags:
- sharps
- items visibly dripping with blood or body fluids contaminated with blood

Please refer to the Medical Waste chart found on the following page.
MEDICAL WASTE CLASSIFICATION AND SEPARATION REFERENCE CHART

The following items are **MEDICAL WASTE**:

1. **SHARPS**: to be deposited into the designated needle disposal containers.
   - BLADES, GLASS SLIDES, GLASS TUBES
   - NEEDLES- IV, HYPODERMIC, SPINAL, SUTURE
   - LANCETS, PROBES, SAFETY PINS, SHEARS, SCRAPPERS, SCISSORS
   - **Syringes with or without needle, Vacutainers**
     - GLASS MEDICATION VIALS

2. **Visibly dripping waste blood**: contain fluids where possible and deposit any items saturated with visibly dripping blood in regulated waste container.
   - **Infectious waste cerebrospinal and pleural fluids**:
     - Void container of fluids where possible and deposit containers and/or sealed units in regulated waste containers.
   - **Or Spoons, suction tubing & canister liners**,
     - **Other suction tubing containing blood, Pleurevacs, Hemovacs**
     - **Blood transfusion & Pheresis filters, tubing & bags**
     - **Hemodialysis & CVVH filters & tubing**
   - **1 Liter Glass Vacuum Bottles (used to remove ascites)**

3. **All waste from Biosafety Level 4 Agents**: All waste from a person with biosafety level 4 disease, such as viral hemorrhagic fever.

4. **Cultures and Stocks** of agents infectious to humans and associated biologics including cultures from medical, clinical and hospital laboratories; culture dishes and devices used to transfer, inoculate, or mix cultures

5. **Research Animal Waste** which includes contaminated animal carcasses, animal bedding or animals that were intentionally exposed to infectious agents during research.

6. **Pathological Waste** means any human tissue, organ or body part removed during surgery, autopsy or other medical procedure (waste to be segregated in corrugated boxes).

7. **Chemotherapy Waste** IV bags containing less than 3% of antineoplastic agents can be deposited directly into medical waste containers. Any IV bag containing unused antineoplastic over 3% must be returned to Pharmacy for placement in special corrugated containers and disposed of as hazardous waste by incineration.

The following items are **NOT MEDICAL WASTE** unless visibly dripping waste blood.

Dispose in ordinary waste containers:

- **Empty Specimen Containers**
  - DRESSINGS, GAUZE, 3 X 4 PADS, ETC.
  - CHUX, SWABS, SPLINTS
  - MASKS, GLOVES, GOWNS
  - TAPE, PADS, COTTON
  - SUTURES- without attached needle
  - **Respiratory suction tubing**
  - VENTILATOR TUBING
  - **Foley bags, Foley catheters**
  - RED RUBBER CATHETERS
  - BED PANS, EMESIS BASINS
  - DIAPERS
  - URINALS, TOILET HATS
  - PERI (OB) PADS
  - SALEM SUMP (NG) TUBES
  - IRRIGATION SETS, BULB SYRINGES
  - PAPER TOWELS, TISSUES, CUPS
  - PACKAGING MATERIALS
  - CASTS, CAST PADDING
  - PLASTIC MEDICATION VIALS
  - PERITONEAL DIALYSIS BAGS & TUBING

Phone the Nursing Education specialist or Clinical Advisor, or phone Epidemiology at 8-4634 with questions concerning medical waste classification or separation.

Phone Environmental Services at 8-6688 with questions about medical waste containers or pick-up schedule.
HAZARD COMMUNICATION

To keep you informed about the hazards you may face at work, OSHA created the Hazard Communication Standard. This standard gives you the right to know about chemical hazards in your workplace.

You should:
1. know what hazards you face on the job
2. know how to protect yourself, co-workers, patients, and visitors from these hazards
3. read labels and Material Safety Data Sheets (MSDS) and follow instructions and warnings
4. follow safety procedures on the job

Hazardous chemicals can create two types of hazards:
1. Physical and chemical hazards usually result from improper use or storage of hazardous chemicals. These are chemicals that are:
   - flammable (catch fire easily)
   - explosive (causes a sudden release of pressure, gas and heat) and
   - reactive (burns, explodes, or releases toxic vapor if exposed to other chemicals, heat, air, or water).
2. Health hazards

At YNHH, Material Safety Data Sheets can be accessed on-line:

* MSDSdirect!

** You must be using a Hospital computer to log onto the HR Intranet site. **

Clinical WorkStation homepage:
http://info.med.yale.edu/medmenu/ynhh/ClinicalWorkStation

HAZARDOUS SPILL REPORTING

A. MERCURY SPILLS:
1. Phone Environmental Services (8-6688) for proper clean up and disposal.
2. DO NOT ATTEMPT TO PICK UP MERCURY WITH YOUR HANDS.
3. DO NOT DISPOSE OF BROKEN THERMOMETERS OR OTHER GLASS ITEMS CONTAINING MERCURY INTO SHARPS CONTAINERS.

B. CHEMOTHERAPY SPILLS:
1. A chemotherapy spill requires immediate attention.
2. All patient care areas and the pharmacy in which antineoplastic agents are mixed or administered have a "Chemotherapy spill kit".
3. Follow proper procedures as outlined in the spill kit, Material Safety Data Sheet, Pharmacy and the department.
4. Report all contact incidents to OHS and complete a "Supervisor's Report of Employee Accident/Injury" (F-1797) or Incident Report.

C. MAJOR CHEMICAL SPILLS:
1. Phone "155" to report the spill - The Page Operator will sound the "Order Number One" and begin notification.
2. Remove patients and/or employees from immediate danger.
3. Evacuate the area, as needed, under the supervision of the most senior staff.
4. Follow department-specific instructions.

D. RADIATION ACCIDENTS:
1. Phone "155" to report the spill / discovery of radioactive material - The Page Operator will sound the "Order Number One" and begin notification.
2. Injured and possibly contaminated persons should be transported to the Emergency Department under the direction of the area supervisor.
3. Evacuate the area under the direction of the most senior staff upon consultation with Hospital, University, and/or City personnel.
4. Follow department-specific instructions.

E. BIOLOGICAL ACCIDENT:
1. Phone Epidemiology and Infection Control (8-4634) for initial detection - Epidemiology and Infection Control will notify Administration and others.
2. Assist with patient care as directed by area supervisor, Hospital Epidemiologist/designee, etc.
3. Use proper precautions as directed by Hospital Epidemiology and appropriate administrators.
4. Follow department-specific instructions.

**OXYGEN SAFETY**

A. SAFE OXYGEN HANDLING AND STORAGE

Oxygen gas is contained in traditional green, 30 lb. steel tanks or cylinders. As oxygen is a hazardous chemical, each tank MUST be labeled. All gases for medical use are contained in color-coded tanks; however ALWAYS READ THE LABEL and confirm that the tank you are going to use does contain oxygen.

Oxygen tanks that are considered “in use” (regulator attached) should be stored in a rack that is secured to a wall or carrier in an upright position with the regulator off. If an oxygen tank is empty or not in use it must be stored in the “Oxygen Tank Storage Cabinet” that is found in all patient care areas. Oxygen tanks should never be stored lying down. If the tank is stored with the regulator and/or flow meter attached, make sure both the regulator and flow meter are turned OFF. AN OXYGEN TANK MUST BE STORED WITH THE VALVE CLOSED.

B. OXYGEN AND FIRE DANGER

An intentional oxygen shut-off should only happen in the event of a major fire emergency or leak in the system. While oxygen itself is not flammable or explosive, it will feed a fire and cause it to burn hotter and faster. If you discover a fire in a patient room, shut off the oxygen at the wall (turn off the flow meter), if possible. If you are unable to do this, rescue the patient from the room (activate the “R.A.C.E.” protocol), and call for the patient’s nurse and a Respiratory Therapist.

ONLY A RESPIRATORY THERAPIST AND/OR PLANT ENGINEERING PERSONNEL SHOULD SHUT OFF THE FLOOR OR ZONE OXYGEN AFTER ASSESSING THE CONSEQUENCES.
Patients requiring oxygen will need to be connected to portable oxygen. Emergency Oxygen Shut-off valve(s) are located on all floors, usually close to the entrance to the floor/unit; it is unit-specific. NEVER BLOCK ACCESS TO THE EMERGENCY OXYGEN SHUT-OFF VALVE. Some emergency oxygen shut-off valves turn the flow of oxygen off to the entire floor; others will only cause the oxygen to stop in certain areas or zones of a patient care area. Each emergency oxygen shut-off valve is marked with the area it services. In the normal open position of the emergency oxygen shut-off valve the handle is parallel to the pipe.

In the event of a Code Blue or Code White on a ventilated patient remember to TURN THE VENTILATOR OFF BEFORE DEFIBRILLATING OR USING OTHER ELECTRICAL EQUIPMENT. The ventilator will continue to supply concentrated oxygen into the area. Use of electrical equipment in this instance may cause a fire and potential bodily harm to the patient and others.
RADIATION SAFETY

A. KEY SAFETY ELEMENTS

Most healthcare workers receive no more radiation exposure than what occurs naturally in the environment. Employees who work in restricted areas are monitored to ensure safety (film badges). "Time", "distance", and "shielding" are key safety elements when working around radiation sources:

- **Minimize the time** spent in the patient's room or near the patient who is being treated with radionuclide therapy.
- **Maintain at least 6 feet away** from the patient being treated with a radioactive implant when not providing direct patient care or when x-rays are being taken.
- **Wear appropriate shielding** such as a lead apron and thyroid collar when assisting with x-ray procedures.

B. MAIN SOURCES OF RADIATION IN A HEALTH CARE FACILITY

Sources of radiation in a health care facility include x-ray machines, therapeutic radiology equipment and radionuclides. X-rays only generate radiation when making the image using a focused beam. They do not make patients or objects radioactive. In much larger doses, radiation is used to destroy tumors or other diseases. Radionuclides are radioactive materials may be implanted, swallowed, or injected. Unlike x-rays, the patient receiving radionuclide treatment does become radioactive. In most cases, diagnostic radionuclides present no significant danger to the patient and the radioactivity wears off quickly-usually in a day or so. In much larger doses, radionuclides are used to destroy tumors or other disease. A sealed implant is a small capsule containing radioactive material that is inserted into a patient. The patient is radioactive as long as the implant is in place.

C. PRECAUTIONS

Take special precautions when working around radiation, radioactive sources or near patients receiving radionuclide therapy to decrease exposure to radiation:

- Do not enter a patient's room labeled with the radiation caution sign unless you need to provide direct patient care and have been trained to do so.
- Wear disposal gloves when handling waste.
- Wash hands to remove traces of radioactivity after removing gloves and do not rub your eyes or face when working around radiation.
- Do not remove anything from the patient's room as it may be contaminated with radioactivity.
- Do not eat, drink, smoke, or apply cosmetics around radioactive substances as radiation may enter the body through the eyes, nose or mouth.
- Dispose of contaminated material (gloves, uniforms, etc.) in appropriately marked containers.
- If you suspect a radiation leak, do not attempt to clean it up yourself. Always follow proper department procedures when dealing with a radiation leak. Mark off the area and notify the Radiation Safety Officer (8-2950). Further information may be found in the Hazardous Spill Reporting section of the Emergency Preparedness Plan found in the Safety Manual.
- If you work around radiation regularly, your radiation exposure will be monitored to ensure your safety.
- Unborn babies are especially sensitive to radiation. Notify your immediate supervisor if you are pregnant and have been assigned to care for a patient undergoing radionuclide therapy.
- Contact the Radiation Safety Officer if you have questions concerning radiation, radioactivity, and radioactive materials.
- Follow department-specific procedures and protocols when working a round radiation and radioactivity.
WORKPLACE VIOLENCE

Workplace violence is a particular concern in health care facilities because a small percentage of patients or visitors may turn violent due to mental illness, drug or alcohol abuse, or emotional problems. Health care staff or their family or friends may also create violence resulting from stress, substance abuse, emotional problems, or troubled relationships. The availability of weapons heightens the danger. To prevent workplace violence, all personnel must be able to recognize and deal with actions, attitudes, and situations with the potential for violence.

- Be aware of the risk of violent behavior in the workplace.
- Know how to identify signs of potential violence.
- Be alert to danger signs that represent a change in attitude or behavior- know your patients’ and co-workers’ normal behaviors and reactions.
- Respond quickly and appropriately to possible danger signs.
- Take precautions to reduce the chance that you or a co-worker will become a victim of violence.

A. HOW TO PROTECT YOURSELF

Know what to do if violence seems likely and how to protect yourself:

- learn progressive behavior control methods and safe methods of restraint application or escape; get help if you feel unsafe while dealing with anyone; excuse yourself from the scene
- know where alarms are located and how to use them
- report all incidents to your supervisor and YNHH Police (8-2500) immediately
- report poor lighting
- report unauthorized personnel
- lock up personal belongings
- don’t carry (and show) a lot of cash
- don’t wear a lot of jewelry
- prominently wear your ID card
- request a YNHH Police escort to your car
- use the “buddy system”; never walk alone
- be alert to overemotional patients, visitors and staff who make threats or show extreme anger
- be aware of any office or department specific security procedures

Phone the YNHH Police Department at 8-2500 for further information on violence in the workplace.
Healthcare Associated Infections and the Prevention and Control of Multi-Drug Resistant Organisms (MDRO)

Introduction

• The CDC estimates that healthcare-associated infections (HAI) account for an estimated 1.7 million infections and 99,000 associated deaths each year in the US.
  ✓ Cost: $17 - 29 billion a year.
  ✓ One of the top ten leading causes of death.
• HAIs are infections that patients acquire during the course of receiving treatment for other conditions within a healthcare setting.
  ✓ HAIs are not present or incubating at the time of admission.
  ✓ HAIs lead to:
    ➢ increased length of stay
    ➢ more diagnostic tests
    ➢ more treatment
    ➢ more antibiotics
    ➢ more antibiotic resistance

Introduction

• HAIs are more likely to be caused by multi-drug resistant organisms (MDRO) than community acquired infections.
  ✓ MDROs are bacteria resistant to first line therapies.
  ✓ MDROs are often difficult to treat due to their innate or acquired resistance to multiple classes of antimicrobial agents.
    ➢ In some cases, there are few, if any, options for patient treatment.
  ✓ Examples of MDROs:
    ➢ Vancomycin resistant enterococcus (VRE)
    ➢ Methicillin resistant Staphylococcus aureus (MRSA)
    ➢ Gram negative bacteria (e.g., E. coli, Pseudomonas, Klebsiella, Enterobacter, Acinetobacter) resistant to first line antibiotic agents and/or carrying certain resistance traits (e.g., ESBL = extended spectrum beta-lactamase, KPC = Klebsiella pneumoniae carbapenemase)

Introduction

• MDRO infections are particularly difficult and problematic to treat in certain patient populations such as:
  ✓ Immunosuppression
  ✓ Prosthetic devices
  ✓ Device related infections (e.g., central line infection, Foley catheter related infection, ventilator associated pneumonia)
• Although C. difficile (C. diff) is not technically an MDRO, it poses similar challenges for prevention of transmission and treatment.
  ✓ Outbreaks of a particularly virulent strain of C. diff are being increasingly reported in the US.

The Chain of Transmission

HAIs don’t occur spontaneously. They are the result of a number of steps in a process that allows an organism to colonize and/or infect a susceptible host.

These steps are linked and are commonly referred to as the “Chain of Transmission”.

The transmission of infectious agents requires three elements:
1. A source (or reservoir) of infectious organisms
2. A susceptible host with a portal of entry for the organism
3. A mode of transmission for the organism

The Chain of Transmission

• A Source
  Where the organism resides (patients, healthcare workers, visitors, environment, equipment).

• Means (modes) of Transportation
  How the organism is picked up and taken to the host (contact, airborne, droplet).

• A Susceptible Host
  A person who is capable of receiving the organism and playing host to the organism.
Breaking the Chain of Transmission

Hand hygiene, standard precautions, transmission-based precautions (contact, droplet, airborne), aseptic technique, attention to the environment and patient care equipment, etc.

HAI infection prevention strategies are targeted at breaking the chain of transmission. These strategies make up the fundamentals of infection prevention.

Hand Hygiene

• Hand hygiene is the cornerstone of all infection prevention measures and precautions.
  ✓ Proper hand hygiene is the most essential measure for breaking the chain of transmission of organisms, including multi-drug resistant bacteria, that can cause healthcare associated infections.

“Hand Hygiene: An Often Forgotten Infection Prevention Strategy”

“When a doctor or nurse can reduce the spread of antibiotic-resistant bacteria by practicing simple hand hygiene, accountability should matter. True, the hospital and its leaders are accountable for establishing a system in which caregivers have the knowledge, competence, time, and tools to practice perfect hygiene. But each caregiver has the duty to perform hand hygiene—perfectly and every time. When this widely accepted, straightforward standard of care is violated, we cannot continue to blame the system.”

Donald Goldmann, MD
New England Journal of Medicine, 355:2 July 13, 2006, 121-123

What’s On Your Hands?

A 24-year-old man who had quadriplegia due to a traumatic spinal cord injury was found on routine surveillance cultures to have methicillin-resistant Staphylococcus aureus (MRSA) colonization of his anterior nares. He had no history of MRSA infection or colonization. To assess the potential implications of the patient’s MRSA carriage for infection control, an imprint of a healthcare worker’s ungloved hand was obtained after the worker had performed an abdominal examination of the patient. The MRSA colonies grown from this handprint on the plate...are pink and show the outline of the worker’s fingers and thumb (Panel A). ... After the worker’s hand had been cleaned with alcohol foam, another hand imprint was obtained, and the resulting culture was negative for MRSA (Panel B).

These images illustrate the critical importance of hand hygiene in caring for patients, including those not known to carry antibiotic-resistant pathogens.

Copyright © 2009 Massachusetts Medical Society.

When is hand hygiene required?

The main activities that require healthcare workers to perform hand hygiene include:
✓ Before touching a patient
✓ Before putting on gloves (sterile or non-sterile)
✓ Before doing invasive procedures
✓ Before handling clean equipment or supplies
✓ After touching a patient
✓ After handling dirty equipment or supplies
✓ After removing gloves (sterile or non-sterile)
✓ Before eating or drinking
✓ After using the restroom
How to Properly Perform Hand Hygiene

Using Soap and Water
- Turn on faucet
- Wet hands
- Apply soap
- Rub hands together to form a lather for at least 15 seconds
  - Make sure to cleanse thumbs, areas in between fingers, and under fingernails
- Thoroughly rinse lather from hands
- Pat dry with clean paper towel
- Use paper towel to turn off faucet
- Dispose of paper towel in appropriate receptacle

Using Alcohol-based Hand Rub
- Push the dispenser once
- Coat all surfaces of your hands including:
  - Between fingers
  - Under fingernails
  - Back of hands and wrists
- Rub hands together briskly until dry
- No rinsing needed

Hand Hygiene
- Frequently missed areas:
  - Thumbs
  - In between fingers
  - Under finger nails
  - Wrists

When should an alcohol-based hand rub not be used?
- When hands are visibly soiled or dirty.
- When hands have been in direct contact with blood or body fluids.
- After contact with a patient, or their environment, who has C. difficile.

In these cases, hand hygiene should be performed using soap and water instead of an alcohol-based hand rub.

Gloves
- Gloves are not a substitute for hand hygiene!
- In general, wear gloves when you anticipate contact with blood, body fluids, non-intact skin, mucous membranes.
- Perform hand hygiene before putting on gloves.
- Remove gloves after patient care and immediately perform hand hygiene.
- Wear a new, clean pair of gloves for each patient and never wash, disinfect or sterilize gloves for reuse.
- Remove gloves that are torn, cut or punctured.

Remember that all personal protective equipment (e.g., gloves, gowns, etc.) must be removed between patients and before leaving treatment areas.

Fingernails
- Fingernails have been shown to harbor a high number of bacteria and yeast.
- Healthcare personnel who wear artificial nails are more likely to harbor organisms on their fingertips or under their nails than those who have short natural nails.
- Artificial nails have been implicated in outbreaks of hospital acquired infections.
- Artificial nails, nail art or nail jewelry is not permitted for anyone who has contact with patients, medications or food in the healthcare setting.
- Fingernails of healthcare personnel must be clean, natural, and short (1/4 inch) to assure patient safety.
Patient Comments: We See You!

“The only thing that bothered me was the hand washing. I know in the medical field sanitizing your hands is very important and I didn’t see that being done by the employees as often as I thought it should be done.”

“The only negative comment is that you guys need to be more aware and in control of the infections passed around the hospital and come up with a better way to keep it from happening.”

“The [unit] nursing assistant or PCA came into my room with full contact precautions on. When I asked her why, she said “because the person in the next room required it and she was trying to save time.” When I asked her if she would be changing her gloves and washing her hands in between pts, she said no…Finally, I asked to be discharged from the hospital 30 hours after surgery …in fear of contracting a hospital acquired infection…People wonder why MRSA and C. diff are rampant in the inpatient population but I don’t.”

Transmission-Based Precautions

- Used for patients known or suspected to be colonized and/or infected with epidemiologically significant organisms (e.g., MDROs)
- Efforts should be made to counteract possible adverse effects on patients (e.g., anxiety, depression and other mood disturbances, perceptions of stigma, reduced contact with clinical staff, and increases in preventable adverse events) in order to improve acceptance by the patients and adherence by healthcare personnel
- MDROs are most commonly transmitted via contact
  - Direct contact transmission: organisms are transferred from one person to another
  - Indirect contact transmission: transfer of an organism through a contaminated intermediate object or person (e.g., unwashed hands, improperly cleaned patient care devices, instruments, equipment, environment)

Contact Precautions

- Requires putting on gown and gloves
  - You must gown and glove even if “I’m not going to touch anything”.
  - Perform hand hygiene before putting on gloves so gloves are not contaminated. This protects the patient and you.
  - The gown must be tied at the waist and neck to keep it from opening and/or slipping off the shoulders to prevent contamination of your clothing.
  - Remove gown and gloves before leaving the room.
  - Perform hand hygiene immediately after removal of gown and gloves, before touching anything or anyone.

Examples of when contact precautions are required:

- VRE
- MRSA
- Resistant gram negative bacteria
- C. difficile colitis
- Zoster in a normal host
- RSV—Respiratory Syncytial Virus
- Parainfluenza virus
- Rotavirus

“Methicillin-resistant Staphylococcus aureus (MRSA) is a versatile bacterial pathogen, combining virulence, antibiotic resistance and survival fitness. Clonal spread is facilitated by cross-transmission via the hands of healthcare workers and the selection pressure exerted by broad-spectrum antibiotic treatment.”

Clin Microbiol Infect 2006;12:1154–1162

“Outbreaks of MRSA in hospitals are often attributed to a lapse in contact precautions, with transmission from a colonized or infected patient to a non-colonized patient via healthcare worker hands or implements (e.g., stethoscopes).”

Infect Control Hosp Epidemiol 2006;27:1267-1269

“Outbreaks of MRSA in hospitals are often attributed to a lapse in contact precautions, with transmission from a colonized or infected patient to a non-colonized patient via healthcare worker hands or implements (e.g., stethoscopes).”

Expert Opin Pharmacother 2006;7:11
The Basics for Preventing Transmission of MDROs

- Promote compliance with CDC (or WHO) hand hygiene recommendations
- Use Contact Precautions for MDRO colonized and infected patients
- Educate health care personnel about MDROs
- Ensure cleaning and disinfection of equipment and environment
- Educate patients and their families about MDROs
  ✓ Engage patients and families and encourage their participation in their care and encouraging healthcare workers and visitors to comply with hand hygiene and contact precautions
- Monitor compliance
  ✓ Hold all healthcare providers accountable for compliance with all recommended infection prevention practices

Communication Among Healthcare Personnel

All healthcare personnel must take responsibility for infection prevention practices.

Anyone can stop someone or a procedure if infection prevention practices (e.g., hand hygiene, aseptic technique) are not properly adhered to.

It is important for healthcare personnel to follow standard patient safety protocols and to ensure that their peers and other healthcare personnel practice the same standards.

Question: Who is responsible for infection prevention measures at YNHH?

Answer: Each and everyone one of us.

- We are each responsible for maintaining a safe environment for our patients, staff and visitors at YNHH.
- We are each responsible for our own hands.
- We are each responsible to remind others to perform hand hygiene.

Final Thoughts

While conducting rounds with infection prevention specialists, Dr. Gawande observed less than optimal hand hygiene compliance by healthcare providers. When one of his patients acquired an MRSA infection while in the hospital, he was prompted to examine his own infection prevention practices.

“Until that moment, when I stood there looking at the sign on his door, it had not occurred to me that I might have given him that infection. But the truth is I may have. One of us certainly did.”

Hand Hygiene: Everywhere, Everyone, Every time

Wash Those Hands!

How doctors and nurses can make you sick—and what you can do about it

Performance improvement requires…[an] unshakeable belief in the idea that everyone in healthcare really has two jobs when they come to work every day: to do their work and to improve it.

The hardest thing about hand hygiene is remembering to do it!

So, keep in mind…

Every where
Every patient
Every time
YNHH Initiative to Reduce Catheter-related Blood Stream Infections (CR-BSI)

Background: Central Venous Catheters

- A CVC or Central Venous Access Device (CVAD) is an intravenous catheter whose tip ends in the central venous system
- Common sites of insertion include internal jugular vein, subclavian vein, femoral vein, and as well as the cephalic & basilic veins (PICC: peripherally inserted central catheter)
- Indications:
  - IV fluids, medications, vasopressors, blood products, chemotherapy, total parenteral nutrition
  - Frequent phlebotomy
  - Hemodialysis

Background: Scope of Problem

- 18 million ICU days (11% of total hospital days).
- 9.7 million catheter-days in ICUs (54% of ICU days).
- 48,600 patients in the ICUs have a CR-BSI (catheter-related bloodstream infection (5 BSI/1000 catheter days).
- 17,000 deaths attributable to CR-BSIs in the ICU.
- Although the catheter utilization rate is lower outside of the ICU setting, as many or more CR-BSIs occur outside the ICU setting.

CR-BSI Definition: CDC National Healthcare Safety Network (NHSN)

- Presence of a recognized pathogen cultured from one or more blood cultures and organism cultured from blood is not related to infection at another site or
- Presence of a common contaminant bacteria cultured from the blood AND at least one of the following:
  - Fever (temperature >38°C)
  - Chills
  - Hypotension
  (and signs and symptoms and positive results not related to infection at another site)

Pathogenesis of Catheter Infection

- Source of organisms causing CVAD infections:
  - Contamination during insertion or CVAD maintenance
  - Intraluminal or hub contamination
  - Skin colonization
- Contributing Factor: Biofilm deposition on external & internal surface of catheter
- Most common etiology is due to skin colonization and resultant microbial migration through catheter entrance site along tract and infection of biofilm surrounding catheter.
- Catheter tract infection can also occur in absence of associated BSI.

Risk Factors for CR-BSI

- Duration of catheterization (CVAD duration > 3 -4 days)
- Increased diameter and number of ports on catheter
- Location (femoral > internal jugular > subclavian)
- Type of catheter:
  - Tunneled catheters lower risk than non-tunneled
  - Antimicrobial/Antiseptic coated catheters are lower risk than non-coated
- Thrombosis at the site of the CVAD
- Infusion with TPN or other lipid rich infusate
- Impaired skin integrity (burns, dermatologic disease)

References:
**Prevention of CR-BSI**

- Multicenter trial in 103 Michigan Adult ICUs using a central line bundle:
  - Hand washing prior to putting on sterile gloves
  - Chlorhexidine for skin disinfection (allow to dry; not for children < 1yr old)
  - Avoid femoral site for insertion
  - Removal of catheters as soon as feasible
- Process components included:
  - Education of clinicians
  - Central-line cart with necessary supplies
  - Use of a standardized checklist for insertion to guide adherence
  - Consent
  - Communication plans to nursing and other staff who will assist
  - Consent
  - Time-Out (pre-procedural universal verification)
  - Daily review of necessity of catheter
  - Feedback to providers regarding infections
- Central line-Associated Blood Stream Infection Rates
  - Reduction of CR-BSI is one of several components of hospital wide effort to reduce Hospital Acquired Infections (HAIs)
  - Data on YNHH CR-BSI's is provided weekly to physicians, nursing staff, and hospital leadership
  - Information provided on infections, catheter days, and overall catheter usage for all ICUs (sample on next page)
  - Information is provided relative to average data from NHSN data for similar type of ICU or care location
  - All elements of the NPSG 2010 recommendations have been incorporated into the new CVAD Insertion Checklist and CVAD Catheter maintenance policies.

**Components of Effort to Reduce CR-BSI**

- Central line insertion checklist and CVAD policy:
  - Elements of the checklist are reviewed in detail in the following slides.
  - Checklist hard copies available under "C" in the clinical workstation.
  - Completed copies should be returned to nursing leadership on each unit.
  - Completion of training required for all who insert CVADs (sample on next page)
  - Mandates education for nursing and physician providers annually (All licensed independent practitioners who are inserting CVADs)
  - Mandates patient and family education
  - Standardization of maintenance protocol with checklist
  - Full scale implementation: January 1, 2010

**Approach to Procedure & Checklist Elements:**

- The following steps MUST be completed for ALL line insertions on ALL patients.
  - Communicate plans to nursing and other staff who will assist
  - Consent
  - Time-Out (pre-procedural universal verification)
  - Hand Washing Directly Observed
  - Hat & Mask
  - Sterile Gloves
  - Sterile Gown
  - Sterile drape to cover entire patient and adjacent equipment
  - Disinfect procedure site and allow to dry (chlorhexidine except newborns/infants)
  - All staff directly assisting in procedure shall wear sterile gown & gloves along with a hat and mask
  - All staff working within room must wear mask and hat

**Background: Regulation and Reporting**

- CMS no longer reimburses for vascular catheter associated infections as of October 1, 2008
- Catheter-related blood stream infections are reportable to the state and data is available to the public
- National Patient Safety Goals 2009 (The Joint Commission)
  - Mandates the use of a central line insertion checklist (with specified elements on checklist) and a standardized protocol for CVC insertion.
  - Mandates education for nursing and physician providers annually (All licensed independent practitioners who are inserting CVADs)
  - Mandates patient and family education
  - Standardization of maintenance protocol with checklist
  - Feedback to providers regarding infections

**Sample of Reporting of CR-BSI Infection Rates at Yale-New Haven Hospital**

- Central line utilization ratios
- Central line-associated bloodstream infection rates

**Background: Regulation and Reporting**

- Reduction of CR-BSI's is one of several components of hospital wide effort to reduce Hospital Acquired Infections (HAIs)
- Data on YNHH CR-BSI's is provided weekly to physicians, nursing staff, and hospital leadership
- Information provided on infections, catheter days, and overall catheter usage for all ICUs (sample on next page)
- Information is provided relative to average data from NHSN data for similar type of ICU or care location
- All elements of the NPSG 2010 recommendations have been incorporated into the new CVAD Insertion Checklist and CVAD Catheter maintenance policies.
Checklist Elements

- **Intra-procedure**
  - Maintenance of Sterile field
  - Consider obtaining help after 3 unsuccessful attempts
  - Use of ultrasound guidance as appropriate
  - Removal of guidewire

- **Post Procedure**
  - Application of a sterile dressing (including “Biopatch” which is a chlorhexidine based dressing)
  - Imaging (if necessary)
  - Clean and return equipment (ultrasound, cart etc)
  - Complete checklist and submit to floor/ICU manager
  - Complete procedure note

Nurses (and other observers) are empowered to stop the procedure if there has been a breach in sterile technique or any non-adherence to the checklist.

Additional Key Points

- Practice does vary – infants and newborns should not have skin antisepsis with chlorhexidine (iodine based alternative for rare cases of chlorhexidine allergy)
- Many catheter infections are related to maintenance rather than insertion therefore daily surveillance with early removal of lines is essential.
- Blood cultures should always be drawn peripherally – contamination rate (false positives) if drawn through CVAD is substantial.
- Change of CVAD over a wire is not recommended and should be reserved for specialized situations (Due to inability to obtain other access (e.g. stenotic vessels) or emergencies).
- Consider antibiotic/antiseptic coated catheters and early transition to tunneled devices (e.g. transition quinton to permacath in 3-4 days) for immunocompromised hosts and those at high risk (skin breakdown).
- Chlorhexidine dressing (“Biopatch”) should be applied to newly inserted lines while site still sterile and is included in all dressing kits.

YNHH Initiative to Reduce Catheter-related Blood Stream Infections (CR-BSI):

**Review Questions: Answers & Explanations**

**Question #1**

All of the following are elements are now required for insertion of a central venous access device except:

A) Betadine preparation of the site for adults
B) Maximum barrier precautions
C) Wash hands prior to procedure
D) Use of a checklist

**Explanation:**

- (A) is incorrect. Chlorhexidine is a superior antiseptic and Betadine (iodine based antiseptic) is only for use in infants and babies less than 1 year of age.
Question #2

All of the following are true except:
A) Hospital policy requires use of a checklist for insertion of a CVAD
B) Practitioners privileged to insert CVAD devices must receive annual education regarding prevention of blood stream infections
C) Rates of BSI at YNHH are reported to hospital staff as well as the state authorities
D) Blood cultures should be sent from a CVAD to determine if there is an infection in the device

Explanation:
• (D) Blood cultures should be obtained peripherally under nearly all circumstances. Contamination rate when drawn from CVAD is significant leading to difficulty interpreting data and possible removal of a useful CVAD.

Question #3

All of the following are true except:
A) CR-BSI are uncommon in non-ICU patients
B) Femoral vein catheters are more prone to developing CR-BSI
C) Tunneled access devices decrease the risk of CR-BSI
D) Blood cultures should not be sent from a CVAD to determine if there is an infection in the device

Explanation:
• (A) Although proportionally fewer patients have CVADs outside the ICU setting the total number is substantial and they are often in place for an extended duration. At YNHH, and nationally, historically more than half of CR-BSI's occur outside the ICU setting.

Question #4

All of the following are elements of the Insertion Checklist except:
A) Consent obtained
B) Maximum barrier precautions
C) Use of chlorhexidine skin anti-sepsis routinely in adults
D) Hand washing prior to putting on gloves
E) Procedure should continue even if sterile field is disrupted

Explanation:
• (E) If the sterile field is disrupted the procedure must be began again from the start. Supervisors and observers (MD & RN) have been instructed to terminate the procedure if the sterile field is breached.
**Question #5**

Maximal barrier precautions include using a sterile drape to cover the entire patient and adjacent equipment (e.g., ventilator arms/tubing, IV pumps, side rails, etc.).

A) True  
B) False

**Explanation:**

• (A=True) Maximum barrier precautions means using sterile drapes, gowns, etc to cover a wide area around the patient and adjacent areas. Simply draping the patient to their knees or other predetermined point is not sufficient. There should be a clearly defined sterile field a minimum of 4-5 feet from the intended point of insertion for the CVAD.

**Question #6**

Only the person(s) inserting a CVAD, or those directly assisting with the procedure, need to wear a mask and hat. It is not necessary for other persons in the room to wear a mask and hat while a CVAD is being inserted.

A) True  
B) False

**Explanation:**

• (B = False) Personnel in the room should wear a mask and hat to avoid contamination of the sterile field.

**Question #7**

Chlorhexidine is the preferred skin disinfectant (exceptions: newborns/infants, persons allergic to chlorhexidine) for CVAD insertion. It is important to let the disinfectant dry before starting the CVAD insertion procedure.

A) True  
B) False

**Explanation:**

• (A = True) Chlorhexidine is a superior skin disinfectant when compared to iodine based preparations. Both products require time to dry to be effective.
Question #8

Which of the following is true?

A) It is acceptable to leave a central line in when it is no longer needed but it might be needed in the future. Daily assessment of CVADs is not necessary.

B) The patient’s skin and contamination at the hub site are 2 sources of organisms that can cause a CVAD infection.

C) Biofilm deposition along the external and internal catheter surface plays no role in CVAD infections.

D) The only person authorized to halt a CVAD insertion when guidelines for insertion or sterile procedure is not followed is the person inserting the CVAD.

Explanation:

• (B) CR-BSI’s are most commonly caused by bacteria from the patient’s skin (migrating along catheter) or contamination of the hubs.

Question #9

Which of the following is true?

A) Patients and their families are to be educated regarding CVADs and preventing infections. This should occur at the time of consent.

B) Nursing and licensed independent practitioners (e.g., physicians, PAs, APRNs) are required to undergo annual training and education on techniques for preventing CVAD infections.

C) The CVAD Insertion Checklist must be used for all CVAD insertions.

D) Routine changes of CVAD and/or guide wire exchanges are not recommended.

E) All of the above.

Explanation:

• (E) Education of patients and families as well as healthcare workers is a important component of the National Patient Safety Goals from The Joint Commission. The checklist is required for all insertions unless truly emergent and guide wires exchanges are only for use in rare occasions.

Question #10

Which of the following is false regarding preventing CVAD infections?

A) Avoid using the femoral vein for central venous access in adult patients.

B) Remove non-essential catheters as soon as possible.

C) Routinely replace central venous catheters.

D) Scrupulous attention to aseptic technique during insertion and/or maintenance of CVADs is important in preventing CVAD infections.

Explanation:

• (C) Replacement of CVADs routinely is discouragement because it does not clearly reduce the risk of CR-BSI and does have risk related to insertion. Early removal of the CVAD or use of a tunneled catheter are recommended.
YNHH Initiative to Reduce Surgical Site Infections (SSI)

Background: Surgical Site Infections (SSI)

- In spite of advances in infection prevention practices, surgical site infections (SSIs) remain a substantial cause of morbidity and mortality among patients.
- A systematic approach must be applied with the awareness that SSI risk is influenced by characteristics of the patient, operation, personnel, and healthcare setting.

Background: Scope of Problem

- Estimated 24 million surgical procedures/year
- 2 to 5% of operations are complicated by an SSI
- SSIs account for 24% of all Hospital Acquired Infections (HAI)
  - Third most frequent HAI
  - Most costly HAI
- SSIs prolong hospital stay an average of 7-10 days
- Patients with an SSI have a 2-11 times higher risk of death compared with operative patients without an SSI
- Total cost may exceed $10 billion/yr
  - Attributable costs vary: $3000-$29,000

SSI Definition: CDC National Healthcare Safety Network (NHSN)

- General definition:
  - Inflammatory changes
  - Pain
  - Warmth
  - Swelling
  - Redness
  - Wound dehiscence
  - Purulent drainage or abscess formation
  - Usually within 30 days of operation
  - Up to 1 year if foreign body implanted
- SSIs are classified as follows:
  - Superficial incisional
  - Involving only skin or subcutaneous tissue
  - Deep incisional
  - Involving fascia and/or muscular layers
  - Organ/space

Surveillance for SSI

- Direct methods (daily wound examinations) are rarely used in practice
  - Impractical
  - Resource utilization requirements
- Indirect methods consists of a combination of the following:
  - Review microbiology reports and individual patient medical records
  - Surgeon and/or patient surveys
  - Screening for readmission of surgical patients
  - Other information such as coded diagnoses or operative reports
  - Sensitivity 84-89%, specificity 99.8%
- Measure SSI rates for the first 30 days following procedures that do not involve inserting implantable devices
- Measure SSI rates for one year following procedures that involve the insertion of implantable devices
- About 70% of SSIs manifest themselves post-discharge
  - Rate varies by type of operation and type of SSI

Pathogenesis of Surgical Site Infections

- Microbial contamination of the surgical site is a necessary precursor of SSI.
  - Dose of bacterial contamination x virulence = risk of SSI
  - Resistance of the host patient
  - The risk of SSI is increased if a surgical site is contaminated with >10^6 organisms per gram of tissue.
  - Dose of contaminating organism required to produce infection may be much lower when foreign material is present.
- Endogenous sources of pathogens include the patient’s skin, mucous membranes, or hollow viscera
- Exogenous sources of pathogens include:
  - Surgical personnel
  - Operating room environment
  - Tools, instruments and materials brought to the sterile field during an operation
### SSI Risk Factors

<table>
<thead>
<tr>
<th>Wound Classification</th>
<th>Infection Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean</td>
<td>&lt;2%</td>
</tr>
<tr>
<td>Clean contaminated</td>
<td>&lt;10%</td>
</tr>
<tr>
<td>Contaminated</td>
<td>20%</td>
</tr>
<tr>
<td>Dirty</td>
<td>30 to 40%</td>
</tr>
</tbody>
</table>

- **Endogenous**
  - Diabetes mellitus
  - Advanced age
  - Obesity
  - Malnutrition, recent weight loss
  - Cancer
  - Immunosuppressed (e.g., steroid use)
  - Other remote site of infection

- **Exogenous**
  - Prolonged preoperative stay
  - Preoperative hair removal by shaving
  - Length of operation
  - Maintenance of body temperature
  - Surgical technique
  - Incorrect use of prophylactic antibiotics

### SSI Prevention Strategies: Pre-operative Measures

- Pre-operative antibiotics: “Timing is everything”
  - **Antibiotic given** | **SSI rate**
    - Early (2-24 hours before incision) | 3.8%
    - Within 2 hours before incision         | 0.6%
    - Within 3 hours after incision         | 1.4%
    - Post-op                                | 3.3%

  Classen et al. (NEJM 1992)

### Surgical Care Improvement Project (SCIP)

- SCIP tracks all of the following at YNHH
  - Antibiotics received within 1 hour prior to incision for those procedures where antibiotics are indicated
    - For quinolones and vancomycin a 2 hour time frame is acceptable
  - Antibiotic selection
    - CABG, other cardiac and vascular -> cefazolin, cefuroxime, or vancomycin*
    - Hysterectomy -> cefotetan, cefazolin, cefoxitin, cefuroxime, or ampicillin/subactam
    - Hip/knee arthroplasty -> cefazolin, cefuroxime, vancomycin*

  *Reason for use of vancomycin must be documented by physician/APRN/PA if patient not beta-lactam allergic
### Surgical Care Improvement Project (SCIP)

- SCIP tracks all of the following at YNHH
  - **Antibiotic discontinuation**
    - Antibiotics must be stopped within 24 hours of surgery end time for elective surgical cases.
    - For cardiac surgery antibiotics must be stopped within 48 hours of surgery end time.
  - Cardiac surgery patients must have blood glucose <200 mg/dl at 6AM on post-operative day #1 and day #2.
  - Hair removal must be with clippers or depilatory only (no shaving), only if necessary and performed immediately prior to incision.
  - Colorectal surgery patients must have a temperature ≥96.8°F within 15 minutes of leaving the operating room.

### Background: Regulation and Reporting

- CMS no longer reimburses for SSIs in the following instances:
  - Mediastinitis after coronary artery bypass grafting
  - Total knee replacement
  - Laparoscopic gastric bypass and gastroenterostomy
  - Ligation and stripping of varicose veins
- Some states have requirements for public reporting of SSI rates post hysterectomy, knee and hip replacements, coronary artery bypass graft.
- The 2009 Joint Commission (TJC) National Patient Safety Goals (NPSG)
  - Mandates education for nursing and physician providers, who care for surgical patients, upon hire and annually.
  - Mandates patient and family education.
  - Administer antimicrobial gents for prophylaxis for a particular procedure or disease according to evidence based best practices.
  - When hair removal is necessary, use clipper or depilatories: shaving is an inappropriate hair removal method.

### Components of Efforts to Reduce SSI

- **Patient and Family Education**
  - All surgical patients must be educated regarding measures to prevent SSIs.
  - Educational materials that have been developed specifically for patients should be used.
- **Whiteboard**
  - Pre-operative antibiotic choice (if indicated), timing, duration; follow evidence based guidelines.
  - Hair removal – no shaving, razors removed from OR.
  - Normothermia.
  - Glucose control.
- **Monitor compliance with best practices or evidence based guidelines**
  - Everyone is empowered to stop a procedure if there has been a breach in sterile technique or any non-adherence with checklists/protocol.

### YNHH Initiative to Reduce Surgical Site Infections (SSI)

**Review Questions**

**Question #1**

- Patient factors that increase the risk of a surgical site infection (SSI) include all of the following except:
  - A. Obesity
  - B. Diabetes Mellitus
  - C. Low albumin
  - D. Coronary artery disease
  - E. Cancer
Question #1

- Patient factors that increase the risk of a surgical site infection (SSI) include all of the following except:
  A. Obesity
  B. Diabetes Mellitus
  C. Low albumin
  D. Coronary artery disease
  E. Cancer

(D) Explanation: Diabetes, advanced age, obesity, malnutrition, cancer, immunosuppression (e.g., steroids) and other remote site of infection are all endogenous risk factors for SSI. Coronary artery disease is not a SSI risk factor.

Question #2

- Which of the following documented findings would not be considered a superficial SSI by NSQIP criteria:
  A. Purulent drainage from the wound
  B. An erythematous, tender, warm wound
  C. Isolation of bacteria from an aseptically obtained wound culture.
  D. Wound opened by the surgeon with a negative culture
  E. B and D

(D)

Question #3

- Which of the following are characteristics of SSIs:
  A. Complicate 8-10% of all surgical interventions.
  B. Are an uncommon example of a hospital acquired infection.
  C. Are associated with both a longer hospital length of stay and increased patient mortality.
  D. Nationally cost 3-5 million dollars per year.
  E. Source is often the surgeon’s naso-pharyngeal flora.

(C) Explanation: SSIs are estimated to complicate 2-5% of all surgical interventions and account for 24% of hospital acquired infections at a cost of $10 billion/year. Sources of organisms causing SSIs are both endogenous (the patient’s own flora) and exogenous (personnel, instruments, environment).

Question #4

- Which of the following are components of efforts to reduce SSIs:
  A. Administer pre-operative antibiotic prophylaxis (if indicated) within 60 minutes before incision (2 hours for vancomycin or quinolones).
  B. Do not use shaving as a method of hair removal.
  C. Maintain normothermia for colo-rectal surgery patients.
  D. Maintain glucose control for cardiac surgery patients.
  E. All of the above.

(E)
Question #5

- Which of the following is correct?
  A. Most SSIs manifest themselves before patients are discharged home.
  B. Patients and their families don’t need to be educated regarding measures to prevent SSIs if they don’t ask for the information.
  C. Pre-operative antibiotic prophylaxis should be continued until the patient is discharged.
  D. Everyone is empowered to stop a procedure if there has been a breach in sterile technique or any non-adherence with checklists/protocol.

(D) Explanation: The majority of SSIs manifest themselves after patients are discharged. All surgical patients and their families must be educated regarding measures to prevent SSIs. Pre-operative antibiotic prophylaxis must be stopped within 24 hours of surgery end time for elective surgical cases (exception: within 48 hours of surgery end time for cardiac surgery).

✓ Everyone is empowered to stop a procedure if there has been a breach in sterile technique or any non-adherence with checklists/protocol.