Prevention of Healthcare-Associated Infections (MDROs, CLABSIs, SSIs, and CAUTIs)

Prevent MDRO Infections

What are MDROs (Multidrug-resistant Organisms)?

- MRSA (Methicillin-Resistant Staph aureus)
- VRE (Vancomycin-Resistant enterococcus)
- ESBL (Extended-Spectrum Beta Lactamases) – some strains of E. coli, Klebsiella, other Enterobacteriaceae

Prevent MDRO Infections

- CRE (Carbapenem-resistant Enterobacteriaceae)
- MDRSP (Multidrug-resistant Strep pneumonia)
- Other MDR gram negative bacteria, such as Stenotrophomonas multophilia, Burkholderia cepacia, and some strains of Acinetobacter baumannii
- C diff (Clostridium difficile)

Prevent MDRO Infections - MRSA

- Strain of *Staphylococcus aureus* resistant to many antibiotics, including Methicillin
- Usually classified as Healthcare or Community Acquired (HA-MRSA or CA-MRSA)

Prevent MDRO Infections - MRSA

- HA-MRSA infections occur most frequently among persons in hospitals, nursing homes and dialysis centers who have weakened immune systems
- CA-MRSA infections occur in otherwise healthy people who have not been recently (within the past year) hospitalized or had a medical procedure – usually skin infections

Prevent MDRO Infections - MRSA

- Spread by physical contact – lives in moist areas
- Treatment of MRSA infections
  - Skin – Bactrim, Clindamycin
  - Systemic – Vancomycin
- Contact or droplet isolation for infection
- Handwashing is key to stop the spread of MRSA

Prevent MDRO Infections - VRE

- Developed because of use and misuse of antibiotics, including Vancomycin
- Can be spread person to person
- Can be facility-acquired
- Drug of choice - Linezolid
- Contact isolation for UTI, wound, or bloodstream infections

Prevent MDRO Infections - ESBLs

- ESBLs are bacteria that produce an enzyme that renders the bacteria resistant to many antibiotics
- Most common in certain strains of *Escherichia coli* and *Klebsiella pneumonia*
- Antibiotic of choice – Meropenem, Ertapenem (carbapenems)
- Contact isolation for UTIs and wound infections

Prevent MDRO Infections - CRE

- Carbapenem-Resistant Enterobacteriaceae (was originally called KPCs)
  - Gram negative organisms such as Klebsiella
  - Resistant to almost all antibiotics
  - High rates of mortality and morbidity
  - Strict attention to Isolation and Handwashing!!

Prevent MDRO Infections – other GNB

- Several other gram negative bacteria (GNB) are showing signs of resistance to many, if not most antibiotics
  - Acinetobacter sp., Stenotrophomonas sp., Serratia sp., others
- Contact precautions
- Handwashing is extremely important!!

Prevent MDRO Infections – C. difficile

- While not actually considered a MDRO, still an important pathogen
- Spore-forming bacteria that can be part of the normal flora
- CDI occurs when normal intestinal bacterial flora is altered, allowing C diff to flourish and produce toxin, causing severe watery diarrhea (Pseudomembranous colitis)

Prevent MDRO Infections – C. difficile

- Patients at risk for C. diff - repeated enemas, prolonged NG tube insertion, GI surgery, overuse of antibiotics (penicillin, clindamycin, cephalosporins, etc.)
- Patients with CDI shed spores in the stool that can be spread person to person

Prevent MDRO Infections – C. difficile

- Spores can survive up to months or even years in the environment, and can be spread on the hands of healthcare workers who have direct contact with infected patients or environmental surfaces
- Contact isolation
- Strict adherence to handwashing – no alcohol hand rubs!

Prevent MDRO Infections – C. difficile

- Proper handling of contaminated wastes
- CDC Environmental Guidelines – use bleach based products when there is ongoing transmission of *C. difficile*
- Limiting the use of antibiotics will lower the risk of developing CDI
- Use of proton pump inhibitors (PPIs) may also play a part in increasing risk for CDI

Prevent MDRO Infections – C. difficile Risk Factors

- Previous antibiotic therapy
- Extended length of stay in health care facilities
- Underlying diseases such as diabetes or immune suppression
- Use of invasive devices, such as central lines, foley catheters, or ventilators
- Age > 65 or low birth weight neonates

Prevent MDRO Infections – C. difficile Modes of Transmission

- Unwashed hands
- Gloves worn from patient to patient
- Contaminated environmental surfaces
- Inadequately cleaned and disinfected equipment
- Inadequate or inappropriate use of antibiotics

Prevent MDRO Infections – Colonized vs. Infected

- People who carry MRSA or VRE are said to be colonized. Many kinds of bacteria live in (colonize) your body without causing an infection – this is your “normal flora”. Carriers of MRSA usually have MRSA in their nasal passages. Carriers of VRE often have VRE in their bowel.

Prevent MDRO Infections – Colonized vs. Infected

People who are infected with MRSA or VRE have symptoms of infection, such as

- fever
- elevated WBC
- purulent drainage, heat, redness (wound)
- purulent sputum and positive CXR (respiratory)
- dysuria, positive nitrate and leukocyte esterase (urine)

Prevent MDRO Infections: ASC

- Active Surveillance Cultures (ASC)
  - Nasal swab for presence of MRSA
  - Positive result = patient is colonized with MRSA
  - Does not mean patient has active infection – no need for antibiotics
  - Physician MAY choose to decolonize patient with Bactroban (Mupirocin)

Prevent MDRO Infections – Colonized patients

- Computer flags
  - All patients with documented history of MRSA, VRE, ESBL, or CRE will have a computer flag placed on their medical record
  - Patients with MRSA, VRE, and CRE flags will be placed in contact isolation upon subsequent readmissions to hospital

Prevent MDRO Infections: Prevention and Control

- Proper handwashing
- Use antibiotics as described
- Instruct patients and families on importance of following the prescribed medication course and need for isolation
- Isolate colonized and infected patients

Prevent MDRO Infections: Prevention and Control

- Encourage family to continue to visit patient and assist in care as instructed
- When transporting patients to other areas for testing, be sure appropriate measures are taken
- When transferring a patient, notify receiving facility of resistance so appropriate measures can be implemented

Prevent MDRO Infections: PPE

- Gloves – When coming into contact with any body substances including urine and feces
- Gown – When tasks may lead to soiling or contact of clothing with contaminated items
- Mask – According to posted instructions (Droplet or Airborne Isolation)

Prevent MDRO Infections: Prevention and Control

- Use patient specific equipment when patient is in isolation (examples include blood pressure cuffs, thermometers, and tourniquets)
- Clean and disinfect reusable equipment between patients – use bleach wipes for C. diff patients
- Clean environmental surfaces regularly and when soiled with approved disinfectant

Prevent CLABSI Infections

Central Line-Associated Bloodstream Infections have serious consequences

- Mortality rate 12-25%
- Recent CDC estimate of >30,000 CLABSIs in US annually
- Average cost $70,696/patient

Prevent CLABSI Infections

Best practices to prevent CLABSIs:

- Use catheter checklist and standardized protocol for insertion
- Perform hand hygiene prior to catheter insertion or manipulation
- Avoid femoral site unless other sites are unavailable
- Use standardized kit that contains all necessary components for insertion

Prevent CLABSI Infections

- Use standardized protocol for sterile barrier precautions
- Use CHG for skin preparation during insertion in patients >2 months of age
- Use standardized protocol to disinfect catheter hubs and injection ports
- Evaluate all central lines routinely and remove nonessential catheters

Prevent CLABSI Infections

- CLABSIs are monitored on every patient with a central line or PICC in the hospital.
- Insertion checklist must be completed and forwarded to Infection Prevention for monitoring of practice compliance.
- CLABSI rates are calculated monthly and shared with staff, physicians, and senior leadership on a regular basis.

Prevent Surgical Site Infections

- Surgical Site Infections (SSI)
  - Approximately 157,500 SSIs occur each year
  - SSIs are associated with nearly 1 million additional inpatient days
  - Estimated annual cost of $3.3 billion
  - Estimated that half of SSIs are preventable using evidence-based strategies

Prevent Surgical Site Infections

- Best practices to prevent SSIs:
  - Educate surgical patients and their families on SSI prevention
  - Implement policies and procedures aimed at reducing SSIs
  - Conduct risk assessments for SSIs and select SSI measures using best practices. Monitor compliance with these measures and evaluate effectiveness

Prevent Surgical Site Infections

- Measure SSI for the first 30 days following procedures that do not involve implants
- Measure SSIs for the first 90 days following procedures with implants
- Administer antimicrobial agents for prophylaxis according to best practices
- Use clippers or depilatories for hair removal – no razors

Prevent Surgical Site Infections

- Preoperative bathing kits containing CHG are provided to patients undergoing certain procedures, such as total knee and hip, and some abdominal and intrathoracic surgeries.
- Normothermia is maintained for patients during certain surgeries by using an active warming device intraoperatively.

Prevent Surgical Site Infections

- Antimicrobial prophylaxis:
  - Given within one hour before incision (two hours for Vancomycin or fluoroquinolones)
  - Selected by type of procedure, most common pathogen for surgery site, patient's weight, and published recommendations

Prevent Surgical Site Infections

- Redosing recommended if procedure is greater than 4 hours, major blood loss, or if antibiotic has short half-life
- Antibiotic is discontinued within 24 hours after surgery for most procedures unless documented infection is present

Prevent Surgical Site Infections

- Other prevention measures include:
  - Cleaning and disinfecting of equipment and environment
  - Preparation and disinfection of operative site and hands of surgical team
  - Hand hygiene
  - Traffic control in OR

Prevent CAUTI Infections

- Catheter-Associated Urinary Tract Infections are the fourth most common type of healthcare associated infection (HAI) in the U.S.
- 2017 – 160,833 CAUTIs (AHRQ data)
- Average cost of a HA-CAUTI: $13,793
- Research suggests 50-70% of these are preventable
- 15-25% of patients will have a urinary catheter placed during their hospitalization

Prevent CAUTI Infections

- Patients with indwelling foleys are at greater risk for developing UTIs with risk of bacteriuria increasing with each day of use:
  - Per day: ~5%
  - One week: ~25%
  - One month: ~100%

Prevent CAUTI Infections

- Leading risk factors of CAUTI:
  - Prolonged catheterization
  - Female gender
  - Catheter insertion outside the OR
- In addition to cost and risk of infection, foleys also cause patient discomfort and restrict their ability to ambulate

Prevent CAUTI Infections

- Best Practices to prevent CAUTI:
  - Insert foleys only for appropriate indications:
    - Acute urinary retention or obstruction
    - Accurate measurement of urinary output in critically ill (ICU) patients
    - Perioperative use in selected surgeries
    - To assist healing of perineal and sacral wounds in an incontinent patient

Prevent CAUTI Infections

- Appropriate Indications Continued:
  - Hospice/comfort/palliative care
  - Required immobilization for trauma or surgery
  - Chronic indwelling urinary catheter on admission (from home or extended care facility)
- Use aseptic technique when inserting catheters

Prevent CAUTI Infections

- Maintain a sterile, continuously closed drainage system
- Educate patients on CAUTI prevention and UTI symptoms
- Remove catheters promptly when no longer needed

Daily monitoring of patient catheters is key!

Prevention of HAIs

Prevention of Healthcare-Associated Infections is at the heart of patient safety, and is everyone's business.

Implementation of these basic infection control and prevention recommendations will lead to decreased infection rates, reduced costs, and most importantly, save lives.

Mon Health Medical Center

Prevention of Healthcare Associated Infections Post Test
Medical Staff and AHPs

Name_____ **Date**_____

1. **Patients with MRSA in wounds are placed in Contact Isolation.**
   True **False**

2. **The antibiotic class of choice to treat patients with ESBL infections is carbapenems.**
   True **False**

3. **C. diff spores can live in the environment for up to 20 days.**
   True **False**

4. **The mortality rate of patients with a Central Line Associated Bloodstream Infection (CLABSI) is 60%.**
   True **False**

5. **Chlorhexidine gluconate (CHG) is used for skin prep before inserting a central line in patients > 2 months of age.**
   True **False**

6. **It is estimated that 75% of surgical site infections are preventable using evidence-based strategies.**
   True **False**

7. **Antibiotic prophylaxis should be given within one hour before the surgical incision (two hours for Vancomycin or fluoroquinolones).**
   True **False**

8. **Catheter Associated Urinary Tract Infections (CAUTIs) are the fourth most common type of healthcare-acquired infection in the U.S.**
   True **False**

9. **Leading risk factors of CAUTI include prolonged catheterization, female gender, and catheter insertion outside the OR.**
   True **False**

10. **An appropriate indication for foley insertion is accurate measurement of urinary output on the medical or surgical floor.**
    True **False**

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