PREVENTING/CONTROLLING THE TRANSMISSION OF INFECTIOUS AGENTS

CIC REVIEW COURSE
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https://spice.unc.edu/

KEY CONCEPTS

- Understanding the modes of transmission of infectious organisms and the appropriate application of basic principles of infection prevention and control is vital to the success of an infection control program
- Healthcare-associated infections (HAIs) are an important measure of quality and IPs play a critical role by leading initiatives to prevent them
- Evidence-based recommendations provide a framework
- Compliance with currently recommended evidence-base practices can result in a dramatic reduction in infection rates
- Eliminating HAIs requires clear goals, committed leadership, access to resources, effective personnel management and ongoing vigilance

PREVENTION MEASURES

- Hand hygiene
- Standard Precautions
- Transmission-based Precautions
- Aseptic Techniques
- Device Related Infection – CR-BSI, VAE, CA-UTI, SSI

HAND HYGIENE

- Key Terms:
  - Alcohol-based hand rub
  - Antimicrobial soap contains an antiseptic agent, FDA regulates
  - Antiseptic hand wash is washing hands with water and soap containing an antiseptic agent
  - Antiseptic hand rub is applying rub without rinsing
  - Hand washing is washing with plain soap (non-antimicrobial) and water
  - Surgical hand antisepsis is an antiseptic hand rub performed preoperatively by OR personnel

HAND HYGIENE

Purpose

- Remove microbial contamination acquired by recent contact with infected or colonized patients or environmental sources
- Minimize counts of transient skin bacteria

ASPECTS OF HAND HYGIENE

- Product Selection:
  - Alcohol-based (60-95 percent alcohol) hand rub
  - Antimicrobial or non-antimicrobial soap
  - FDA ruled that triclosan is not considered safe and effective for use in healthcare in the U.S.
  - Hand lotions or creams
- Dispenser Location
  - Alcohol-based product conveniently located at the entrance to patient care space
  - Alternatively located inside rooms near door
  - Not installed over or directly adjacent to electrical outlets and switches
  - ***Check with local fire authorities***

Employee Input Required

HAND HYGIENE SOAP AND WATER

- Hands are visibly soiled
- After using the restroom
- Before eating
- When caring for patients with diarrhea
- If exposure to a bacterial spore is suspected (*B. anthracis, C. difficile*)
- In outbreak settings of norovirus and *C . difficile*

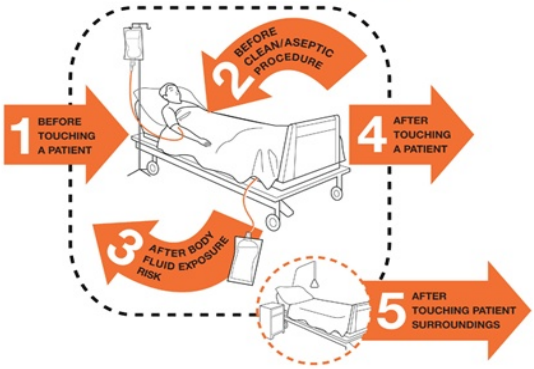
ALCOHOL BASED HAND RUB

- Hands are NOT visibly soiled
  - Before and after direct patient contact
  - Before donning sterile gloves
  - Before inserting invasive devices
  - After contact with a patient's intact skin
  - After removing gloves
  - After contact with equipment
  - When moving from contaminated to clean body site

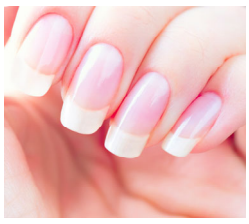
HAND HYGIENE TECHNIQUE

- Soap and water
  - Wet hands first-water does not have to be hot
  - Apply product
  - Rub hands together vigorously, covering all skin surfaces and under rings for at least 15 seconds
  - Rinse thoroughly and then dry with a paper towel
  - Turn faucet off with paper towel
- Alcohol-based hand rub
  - Check manufacturer's recommendations for volume of product
  - Rub all surfaces together until they are dry
  - A good rule is should take 15-20 seconds of rubbing for the hand sanitizer to dry

Your 5 Moments for Hand Hygiene



ADDITIONAL COMPONENTS OF HAND HYGIENE PROGRAM



- ✓ Do not wear artificial fingernails or extenders when having direct contact with patients at high risk
- ✓ Keep natural nails tips less than 1/4-inch long
- ✓ Monitor for adherence to recommended hand hygiene practices
  - ✓ Direct Observation
  - ✓ Monitor volume of hand hygiene product used per 1,000 patient days
  - ✓ Video monitoring or sensing devices
- ✓ Feedback data to healthcare personnel

HAND HYGIENE PROGRAM

ESSENTIAL PRACTICES = QUALITY OF EVIDENCE HIGH

- Promote the preferential use of ABHS in most clinical situations
- Perform HH as indicated by CDC **OR** the WHO Five moments
- HCP who provide direct or indirect care in high-risk areas (e.g, ICU, perioperative) should not wear artificial fingernail extenders
- Engage all HCP in primary prevention of occupational irritant and allergic contact dermatitis
- Provide facility-approved hand moisturizer that is compatible with antiseptics and gloves
- For routine hand hygiene, choose liquid, gel or foam ABHS with at least 60% alcohol

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HAND HYGIENE PROGRAM

ESSENTIAL PRACTICES = QUALITY OF EVIDENCE HIGH

- Involve HCP in selection of products
- Educate HCP about an appropriate volume of ABHS and the time required to obtain effectiveness
- Ensure that ABHS dispensers are unambiguous, visible, and accessible within the workflow of HCP
- In private rooms, consider 2 ABHS dispensers the minimum threshold for adequate number of dispensers: 1 dispenser in the hallway, and 1 in the patient room

https://doi.org/10.1017/ice.2022.304

HAND HYGIENE PROGRAM

ESSENTIAL PRACTICES = QUALITY OF EVIDENCE HIGH

- Educate HCP about the potential for self-contamination and environmental contamination when gloves are worn
- *Clean hands immediately following glove removal. If handwashing is indicated (C. difficile, norovirus) and sinks are not immediately available, use ABHS and then wash hands as soon as possible.*
- Educate and confirm the ability of HCP to doff gloves in a manner that avoids contamination.
- Take steps to reduce environmental contamination associated with sinks and sink drains
- ***Do not keep medications or patient care supplies on countertops or mobile surfaces that are within 1 m (3 feet) of sinks***
- Monitor adherence to hand hygiene

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APPROACHES THAT SHOULD NOT BE CONSIDERED ROUTINE PART OF HH

- Do not supply individual pocket-sized ABHS dispensers in lieu of accessible wall-mounted dispensers
- Do not refill or "top-off" soap dispensers, moisturizer dispensers or ABHS dispensers
- Do not use antimicrobial soaps formulated with triclosan
- Do not routinely double-glove
- Do not remove access to ABHS when responding to organisms such as *C. difficile* or norovirus
- Do not disinfect gloves during care

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PRACTICE QUESTION:

***Most healthcare-associated pathogens are transmitted from patient to patient via*:**

A. Improper isolation practices
B. Inadequate sterilization of medical instruments
C. Hands of healthcare personnel
D. Ineffective disinfection of medical devices

STANDARD PRECAUTIONS

- 1996, Healthcare Infection Control Practices Advisory Committee (HICPAC):
  - Incorporated Universal Precautions and Body Substance Isolation into Standard Precautions
- 2007, Guidelines revised:
  - ***To include respiratory hygiene, safe injection practices and special lumbar procedures***

Implementation of Standard Precautions constitutes the primary strategy for the prevention of healthcare-associated transmission of infectious agents among patients and healthcare personnel

ESSENTIAL COMPONENTS (SP)

- Hand Hygiene
- Respiratory Hygiene/Cough Etiquette
- PPE
- Infection Control for Special Lumbar Procedures
- Safe Work Practices
- Environmental Cleaning
- Safe Injection Practices
- Patient Placement

USE OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Perform and maintain an inventory of PPE – monitor daily PPE use
- Make necessary PPE available where patient care is provided
- Position trash can near the exit inside the room for disposal
- Implement strategies to optimize current PPE supply – even before shortages occur

USE OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

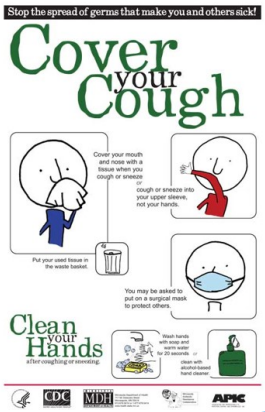
- Three overriding principals related to personal protective equipment (PPE)
  - Wear PPE when the nature of the anticipated patient interaction indicates that contact with blood or body fluids may occur
  - Prevent contamination of clothing and skin during the process of removing PPE
  - ***Before leaving the patient's room, remove and discard PPE –respirators removed after leaving***

SAFE WORK PRACTICES (PPE USE)

- ✓ Keep hands away from face
- ✓ Work from clean to dirty
- ✓ Limit surfaces touched
- ✓ Change when torn or heavily contaminated
- ✓ Perform hand hygiene

RESPIRATORY HYGIENE COUGH ETIQUETTE

- Five main elements
  - Education of HCP, patients, and visitors on the signs and symptoms of respiratory illness
  - Posted signs at facility entries with instructions for prevention of transmission of respiratory illness (language of local population)
  - Readily accessible source control materials (tissue, masks)
  - Readily accessible hand hygiene product
  - Encourage patients or visitors with respiratory symptoms to physically distance from other



PRACTICE QUESTION

Respiratory hygiene includes all but the following:

A. Covering the mouth and nose with the hands when coughing and sneezing

B. Offering a surgical mask to a coughing patient

C. Discarding used masks and tissues appropriately and performing hand hygiene

D. Posting signs in public areas in languages appropriate to the population served, educating healthcare staff, patients and visitors and leaving in place all year

CAUSES OF UN-SAFE INJECTION PRACTICES

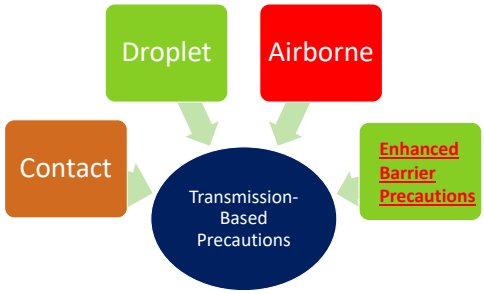
1. Syringe re-use, directly or indirectly
2. Inappropriate use of single dose or single use vials
3. Failure to use aseptic technique (contamination of injection equipment from the non-sterile environment)
4. Unsafe diabetes care/ assisted blood glucose monitoring (ABGM)
5. Drug diversion

PRACTICE QUESTION

Numerous outbreaks of infections have been attributed to unsafe injection practices. The IP designs an educational program to review safe injection practices with all the nursing staff. These practices do not include:

A. Use single-dose vials whenever possible and avoid multi-dose vials
B. Discard saline bags used for IV flushes for multiple patients after 1 hour
C. Enter medication vials with a new needle and syringe, even on the same patient
D. Use needles and syringes for only one patient

TRANSMISSION BASED PRECAUTIONS



Transmission-Based Precautions are for patients who are known or suspected to be infected or colonized with infectious agents, including certain epidemiologically important pathogens, and are used when the route(s) of transmission are not completely interrupted using Standard Precautions alone.

TRANSMISSION-BASED PRECAUTIONS

- Contact:
  - Used for diseases transmitted by contact with the patient or the patient's environment
  - Examples: MRSA, VRE, C difficile

- Droplet:
  - Used to prevent transmission of diseases caused by large respiratory droplets, generated by coughing, sneezing or talking
  - Examples: Influenza, pertussis, *Neisseria meningitidis*

- Airborne:
  - Used to prevent transmission of infectious organisms that remain suspended in the air and travel great distances due to their small size
  - Example: TB, measles, chickenpox

PRACTICE QUESTION

Which of the following does not meet the requirements for an airborne isolation room?

A. Negative airflow isolation room (negative air pressure to the corridor)
B. At least 15-20 air exchanges per hour
C. Direct exhaust to the outside
D. Daily monitoring of the air pressure with visual indicators

PRACTICE QUESTION

A patient with bacterial meningitis due to Neisseria meningitidis requires what type of TBP?

A. Contact precautions
B. Airborne precautions
C. Standard precautions
D. Droplet precautions

PROTECTIVE ENVIRONMENT

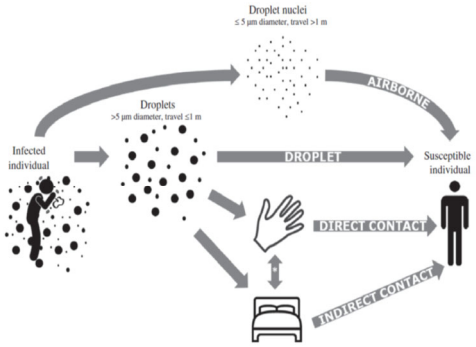
- Recommended for allogenic hematopoietic stem cell transplant (HSCT) recipients to reduce risk of invasive environmental fungal infections
  - Environmental Controls
    - HEPA filtration
    - Positive Pressure (monitor daily with visual indicators)
    - 12 ACH
  - Environmental Measures
    - Baths over showers
    - No dried and fresh flowers or potted plants
    - Clean in a manner to minimize dust (wet dust, no cloth furnishings, avoid carpet)

PROTECTIVE ENVIRONMENT

- Nutrition
  - No recommendation is made for restricted diets
- Patient transport
  - Construction place a N95 respirator on the patient (can medically tolerate and leaving PE)
  - Can not tolerate use barrier mask
- TBP in the protected environment
  - Contact/droplet as recommended
  - Airborne if anteroom present (HEPA unit in anteroom
  - No anteroom use a portable unit in the room

TRANSMISSION-BASED PRECAUTIONS

- Combinations of precautions may be necessary based on the pathogen:
  - **Droplet plus Contact**
  - **Airborne plus Contact**



* Transmission routes involving a combination of hand & surface = indirect contact.

1Proceianoy RS, et al. J Pediatr (Rio J) 2002;11 April; 2 Almendros A, et al. Vet Rec 2020;4; 3Chin AWH, et al David Weber: Associate Chief Medical Officer, UNC Hospitals; Medical Director, Hospital Epidemiology: COVID-19 (SARS Co-V-2) Update

Multi-drug Resistant Organisms (MDROs)

MANAGEMENT OF MULTIDRUG-RESISTANT ORGANISMS IN HEALTHCARE SETTINGS, 2006

- Major point – all types of settings
  - Administrative support, adherence monitoring
  - MDRO education
  - Judicious Antimicrobial Use
  - Surveillance
  - Standard and Transmission based precautions
  - Environmental cleaning
  - Decolonization

RISK FACTORS FOR DEVELOPING A MDRO

- Duration of hospitalization
- High rates of transfer in and between hospitals
- Local institution risk factors
- Long term care facilities
- Intensive care units
- High rate of device utilization
- Colonization
- Prior antibiotic use

"Age, comorbid illnesses, invasive medical devices, frequent antibiotic exposure, and dependence on healthcare workers, in the setting of communal living, all serve to increase the risk of nursing home residents becoming colonized or infected with healthcare-acquired bacterial pathogens. " (Dumyati, et. Al., 2017)

PRACTICE QUESTION:

Which of the following precautions should be used for a patient who is immunocompromised and suspected of having cryptococcal meningitis?

A. Airborne Precautions for 24 hours after antibiotic is started if the patient is improving
B. Mask worn when within 3 feet from the bed
C. Standard Precautions for family and staff
D. Contact Precautions for staff, family restricted from visiting other patients.

PRACTICE QUESTION

An IP has been asked to provide infection prevention consultation to a long-term care facility. As a part of this consultation, she checks to make sure which of the following program components are in place?

A. Decolonizing residents with MRSA
B. Establishing an antimicrobial stewardship program
C. Implementing an annual influenza vaccination program
D. Collecting environmental cultures of high-touch areas

A. A, B
B. B, C
C. C, D
D. A, D

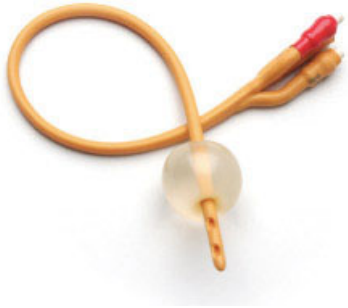
ASEPSIS

PROCESS FOR KEEPING AWAY DISEASE-PRODUCING MICROORGANISMS

- Medical:
  - Also know as "clean technique";
  - Reduce number of microorganisms
  - Reduce/prevent transmission

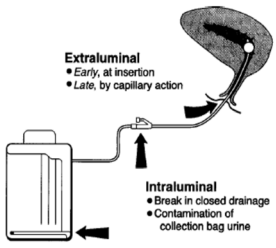
- Surgical:
  - Also know as "sterile technique"
  - Maintain the microbe count at an irreducible minimum

URINARY TRACT INFECTION



PATHOGENESIS OF CA-UTI

- Source of microorganisms
  - Endogenous: meatal, rectal, vaginal colonization
  - Exogenous: via contaminated hands of HCP during catheter insertion or manipulation of the collecting system



KEY CONCEPTS

- The urinary tract is normally sterile.
- Urinary tract infections cover a range of syndromes from asymptomatic cystitis to pyelonephritis and sepsis.
- Most instances of bacteriuria are asymptomatic and do not warrant treatment.
- Urinary tract infections are the most commonly occurring healthcare-associated infections.
- The indwelling urinary catheter is one of the most used medical devices in the United States.

KEY CONCEPTS

- Risk factors for development of a urinary tract infection follow this mnemonic:
  - Sex: female gender and sexual activity
  - Age: very young males and advanced age
  - Diabetic: especially type 2 females
  - Debilitated: all ages and all genders
- The Centers for Medicare & Medicaid Services identified hospital-associated catheter-associated urinary tract infections as one of first conditions for which hospitals will not receive additional reimbursement.

SOURCES OF CATHETER CONTAMINATION

- Insertion technique
- Catheter-meatal junction
- Catheter tubing junction
- Urine sampling port
- Reflux of contaminated urine
- Bag emptying port
- Urine collection container

MEASURES TO PREVENT UTI

- Avoid catheterization
- Consider less invasive alternatives
- Reduce duration
- Use closed drainage system
- Develop criteria for catheterization and removal protocols

INDWELLING CATHETER USE

- ***Appropriate reasons*** for the use of an indwelling urinary catheter include:
  - Acute anatomic or functional urinary retention or bladder outlet obstruction
  - Need for accurate measurements of urinary output in critically ill patients
  - Perioperative use for selected surgical procedure
  - To assist in healing open sacral or perineal wounds in incontinent patients
  - Improve comfort for end-of life care if needed or patient preference
- ***Inappropriate reasons*** for use of an indwelling catheter include:
  - Convenience of nursing care
  - Obtaining urine for culture or other diagnostic studies when the patient can cooperate and voluntarily void
  - For prolonged postoperative duration without appropriate indications

BLADDER BUNDLE

- Aseptic insertion and proper maintenance is paramount.
- Bladder ultrasound may avoid indwelling catheterization.
- Use a condom or intermittent catheterization in appropriate patients.
- Do not use the indwelling catheter unless you must!
- Early removal of the catheter using reminders or stop orders appears warranted.

"When in doubt, pull it out"

PRACTICE QUESTION

All the following methods of collecting a urine sample are correct except?

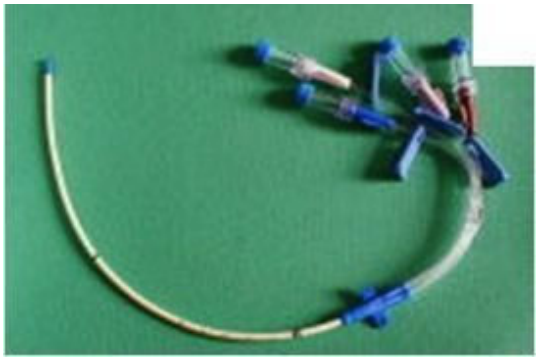
A. Disinfection of foley catheter collection port with 70% alcohol
B. Obtain 5-10 ml. of urine with syringe from the collection port after it has been prepped with 70% alcohol
C. Collect from foley catheter bag
D. Urine from a straight catheter, discard first 15 ml; collect the remainder

PRACTICE QUESTION

***Several measures to reduce urinary tract infections have been implemented at a long-term care facility. The most important action that will reduce infections is*:**

A. An appropriately trained person performing twice daily meatal care with a povidine-iodine solution
B. Maintaining a sterile, closed drainage system
C. Changing all indwelling catheters every 7 days and obtaining a urine culture on removal
D. Administering continuous antibiotic bladder irrigation on all patients who must maintain a catheter

INTRAVASCULAR DEVICE INFECTION



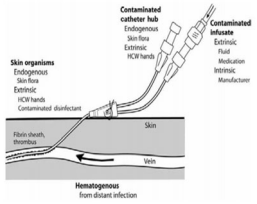
INTRAVASCULAR DEVICE INFECTIONS

Mechanisms:

- Colonization of the intravenous device or *catheter-associated infection*
  - Endemic
- Contamination of the fluid administered through the device or *infusate-associated infection*
  - Epidemic

SOURCES OF VASCULAR ACCESS-DEVICE-ASSOCIATED BLOODSTREAM INFECTION

- Intraluminal and extraluminal colonization of the vascular access device, or vascular access device-associated infection;
- Contamination of the fluid administered through the device, or infusate-associated infection;
- Hematogenous spread from remote sources of infection; and
- Other risk factors that are modifiable.



Characteristics	*Higher risk*	*Lower risk*
Insertion circumstances	Emergency	Elective
Skill of inserter	General	Specialized
Insertion site	Femoral vein	Subclavian vein
Skin antisepsis	70 % alcohol, 10% povidone iodine	2% CHG
Catheter lumens	Multi-lumen	Single
Duration of use	Longer duration	Shorter duration
Barrier precautions	Submaximal	Maximal

PREVENTION OF CR-BSI

- Hand hygiene (IB)
  - Waterless, alcohol-based product or antimicrobial soap
- Maximum barrier for CVC (IB)
  - Cap, mask, sterile gown, sterile gloves, and
  - Full body sterile drape
- Site of insertion (IA)
  - Subclavian vs. IJ, vs. femoral
- Skin antisepsis (in order of most effective): chlorohexidine with alcohol, tincture of iodine, providone-iodine, alcohol (IA)

PREVENTION OF CR-BSI

- Catheter dressing and site care –
  - Sterile gauze or sterile transparent (IA)
- Patient Cleansing –
  - 2% chlorhexidine wash daily (II)
- Care of hubs and ports –
  - Scrub with appropriate antiseptic (chlorhexidine, povidone iodine, iodophor or 70% alcohol) before accessing system (IA)
- Education
  - Indications for use, procedures for insertion and maintenance and prevention (1A)
- Remove when no longer essential

Device Type	Proposed Duration of Infusion			
	≤ 5 days	6-14 days	15-30 days	≥31 days
Peripheral IV catheter	No preference between peripheral IV and US-guided peripheral IV catheters for use ≤ 5 days			
US-guided peripheral IV catheter	US-guided peripheral IV catheters preferred to peripheral IV catheters if proposed duration is 6-14 days			
Midline catheter	Midline catheters preferred to PICC if proposed duration is ≤14 days			
Nontunneled/acute intravenous device*	Central venous catheter preferred to PICC for use ≤14 days in critically ill patients.			
PICC	Disagreement on appropriateness of PICC for durations ≤5 days.	PICC use appropriate if proposed duration is ≥6 days; PICC preferred to tunneled catheters for durations of 15-30 days.		
Tunneled intravenous device			Tunneled catheter neutral for difficult IV access for use ≥ 15 days.	No preference between tunneled catheter or implanted port for use ≥ 31 days.
Implanted Port				

Appropriate | Neutral | Inappropriate | Disagreement

PRACTICE QUESTION

The CDC recommendations for decreasing CLABSI include all the following except:

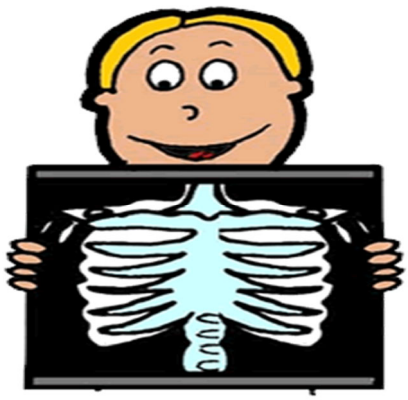
A. Educational programs
B. Routine replacement of catheters
C. The use of chlorhexidine for skin antisepsis
D. The use of maximal sterile barrier precautions

PRACTICE QUESTION

According to the CDC central venous catheters should be replaced:

A. Every 72 to 96 hours
B. Every 7 days
C. After 1 month
D. If malfunctioning

PNEUMONIA



RISK FACTORS FOR PNEUMONIA

- Terms: CAP, HCAP, HAP, VAE-PVAP
- Patient-related
- Device-related
- People & procedure-related

PATIENT-RELATED RISK FACTORS FOR PNEUMONIA

- Extremes of age
- Chronic lung disease
- Immunosuppression
- Depressed consciousness

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PATIENT-RELATED RISK FACTORS FOR PNEUMONIA

- Surgery (thoracic/abdominal)
- Obesity, malnutrition, smoking
- Diabetes, cardiopulmonary disease
- Severe underlying disease
- Current hospitalization of 5 days or more

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DEVICE-RELATED RISK FACTORS FOR PNEUMONIA

- Endotrachael intubation
- Mechanical ventilator
- Nasogastric tube
- Enteral feeding

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PEOPLE/PROCEDURE-RELATED RISK FACTORS FOR PNEUMONIA

- Cross contamination by hands
- Contamination equipment, supplies or environment

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PATHOGENESIS OF HEALTHCARE ACQUIRED PNEUMONIA

- Aspiration of oral pharyngeal or gastric organisms*
- Inhalation of contaminated aerosols
- Large droplet deposition
- Hematogenous spread from remote side of infection

*Most important for HC-related and community

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PREVENTION OF HAP, HCAP, VAP, VAE

- Immunization
- Hand Hygiene
- Avoid intubation
- Subglottic secretion drainage
- Reduction in the use of nasogastric tubes
- Enteral feeding 24-48 hours after intubation
- Compliance with ventilator bundles

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PREVENTION: INTERRUPT PERSON TO PERSON SPREAD

- Hand Hygiene before and after contact with mucous membranes and respiratory secretions
- Hand hygiene before and after contact with a patient with endotracheal tube or trach
- Gloves for contact with mucous membranes/secretions
- Change gloves between patients

RESPIRATORY THERAPY EQUIPMENT

- Change humidifiers and heat/moisture exchangers (HME) when visibly soiled or mechanically malfunctioning
- Prevent drainage of condensate into trachea
- Use sterile water for bubbling humidifiers
- Small volume nebulizers, clean, disinfect rinse with sterile water between treatments same patient
- Use sterile solutions in nebulizers
- Store nebulizers dry between use
- Nebulizers should not be reused between patients without HLD or sterilization

VENTILATOR BUNDLES

- Education
- Surveillance
- Equipment cleaning/maintenance
- Semi-recumbent position
- Antiseptic oral care
- Sedation "vacation"
- Promote use of noninvasive ventilation
- Leadership accountability

PRACTICE QUESTION

Which of the following is not part of the bundle practices to reduce VAP?

A. Keeping the head of the bed raised to 30-45 degrees elevation unless medically contraindicated
B. Performing routine oral care on a ventilated patient
C. Taking sedation "vacations" to assess patients' ability to breathe on their own
D. Changing ventilator circuits every 48 hours

SURGICAL SITE INFECTION

KEY CONCEPTS

- Essentially every surgical site is contaminated with bacteria by the end of the procedure, but only a minority of sites gets infected.
- The probability of infection is determined by the interaction of four clinical variables:
  - (1) inoculum of bacteria,
  - (2) virulence of bacteria,
  - (3) adjuvants in the microenvironment, and
  - (4) efficiency of host defenses.

HOST RISK FACTORS OF SSIs

- Age
- Obesity
- Smoking
- Chronic disease & immune status
- Nasal carriage of *S. aureus*
- Duration of pre-op stay
- Nutritional status
- Mental status
- Presence of infection at another site
- Medications

PROCEDURE RISK OF SSIs

- Operative technique
- Hair removal technique
- Timing of antibiotic prophylaxis
- Duration of procedure
- Warmth of patient during procedure
- Blood glucose levels
- Use of flash sterilized instruments, esp. implants
- OR room traffic

HICPAC GUIDELINE RECOMMENDED RANKINGS-2017

- Category IA – A strong recommendation supported by high to moderate-quality evidence
- Category IB – A strong recommendation supported by low quality evidence
- Category IC- A strong recommendation required by state or federal regulation
- Category II – A weak recommendation supported by any quality evidence
- No recommendation/unresolved issue

PARENTERAL ANTIBIOTIC PROPHYLAXIS

- Use only when indicated & selected based on common pathogens causing SSI in specific operation (IB)
- Time administration of drug for adequate serum/tissue levels & maintain levels throughout procedure (IB)
- C. section – before skin incision (IA)
- In clean and clean-contaminated procedures do not administer additional doses after the surgical incision is closed (IA)

NON-PARENTERAL ANTIMICROBIAL PROPHYLAXIS

- Do not apply antimicrobial agents to surgical incision (IB)
- Application of autologous platelet-rich plasma not necessary (II)
- Consider use of triclosan-coated sutures (II)
- Antimicrobial dressings (No recommendation)

- Glycemic Control-blood glucose target levels less than 200mg/dl (IA)
- Normothermia-maintain perioperative normothermia (IA)
- Oxygenation-increased FIO2 during surgery and after extubation in immediate PO period (IA)
- Antiseptic Prophylaxis-
  - Shower or bathe with soap or an antiseptic agent night before surgery (IB)
  - Intraoperative skin preparation with an alcohol-based antiseptic (IA)
  - Microbial sealant after skin preparation not necessary (II)
  - Plastic adhesive drapes (with or without antimicrobial properties) not necessary (II)

PREPARATION OF PATIENT

- Identify and treat all infections
- Do not remove hair
- Use clippers
- Encourage tobacco cessation (30 days)
- Ensure skin is clean prior to antiseptic prep

SURGICAL HAND SCRUB

- Perform a preoperative surgical hand/forearm antisepsis according to manufacturer's recommendations for product
- After performing the scrub keep hands away from body, elbows flexed, dry with sterile towel
- Keep nails short; no artificial nails
- No hand or arm jewelry
- Clean underneath fingernails

INTRA-OPERATIVE CONTROL MEASURES

- Surgical technique
- Barriers
- Limit people entering room
- Keep doors closed
- Equipment in room before surgery
- >15 air exchanges per hour – Positive pressure
- Relative humidity 50%-60%

PRACTICE QUESTION

In reviewing the literature on risk for acquiring post-operative pneumonia, the ICP finds that the risk is greatest for patients undergoing what type of surgery?

A. Total hip replacement
B. Bowel resection
C. Coronary artery bypass
D. Esophagogastrectomy