

Basics of Controlling Device-Related Infections

Loretta Litz Fauerbach, University of Florida

A Webber Training Teleclass

Basics of Controlling Device-Related Infections

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Basics of Controlling Device-Related Infections

Objectives

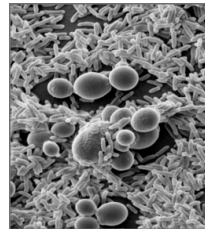
- To identify key elements of prevention strategies for device related infections
- To identify the benefits of using the bundle approach in prevention initiatives
- To list key stake holders in the development of a prevention program and feedback of data
- To identify advances in technology that have contributed to preventing device related infections
- To identify the key strategies for preventing central line associated infections, foley catheter related infections, and ventilator associated pneumonia

Device Associated Infections

- Catheter Associated Bloodstream Infection – CLA-BSI
- Ventilator Associated Pneumonia – VAP
- Catheter Associated Urinary Tract Infection – CA-UTI
- Other Devices



A Look at Bacteria



Mixed Biofilm of the Yeast-like Fungus *Candida Albicans* and the Gram Negative Bacterium *Serratia Marcescens*

Thank you Bard

Important Guidelines

- CDC/HICPAC Guidelines
- IHI 5 Million Lives from Harm
- SHEA/IDSA Compendium

12 Steps to Device Associated Prevention Success

1. Devices must only be used when medically necessary according to established criteria.
2. Devices must be removed when it is no longer clinically needed.
3. Implement Bundled Care approach including daily evaluation of whether a patient still needs the device should be part of rounding and discussed by the clinical team providing care.
4. Checklists specific for procedures should be developed and used to assure compliance at least daily but probably once a shift may be more effective.
5. Monitoring practice and procedure and documenting it on the chart. Review of monitoring forms and procedural documentation with evaluation and assessment of compliance with feedback to all involved in care.
6. Healthcare provider education about their role in prevention with return demonstration to document competency.
7. Patient and Family education about the proper management of the device.
8. Observation and monitoring during insertion and other critical activities.
9. Commitment of healthcare providers to do their part in reducing device related infections, including administration, physicians, nurses, technologists, materials management, etc.
10. Supplies & kits to facilitate compliance so the tools are available to do the right things right.
11. Outcome (device specific surveillance for associated infection) and process surveillance for devices that is reported to frontline staff, managers, medical staff and administrators.
12. Hand hygiene and proper sterile and/or aseptic technique.

Created by Loretta Litz Fauerbach, 2009

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STRATEGIES TO PREVENT CLA-BSI

Existing guidelines and recommendations CLABSI

- The Healthcare Infection Control Practices Advisory Committee
- The Institute for Healthcare Improvement
- Making Health Care Safer, Agency for Healthcare Research and Quality
- National Patient Safety Goal 07.04 -

Outcomes associated with Hospital-Acquired CLA-BSI

- 90% of all CR-BSIs are associated with CVLs.
- 400,000 CR-BSIs occur per year in U.S.
- CR-BSI's hurt our patients since they are:
 - 1) Associated with increased morbidity.
 - 2) Associated with mortality rates of 10% to 20%.
 - 3) Increased length of hospital stay (mean of 7 days)
 - 4) Increased cost; the non-inflation-adjusted attributable cost of CLA-BSIs has been found to vary from \$3,700 to \$29,000 per episode

SHEA/IDSA Compendium, ICHC 2008

Independent risk factors for CLABSI

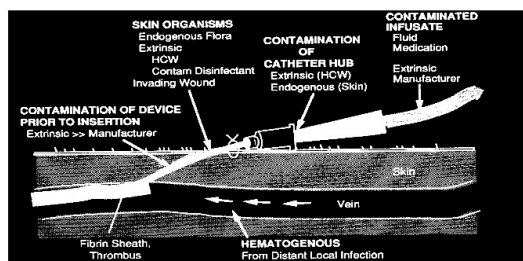
- a. Factors associated with Increased Risk
- ✓ Prolonged hospitalization before catheterization
 - ✓ Prolonged duration of catheterization
 - ✓ Heavy microbial colonization at the insertion site
 - ✓ Heavy microbial colonization of the catheter hub
 - ✓ Internal jugular catheterization
 - ✓ Neutropenia
 - ✓ Prematurity (i.e., birth at an early gestational age)
 - ✓ Total parenteral nutrition or lipids
 - ✓ Substandard care of the catheter (eg, excessive manipulation of the catheter or reduced nurse-to-patient ratio)
 - ✓ Femoral Lines
- b. Factors associated with reduced risk
- ✓ Female sex

SHEA/IDSA Compendium, ICHC 2008

Risk Factors for CR-BSI's

- Infection elsewhere (remote, for example, UTI or wound) – secondary source.
- Colonization of catheter with organisms.
- IV catheterization longer than 72 hours.
- Inexperience of personnel inserting the CVL.
- Use of stopcocks.
- Multi-lumen catheters

Process of Catheter Related Infections



HCW= Healthcare worker

5 Evidence Based Steps To Preventing CR-BSI

1. Clean hands
2. Select best insertion site.
3. Use CHG + alcohol combo proper skin preparation
 - [0.5% CHG or greater- note change from original 2% or greater] (chlorhexidine rather than betadine).
4. Use maximal barrier precautions.
5. Remove catheter as soon as possible.

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Additional Recommendations Observation and Checklist

- ✓ Use a catheter checklist to ensure adherence to infection prevention practices at the time of CVC insertion (B-II).
- ✓ Ensure and document compliance
 - Trained Observer
 - Empowered to stop procedure if breaches in aseptic technique are observed.

SHEA/IDSA Compendium, ICHE 2008

IHI Bundle - CVL

- Hand Hygiene
- Maximal Barrier Precautions Upon Insertion
- Chlorhexidine Skin Antisepsis
- Optimal Catheter Site Selection, with Subclavian Vein as the Preferred Site for Non-Tunneled Catheters
- Daily Review of Line Necessity with Prompt Removal of Unnecessary Lines

Routine Hand Hygiene: When and Where?

Clean hands with either soap & water or use a waterless hand sanitizer.

- Before and after invasive procedures.
- Between patients.
- After removing gloves.
- Before eating.
- After using the bathroom.
- If contamination is suspected.

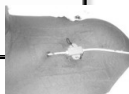
Infection Prevention

Waterless Hand Hygiene Steps:

- Coat all surfaces of your hands thoroughly with waterless alcohol based hand sanitizer including your palms, in between fingers and under fingernails, backs of hands and around wrists.
- Rub your hands briskly until they feel comfortably dry.
- It takes about 15 seconds, and no water or towels are needed.



CVL Site Selection



- Use the **SUBCLAVIAN** site unless medically contraindicated (e.g. patient has an anatomic deformity, coagulopathy, or has **renal disease that may require dialysis**).
 - For patients on hemodialysis, National Kidney Foundation 2000 guidelines recommended against the use of the subclavian vein for CVL unless use of the IJ is absolutely contraindicated
 - If the IJ vein is chosen, use the right side to reduce the risk of non-infectious complications.
- PICCs are placed in the arm/antecubital fossa
 - Site of choice for neonatal population

PICC Lines

- Use of PICCs if not an evidence-based strategy to reduce the risk of CLABSI.
 - The risk of infection with peripherally inserted CVCs in ICU patients approaches that with CVCs placed in the subclavian or internal jugular veins.

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Supply Access

- Use an all-inclusive catheter cart or kit
 - Barrier PPE
 - Skin Prep
 - Dressing
 - Other products

Aseptic Technique: Goals

- Remove transient organisms and soil from the skin.
- Reduce number of resident microbial flora and inhibit their rebound growth.
- Create a sterile working surface that acts as a barrier between the insertion site and any possible source of contamination.

CVL Site Skin Prep using an approved 2% or greater CHG in 70% alcohol*

•Prepare skin with hospital provided chlorhexidine gluconate (CHG) + alcohol skin prep

•Can be use in all patient greater than 2 months of age
a vigorous back and forth friction scrub for at least 30-60 seconds.

- Do not wipe or blot.
- Allow antiseptic solution time to dry **completely** before puncturing the site.

For optimal results,
 Scrub in a vigorous
 back-and-forth motion*



*Per FDA approval & manufacturer's recommendations

Maximal Barrier Precautions (MBP) Decrease CR-BSI Infections

Author/ date	Design	Catheter type	OR for infection without MBP
Mermel 1990	Prospective Cross- sectional	Swan Ganz	2.2 (p<0.03)
Raad 1994	Prospective Randomized	Central	6.3 (p<0.03)

OR=odds ratio MBP= inserter washes hands and wears mask, sterile gown, sterile gloves and patient's head & body are covered with a large, sterile drape.

Maximal Barrier Required For CVL Insertion

- Use face mask, cap and sterile gloves.
- Wear a sterile gown with neck snaps and wrap-around ties properly secured.
- Instruct anyone assisting you to wear the same barriers.
 - Anyone within 12 inches of sterile field must also wear same barriers
- Drape the patient with a LARGE (full body) sterile drape that covers the entire patient.
- Use Maximal Barrier for exchanging over a guide wire, too

Caveats: Catheter Insertion

- IV antimicrobial prophylaxis does not reduce CR-BSI.¹
- Insertion of CVLs through open techniques/cutdown increases the risk of CR-BSI.
- Ensure adequate room to perform the procedure without risk of contamination.

¹ Ranson. J Hosp Infect. 1990;15(1):95-102

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Post Insertion: CVL Care

- Secure CVL to prevent movement
 - Use sutures and/or a securement device to secure CVL
- Apply CHG patch to site at catheter skin junction and then apply a sterile dressing to the insertion site before the sterile barriers are removed.
- Transparent dressings are preferred to allow visualization of the site.
- Neonatal PICCs are secured per manufacturer's recommendations.

CHG Patch reduces risk of CR-BSI by 16% at SUF

- CHG Patch should be used over all CVL including PICC sites, except for
 - Neonates less than 7 days or premature infants less than 36 weeks gestational age, or
 - When patient has known sensitivity to chlorhexidine gluconate.
- Note: apply with the blue side up.

Post Insertion: CVL Care cont.

- If the insertion site is oozing, a sterile gauze dressing may be applied instead of a transparent dressing.
 - Neonatal PICCs must have a transparent dressing.
- Replace CVL dressings when the dressing becomes damp, loosened, soiled or after lifting the dressing to inspect the site.
- Do not use an antimicrobial ointment since it does not reduce the incidence of CR-BSI.

Maintenance Dressing regimens

- Use either sterile gauze or sterile, transparent, semi-permeable dressings to cover catheter site
- Change transparent dressings at least weekly.
 - Change gauze dressings with Biopatch® at least weekly
 - Gauze dressing without Biopatch® at least every 3 days.
 - Change dressings that are damp, loosened or visibly soiled ASAP
- Tunneled catheter sites are commonly dressed but sites that are well healed might not require dressings
- Gauze dressings are preferred if the patient is diaphoretic or the site is bleeding/oozing

Site and Dressing Inspection

- Inspect catheter dressing and site to assure that it is clean, dry and intact .
 - Also assess for any catheter-related complications
 - Document change and site conditions with date and time
 - Dressing removal and change is indicated for drainage, site tenderness, movement of line under dressing or clinical signs requiring direct visualization of the site

IV tubing and Needleless Systems

- Change IV tubing every 96 hours
 - Change caps whenever removed or a minimum of every week
 - Change TPN tubing every 96 hours
 - Change cycled TPN tubing every 24 hours with new tubing for each cycle
 - Change transducers every 96 hours
- Ensure that all components are compatible and do not leak
- Wipe access ports with appropriate antiseptic (alcohol) and access port only with sterile devices

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Replacement of Administration Sets

- Replace tubing used to administer blood or blood products
 - Change tubing after completion of single blood unit
 - If multiple consecutive units of blood are given, change at least every 4 hours or after every 2 units due to the potential for clogging filters
 - For other blood products such as IVIG change tubing at the completion of the infusion and at least every 24 hours
 - Blood products should not be administered through Neonatal PICCS
- Lipids and other lipid based medications change every 24 hours
 - Replace tubing for propofol every 24 hours or at the completion of single unit.

IV Injection Ports

- Clean injection port with 70% alcohol before accessing – Scrub the HUB
 - Note it is important to wipe all access sites vigorously with alcohol wipes to remove and kill bacteria to prevent contamination.
- Cap all stopcocks when not in use
- Do not use in-line filters routinely for infection control purposes

Educate Patient

- Teach patient, as appropriate, management and care of lines
- Encourage patients to report any changes in their catheter site or any new discomfort to their care team
 - Interview patients regarding pain at the site after stabilization
 - If pain increases, the patient should be evaluated for line/site infection

Use antiseptic- or antimicrobial-impregnated CVCs for Adult patients

- Rate higher than Goal despite compliance with basic CLABSI prevention practices.
 - Patients have limited venous access and a history of recurrent CLABSI.
 - Patients are at heightened risk for severe sequelae from a CLABSI (eg, patients with recently implanted intravascular devices, such as a prosthetic heart valve or aortic graft).
- Not currently approved by FDA for children, but studies show promise.

STRATEGIES TO DETECT CLABSI

Surveillance protocol and definitions

- Use consistent surveillance methods and definitions to allow comparison with benchmark data
 - Refer to the *NHSN Manual: Patient Safety Component Protocol 16* for information on the appropriate surveillance methodology, including information about blood specimen collection, and for surveillance definitions of CLABSI.

The relevant sections of the manual are:

- “Identifying Healthcare associated Infections (HAI) in NHSN,”
- “Device-Associated Module: Methodology,” and
- “Device-Associated Module: Central Line-Associated Bloodstream Infection (CLABSI) Event.”

Perform surveillance for CLABSI

- Measure unit-specific incidence of CLABSI (CLABSIs per 1,000 catheter-days)
 - report the data on a regular basis to the units, physician and nursing leadership, and hospital administrators overseeing the units.
- Compare CLABSI incidence with historical data for individual units and with national rates (ie, data from the National Healthcare Safety Network).
- Resources to do surveillance in ICUs and non-ICU patients

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Infrastructure Requirements

- Adequately staffed infection prevention and control program
- Information technology to collect and calculate
 - catheter-days as a denominator for computing rates of CLA-BSI
 - patient-days to allow calculation of CVC utilization
 - catheter-days from information systems should be validated against a manual method
- Resources to provide education and training
- Adequate laboratory support

Practical implementation

- Educate physicians, nurses, and other healthcare personnel about guidelines to prevent CLABSI
- Develop and implement a catheter insertion checklist.
 - Educate nurses, physicians, and other healthcare personnel involved in catheter insertion, regarding the use of the catheter insertion checklist.
 - Educate healthcare personnel about the insertion and maintenance of catheters.
 - Establish catheter insertion kits/carts containing all necessary items for insertion.

Basic Practices for Preventing CLA-BSI

Before insertion

- Education of HCP involved in the insertion, care, and maintenance of CVCs about CLABSI prevention and complete program (A-II)
 - indications for catheter use,
 - appropriate insertion and maintenance,
 - the risk of CLABSI, and
 - general infection prevention strategies.
- Periodically assess of knowledge + adherence to preventive measures.
- Credentialing of HCP who insert & competency before they independently insert a CVC.

CHG Bathing

- Bathe ICU patients older than 2 months of age with a chlorhexidine preparation on a daily basis
- Chlorhexidine products are not approved by the US Food and Drug Administration for children younger than 2 months of age but are used at some institutions for cleaning CVC insertion sites or as a sponge dressing for children in this age group.
- A povidone-iodine preparation should be used to clean CVC insertion sites for children younger than 2 months of age, especially low-birth-weight neonates.



Prevention of UTIc

CDC Definition

- Patient with a urinary catheter in place for >48 hours or had foley within last 2 days (previously 7) days
- Concentration of $\geq 10(5)$ cfu/ml in an aseptically collected cath or suprapubic specimen
- AND one or more of the following:

- Fever (>38 c) or chills
- New burning, pain, urgency, frequency
- Change in urine character (cloudy, bloody, foul smelling, or positive lab test
- Flank or suprapubic pain or tenderness
- Change or decrease in mental or functional status >65 years

- Dipstick test positive for leukocyte esterase and or nitrate
- Pyuria (≥ 10 WBC/ml(3) or ≥ 3 WBC/high power field of unspun urine)
- Organisms seen on gram stain of unspun urine

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Risk of Urinary Tract Infection

- Foley catheter
 - 80-90%
- Genitourinary manipulations
 - 5-10%
- With a Foley, bacteriuria is inevitable given sufficient time

Presence of the Catheter Predisposes Infection:

- Presence of urinary catheter can lead to a level of bacteriuria in the range of greater than 10⁵cfu/mL within 24-48 hours.
- Catheter interferes with normal host defenses.
- Consequently clearance of microbes from voiding and bladder mucosa is diminished.
- Absence of urinary catheter results in a lower level of bacteriuria (if any). [APIC Guide, UTI prevention 2008]

Catheter Associated UTIs (UTIc)

- Foley catheter-associated =30% to 50% of all HAIs
- Not a significant increase in mortality, increased morbidity
- Increased cost and length of stay
- Contribute to increased antibiotic resistance
- May lead to other HAI: can seed implantable devices through hemotogenous spread
- Wide range 1% to 100%
- *Most frequent cause of sepsis*
- Expected outcome in catheterized patients
- Adoption of closed system reduces risk
- Risk still substantial with indwelling urinary catheter
- Asymptomatic infections usually resolve with removal of catheter

IHI CA-UTI

- **Avoid unnecessary urinary catheters.**
- **Utilize appropriate hand hygiene practices**
- **Insert catheters using aseptic technique and sterile equipment**, specifically using:
 - gloves, a drape, and sponges;
 - sterile or antiseptic solution for cleaning the urethral meatus; and
 - single-use packet of sterile lubricant jelly for insertion.
 - Use as small a catheter as possible that is consistent with proper drainage, to minimize urethral trauma.
 - Ensure that appropriate supplies are readily available and standard kits may help achieve this.
- **Maintain urinary catheters based on recommended guidelines.**
- **Routine maintenance**
 - Maintain a sterile, continuously closed drainage system.
 - Keep catheter properly secured to prevent movement and urethral traction.
 - Keep collection bag below the level of the bladder at all times.
 - Maintain unobstructed urine flow.
 - Empty collection bag regularly, using a separate collecting container for each patient, and avoid allowing the draining spigot to touch the collecting container.
- **Practices to avoid**
 - Irrigating catheters, except in cases of catheter obstruction;
 - Disconnecting the catheter from the drainage tubing; and
 - Replacing catheters routinely (in the absence of obstruction or infection); if the collection system must be replaced, use aseptic technique.
- **Review urinary catheter necessity daily and remove promptly.**

Risk Factors

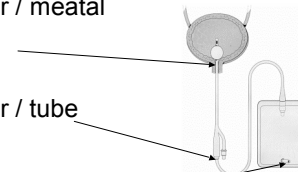
- Acuity of illness
- Co-morbidities
- Length of exposure to invasive device
- Female gender
- Length of hospital stay
- Use of antimicrobial therapy

Risk Factors

- Poor insertion technique
- Incontinence
- Failure to maintain closed system
- Unnecessary catheter manipulation
- Lack of urine meter on bag
- Kinking of tubing
- Bag not lower than bladder
- Bag on floor

“Ports of Entry” for organisms

- Catheter / meatal junction
- Catheter / tube junction
- Outlet tube

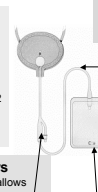


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CA-UTI RCA



Hand Hygiene and Aseptic Technique Factors

- No hand washing prior to catheter manipulation
- Breach of practice during insertion: Poor insertion techniques/unsterile insertion

Patient Factors

- Inappropriate use of catheters
- Other methods to control incontinence not used
- Placing catheter when there is not a medical indication
- Keeping catheter greater than 48-72 hours
- Not doing daily checks to see if catheter can be removed

Flow of Urine Factors

- Standing column of urine
- Obstructed urine flow due to placement
- Kinks in catheter
- Not hanging bag at end of bed to prevent loops
- Backflow of urine into bladder due to placing bag above bladder level
 - in transport
 - changing linens

Securement Factors

- Not securing the catheter which allows movement of catheter
- Contamination of foley on insertion

Closed system Factors

- Not using closed system
- Opening of the closed system

Measurement and Emptying Factors

- Contamination of the drainage port
- Using the same collection vessel between patients

Check points for Preventing UTIc

- Foley catheters should be placed only when medically necessary and removed ASAP
- Use Sterile technique for foley insertion and maintenance
- Use sterile continuously closed drainage system
- Maintain closed system-do not removed tamper proof seal
- Use items in kit for catheter insertion- sterile gloves, drape, sponges, antiseptic solution and lubricant
- Periodic inservices to reinforce proper foley technique
- Hand hygiene prior to catheterizing patient and donning gloves
- Hand hygiene before and after manipulation of catheter and removal of gloves
- Utilize smallest bore catheter as possible
- Secure catheter

Check points for Preventing UTIc

- Irrigate catheter only if medically necessary using sterile technique
- Each patient needs their own drainage container – drainage spigot cannot touch container to prevent cross contamination – use aseptic technique to empty
- Urine samples must be obtained from catheter port after swabbed with alcohol pad (do not disconnect to obtain sample)
- Institute a 3 day stop order for foley catheterization-document medical necessity to keep indwelling foley catheter in patient


Additional Prevention Strategies

- Use catheters only when justified; never for incontinence
- Remove the catheter as soon as possible
- Avoid leg bags (opening the system)
- Encourage fluids
- Avoid irrigating the bladder
- Place collection system below level of bladder (do not allow to touch the floor)
- Avoid pooling of urine in catheter tubing
- Select a urine meter or a drain bag system as required for management of patient
- Keep perineal area clean

Performance Measures for Preventing CA-UTI

- Process Monitoring
 - Catheterized for medical management
 - Removal of catheter as soon as clinically indicated
 - Use of silver catheter
 - Positioning of catheter bag and system
 - Hygiene – catheter and perineal care
- Outcomes
 - Calculate rate of UTIC/1000 foley catheter days
 - Calculate utilization rate for foley catheters

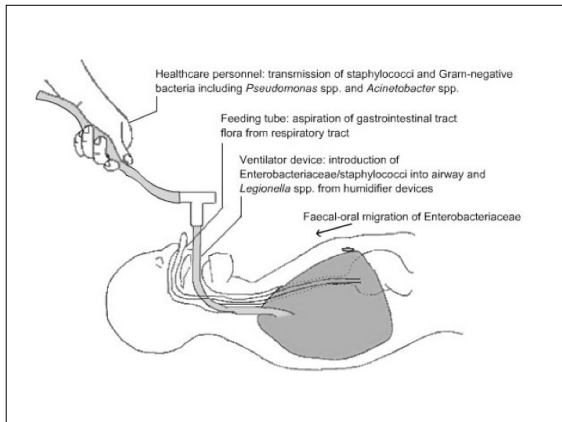
Prevention of Pneumonia



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2007: best of times

- Microbiologic diagnosis and treatment of infections
- ↑ in the number of specialized ICUs
- ↑ in sophisticated devices and procedures
 - Internet has made physicians generally more knowledgeable
- Over 100 antimicrobials (including new antiviral agents) now available
- Molecular diagnostic techniques widely available: e.g., PCR, PFGE

Lennox Archibald, MD

2007: worst of times

- ✓ Hospital infections continue ↑
- ✓ Antimicrobial resistance ↑

HA Infections Lower Respiratory Infections Modifiable Risk Factors

- | | |
|---|--|
| <ul style="list-style-type: none"> • Strong evidence <ul style="list-style-type: none"> – Semi-recumbent – Noninvasive ventilation – Continuous lateral rotation – Subglottic suctioning | <ul style="list-style-type: none"> • Some evidence <ul style="list-style-type: none"> – Avoid over sedation – Avoid paralytics – Closed suctioning – Oro-tracheal intubation – Maintain adequate cuff pressures – Avoid H₂ antagonists |
|---|--|

Recommendations - Category I

- Do not change routinely, on basis of duration or use, the ventilator circuit that is in use on an individual patient
- Rather change the circuit when it is visibly soiled or mechanically malfunctioning.
- Periodically drain and discard any condensate that collect in the tubing of a mechanical ventilator, taking precautions not to allow condensate to drain toward patient. Decontaminate handsafter performing procedure or handling fluids.

CDC/HICAC 2003

Category I

- Use only sterile, filtered or pasteurized fluid for nebulization and dispense into the nebulizer aseptically.
- Decontaminate hands with soap and water or waterless antiseptic agent after contact...
- Change gloves and decontaminate hands...

CDC/HICAC 2003

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IHI VAP

- Elevation of the Head of the Bed
- Daily "Sedation Vacations" and Assessment of Readiness to Extubate
- Peptic Ulcer Disease Prophylaxis
- Deep Venous Thrombosis Prophylaxis

Performance Measures

- Monitor rates of VAP; can use established benchmarks and definitions of pneumonia (e.g., NNIS definitions and rates)
- Provide feedback to the staff about the facility's VAP rates and reminders about the need for personnel to adhere to infection-control practices and procedures that reduce the incidence of VAP.

COCHICAC 2003

Major Topics

- Staff Education - Category 1B
- Surveillance - Category 1B
 - Use standardized definitions
 - ICU and high risk patients
 - Identify causative organisms
 - Express rates
 - Number of infections/1000 vent-days or
 - # of infected patients/100 ICU-days
- Do not routinely perform surveillance cultures on patients or equipment - Category 1B

COCHICAC 2003

VAP BUNDLE CHECKLIST 100% Compliance each + every day/shift

- HOB=30-45degrees
- Sedative Interruption
- Assess ready to extubate
- PUD prophylaxis
- DVT prophylaxis
- Oral care
- Subglottic suctioning
- Gut decontam
- Continuous lateral rotation?

Education for Prevention of VAP

- Educate healthcare personnel who care for patients undergoing ventilation about VAP, including information about local epidemiology, risk factors, and patient outcomes
- Educate clinicians who care for patients undergoing ventilation about noninvasive ventilatory strategies
- Provide education to family to increase understanding of care and condition of patient

Surveillance of VAP

- Perform direct observation of compliance with VAP-specific process measures – all shifts!
- Conduct active surveillance for VAP and associated process measures in units that care for patients undergoing ventilation who are known or suspected to be at high risk for VAP on the basis of risk assessment.

SHEA IDSA Compendium, ICHE 2008

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Key Practices to Prevent VAP

- Policy and Procedures for disinfection, sterilization, and maintenance of respiratory equipment (CDC and other professional organizations)
- Ensure that all patients (except those with medical contraindications) are maintained in a semirecumbent position
- Perform regular antiseptic oral care in accordance with product guidelines (no one regime has been proven to be best)
- Provide easy access to noninvasive ventilation equipment and institute protocols to promote the use of noninvasive ventilation.

SHEA IDSA Compendium/ICHE 2008

Key Practices to Prevent VAP

- Use an endotracheal tube with in-line and subglottic suctioning for all eligible patients
- Ensure that all ICU beds used for patients undergoing ventilation have a built-in tool to provide continuous monitoring of the angle of incline

SHEA IDSA Compendium/ICHE 2008

Not Recommended

- Do not routinely administer intravenous immunoglobulin, white-cell-stimulating factors (filgrastim or sargramostim), enteral glutamine, or chest physiotherapy
- Do not routinely use rotational therapy with kinetic or continuous lateral rotational therapy beds
- Do not routinely administer prophylactic aerosolized or systemic antimicrobials

SHEA IDSA Compendium/ICHE 2008

Supply Access

- Use an all-inclusive catheter cart or kit
 - Barrier PPE
 - Skin Prep
 - Dressing
 - Other products

Root Cause Analysis

- Getting to Zero
- Evaluate each device specific infection
 - Adverse Event Trigger
 - Root Cause Analysis

Administrative Support

- Accountability
- Resources
- Bundles
- Communication to all levels
 - Reports
 - Dashboards

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Summary

- Human Factor Engineering- Design systems
- Make things easy to do
- Teach, Monitor, and Feedback Process compliance and Outcomes
- Get a commitment from everyone to prevent device related infections!

References

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Loretta Litz Fauerbach, University of Florida
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