Prevention of Ventilator-Associated Pneumonia

Robert Garcia, MMT(ASCP), CIC
Infection Control Professional

Hosted by Paul Webber
paul@webbertraining.com
www.webbertraining.com

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1. National Quality Issues

- Agency for Healthcare Research & Quality (AHRQ)
  - Issued review of 73 patient care practices; addressed CRBSI prevention
- Institute of Medicine's (IOM) 1999 *"To Err is Human: Building A Safer Health System"*
  - Indicated that up to 98,000 Americans die each year as a result of medical errors
- The National Quality Forum
  - *Safe Practices for Better Healthcare: A Consensus Report, May 2003.* (national voluntary consensus standards, includes Safe Practice #20, "Prevent catheter-associated bacteremias")

Institute for Healthcare Improvement

- *100,000 Lives Campaign*
- Initiative to reduce healthcare errors and infections
- Addresses specific healthcare acquired infections
  - Ventilator-associated pneumonia (VAP)
  - "VAP bundle"
    - Raising head of the bed
    - Weaning
    - Peptic ulcer prophylaxis

http://ihi.org/IHI/Programs/Campaign/Campaign.htm

2. Regulatory Issues

- Joint Commission on Accreditation of Healthcare Organizations (JCAHO)
  - *2004 Standard:*
    IC.1.10 "The organization uses a coordinated process to reduce the risks of nosocomial infections in patients and health care workers …"

www.jcaho.com/accredited+organizations/svnp/svnp_index.htm

3. Global Infection Control Issues

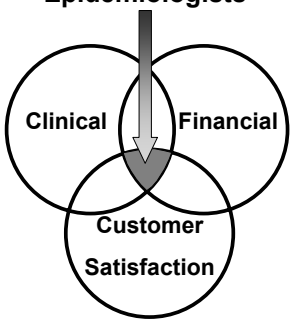

GUEST EDITORIAL

Infection surveillance, prevention, and control in the new millennium: A test of survival


The fifth evolutionary era in infection control: Interventional epidemiology

Garcia R, Barnard B, Kennedy V. The fifth evolutionary era in infection control: Interventional Epidemiology. AJIC Am J Infection Cont, 2000;28:30-43.

The Practice Arena of Interventional Epidemiologists



Let's Talk Prevention of Ventilator-Associated Pneumonia

High Risk, High Morbidity

VAP Facts

- Mechanical ventilation increases risk of pneumonia 6-21 times (1% per day)
- Attributable mortality is 27% and increases to 43% when etiologic agent is *P.aeruginosa* or *Acinetobacter* sp.
- LOS with VAP is 34 days and 21 days without VAP

12 Steps to Prevent Antimicrobial Resistance: Hospitalized Adults
Step 11: Isolate the pathogen

Hospital-Onset Infection Rates in NNIS Intensive Care Units, 1990-1999

Type of ICU	BSI*	VAP*	UTI*
Coronary	43%	42%	40%
Medical	44%	56%	46%
Surgical	31%	38%	30%
Pediatric	32%	26%	59%

* BSI = central line-associated bloodstream infection rate
VAP = ventilator-associated pneumonia rate
UTI = catheter-associated urinary tract infection rate

Source: National Nosocomial Infections Surveillance (NNIS) System

12 Steps to Prevent Antimicrobial Resistance: Hospitalized Adults

Prevalence of Antimicrobial-Resistant (R) Pathogens Causing Hospital-Onset Intensive Care Unit Infections: 1999 versus 1994-98

Organism	# Isolates	% Increase*
Fluoroquinolone-R *Pseudomonas* spp.	**2657**	**49%**
3rd generation cephalosporin-R *E. coli*	**1551**	**48%**
Methicillin-R *Staphylococcus aureus*	**2546**	**40%**
Vancomycin-R enterococci	**4744**	**40%**
Imipenem-R *Pseudomonas* spp.	**1839**	**20%**

* Percent increase in proportion of pathogens resistant to indicated antimicrobial

Source: National Nosocomial Infections Surveillance (NNIS) System

ICU Rates of VAP, NNIS Study, Jan 2002-Jun 2004

	Ventilator-associated pneumonia rate*			Percentile				
Type of ICU	No. of units	Ventilator-days	Pooled mean	10%	25%	50% (median)	75%	90%
Coronary	59	76,145	4.4	0.0	1.9	4.0	6.8	9.8
Cardiothoracic	47	98,358	7.2	1.2	2.9	6.3	12.6	15.5
Medical	92	268,518	4.9	0.5	2.1	3.7	6.2	8.9
Medical-surgical								
Major teaching	99	320,916	5.4	1.2	2.6	4.6	7.2	9.9
All others	109	351,705	5.1	1.7	2.9	5.1	6.7	8.9
Neurosurgical	29	45,073	11.2	0.0	2.4	6.2	13.5	16.8
Pediatric	52	133,995	2.9	0.0	0.9	2.3	4.8	8.1
Surgical	98	253,900	9.3	2.2	4.7	8.3	12.2	17.9
Trauma	22	63,137	15.2	4.3	8.0	11.4	16.6	25.3
Burn	14	23,117	12.0	—	—	—	—	—
Respiratory	6	18,838	4.9	—	—	—	—	—

Pooled means:
Medical – 4.9
Med-Surg – 5.4
Surgical – 9.3

Cost of VAP

Study/Year	#Pts with VAP	Measure	ICU Type	Cost with VAP	Cost without VAP	Cost per VAP case
Warren 2003	127	Attributable cost (hospital)	Med, surg	$27,033	$15,136	**$11,897**
Rello 2002	842	Charges	Med, surg, trauma	$104,983	$63,689	**$41,294**
Cocanour 2005	70	Attributable cost	Trauma	$82,195	$25,037	**$57,158**

Warren DK, et al. Outcome and attributable cost of ventilator-associated pneumonia among intensive care unit patients in a suburban medical center. Crit Care Med 2003;31:1312-3.

Rello J, Ollendorf DA, Oster G, Vera-Llonch M, Bellm L, Redman R, Kollef MH. Epidemiology and outcomes of VAP in a large US database. Chest 2002;122:2115-2121.

Cocanour et al. Cost of ventilator-associated pneumonia in a shock trauma intensive care unit. Surg Inf, 2005;6:65-72.

Cost of VAP (cont'd)

- Study of 819 adult ICU pts. to determine attributable cost of VAP
- Comparison of uninfected vent pts. to vent pts. with VAP
  - ICU LOS: 26 vs. 4 days
  - Hospital LOS: 38 vs. 13 days
  - Mortality: 50% vs. 34%
  - Costs: $70,568 vs. 21,620
- Attributable cost of VAP: $11,897

Warren DK, et al. Outcome and attributable cost of ventilator-associated pneumonia among intensive care unit patients in a suburban medical center. Crit Care Med 2003;31:1312-3.

What strategies have been advocated in preventing VAP?

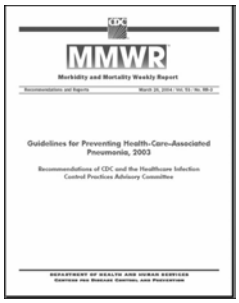
- Ventilator circuit replacement
- Closed suction catheter replacement
- Heat and moisture exchanger replacement
- Semirecumbent positioning of patients
- Selective digestive decontamination
- Stress ulcer prophylaxis
- Enteral feeding methodologies
- Weaning
- Oral and dental care

Outbreaks & Contaminated Environment

- Pimentel, et al. Control of an outbreak of multi-drug-resistant Acinetobacter baumannii in an intensive care unit and a surgical ward. J Hosp Infect 2005;59:249-53
- Denton, et al. Role of environmental cleaning in controlling an outbreak of Acinetobacter baumannii on a neurosurgical intensive care unit. Inten Crit Care Nurs 2005;21:94-8.

HICPAC Guidelines on Preventing Pneumonia

- Issued 3/26/04
- Evidence based
- Expert review
- Recommendations categorized



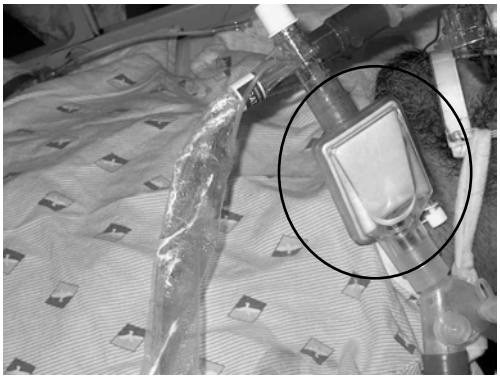
www.cdc.gov/mmwr/preview/mmwrhtml/rr5303a1.htm

HICPAC Categories

- **Category IA.** Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.
- **Category IB.** Strongly recommended for implementation and supported by certain clinical or epidemiologic studies and by strong theoretical rationale.
- **Category IC.** Required for implementation, as mandated by federal or state regulation or standard.
- **Category II.** Suggested for implementation and supported by suggestive clinical or epidemiologic studies or by strong theoretical rationale.
- **No recommendation; unresolved issue.** Practices for which insufficient evidence or no consensus exists about efficacy.

Ventilator Circuits

- Humidifier vs. HME technology
- HICPAC:
  - *Do not change routinely, on the basis of duration of use, the ventilator circuit (i.e., ventilator tubing and exhalation valve, and the attached humidifier) that is in use on an individual patient. Change the circuit when it is visibly soiled or mechanically malfunctioning.* Cat IA [same as for HME - Cat II].
- Kollef MH, Shapiro SD, Fraser VJ, et al. Mechanical ventilation with and without 7-day circuit changes: a randomized controlled trial. *Ann Intern Med* 1995; 123;168-74.



Heat & Moisture Exchangers (HME)

- Is filter hydroscopic or hydrophobic?
- HICPAC:
  - *No recommendation can be made for the preferential use of either HMEs or heated humidifiers to prevent pneumonia in patients receiving mechanically assisted ventilation..* (Unresolved Issue).
  - *Change an HME that is in use on a patient when it malfunctions mechanically or becomes visibly soiled.* Cat II
  - *Do not routinely change more frequently than every 48hours an HME that is in use on a patient.* Cat II
  - *Do not change routinely (in the absence of gross contamination or malfunction) the breathing circuit attached to an HME while it is in use on a patient.* Cat. II
- Davis K, Evans SL, Campbell RS, Johannigman JA, Luchette FA, Porembka DT. Prolonged use of heat and moisture exchangers does not affect device efficiency or frequency rate of nosocomial pneumonia. *Crit Care Med* 2000;28:1412-18.

Circuits & HMEs: VAP Outcome

- Study to determine if vent circuits are needed to be changed periodically when an HME is used
- Randomized, controlled trial in 24 bed adult ICU
- Results:
  - Group 1 (143 pts.;vent circuit changes every 48 hrs.): 1.71/1000 VD
  - Group 2 (161 pts.; no circuit changes): 1.25/1000 VD [*no significant difference)*

Lorente L, et al. Periodically changing ventilator circuits is not necessary to prevent ventilator-associated pneumonia when a heat and moisture exchanger is used. Infect Control Hosp Epidemiolo 2004;25:1077-82.

Closed Suction Catheters

- Manufacturers: replace at 24 hours
- HICPAC:
  - *No recommendation can be made about the frequency of routinely changing the in-line suction catheter of a closed-suction system in use on one patient.* (Unresolved issue)
- Kollef MH, Prentice D, Shapiro SD, Fraser VJ, Silver P, Trovillion E, et al. Mechanical ventilation with or without daily changes of in-line suction catheters. Am J Resp Crit Care Med, 1997;156:466-72

Closed vs. Open Suctioning

- Randomized, controlled study aimed at measuring VAP outcome in pts. using either closed or open suctioning
- 24 bed med surg ICU; 443 pts.
- No differences in percentage of patients developing VAP (20.47% vs. 18.02%) or VAP per 1000 vent days (17.59 vs. 15.84)

Lorente L, et al. Ventilator-associated pneumonia using a closed versus open tracheal suction system. Crit Care Med 2005;33:115-9.

Closed Suction Catheter Replacement

- Study designed to measure impact of decreasing the frequency of in-line suction catheters changes
- MICU; Before/after observation trial
- Results:
  - VAP rate, daily change: 0.19/100 VD
  - VAP rate, 7 day change: 0/100 VD
- Annual cost savings: $18,782

Stoller JK, e al. Weekly versus daily changes of in-line suction catheters: impact on rates of ventilator-associated pneumonia and associate costs. Respir Care 2003;48:494-9.

New Intervention: Redefining the Ventilator Circuit

- Ventilator circuitry was defined by three separate devices: tubing, HME, in-line suction catheter
- Revised policy to consider circuitry as single closed system; change when soiled, malfunction, patient transport
- Rates: 28.7/1000 VD in 2000; 9.8 in 2001
- Saved >$15,000 per year

  - Bertrand M, Zink K, McCormick J, et al. Reducing ventilator associated pneumonia by redefining the ventilator circuit as a single closed unit and eliminating routine component changes. [abstract] 2002 APIC Education Conference, Nashville, TN

Airway Suctioning

- Subglottic suctioning
  - Yankauers don't reach
  - Routinely done every 2 hours
  - Before repositioning ETT
  - Special ETT tubes???

Subglottic Secretion Suctioning

- HICPAC:
  - If feasible, u*se an endotracheal tube with a dorsal lumen above the endotracheal cuff to allow drainage (by continuous or frequent intermittent suctioning) of tracheal secretions that accumulate in the patient's subglottic area.* Cat. II

- Valles J, Artigas A, Rello J, et al. Continuous aspiration of subglottic secretions in preventing ventilator associated pneumonia. Ann Intern Med 1995;122:179-86.
- Kollef MH, Skubas NJ, Sundt TM. A randomized clinical trial of continuous subglottic suctioning in cardiac surgery patients. *Chest* 1999; 116:1339-46.

Effect of Subglottic Suctioning

- Meta-analysis of five studies, 896 pts.
- In pts expected to require >72 hrs. of ventilation, subglottic secretion suctioning shortened:
  - duration of ventilation by 2 days
  - Length of stay by 3 days
  - Delayed onset of pneumonia by 6.8 days

Dezfulian C, et al. Subglottic secretion drainage for preventing ventilator-associated pneumonia: a meta-analysis. Am J Med 2005;118:11-18.

Semirecumbent Positioning

- HICPAC:
  - *In the absence of medical contraindication(s), elevate at an angle of 30-45° the head of the bed of a patient at high risk for aspiration (e.g., a person receiving mechanically assisted ventilation and/or who has an enteral tube in place)* Cat II

- Drakulovic MB, Torres A, Bauer TT, Nicholas JM, Nogue S, Ferrer M. A Supine body position as a risk factor for nosocomial pneumonia in mechanically ventilated patients: a randomized trial. *Lancet* 1999;354:1851-58.

How high is 30 degrees?




Head of Bed

- How high is 30 degrees???
  - A lot higher then you might think
  - Look at objective gauges or LCD readouts


Can't make it to 30 degrees?

- Situations when HOB up 30 degrees may not be possible
  - Low BP/unstable VS
  - Agitated and at risk of falling out of bed
  - Compromised circulation due to femoral lines
  - Spinal clearance/Spinal cord injury patients – **MUST** have a physician's order identifying the degree of elevation allowed
- Use combination of HOB up and reverse Trendelenburg to obtain a 30 degree angle

Stress Ulcer Prophylaxis

- Theory has it that modifying stomach acid effects the bacterial colonization level
- HICPAC:
  - *No recommendation can be made for the preferential use of sucralfate, H2-antagonists, and/or antacids for stress-bleeding prophylaxis in patients receiving mechanically assisted ventilation.* (Unresolved Issue)

- Livingston DH. Prevention of ventilator-associated pneumonia. *Am J Surg* 2000;179(suppl 2A):12S-17S:
  - *"after all of this time and study, it is likely that neither drug has any advantage in significantly maintaining gastric flora and reducing VAP."*

Selective Digestive Decontamination

- Preventive decolonization on the theory that the gut is a major source of VAP
- HICPAC:
  - *No recommendation can be made for the routine selective decontamination of the digestive tract (SDD) of all critically-ill, mechanically ventilated, or ICU patients.* (Unresolved issue)
- 30+ studies to date

- Eggimann P, Pittet D. Infection control in the ICU. *Chest* 2001;120:2059-2093:
  - "…this selective pressure on the epidemiology of resistance definitely precludes the systematic use of SDD for critically ill patients"
- Kollef MH. Selective digestive decontamination should not be routinely employed. Chest 2003;123:464S-8S.

Weaning

- Duration, duration, duration!!!

- Cook D, Meade M, Guyatt G, Griffith L, Booker L. Criteria for Weaning from Mechanical Ventilation. Evidence Report/Technology Assessment No. 23 (Prepared by McMaster University under Contract No. 290-97-0017). AHRQ Publication No. 01-E010. Rockville MD: Agency for Health Care Research and Quality. November 2002.
- Evidence-Based Guidelines for Weaning and Discontinuing Ventilatory Support. A Collective Task Force comprised of members of the American College of Chest Physicians, the American Association for Respiratory Care and the American College of Critical care Medicine. *Chest* 2001;120:375S-395S.

Cost of Mechanical Ventilation

- Retrospective, cohort study designed to examine costs associated with mechanical ventilation
- Data from 253 hospitals, 51,009 pts.
- Mean cost with vent = $31,574
- Mean cost without vent = $12,931
- Incremental cost of mech. vent per day = $1,5522

Dasta JF, et al. Daily cost of an intensive care unit day: the contribution of mechanical ventilation. Crit Care Med 2005;33:1266-71.

Active Weaning Protocols

- Effect of a protocol-driven vent weaning on outcomes
- Results:
  - Vent use: from 0.47 to 0.33 (VD/ICU days)
  - VAP: 17 in 2000 to 5 in 2002

Dries DJ, et al. Protocol-driven ventilator weaning reduces use of mechanical ventilation, rate of early reintubation, and VAP. J Trauma 2004;56:943-51.

Multidisciplinary Approaches

- Study conducted in 3 adult ICUs (med surg, neuro, cardiac) in a Level II trauma facility
- Ventilator bundle:
  - Comprehensive oral care protocol
  - HOB
  - Daily sedation holiday
  - Daily assessment of readiness to extubate
- Results:
  - 21/1523 vent days in Q2
  - 3/1734 vent days in Q4 (26% reduction)

Shaikh, et al. A multidisciplinary approach towards the reduction of ventilator-associated pneumonia. [abstract] APIC Education Conference, Baltimore, MD, June 2005

(cont'd)

- Study conducted in a Medical ICU and Surgical ICU
- Interventions:
  - Elevated HOB
  - Sterile water and replacement of stopcocks with enteral valves for NG tubes
  - Prolongation of changing closed suction catheters from 24 hours to as needed
- Results:
  - MICU: decrease by 10.8/1000 VD
  - SICU: decrease by 17.2/1000 VD
  - Net cost savings: $349,899

Lai KK, et al. Impact of a program of intensive surveillance and interventions targeting ventilated patients in the reduction of ventilator-associated pneumonia and its cost-effectiveness. Infect Control Hosp Epidemiol 2003;24:859-63.

Is there scientific evidence that links oropharyngeal and dental colonization with respiratory illness?

Please refer to: Garcia R. A review of the possible role of oral and dental colonization on the occurrence of health care-associated pneumonia: Underappreciated risk and a call for interventions. Am J Infect Control 2005;33:527-41.

Prevention or Modulation of Oropharyngeal Colonization

- HICPAC:
  - *Oropharyngeal cleaning and decontamination with an antiseptic agent: develop and implement a comprehensive oral-hygiene program (that might include the use of an antiseptic agent) for patients in acute-care settings or residents in long-term-care facilities who are at high risk for health-care-associated pneumonia.* Cat. II
- Schleder B, Stott K, Lloyd RC. The effect of a comprehensive oral care protocol on patients at risk for ventilator-associated pneumonia. J Advocate Health 2002;4:27-30.
- Yoneyama T, Yoshida M, Ohrui T, et al. Oral care reduces pneumonia in older patients in nursing homes. J Am Geriatr Soc 2002;50:430-3.

1. Oral Cavity vs. Gastric Colonization

- Prospective study of 86 mechanically vented ICU patients to assess relationship between oropharyngeal colonization and subsequent occurrence of pneumonia
- Patients oral and gastric specimens were collected on admission and twice weekly
- When pneumonia suspected, bronchoscopic specimens were taken with protected specimen brush
  - In 31 cases of pneumonia identified, DNA genomic analysis demonstrated that oropharyngeal colonization was the predominant factor in the development of pneumonia compared with gastric colonization

Garrouste-Orgeas M, et al. Oropharyngeal or gastric colonization and nosocomial pneumonia in adult intensive care unit patients. A prospective study based on genomic DNA analysis. *Am J Respir Crit Care Med* 1997;156:164

Acquired bacterial colonization: Location of the microorganisms in the 44 carrier patients

Colonizing microorganisms	Patients with OC	Patients with GC	Patients with BC	Colonized patients
A. baumanii	7	0	1	8
K. Pneumoniae	12	0	3	15
Enterobacteriaceae	9	5	8	22
Psuedomonadaceae	8	2	1	11
S. aureus	17	0	3	20
Enterococcus sp.	2	1	1	4
Total	**22**	**5**	**17**	

OC = oropharyngeal colonization; GC = gastric colonization; BC = both OC/GC colonization

Garrouste-Orgear M, et al. Am J Resp Crit Care Med 1997.

Oropharyngeal rather than gastric colonization: further support

- Kerver AJ, et al. Colonization and infection in surgical intensive care patients – a prospective study. Intensive Care med 1987;13:347-51.
- Bonten MJM, et al. Risk factors for pneumonia, and colonization of respiratory tract and stomach in mechanically ventilated ICU patients. Am J Resp Crit Care Med 1996;154:1339-46.
- Ewig S, et al. Bacterial colonization patterns in mechanically ventilated patients with traumatic head injury. Am J Resp Crit Care Med 1999;158:188-98.

2. Decontamination of the Oropharynx

- Prospective, randomized, double-blind study of ICU patients to determine VAP while manipulating oropharyngeal colonization and without influencing gastric or intestinal colonization
- 87 given topical antibiotics (study group), 139 given placebo (control group)
- Results:
  - VAP in study group: 10%
  - VAP in control group: 27%

Bergmans D, et al. Prevention of ventilator-associated pneumonia by oral decontamination. Am J Resp Crit Care Med 2001;164:382-88.

Additional Studies and Reviews using Antibiotic Pastes or Solutions

- Rodriguez-Roldan JM, et al. Prevention of nosocomial lung infection in ventilated patients: use of an antimicrobial nonabsorbable paste. Crit Care Med 1990;18:1239-42.
- Pugin J, et al. Oropharyngeal decontamination decreases incidence of ventilator-associated pneumonia: a randomized, placebo-controlled, double-blind clinical trial. J Am Med Assoc 1991;265:2704-10.
- Bonten MJ, et al. Role of colonization of the upper intestinal tract in the pathogenesis of ventilator-associated pneumonia. Clin Infect Dis 1997;24:309-19.

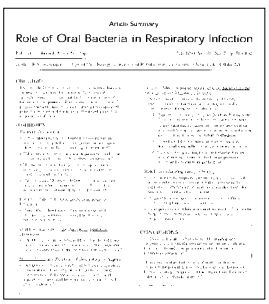
3. Oral Decolonization: Use of Chlorhexidine

- Prospective, randomized, double-blind, placebo-controlled trial testing the effectiveness of oral decontamination on nosocomial infection
- 353 pts undergoing coronary bypass surgery
- Used chlorhexidine gluconate (0.12%) as oral rinse to prevent nosocomial infections
- Randomized to receive CHG or placebo
- Results:
  - Overall reduction in nosocomial infections of 65% when using CHG
  - Respiratory infections were reduced 69% in CHG group

DeRiso AJ II, Ladowski JS, Dillon TA, Justice JW, Peterson AC. Chlorhexidine gluconate 0.12% oral rinse reduces the incidence of total nosocomial respiratory infection and non-prophylactic systemic antibiotic use in patients undergoing heart surgery. *Chest* 1996;109:1556-61.

4. Link Between Oral Pathogens & Respiratory Infection

- A review article
- 6 articles cited as support for a relationship between poor oral health and respiratory infection
- Bacteria from colonized dental plaque may be aspirated into the lower airway


Article Summary

Role of Oral Bacteria in Respiratory Infection

Scannapieco, FA. Role of oral bacteria in respiratory infection. J Periodontol 1999;70:794-802

5. Dental Plaque as a Bacterial Source of VAP

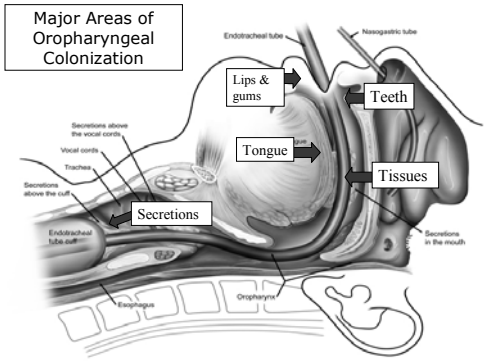
- Study on dental plaque colonization and ICU nosocomial infs.
- 57 patients studied
- Results:
  - Dental plaque occurred in 40% of pts.
  - Colonization of dental plaque was highly predictive of nosocomial infection
  - Salivary, dental, and tracheal aspirates cultures were closely linked

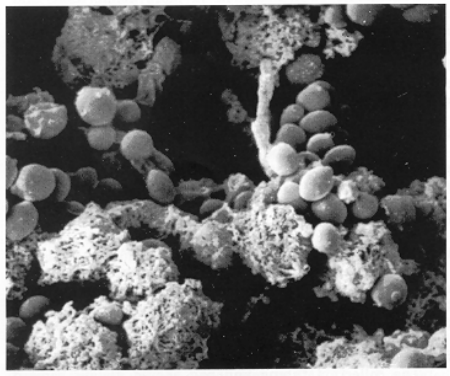
Fourrier E, et al. Colonization of dental plaque: a source of nosocomial infections in intensive care patients. Crit Care Med 1998;26:301-8.

Additional Evidence Linking Colonized Dental Plaque and Respiratory Infection

- Scannapieco FA, et al. Colonization of dental plaque by respiratory pathogens in medical intensive care patients. Crit Care Med 1992;20:740-45.
- Fitch JA, et al. Oral care in the adult intensive care unit. Am J Crit Care 1999;8:314-18.
- Sumi Y, et al. Colonization of denture plaque by respiratory pathogens in dependant elderly. Gerontolog 2002;9:25-9.
- Russel SL, et al. Respiratory pathogen colonization of the dental plaque of institutionalized elders. Spec Care Dentist 1999;19:128-34.

Major Areas of Oropharyngeal Colonization





A Case Study

Reduction of Microbial Colonization in the Oropharynx and Dental Plaque Reduces VAP

R Garcia, L Jendresky, L Colbert

Brookdale University Medical Center, Brooklyn NY

Abstract presented at the 2004 APIC Education Conference, Phoenix, AZ

A Case Study

Update!

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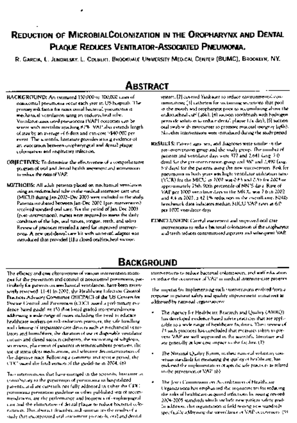


REDUCTION OF MICROBIALCOLONIZATION IN THE OROPHARYNX AND DENTAL PLAQUE REDUCES VENTILATOR-ASSOCIATED PNEUMONIA.

R. GARCIA, L. JENDRESKY, L. COLBERT, BROOKDALE UNIVERSITY MEDICAL CENTER (BUMC), BROOKLYN, NY.

ABSTRACT

BACKGROUND: [illegible]

OBJECTIVES: [illegible]

METHODS: [illegible]

RESULTS: [illegible]

CONCLUSION: [illegible]

BACKGROUND

[illegible]

The Brookdale University Medical Center

Prioritization & Action

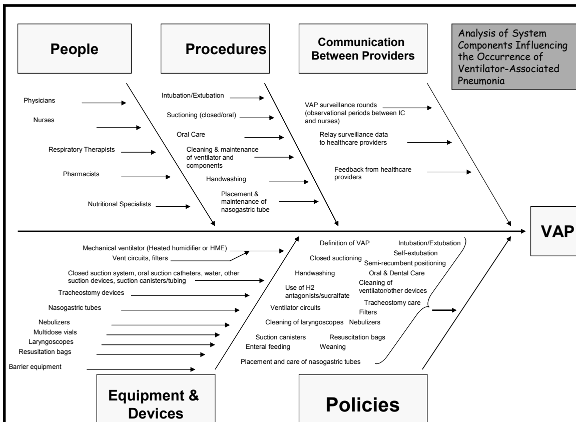
- Comparison of VAP rates with NNIS data indicated MICU rate above 50th percentile (6.0 cases per 1000 VD)
- Interventions taken prior to 2002 did not have sufficient effect to reduce rate below the benchmark
- ICP conducting VAP surveillance
- Interventional Epidemiology methodology applied: interviews and observations

VAP Reduction Task Force

- Director of Nursing, Critical Care
- Nurse Manager, Critical Care
- Front line nurses
- Medical Director, Critical Care
- Emergency Room physicians
- Respiratory Therapy
- Materials Management
- Infection Control

Assessment

- Interviews of front line workers
- Observation of procedures
- Review of products
- Review of policies
- Review of literature, guidelines



Identification of Needs

- A uniform education program for nurses and respiratory therapists
- Standards for oral assessment
- Standards for oral care
- Standards for dental care
- Standardization of oral care solutions
- Keeping a closed system CLOSED
- Reduce environmental exposure

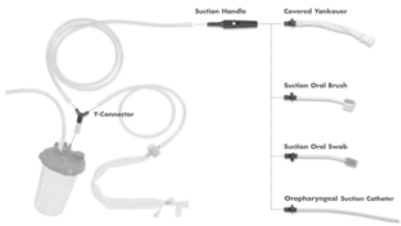
Key Strategy #1: Education

- Handout created, includes answers to the following questions:
  - Why is prevention of VAP important?
  - What is hospital's (unit's) current rate?
  - How do you compare with national benchmark?
  - What are major interventions implemented to date?
  - What role does bacterial colonization play in the development of respiratory infection?
  - What new products/techniques will be implemented to address oral bacterial colonization?

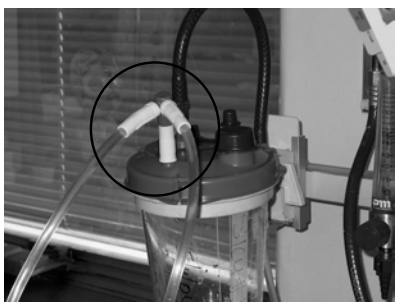
Tip: Applicable HICPAC Recommendation

- I. Staff Education and Involvement in Infection Prevention
  - *Educate health-care workers about the epidemiology of, and infection-control procedures for, preventing health-care—associated bacterial pneumonia to ensure worker competency according to the worker's level of responsibility in the health-care setting, and involve the workers in the implementation of interventions to prevent health-care—associated pneumonia by using performance improvement tools and techniques.* **Cat IA**

Key Strategy #2: Reduce Oral and Dental Colonization



Maintaining a Closed System



Covered Yankauer

Policy: Use as needed

Yankauer

- Proper storage
- Keep Yankauer covered when not in use
- Assists in decreasing the risk of environmental contamination
- Replace every day and PRN

Suction Catheter

Policy: Every 4 hrs. or as needed

*the device manufacturer does not market or approve of its use below the vocal cords

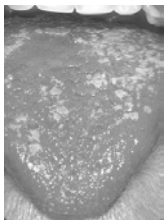
Toothbrush with Sodium Bicarbonate

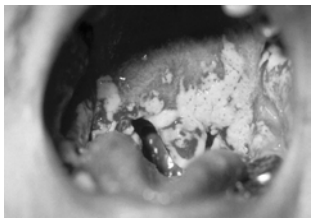
Policy: 2 X per day

Suction Swab with Moisturizer

Policy: Every 6 hrs.

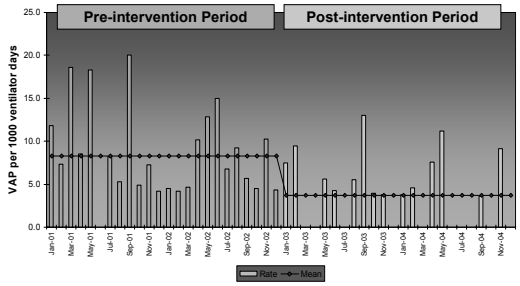
Feeling fuzzy???





Photographs courtesy of D. Ryan

VAP Rates, MICU, BUMC, 2001-2004



VAP Rates, MICU, BUMC

Period	# Pts	# VAP cases	Vent days	Rate (VAP/ 1000 VD)	% Pts with VAP
Jan 2001-Dec 2002	859	44	5262	8.3	5.1
Jan 2003-Dec 2004	755	20	5147	3.8	2.6

Cost Avoidance

- Attributable cost of a healthcare acquired pneumonia is estimated to be $40,000 (Rello, *Chest,* 2002).
- Based on the avoidance of approximately 10 VAP cases per year, BUMC estimates that the annual avoided extra cost to the institution to be

[10 x $40,000 (infection cost)] – [$56,606 (product cost)] = $343,394.

Cost Avoidance, BUMC Study

Study, year	Cost per VAP case	X 12 (avoided cases per yr.)	- Product cost per yr.	**Cost avoided/yr.**
Warren, 2003	$11,897	$142,764	-$56,606	**$86,158**
Rello, 2003	$41,294	$495,528	-$56,606	**$438,922**
Cocanour, 2005	$57,158	$685,896	-$56,606	**$629,290**

Let's Summarize Interventions

- Perform proper cleaning and maintenance of respiratory care equipment
- If HMEs are used, replace vent circuits as needed
- Elevate HOB when not contraindicated
- Perform comprehensive oropharyngeal care
- Establish active weaning protocols

The speaker gratefully acknowledges the supreme effort of all the critical care nursing staff, the resident staff, and especially Mr. Trevor Grazette, Director of Nursing, Ms. Althea Bailey, Nurse Manager, and Ms. Henrietta Basanez, Nurse Educator

Robert Garcia, BS, MMT(ASCP), CIC
Assistant Director of Infection Control
Brookdale University Medical Center
One Brookdale Plaza, Brooklyn NY 11212
718-240-5924
rgarcia@brookdale.edu

2006 Teleclass Schedule

Do you have a topic idea for our 2006 teleclass series? We are open to all suggestions and there's still time to get them in the 2006 schedule (barely)

Contact Paul Webber
paul@webbertraining.com