

The Next Big Adventure: Prevention of Pneumonia in the Home

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- Consultant-Michigan Hospital Association Keystone Center
- Consultant/Faculty for CUSP for MVP—AHRQ funded national study
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- Consultant and speaker bureau for Sage Products LLC
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Session Objectives

- Discuss the importance of the oral cavity is a potential source for pneumonia
- Identify risk factors for the development of pneumonia in the home
- Outline the evidence-based practices for oral care and head of the bed elevation and mobility to reduce the risk for pneumonia
- Ascertain responsibilities for the provider and client

Population at Risk for Pneumonia

- Weaker-than-normal immune systems are at greatest risk
 - Children younger than 2 years
 - 65 and older
 - Chronic health conditions, such as lung or heart disease, sickle cell anemia, or diabetes
 - People fighting cancer or AIDS are also at high risk

The Older Adult At Risk

- Cognitively impaired
- Diminished swallow and cough reflex
- Functionally dependent
- Dry mouth
- Multiple medications
- High rate tooth decay
- Behavioral problems during oral hygiene

Research Dissemination Core. Iowa City (IA): University of Iowa Gerontological Nursing Interventions Research Center; 2002 Nov. 48 p. Marik PE. et al. Chest; 2003; 124:328–336

Significant Independent Predictors of Aspiration Pneumonia

- Dependant for feeding
- Dependant for oral care
- Number of decayed teeth
- Tube feeding
- Multiple medical diagnoses
- Number of medications
- Dry mouth
- Smoking

Overall Prevention Strategies

- Healthy lifestyle is the best way to prevent pneumonia
 - Flu vaccination each year
 - Not smoking
 - Eating a healthy diet
 - Plenty of exercise/Movement and rest
- Pneumococcal pneumonia vaccine for patients at high risk

Table 2. Distribution of 504 Health Care–Associated Infections.*

Type of Infection	Rank	No. of Infections	Percentage of All Health Care–Associated Infections (95% CI)
Pneumonia†	1 (tie)	110	21.8 (18.4–25.6)
Surgical-site infection	1 (tie)	110	21.8 (18.4–25.6)
Gastrointestinal infection	3	86	17.1 (14.0–20.5)
Urinary tract infection‡	4	65	12.9 (10.2–16.0)
Primary bloodstream infection§	5	50	9.9 (7.5–12.8)
Eye, ear, nose, throat, or mouth infection	6	28	5.6 (3.8–7.8)
Lower respiratory tract infection	7	20	4.0 (2.5–6.0)
Skin and soft-tissue infection	8	16	3.2 (1.9–5.0)
Cardiovascular system infection	9	6	1.2 (0.5–2.5)
Bone and joint infection	10	5	1.0 (0.4–2.2)
Central nervous system infection	11	4	0.8 (0.3–1.9)
Reproductive tract infection	12	3	0.6 (0.2–1.6)
Systemic infection	13	1	0.2 (0.01–1.0)

Hospital Acquired Pneumonia?

- HAP 1st most common HAI in U.S.
 - Increased morbidity → 50% are not discharged back home
 - Increased mortality → 18%-29%
 - Extended LOS → 4-9 days
 - Increased Cost → \$28K to \$109K
 - 2x likely for readmission <30 day

Kollef, M.H. et.al. (2005). *Chest*. 128, 3854-3862.

ATS, (2005). *AmJ Respir Crit Care Med*. 171, 388-416.

Lynch (2001) *Chest*. 119, 373S-384S.

Pennsylvania Dept. of Public Health (2010).

Incidence, Prevalence of NV-HAP: A Local Study (2010)

- Purpose:
 - Determine incidence and clinical factors of NV-HAP
- Method:
 - Descriptive, quasi-experimental study using retrospective data
 - Inclusion criteria:
 - All adult discharges
 - ICD-9 codes of pneumonia not POA
 - AND met CDC definition of HAP

NV-HAP SMCS Research Findings: 2010

24,482 patients and 94,247 patient days

Incidence:

- 115 adults
- 62% non-ICU
- 50% surgical
- Average age 66
- Common comorbidities:
 - ❖ CAD, COPD, DM, GERD
- Common Risk Factors:
 - ❖ Dependent for ADLs (80%)
 - ❖ CNS depressant meds (79%)

Cost:

- \$4.6 million
- 23 deaths
- Mean Extended LOS 9 days
- 1035 extra days

Impact of NV-HAP in the ICU

HAPPI-2 Preliminary Data

- 23 hospitals in U.S.; 2014 data; 1306 total cases
 - 28% occurred in ICU
 - 26% occurred on Med/Surg units and were transferred to ICU
 - 54% of all NV-HAP cases spend some time in the ICU
 - 33% transferred to ICU died
 - 42% transferred to ICU survived but were discharged to a higher level of care; 25% home

Impact of NV-HAP on one year mortality:

- Any length of time spent in an ICU increases mortality of elderly patients who survive to discharge

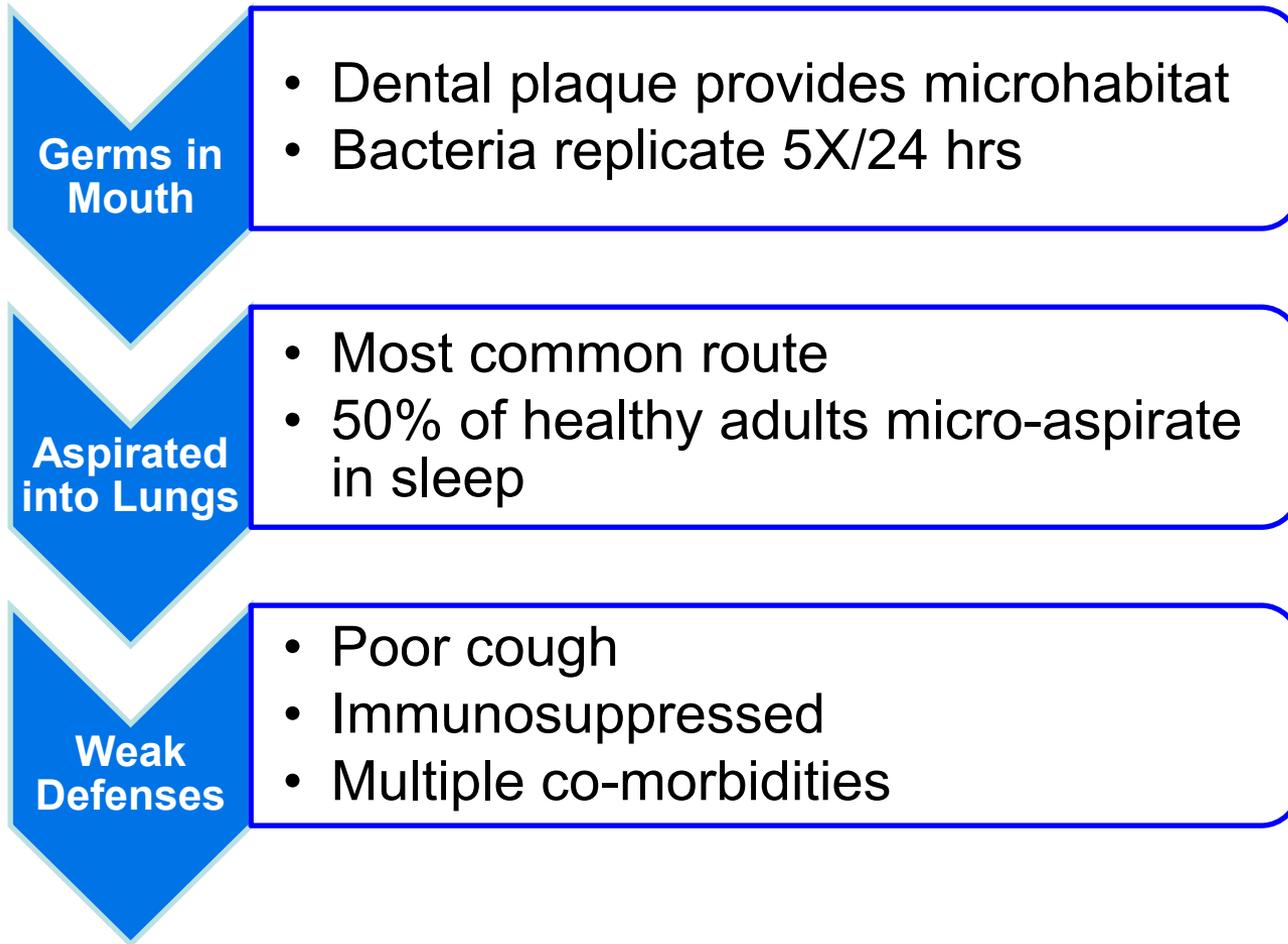


“A person can’t have good general health without good oral health.”

Former US Surgeon General C. Everett Koop



Pathogenesis → Prevention





<http://helios.bto.ed.ac.uk/bto/microbes/biofilm.htm>

Loesche, W. 2012



Older Adult's Oral Health in a State of Decay

By 2030 there will be 72+ million older adults in the US.

MOST won't have access to dental care, impacting overall health.

(Oral Health America 2014)

Poor Oral Health and Lack of Care Can Result in Overall Health Issues

Nutritional Deficiencies

- 30% of older adults lose their teeth

Systemic Diseases

- 23% have severe gum disease

Pain and Infection

- 50% have untreated cavities

Death

- 30,000 oral & pharyngeal cancers diagnosed annually



Oral Microbiome in Health vs Disease

The human microbiome project says the human body has 100 trillion microscopic life forms living in it.



Oral Conditions & Systemic Disease

While the literature has many associations between oral conditions and systemic disease (Alzheimer's, premature babies, pneumonia, heart disease, diabetes), a direct, causal effect has yet to be irrefutably established. The one exception to this is the causal effect of periodontal disease and glycemic control in diabetic patients. For those patients with periodontal disease, the ability to maintain glycemic control in diabetic patients is challenged.

Table. Common causes of hospitalization for adults aged 85 and over: United States, 2010

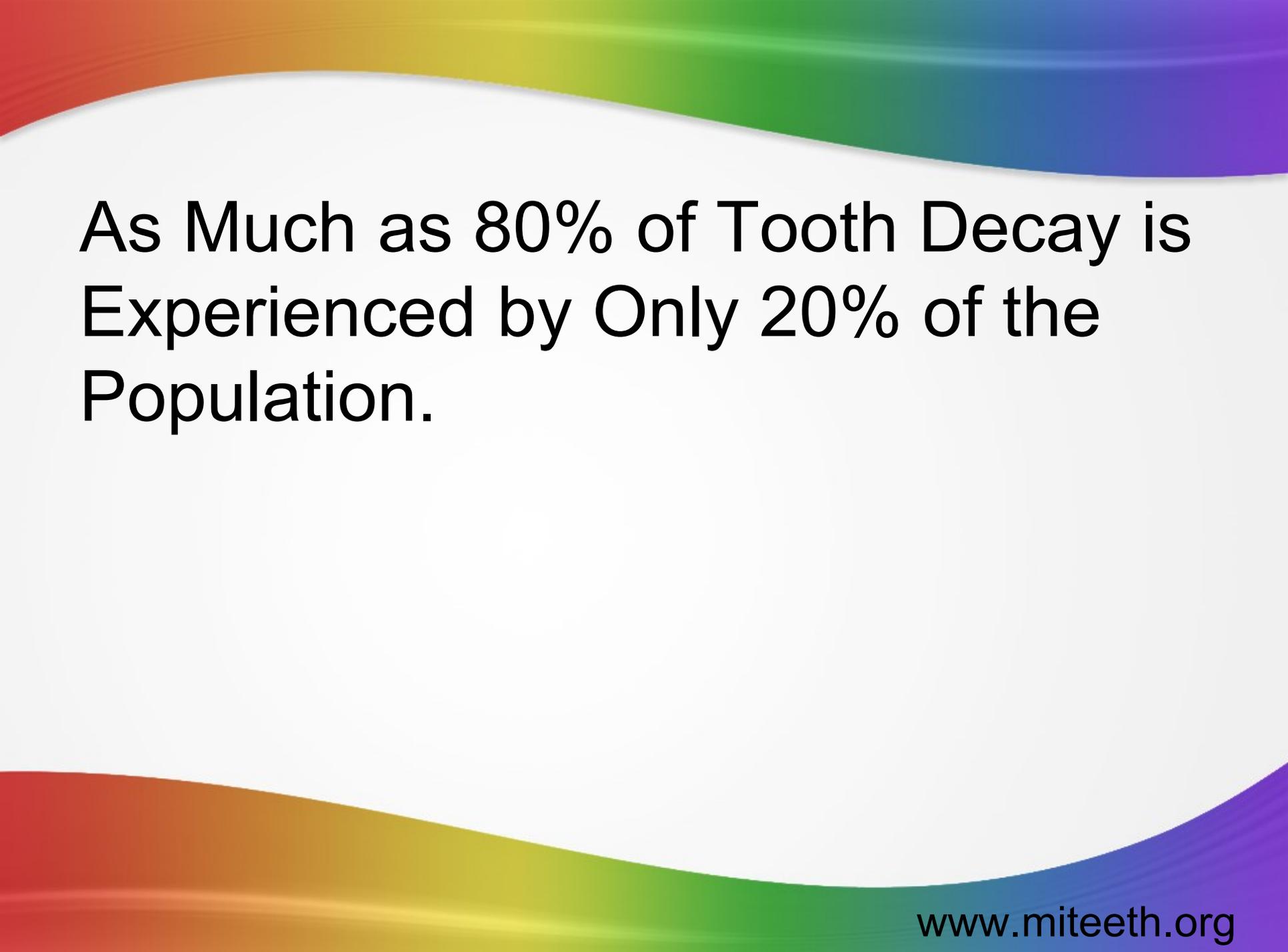
First-listed diagnosis	2000	2005	2010	Percent change ¹ (2000 to 2010)
Rate of hospitalization per 1,000 population				
Congestive heart failure	48	47	43	-9.5
Pneumonia	51	52	34	-32.8
Urinary tract infection	19	24	30	+55.9
Septicemia	15	18	28	+84.8
Stroke	37	27	28	-25.0
Hip fracture	28	23	21	-25.4

¹Percent change for each diagnosis is significant from 2000 through 2010 ($p < 0.05$).

NOTE: First-listed diagnosis is considered to be the main cause or reason for the hospitalization. The diagnoses were chosen because they were the top six first-listed diagnoses in 2010.

SOURCE: CDC/NCHS, National Hospital Discharge Survey, 2000–2010.

Oral Diseases  **Systemic Diseases**

A decorative graphic consisting of two wavy, overlapping bands of color. The top band is a gradient from red on the left to purple on the right. The bottom band is a gradient from red on the left to purple on the right, positioned below the top band. The background is white.

As Much as 80% of Tooth Decay is Experienced by Only 20% of the Population.

Oral Cavity & VAP

- 89 critically ill patients
- Examined microbial colonization of the oropharynx through out ICU stay
- Used pulse field gel electrophoresis to compare chromosomal DNA
- Results:
 - Diagnosed 31 VAPs
 - 28 of 31 VAP's the causative organism was identical via DNA analysis
- 49 elderly nursing home residents admitted to the hospital
- Examined baseline dental plaque scores & microorganism within dental plaque
- Used pulse field gel electrophoresis to compare chromosomal DNA
- Results
 - 14/49 adults developed pneumonia
 - 10 of 14 pneumonias, the causative organism was identical via DNA analysis

Role of Salivary Flow

- Provides mechanical removal of plaque and microorganisms
- Innate & specific immune components (IgA, cortisol, lactoferrin)
- Patients receiving mechanical ventilation have dry mouth which in turn contributes to accumulation of plaque & reduced distribution of salivary immune factors

Risk Factor Categories for Oral Cavity & Pneumonia

- Factors that increase bacterial burden or colonization
- Factors that increase risk of aspiration

Micro Aspiration During Sleep in Healthy Subjects

- Prospective duplicate full-night studies
- 10 normal male's 22-55 yrs of age
- Methods:
 - Radioactive ^{99m}Tc tracer inserted into the nasopharynx
 - Lung scans conducted immediately following final awakening
 - No difference in sleep efficacy btwn 2 study nights
- Results:
 - 50% of subjects had tracer in the pulmonary parenchyma upon final awakening
 - No difference in age, time spent in bed, efficacy of sleep, apnea-hyponea index, arousal plus awakening index or % sleep in the supine position between subjects that aspirated and those that did not.

Body Position: Supine Versus Semi-recumbent (30-45 degrees)

Methodology

- 19 mechanically ventilated patients
- 2 period crossover trial
- Study supine and semirecumbent positions over 2 days
- Labeled gastric contents (Tc 99m sulphur colloid)
- Measured q 30 min content of gastric secretions in endobronchial tree in each position
- Sampled ET secretions, gastric juice & pharyngeal contents for bacteria

Body Position: Supine Versus Semi-recumbent (30-45 degrees)

Results

- Radioactive contents higher in endobronchial secretions in supine patients
- Time dependent:
 - Supine: 298cpm/30min vs. 2592cpm/300min
 - HOB: 103cpm/30min vs. 216cpm/300min
- Same microbes cultured in all 3 areas 32% with HOB vs. 68% supine.

Risk Factor Categories for Oral Cavity & Pneumonia

- Factors that increase bacterial burden or colonization
- Factors that increase risk of aspiration

Maintain Good Oral Health

- Oral Hygiene: 2 mins twice a day
- See your dentist or dental hygienist regularly for cleanings, usually every six to 12 months

Brushing Removes Plaque

- Methodology:
 - 34 volunteers.
 - Double-blind crossover study.
 - Examine the amount and % of plaque removed with a single brushing with 3 solutions (Sodium Bicarb, Crest, Colgate).
- Results:
 - Significantly higher % of plaque removed with one minute brush using Sodium Bicarb.

Measures to Reduce or Prevent Periodontitis:

- Brush your teeth twice a day or, better yet, after every meal or snack
- Use a soft toothbrush/replace it at least every three to four months
- Consider using an electric toothbrush, which may be more effective at removing plaque and tartar
- Floss daily

Measures to Reduce or Prevent Periodontitis:

- Use a mouth rinse to help reduce plaque between your teeth, if recommended by your dentist
- Supplement brushing and flossing with an interdental cleaner
- Get regular professional dental cleanings, on a schedule recommended by your dentist
- Don't smoke or chew tobacco

Denture Care

- Patients should never sleep in dentures
 - If patient refuses, remove for 3-4 hours during day
- Dentures **should** be kept in liquid if not in mouth
 - Cleaning tablets should not be used with persons who have dementia
 - Dentures should be rinsed well before placing in patient's mouth

Denture Care

- Denture cup should be cleaned once a week to prevent bacterial or fungal growth
- Soaking dentures overnight, even with a cleansing tablet, is not enough
- Biofilm forms on dentures just the same as on natural teeth
- All adhesive should be removed daily
- Daily brushing with a denture brush and liquid soap
 - Not toothpaste

South Dakota Oral Health Vision

- Oral health understood as a critical component of overall health and well-being across the life span.
- Citizens understand and feel a sense of responsibility for their own oral health care
- Free from oral disease and enjoy optimal oral health;
- **Every professional within healthcare, education, social service, and safety-net services systems of the state possess understanding of the importance of oral health and its relationship to overall health and well-being;**
- Prevention and health promotion efforts for oral health care are embraced as a critical component of health and well-being
- Oral care is accessible and delivered in the most efficient and affordable way possible



What Is Your Role in the Journey?





**PASSION TO MAKE A
DIFFERENCE**



Missed Nursing Care

- “Any aspect of required patient care that is omitted (either in part or whole) or significantly delayed.”
- A predictor of patient outcomes
- Measures the process of nursing care

Hospital Variation in Missed Nursing Care

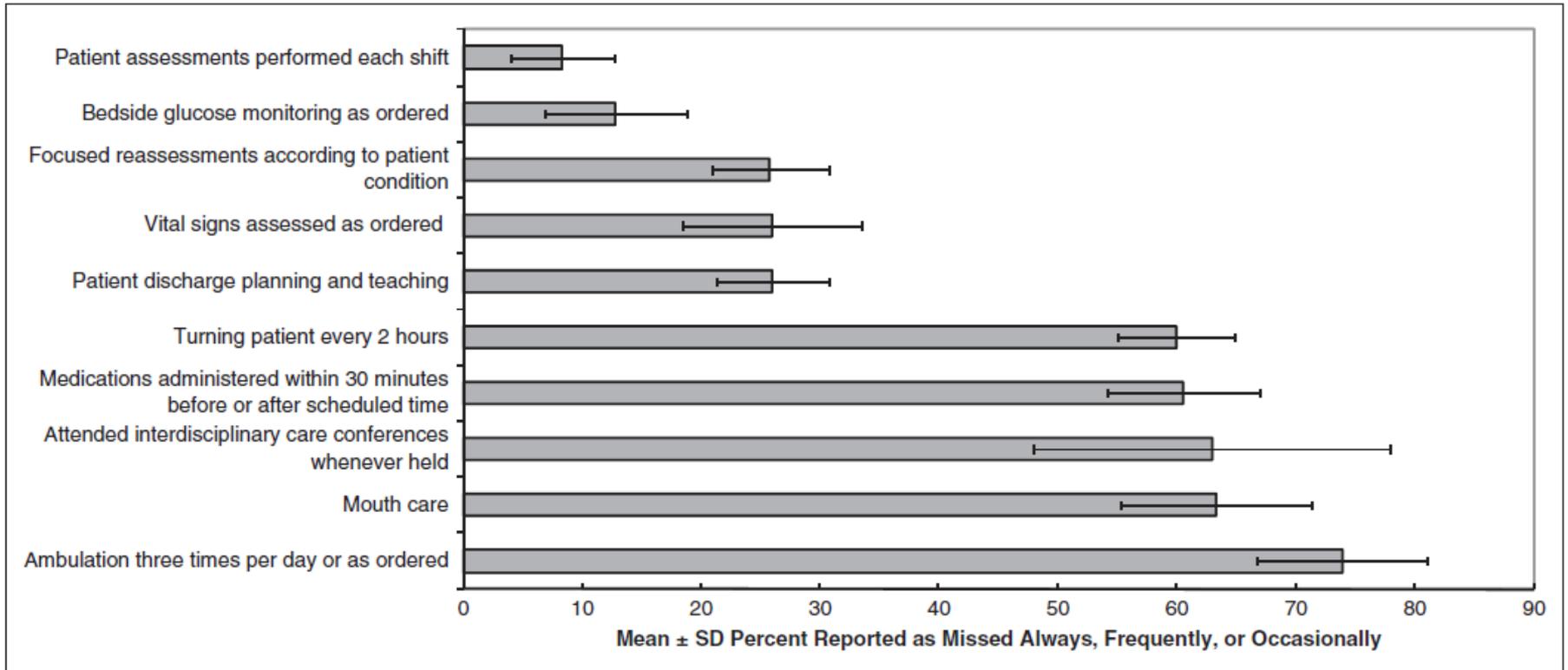


Figure 2. Elements of care most and least frequently missed. The solid bars represent the means across all 10 hospitals, and the range lines indicate the standard deviations.

Patient Perceptions of Missed Nursing Care

Table 2. Elements of Nursing Care by Ability of Patient to Report and Extent Missed*

	Fully Reportable	Partially Reportable	Not Reportable
			<ul style="list-style-type: none"> ■ Patient assessment ■ Surveillance ■ IV site care
Frequently Missed	<ul style="list-style-type: none"> ■ Mouth care ■ Listening ■ Being kept informed 	<ul style="list-style-type: none"> ■ Ambulation ■ Discharge planning ■ Patient education 	
Sometimes Missed	<ul style="list-style-type: none"> ■ Response to call lights ■ Response to alarms ■ Meal assistance ■ Pain medication and follow-up 	<ul style="list-style-type: none"> ■ Medication administration ■ Repositioning 	
Rarely Missed	<ul style="list-style-type: none"> ■ Bathing 	<ul style="list-style-type: none"> ■ Vital signs ■ Hand washing 	

* IV, intravenous.

Kalisch, B et al. (2012). TJC Jour Qual Patient Safety,38(4), 161-167.

Notes on Hospitals: 1859

“It may seem a strange principle to enunciate as the very first requirement in a Hospital that it should do the sick no harm.”

Florence Nightingale

Advocacy = Safety

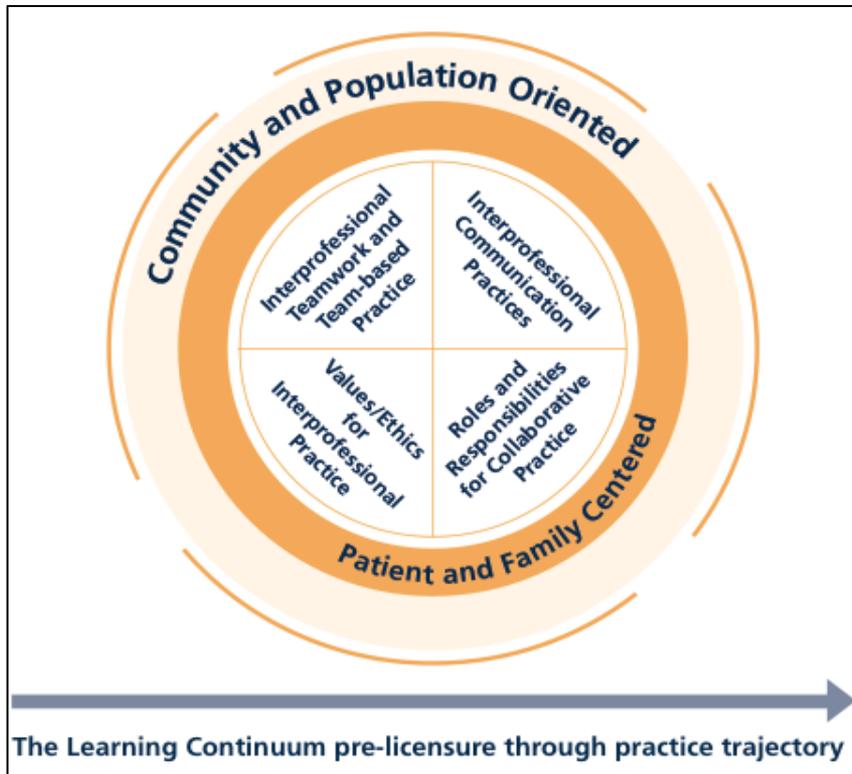
- 
- **Knowledge acquisition**
 - **Skill acquisition**
 - **Incorporate into your practice**
- 



Knowledge: www.OHNEP.org



IPEC Competencies (2011)



The cover of the report features logos for the American Association of Colleges of Nursing, AACOM (American Association of Colleges of Osteopathic Medicine), ASPH (Association to Advance Practical Education for Schools of Public Health), Association of Colleges of Pharmacy (ACCP), ADEA (Association to Advance Collegiate Schools of Education), and AAMC (Association of American Medical Colleges). The title "Core Competencies for Interprofessional Collaborative Practice" is prominently displayed, along with the text "Sponsored by the Interprofessional Education Collaborative*". A photograph shows a group of healthcare students in a classroom setting. At the bottom, it reads "Report of an Expert Panel May 2011" and lists the IPEC sponsors: American Association of Colleges of Nursing, American Association of Colleges of Osteopathic Medicine, American Association of Colleges of Pharmacy, American Dental Education Association, Association of American Medical Colleges, and Association of Schools of Public Health.

www.ohnep.org/



www.smilesforlifeoralhealth.com



Clients Role

- Understand the significance of oral self care in preventing pneumonia
- Necessary supplies for oral hygiene/denture care
- Obtain flu shots
- Pneumonia vaccine if appropriate
- Connect and maintain relationship with a dental home
- A healthy life style



Back to The Basics!!!!





Forbid yourself to be deterred by poor odds just because your mind has calculated that the opposition is too great. If it were easy, everyone would do it.

