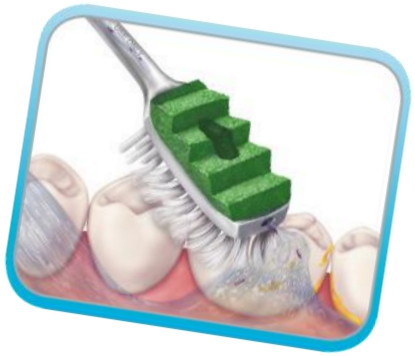

# Do No Harm: Mitigating Risk Factors for Non-Ventilator Pneumonia

Kathleen Vollman
ADVANCING NURSING THROUGH KNOWLEDGE & INNOVATION

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# Disclosures

- Consultant-Michigan Hospital Association Keystone Center
- Consultant/Faculty for CUSP for MVP—AHRQ funded national study
- Subject matter expert CAUTI, CLABSI, HAPU, Sepsis, Safety culture
- Consultant and speaker bureau
  - Stryker's Sage business
  - LaJolla Pharmaceutical
  - Potrero Medical
- Baxter Advisory Board

# Session Objectives

- Create the link of patient advocacy to the basic nursing care
- Define key fundamental evidence-based nursing care practices that reduce non-vent HAP
- Discuss strategies to overcome barriers

# 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**

# Protect The Patient From Bad Things Happening on Your Watch

**Implement Interventional Patient Hygiene**

# Interventional Patient Hygiene

- Hygiene…the science and practice of the establishment and maintenance of health
- Interventional Patient Hygiene….nursing action plan directly focused on fortifying the patients host defense through proactive use of evidence-based hygiene care strategies

Hand Hygiene

Catheter Care

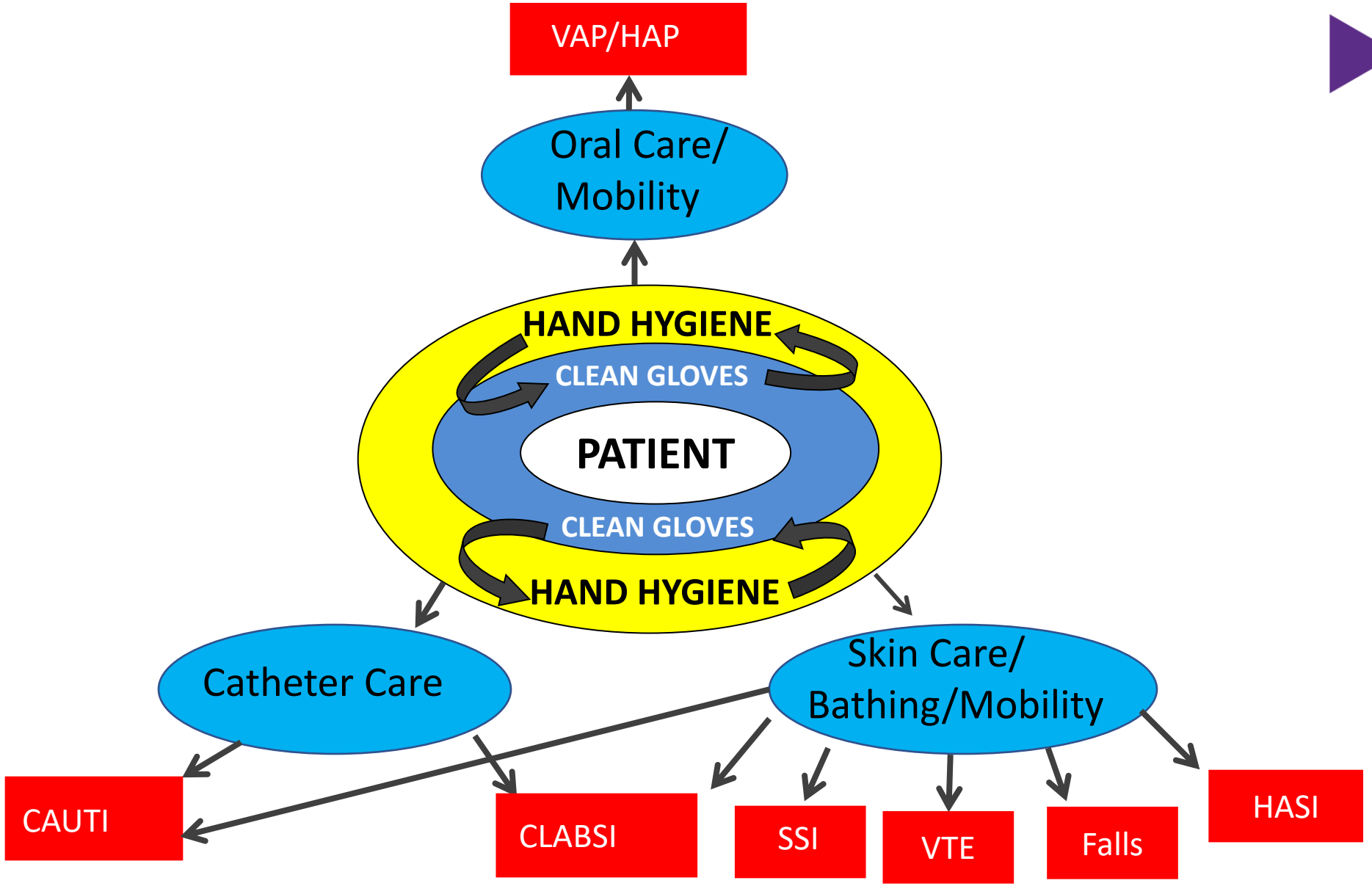
Comprehensive Oral Care Plan

Incontinence Associated Dermatitis Prevention Program

Bathing & Assessment

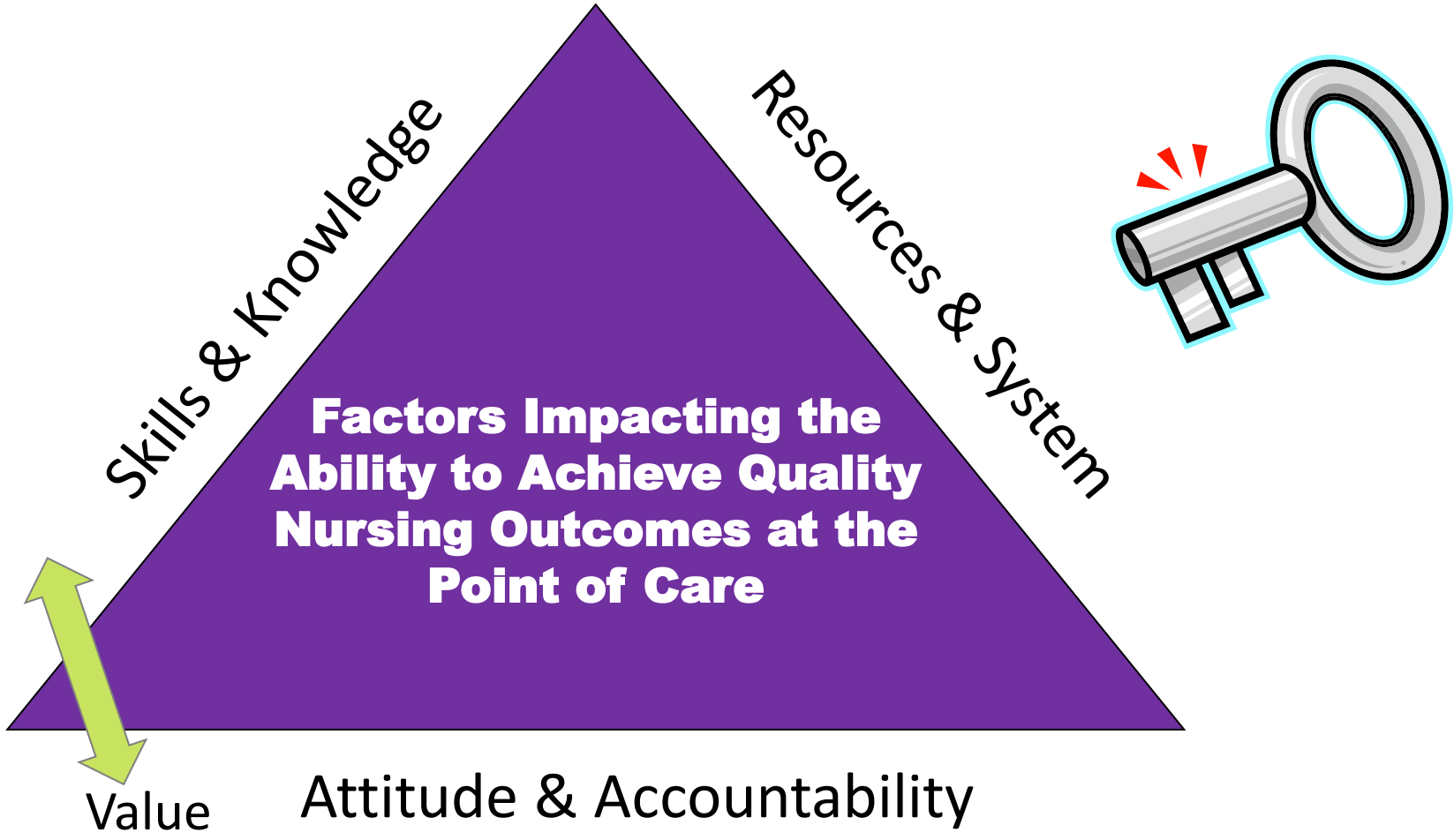
Pressure Ulcer Prevention

# INTERVENTIONAL PATIENT HYGIENE(IPH)



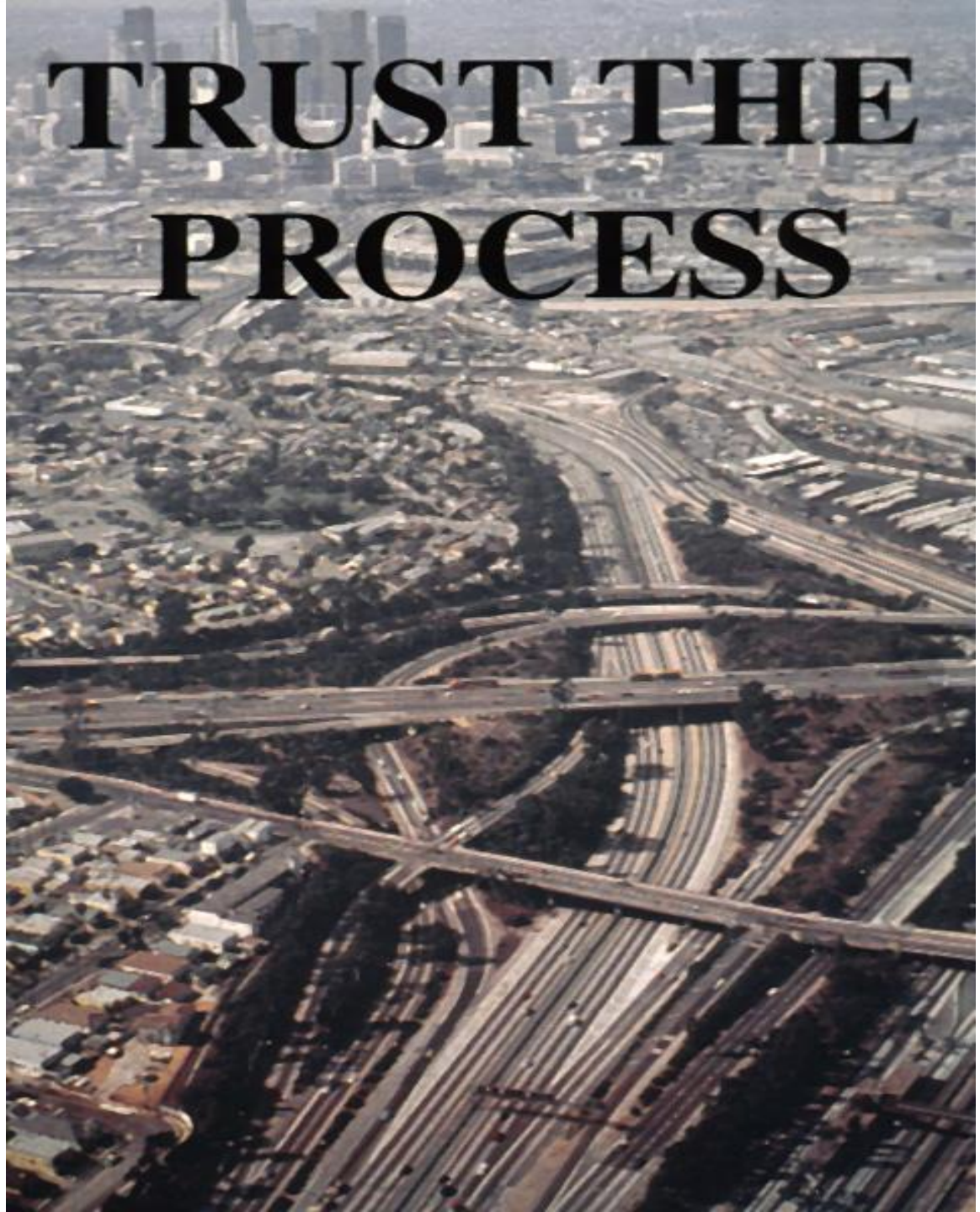

Vollman KM. Intensive Crit Care Nurs, 2013;22(4): 152-154

# Achieving the Use of the Evidence






Vollman KM. Intensive Crit Care Nurs, 2013;22(4): 152-154


TRUST THE
PROCESS

# Non-Vent Pneumonia:
## Addressing Risk Factors

# Build the Will: NV-HAP Causes Harm

- HAP 1st most common HAI in U.S.
- 1 in every 4 hospital infections are pneumonia
  - 60% non-ventilator
- Increased mortality →15.5%-30.9%
  - 8 ½ x more likely to die than equally sick patients who did not get non-vent HAP


Magill SS, et al. NEJM 2018;379:1732-1744
Micek ST, et al. Chest. 2016 Nov;150(5):1008-1014.
Baker D, Quinn B et al. J Nurs Care Qual, 1-7.
Giuliano K, et al. Am J of Infect Control. 2018;46:322-327
Davis J et al. Pa Patient Safety Advisory, 2018;15(3)
Strassle PD, et al. Infect Control Hosp Epidemiol. 2020 Jan;41(1):73-79.
Lacerna CC, et al. Infec control & Hosp Epidemiology 2020;41, 547-552

# Build the Will: NV-HAP Causes Harm

- Increased morbidity → 50% are not discharged home
  - Extended LOS → 7-9 days
  - Increased Cost → $36K to $54K per case
  - 2x likely for readmission <30 day
  - 46% ↑ ICU utilization
  - Increase antibiotic utilization


Magill SS, et al. NEJM 2018;379:1732-1744
Micek ST, et al. Chest. 2016 Nov;150(5):1008-1014.
Baker D, Quinn B et al. J Nurs Care Qual, 1-7.
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Lacerna CC, et al. Infec control & Hosp Epidemiology 2020;41, 547-552

# Relative Harm: Most Common HAIs

| Type | % Prevalence | % Mortality | Cost |
|---|---|---|---|
| **CAUTI** | 13% | 1.5% | $1,108 |
| **CLABSI** | 5-10% | 12% | $33,618 |
| **SSI** | 22% | 3% | $19,305 |
| **HAP** | 22% | 19% | $40,000 |

Magill SS, et al. New England Journal of Med, 2014;370:1198-208

# Hospital-Acquired Pneumonia:
## Non-Ventilated versus Ventilated Patients in Pennsylvania

**Purpose:**

- Compare VAP and NV-HAP incidence, outcomes

**Methods:**

- Pennsylvania Database queried
- All nosocomial pneumonia data sets (2009-2016)

Retrieved on 13/17/2020 from
http://patientsafety.pa.gov/ADVISORIES/Pages/201809_NVHAP.aspx

# Results:

**Table 1. Pennsylvania Nosocomial Pneumonia Incidence and Number of Patients with NV-HAP or VAP Who Died**

| Year | Number of NV-HAP Patients | Number of NV-HAP Patients Who Died | Percentage of Patients with NV-HAP Who Died (Confidence Interval) | Number of VAP Patients | Number of VAP Patients Who Died | Percentage of Patients with VAP Who Died (Confidence Limit) |
|---|---|---|---|---|---|---|
| 2009 | 1,977 | 364 | 18.41 (16.52–20.3) | 922 | 163 | 17.68 (14.96–20.39) |
| 2010 | 1,848 | 366 | 19.81 (17.78–21.83) | 737 | 144 | 19.54 (16.35–22.73) |
| 2011 | 1,780 | 318 | 17.87 (15.9–19.83) | 643 | 127 | 19.75 (16.32–23.19) |
| 2012 | 1,620 | 307 | 18.95 (16.83–21.07) | 571 | 112 | 19.61 (15.98–23.25) |
| 2013 | 1,528 | 285 | 18.65 (16.49–20.82) | 767 | 160 | 20.86 (17.63–24.09) |
| 2014 | 1,419 | 256 | 18.04 (15.83–20.25) | 901 | 199 | 22.09 (19.02–25.16) |
| 2015 | 1,427 | 277 | 19.41 (17.13–21.7) | 912 | 218 | 23.90 (20.73–27.08) |
| 2016 | 1,380 | 280 | 20.29 (17.91–22.67) | 980 | 221 | 22.55 (19.58–25.52) |
| **Total** | **12,979** | **2453** | **18.89%** | **6433** | **1344** | **20.89%** |

- Mortality
- Incidence
- Total deaths
- Total cost
- Wide-spread

Retrieved on 13/17/2020 from http://patientsafety.pa.gov/ADVISORIES/Pages/201809_NVHAP.aspx

# NV-HAP SMCS Research Findings: 2010

## 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%)

**24,482 patients and 94,247 pt days**

## Cost:

- $4.6 million
- 23 deaths
- Mean Extended LOS 9 days
- 1,035 extra days

Quinn, B. et al. Journal of Nursing Scholarship, 2014. 46(1):11-19

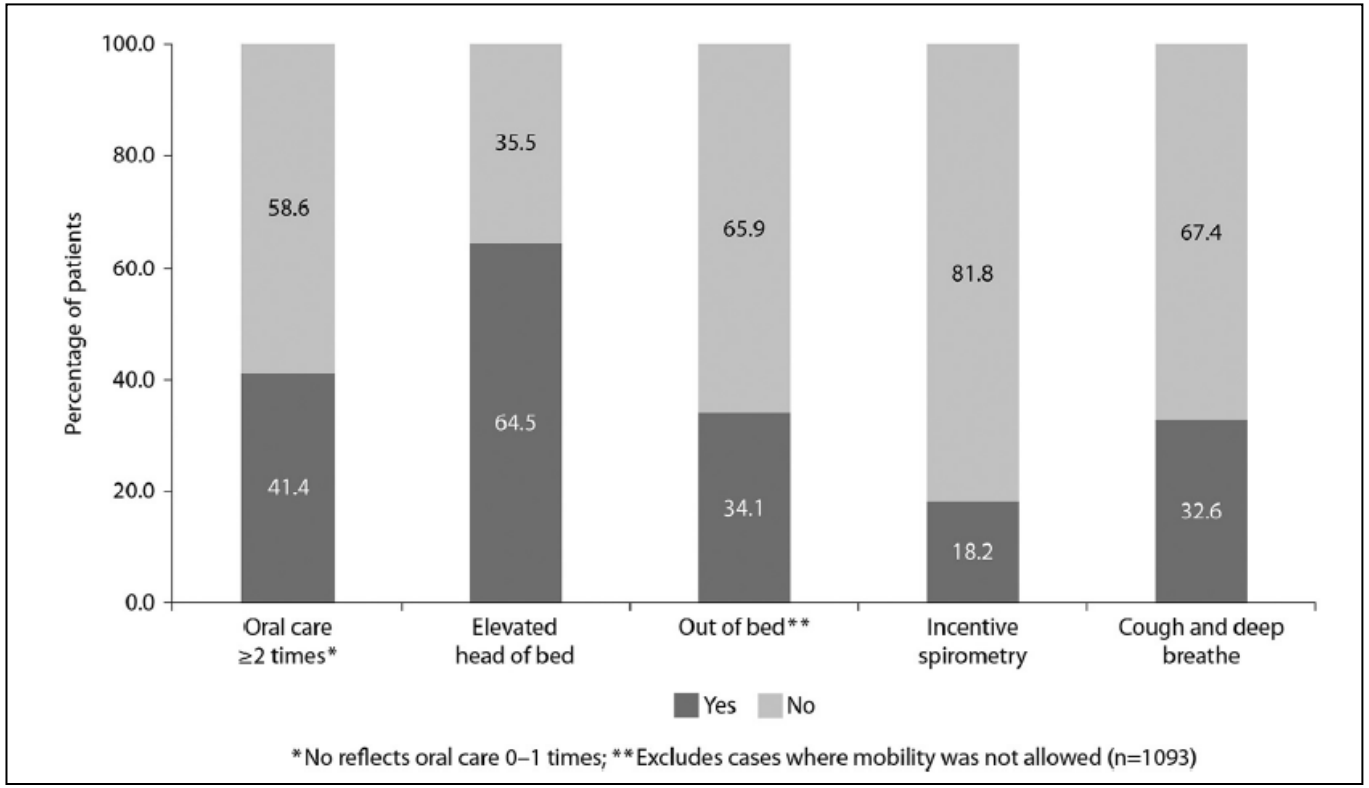
# HAPPI-2 Incidence of Non-Ventilator Hospital-Acquired Pneumonia

- Multicenter retrospective chart review
- Extracted NV-HAP cases per the 2014 ICD-9-CM codes for pneumonia not POA and the 2013 CDC case definition
- 21 hospitals completed data collection
- Measured nursing care missed 24hrs before diagnosis
- Non-vent HAP occurred on every unit

Baker D, Quinn B, Amer J of Infect Control, 2018;46:2-7

# HAPPI-2 Incidence of Non-Ventilator Hospital-Acquired Pneumonia

Missed nursing care 24 hours prior to Non-Vent HAP dx.




Baker D, Quinn B, Amer J of Infect Control, 2018;46:2-7

# HAPPI-2 Incidence of Non-Vent Hospital-Acquired Pneumonia

**Results:**

- 1,300 NV-HAP (0.12-2.28 per 1,000 pt days)
  - 15.8% mortality
  - 50% < 66 yrs old
  - 63% non-surgical
  - 70.8% outside the ICU
  - 27.3 % in ICU
  - 18.8% transferred to ICU
  - 37.3% LOS >20 days
  - 57.7% LOS > 15 days
  - 40.6% admitted from home were discharged back to home
  - 19.3% readmitted within 30 days
  - $36.4 -$52.56 million in extra costs

- Med-Surg (43.1%; n = 560)
- Telemetry (8.5%; n = 111)
- Progressive (7.2%; n = 93)
- Oncology (4.9%; n = 64)
- Orthopedic (2.8%; n = 37)
- Neurology (1.5%; n = 19)
- Obstetric (0.2%; n = 3)

Baker D, Quinn B, Amer J of Infect Control, 2018;46:2-7

# Epidemiology of Non-Ventilator Hospital Acquired Pneumonia in US

- The 2012 US national inpatient sample dataset was used to compare an NV-HAP group to 4 additional group cohorts:
  - Pneumonia on admission
  - General hospital admissions
  - Matched on mortality & disease severity
  - Ventilator-associated pneumonia (VAP)
- Secondary outcome: compare HLOS, total hospital charges, and mortality between the NV-HAP group and the 4 l group cohorts

Giuliano K, et al. Am J of Infect Control. 2018;46:322-327

# Epidemiology of Non-Ventilator Hospital Acquired Pneumonia in US

- Incidence of NV-HAP was 1.6%, (3.63 per 1,000 pt days)
- NV-HAP was associated with:
  - Increased total hospital charges
  - Longer hospital length of stay
  - Greater likelihood of death

Compared to all groups except patients with VAP

Giuliano K, et al. Am J of Infect Control. 2018;46:322-327

# Is Pneumonia Part of the Sepsis Picture?

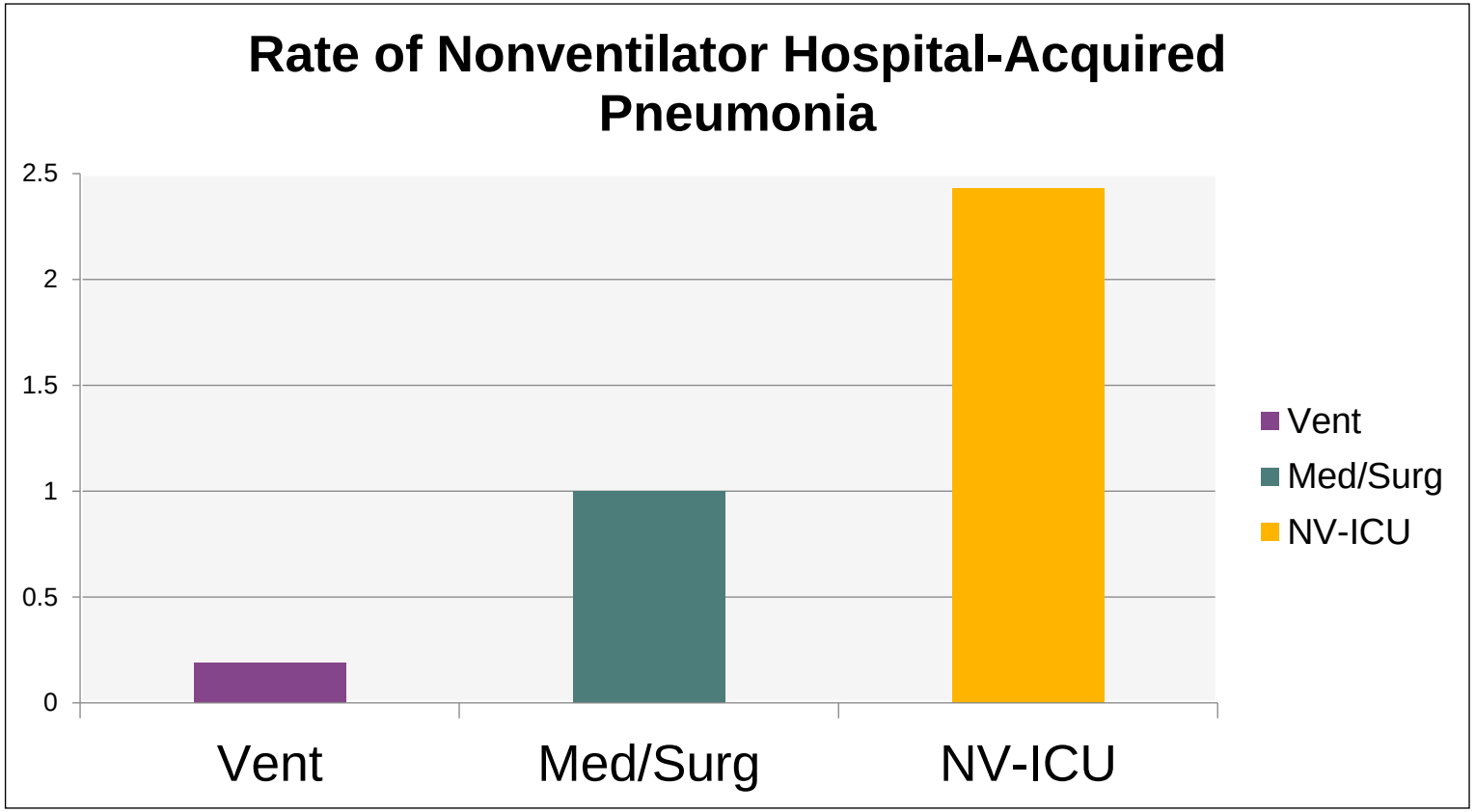
30-50% of sepsis cases may initiate with pneumonia

| Site of infection | Frequency % | | Mortality % | |
|---|---|---|---|---|
| | Male | Female | Male | Female |
| Respiratory | 41.8 | 35.8 | 22.0 | 22.0 |
| Bacteremia | 21.0 | 20.0 | 33.5 | 34.9 |
| Genitourinary | 10.3 | 18.0 | 8.6 | 7.8 |
| Abdominal | 8.6 | 8.1 | 9.8 | 10.6 |
| Device related | 1.2 | 1.0 | 9.5 | 9.5 |
| Wound/ soft tissue | 9.0 | 7.5 | 9.4 | 11.7 |
| Central nervous system | 0.7 | 0.5 | 17.3 | 17.5 |
| Endocarditis | 0.9 | 0.5 | 23.8 | 28.1 |
| Other/ unspecified | 6.7 | 8.6 | 7.6 | 6.5 |

Risk of developing sepsis 28x greater with NVHAP than with pneumonia on admission

Angus DC, et al. N Engl J Med. 2013 Aug 29;369(9):840-51.
Giuliano K, et al. Am J of Infect Control. 2018;46:322-327

# Where is the Highest Risk for NV-HAP?



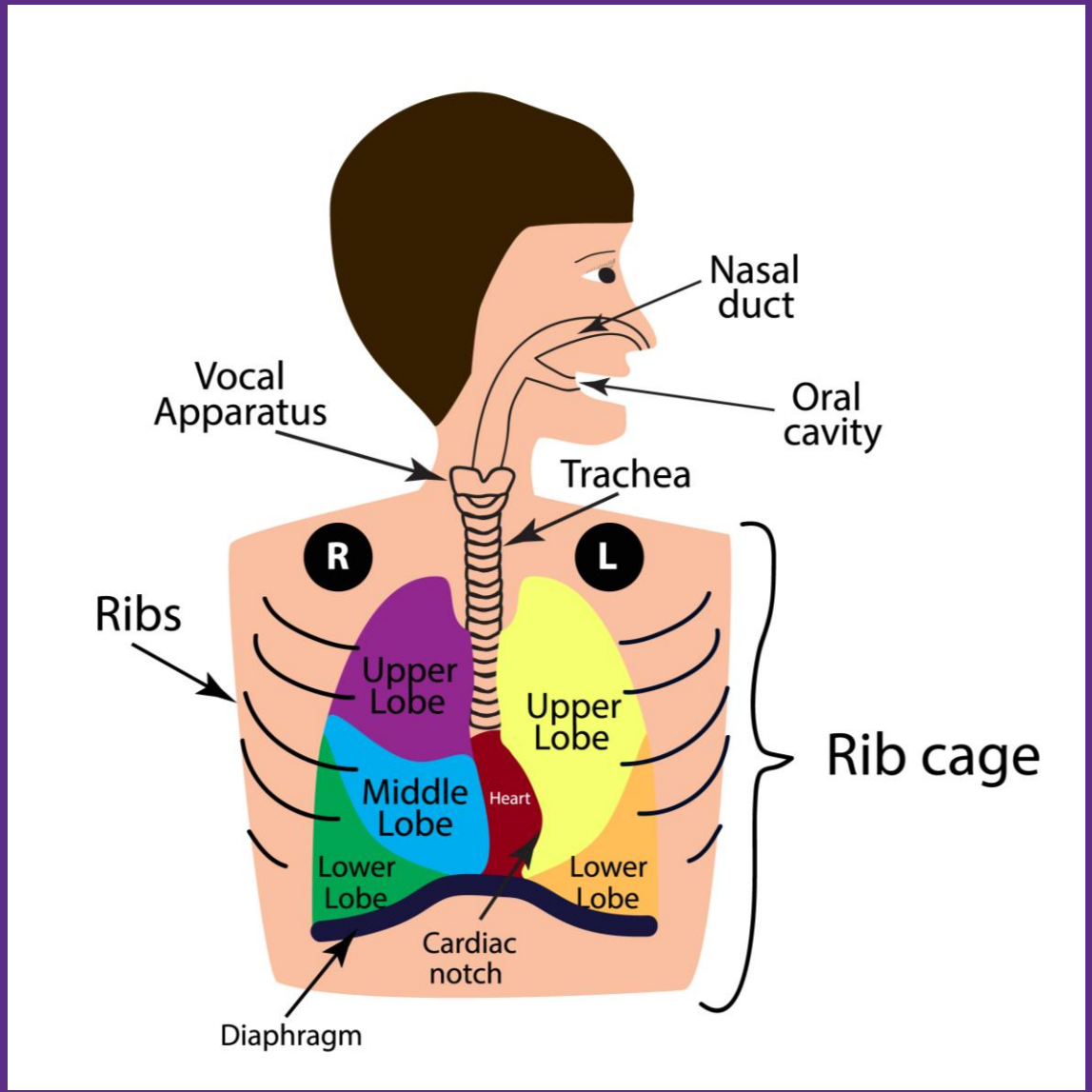

**NV-HAP per 1000 patient days**

Slide courtesy of Barb Quinn

# Addressing the risk-factors associated with NV-HAP through evidence based fundamental nursing care strategies

# Single Ecosystem

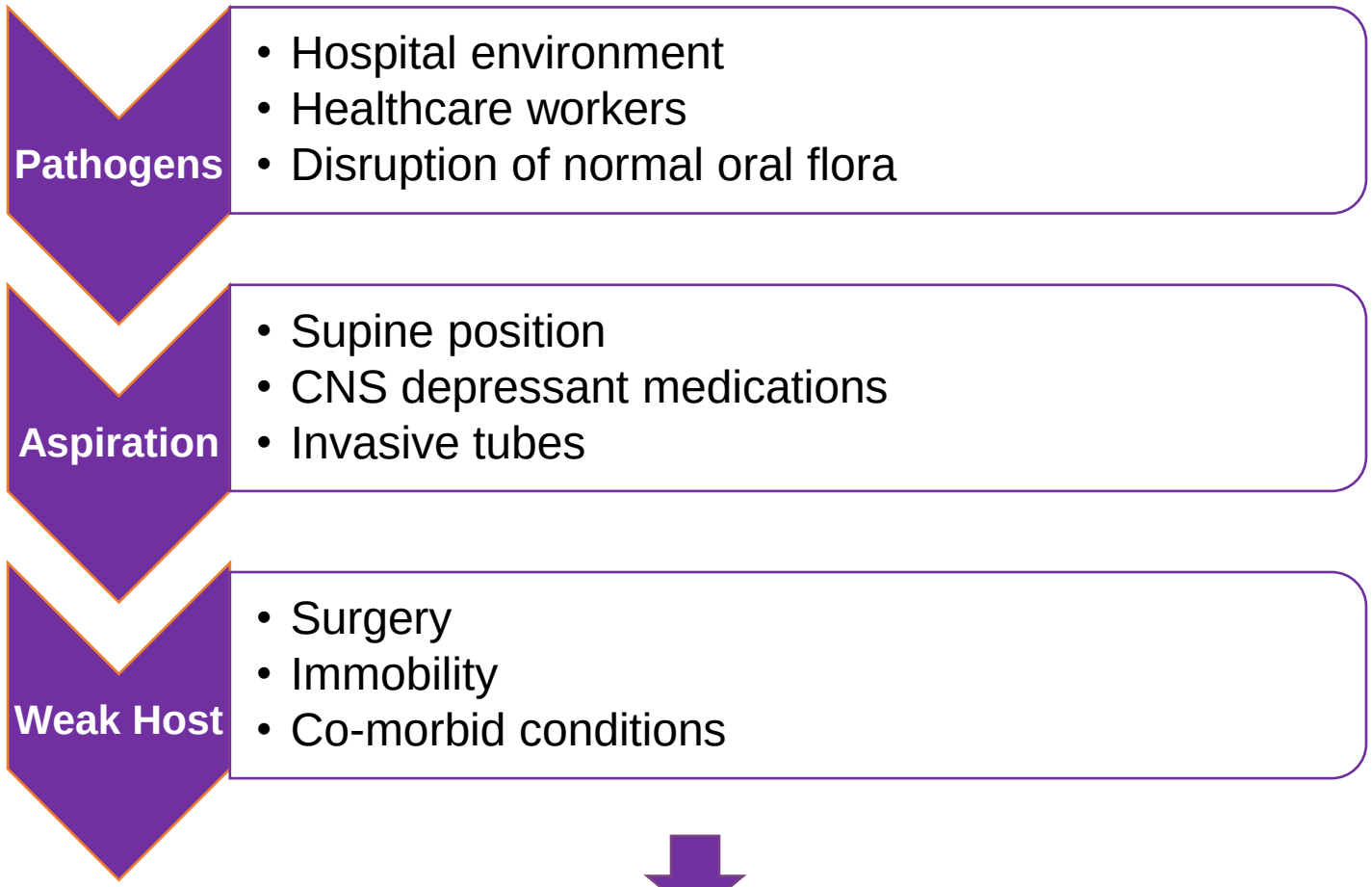
- Entire respiratory tract is one ecosystem
  - Upper-nasal and oral cavities
  - Lower-alveoli
- Not  sterile environment
- Oral flora changes in hospitalized patients
- Relationship between dental plaque and pulmonary lavage fluid





Huffnagle GB, et al. Mucosal Immunol. 2017 Mar;10(2):299-306
Johanson WG, et al. N Engl J Med. 1969 Nov 20;281(21):1137-40
Heo SM, et al. Clin Infect Dis. 2008 Dec 15;47(12):1562-70.

# Risk Factors for Pneumonia

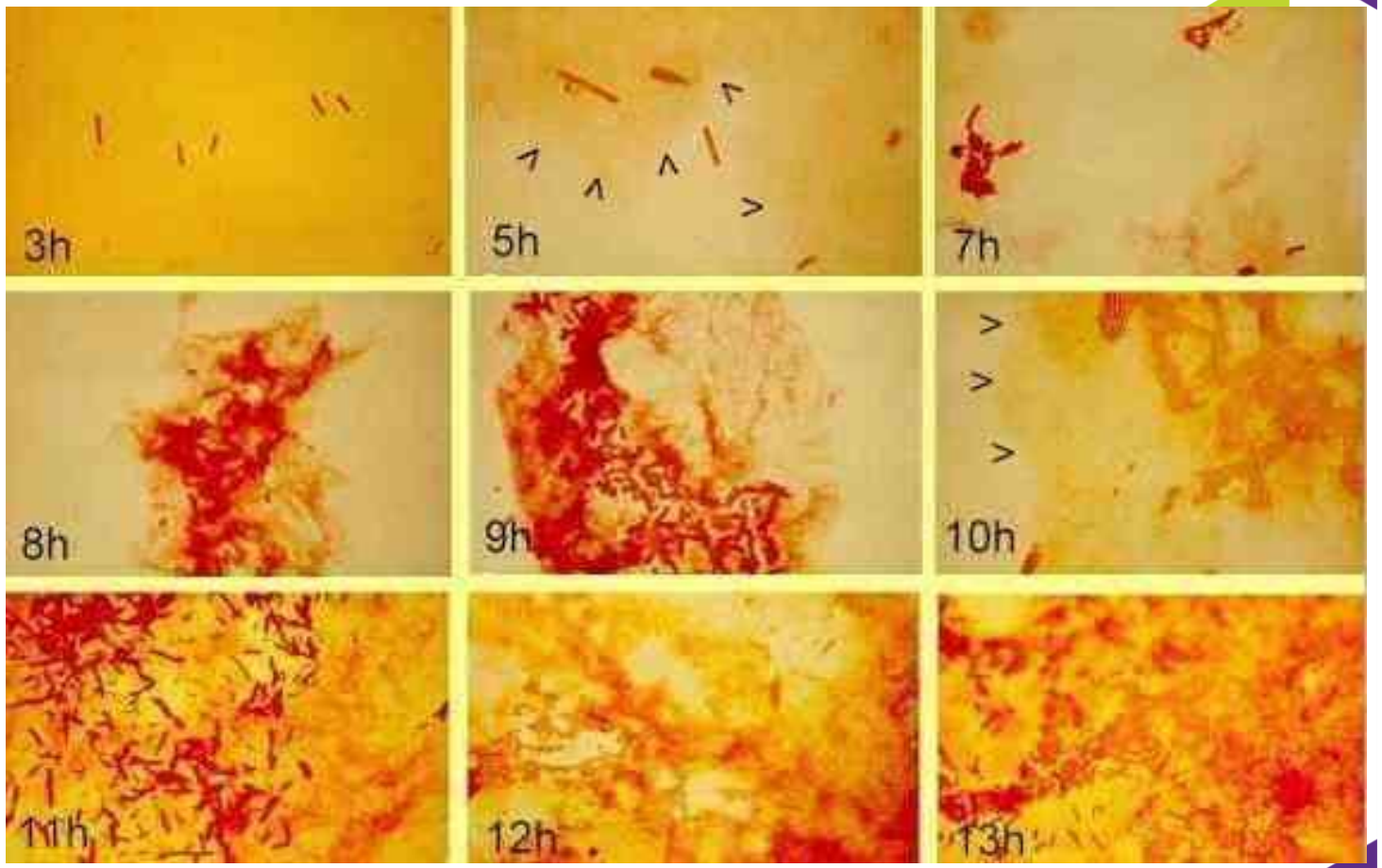



Quinn & Baker. (2014). *J Nsg Scholarship, 46*(1), 11-19.

Slide courtesy of Barb Quinn

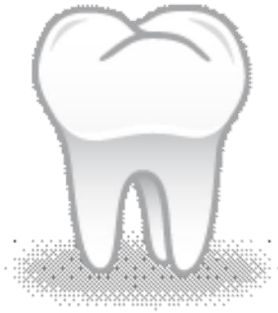
# Where does Pneumonia Start: Oral Bacteria during Hospitalization & Illness

- Oral cavity
  - > 1 billion oral microbes
  - 700-1000 species
  - Replicate's 5 x in 24hr period
- Disruption of Microbiome
  - Plaque, gingivitis, tooth decay
  - Reduced salivary flow/change in pH
- 24-48 hours for HAP pathogens in mouth
- If aspirated =100,000,000 bacteria/ml saliva into lungs




Scannapieco FA, Stewart EM, Mylotte JM.. *Crit Care Med. 1992;20:740-745.*
Langmore, S. et.al. (1998) *Dysphagia. 13,* 69-81
Loesche, W. 2012
http://helios.bto.ed.ac.uk/bto/microbes/biofilm.htm

# 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 VAPs 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

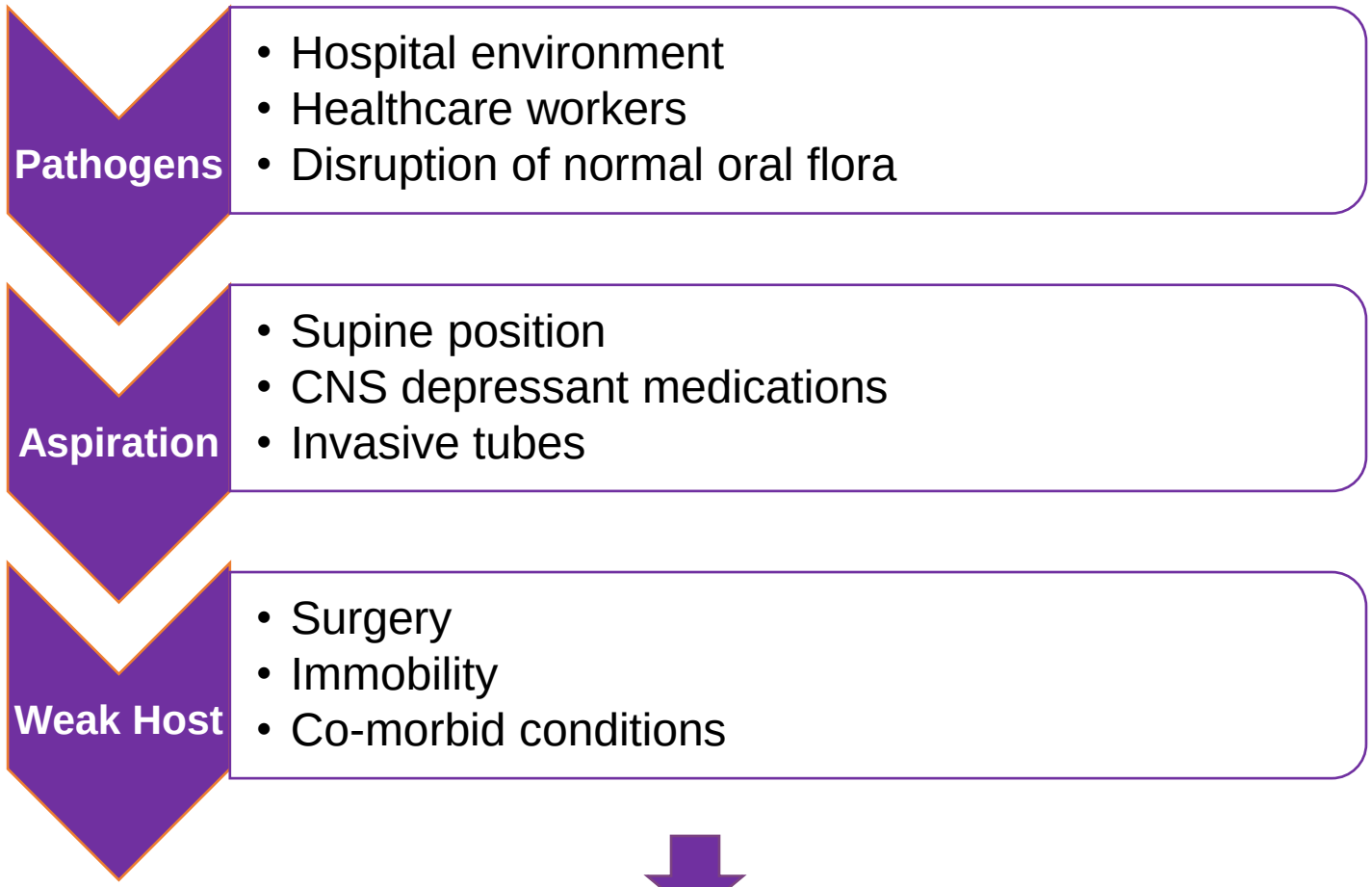
Garrouste-Orgeas et. al. Am J Respir Crit Care Med. 1997;156:1647-1655
El-Solh AA. Chest. 2004;126:1575-1582

# 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

Munro CL & Grap MJ. AJCC. 2004;13:25-34

# Risk Factors for Pneumonia




Quinn & Baker. (2014). *J Nsg Scholarship, 46*(1), 11-19.

Slide courtesy of Barb Quinn

# Micro Aspiration during Sleep in Healthy Subjects

- Prospective duplicate full-night studies
- 10 normal male's 22-55 years of age
- Methods:
  - Radioactive 99 mTc tracer inserted into the nasopharynx
  - Lung scans following final awakening
  - No difference in sleep efficacy between 2 study nights
- Results:

**50%**

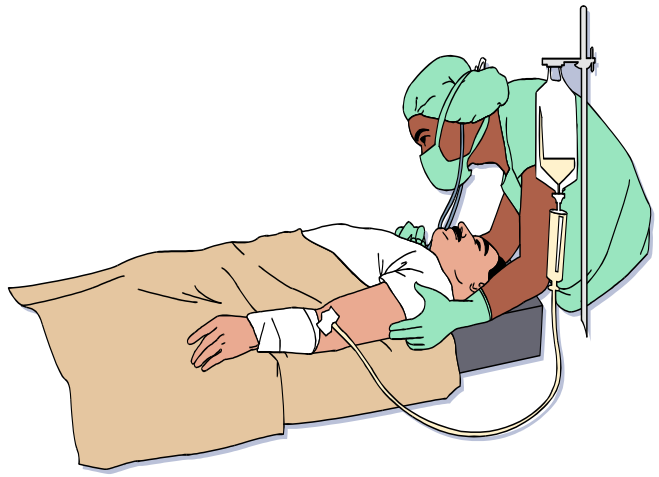
In the lung parenchyma

Gleeson K, et al. Chest. 1997;111:1266-72

# 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



Torres A et. al Ann Intern Med 1992;116:540-543

# 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

Torres A et. al. Ann Intern Med 1992;116:540- 543

# Body Position: Supine versus Semi-recumbent

**Results:**

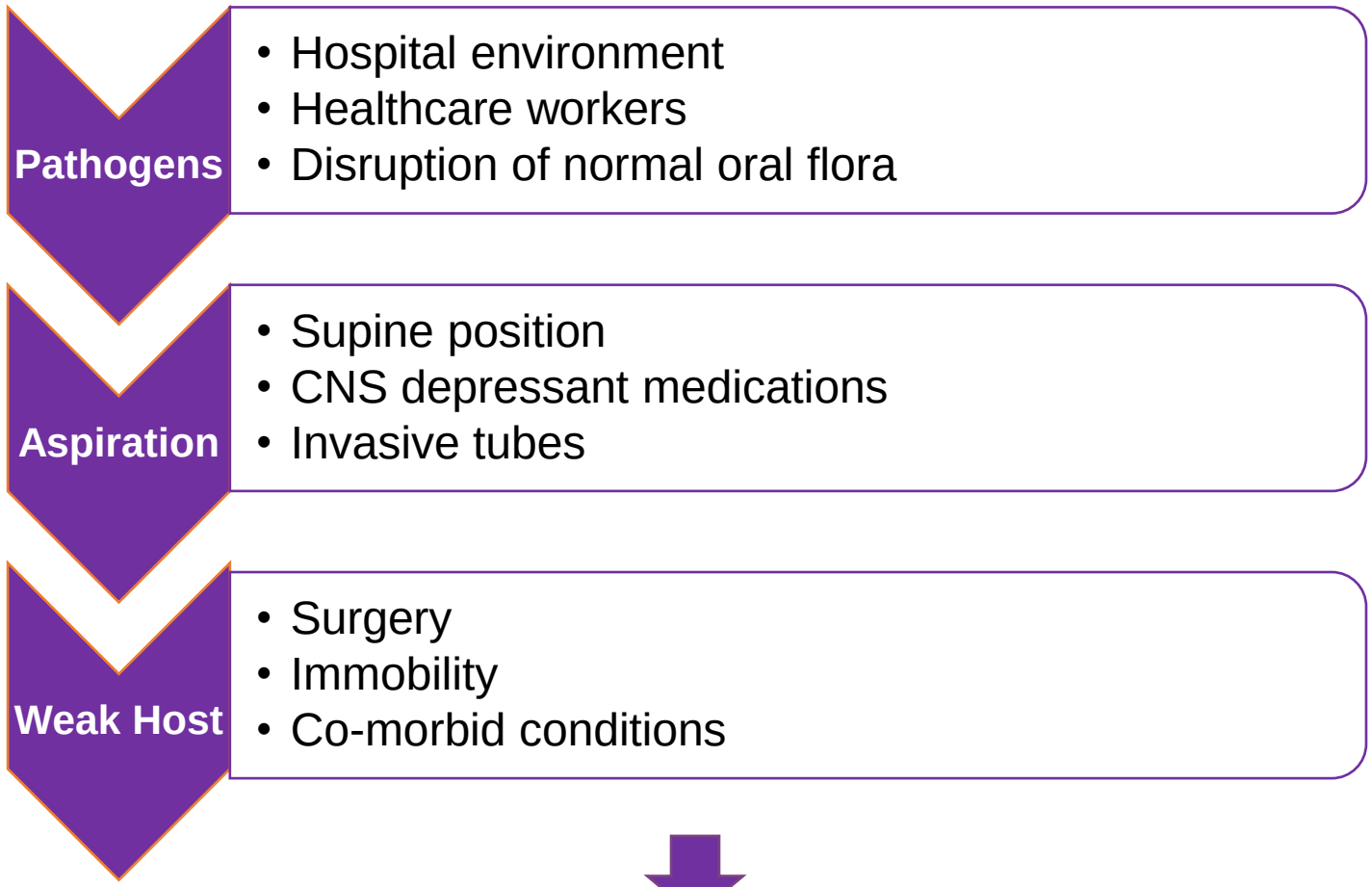
- Radioactive  contents higher in endobronchial secretions in supine patients
- Time dependent:
  - Supine: 298cpm/30min vs. 2592cpm/300min
  - HOB: 103cpm/30min vs. 216cpm/300min

Same microbes cultured in all 3 areas

- HOB: 32%
- Supine: 68%

Torres A et. al. Ann Intern Med 1992;116:540- 543

# Risk Factors for Pneumonia




Quinn & Baker. (2014). *J Nsg Scholarship, 46*(1), 11-19.

Slide courtesy of Barb Quinn

# Weak Host: Who is at Highest Risk?

- Male
- Elderly
- Surgical
- ICU
- Chronic disease
  - DM, CHF, CKD, COPD, alcoholism

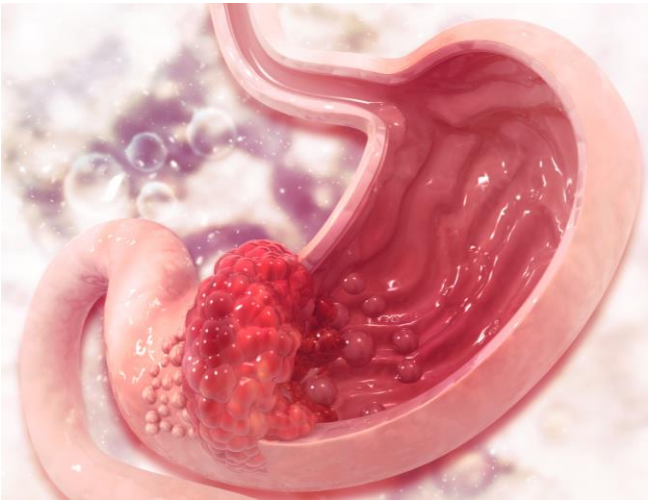
- Immunocompromised
- More than 6 medications
- Low albumin
- On antibiotics
- Dependent for ADLs
- Smokers

Strassle PD, et al. Infect Control Hosp Epidemiol. 2020 Jan;41(1):73-79.

Slide courtesy of Barb Quinn

# Stewardship of Stress Ulcer Prophylaxis (SUP)

- The most common complication of SUP is pneumonia
- ICU enteral fed patients –
  - no benefit & may increase risk for pneumonia (Huang study)
  - Avoid unnecessary use
- Acute Stroke patients (Systematic Review & Meta-Analysis)
  - Acid suppressive medications are an important contributor to pneumonia development, especially PPIs
- May lead to loss of protective bacteriostatic effect of gastric acid
- Higher risk of Clostridium difficile infection when combined with antibiotics



Huang et. al (2018). Critical Care 22(20), 1-9.
Herzig et. Al (2014) Ann Neurol. 76(5): 712-178.
Marchina et al (2019). J of the Neurological Sciences, 400;122-128.

Slide courtesy of Barb Quinn

# Systematic Review of Inpatient Mobilization

- Literature review of research studies that provides evidence to the consequences of mobilizing or not mobilizing hospitalized adult patients
- 36 studies were included
- Findings in four theme areas:
  - Physical outcomes include pain relief, reduced deep vein thrombosis, less fatigue, less delirium, less pneumonia, improved physical function (no relationship to falls)
  - Psychological outcomes include less anxiety, ↓depressive mood, ↓ distress symptoms, ↑comfort and ↑satisfaction
  - Social outcomes include ↑quality of life and more independence
  - Organizational outcomes include ↓length of stay, ↓mortality and ↓cost

Kalish BJ, et al. Journal of Clinical Nursing, 2013;23:1486-1501

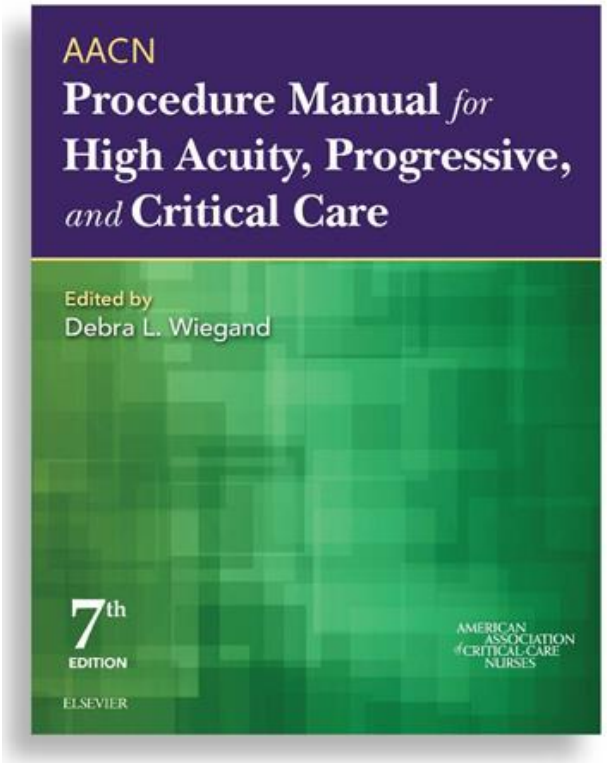
# What about Incentive Spirometry?

- Commonly prescribed to improve lung function for patients with surgery, pneumonia, rib fractures, etc.
- No evidence that Incentive Spirometry is effective in the prevention of pulmonary complications in upper abdominal surgery or CABG (Cochrane 2012 & 2014)
- Postop IS did not demonstrate any effect for bariatric surgery patients on postop hypoxemia, $SaO_2$ level, or postop pulmonary complications (JAMA Surg 2017)


Slide courtesy of Barb Quinn

Freitas et al (2012) IS for prev pulm compl after CABG. Cochrane Database Syst Rev (9) do Nascimento Jr et al (2014) IS for prev of postop pulm compl in upper abd surg. Cochrane Review. Issue (2) Pantel et al (2017) Effect of IS on postop hypoxemia & pulm compl. after bariatric surg: A RCT

# AACN Procedural Manual-7th Ed



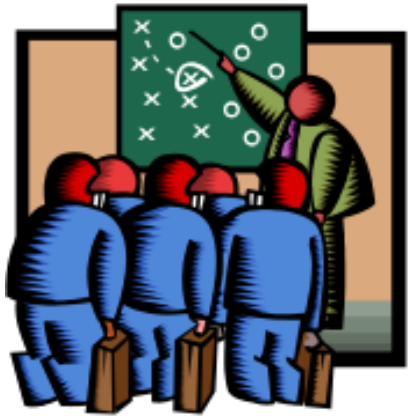

**Procedure 4: Endotracheal Tube Care and Oral Care**

**Authors:**
Kathleen M Vollman
Mary Lou Sole
Barbara Quinn

# SMCS HAP Prevention Plan

## Phase 1: Oral Care

- Formation of new quality team: Hospital-Acquired Pneumonia Prevention Initiative (HAPPI)
- New oral care protocol to include non-ventilated patients
- New oral care products and equipment for all patients
- Staff education and in-services on products
- Ongoing monitoring and measurement
  - Monthly audits



Quinn B, et al. J of Nursing Scholarship, 2014, 46(1):11-19

# Gap Analysis

| Best Practice | Our Gaps | Action To Take |
|---|---|---|
| Comprehensive oral care for all (CDC, SHEA) | ICU vent patients only | Develop inclusive oral care protocol |
| Oral CHG (0.12%) periop adult CV surgery and vent pts. (CDC, ATS, IHI) | Not using CHG on these patients | Added to preprinted orders, and to protocol |
| Therapeutic oral care tools (ADA) | Poor quality oral care tools; Absence of denture care supplies | New tools and supplies. |

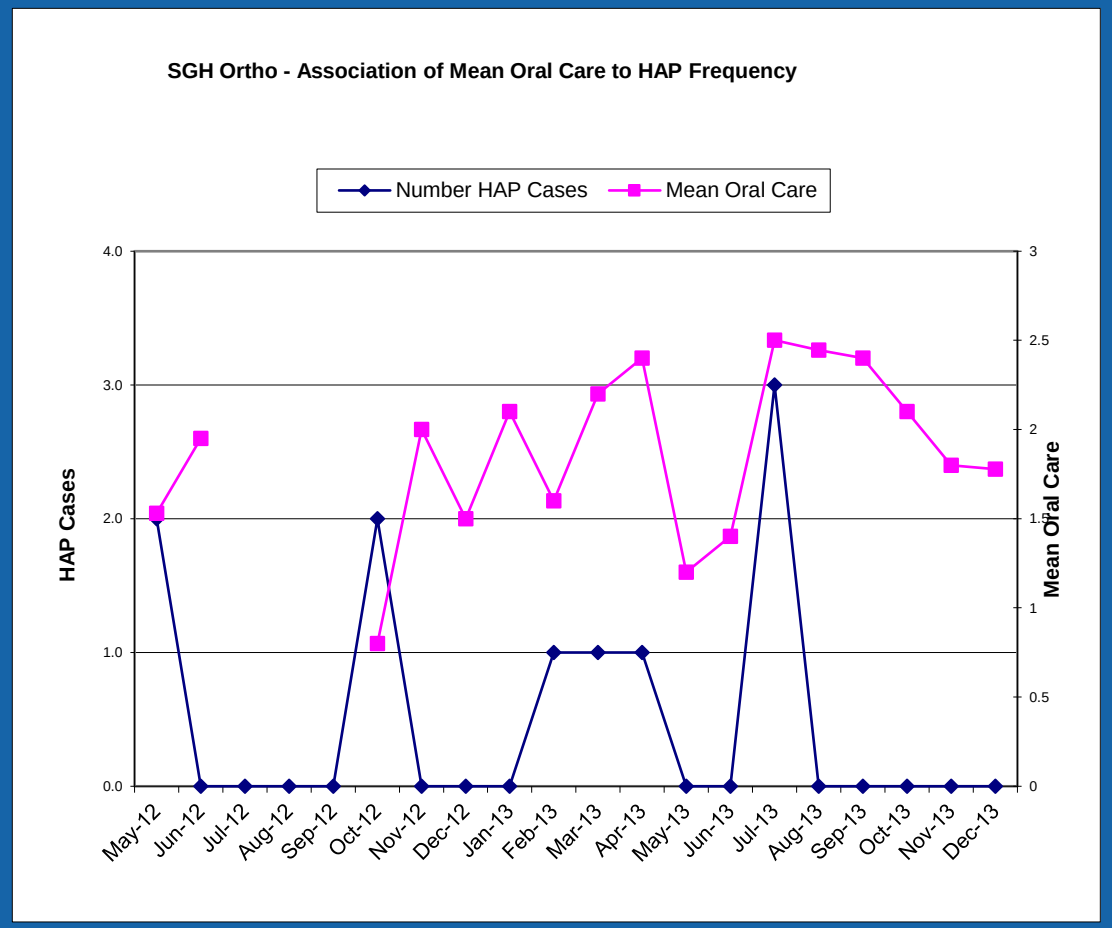
Quinn, B. et al. Journal of Nursing Scholarship, 2014. 46(1):11-19

# Protocol – Plain & Simple

| Patient Type | Tools | Procedure | Frequency |
|---|---|---|---|
| Self Care / Assist | Brush, paste, rinse, moisturizer<br>• Soft-bristled toothbrush<br>• Toothpaste with dentifrice<br>• Antiseptic mouth rinse (alcohol-free)<br>• Moisturizer (Petroleum-free) | Provide tools<br>Brush 1-2 minutes<br>Rinse | 4X / day |
| Dependent / Aspiration Risk | Suction toothbrush kit (4) | Package instructions | 4X / day |
| Dependent / Vent | ICU Suction toothbrush kit (6)<br>• CHG for vent & cardiac surgery patients | Package instructions | 6X / day |
| Dentures | Denture cup, brush<br>Cleanser<br>Adhesive | Remove dentures & soak<br>Brush gums, mouth<br>Rinse | 4X / day |

Quinn B, et al. J of Nursing Scholarship, 2014, 46(1):11-19

# Provide Meaningful Data




- Ortho Unit had ZERO HAP cases in the last 4 months of 2013!!
- Great WORK!!
- Remember, the goal is to provide and document oral care after each meal and before bedtime.

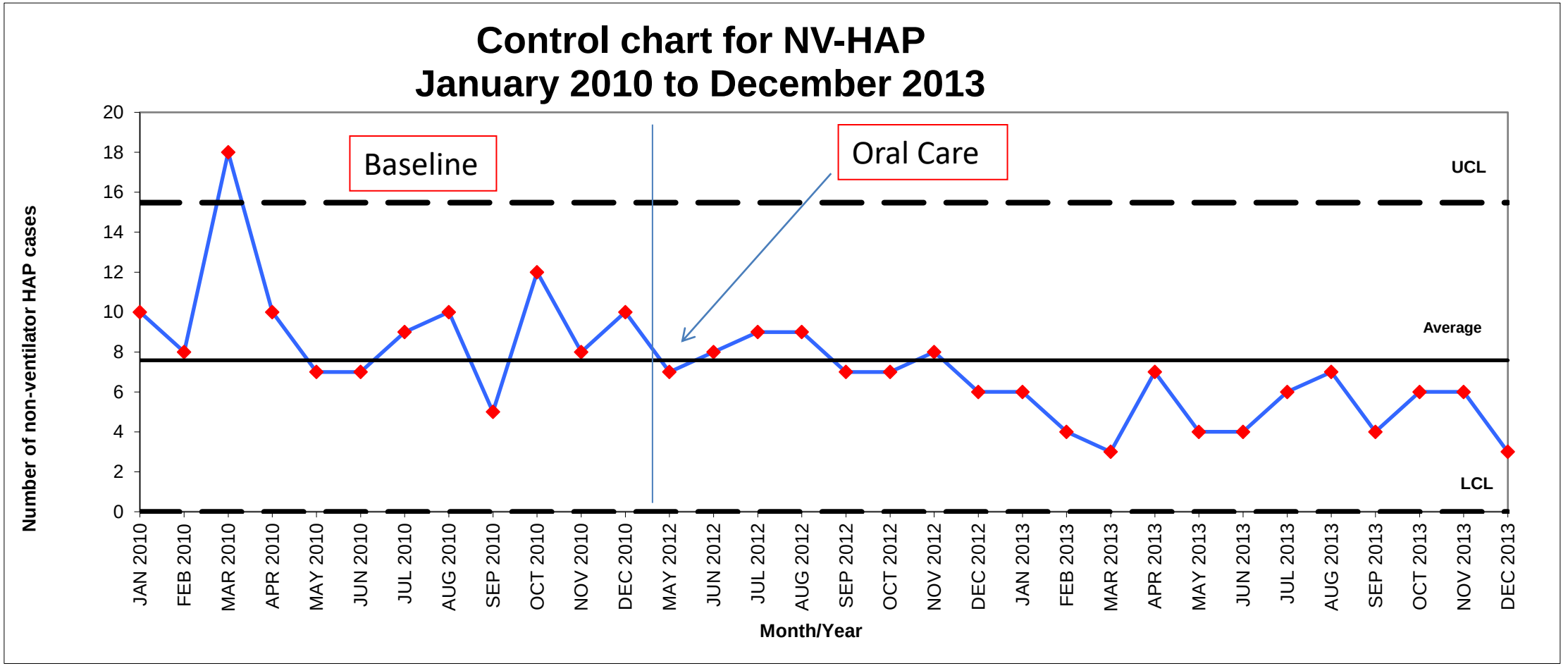
Used with permission from Barbara Quinn

# Oral Care Knowledge & Attitude Survey:

- Method:
  - Staff survey
  - Pre – Post education
- Results:
  - Awareness of oral care protocol (77%)
  - Priority of care for NAs (96%)
  - RN perception that their patients received oral care (300%)

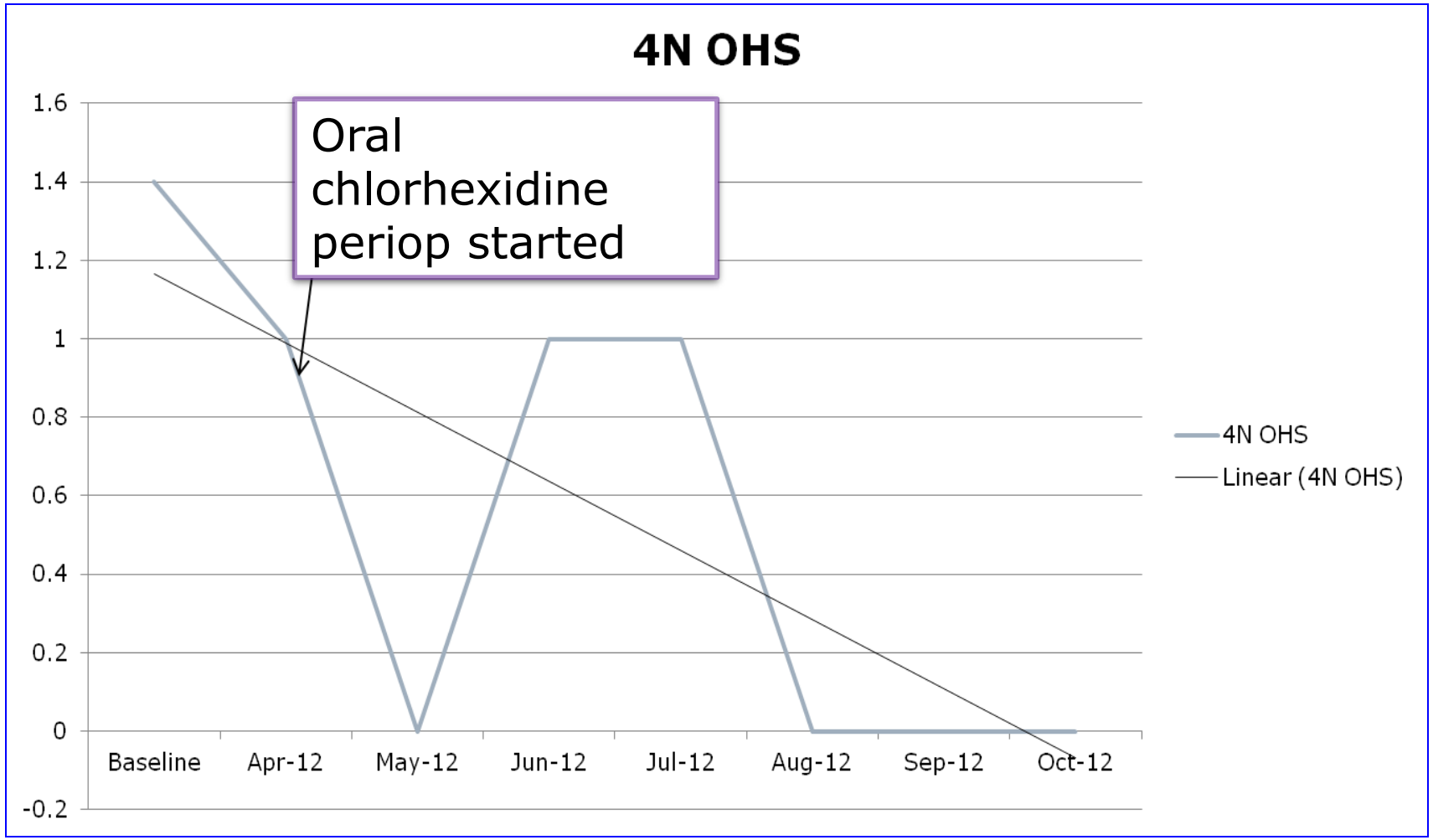
Quinn, B. et al. Journal of Nursing Scholarship, 2014. 46(1):11-19

# NV-HAP Incidence
# 50 % Decrease from Baseline




Quinn, B. et al. Journal of Nursing Scholarship, 2014. 46(1):11-19

# Open Heart Surgery Patients: NV-HAP Reduced 75%




Used with permission from Barbara Quinn

# Return on Investment

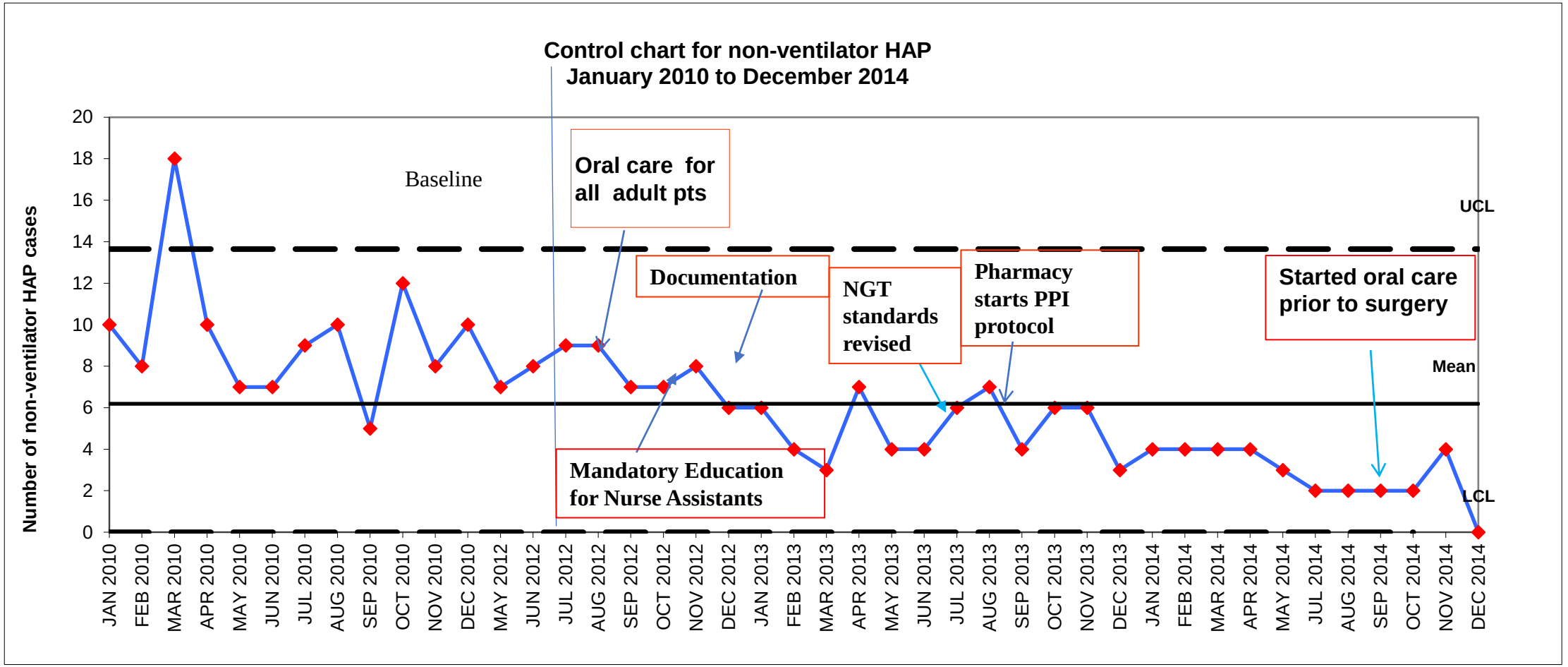
- 60 NV-HAP avoided Jan 1 – Dec. 31 2013
- $2,400,000 cost avoided
- - 117,600 cost increase for supplies
- $2,282,400 return on investment

**8 lives saved**

**PRICELESS**

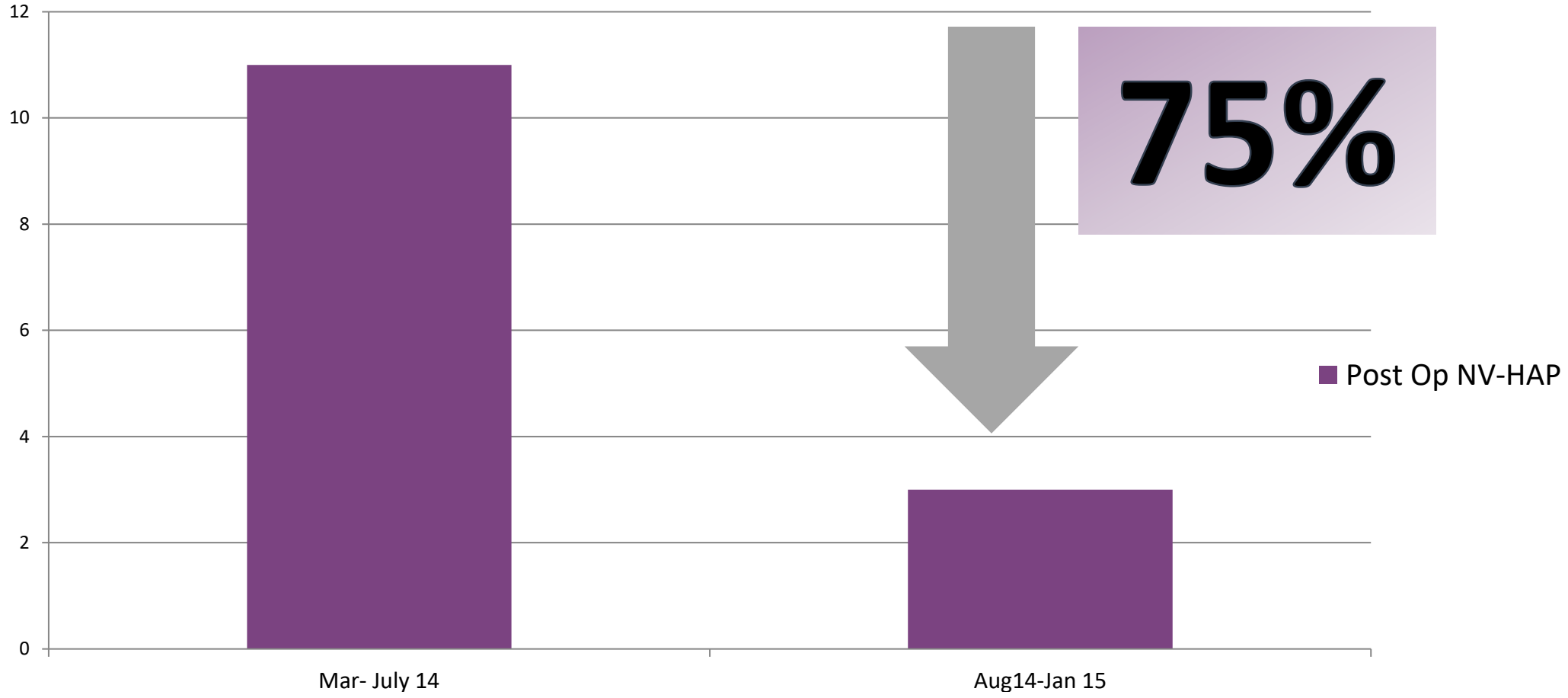
Quinn, B. et al. Journal of Nursing Scholarship, 2014. 46(1):11-19

# NV-HAP ↓ 70% from baseline!




Quinn B, Presented at AACN NTI, Houston, Tx, 2017

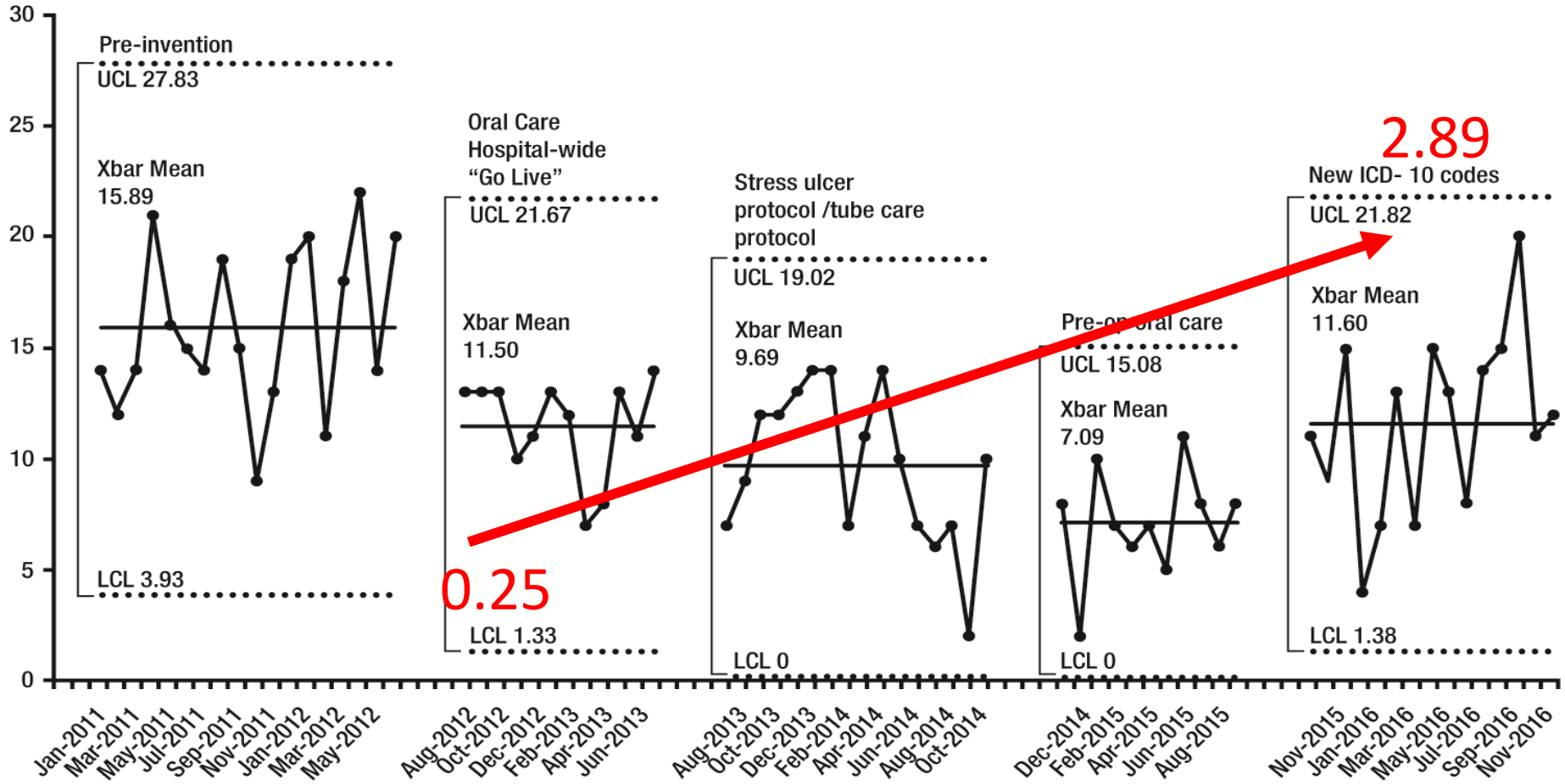
# Post-Operative NV-HAP (all adult inpatient surgery) Incidence 6 months Pre-Oral Care vs. 6 Months After




Quinn B, Presented at AACN NTI, Houston, Tx, 2017

# Sustainability Hospital Wide Oral Care from .25 to 2.89 (almost 3x a day)

Figure 1: Statistical process control R and X-bar-charts:
International Statistical Classification of Diseases and Related Health Problems (ICD) codes (3 standard deviations)




Baker, Quinn, Ewan, Giuliano (2018) Sustaining quality improvement: LT reduction of NVHAP. J Nurs Care Qual, 1-7.

# Return on Investment May 2012-Dec 2014

- 164 NV-HAP avoided
- **31 lives saved**
- 5.9 million dollar ROI

Personal communication Quinn B 2019

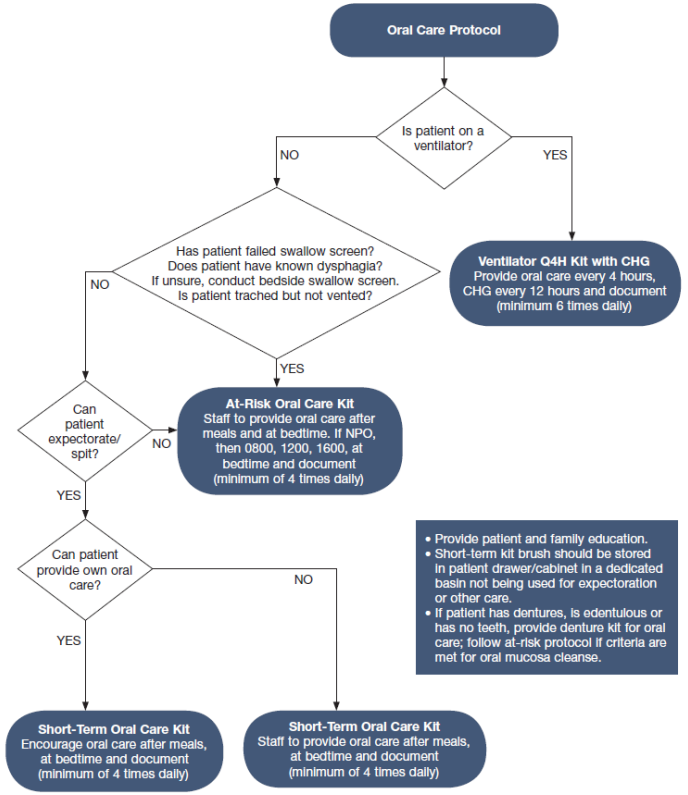
# Outcomes:
## From the Beginning to 2014

- Between May 2012 and December 2014
- Sutter Medical Center avoided 164 cases of NV-HAP:
  - **$5.9 million**
  - **31 lives**
  - **656-1476 extra days in the hospital**

Slide courtesy of Barb Quinn

# Nurse Driven Oral Care Protocol to Improve NV-HAP

- QI project, 650 bed level 1 trauma center
- Data measure retrospectively/prospectively using ICD 9 & 10 codes not POA for NV-HAP and VAP
- 7 months baseline, 7 months intervention
- Method:
  - Evaluated current practice, the literature and oral care supplies
  - Pilot program with new oral care protocols/supplies for self care, assisted oral care and ventilator oral care
  - Expanded to whole hospital post pilot area



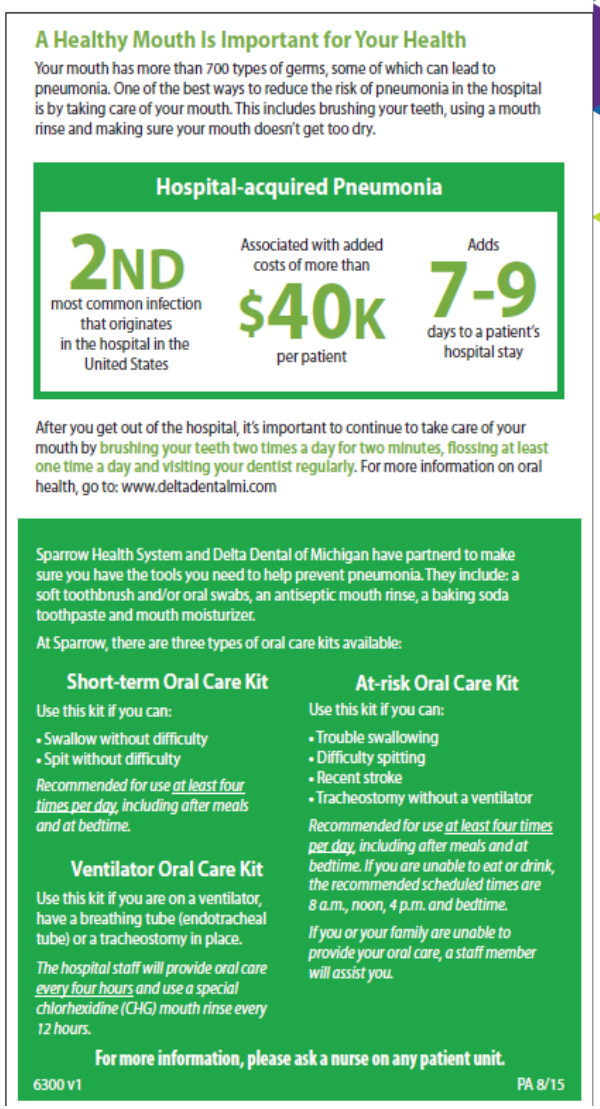

Warren C et al. AJN 2019;119(2):44-51

# Results

- Staff adherence to protocol 76% (36%-100%)
- NV-HAP
  - Baseline: 202 charts/52 NV-HAP's-20 deaths
  - Post: 215 charts/26 NV-HAP's ($p < 0.0001$)-4 deaths
- VAP
  - Baseline: 56 VAE's/ 12 VAP's (2.87 per 1000 vent days)
  - Post: 49 VAE's/3 VAP's (1.26 per 1000 vent days

50% reduction in NV-HAP, avoided 16 deaths & 1.4 million dollars

**Figure 2.** Patient Education Information Sheet



**A Healthy Mouth Is Important for Your Health**

Your mouth has more than 700 types of germs, some of which can lead to pneumonia. One of the best ways to reduce the risk of pneumonia in the hospital is by taking care of your mouth. This includes brushing your teeth, using a mouth rinse and making sure your mouth doesn't get too dry.

**Hospital-acquired Pneumonia**

2ND most common infection that originates in the hospital in the United States

Associated with added costs of more than $40K per patient

Adds 7-9 days to a patient's hospital stay

After you get out of the hospital, it's important to continue to take care of your mouth by brushing your teeth two times a day for two minutes, flossing at least one time a day and visiting your dentist regularly. For more information on oral health, go to: www.deltadentalmi.com

Sparrow Health System and Delta Dental of Michigan have partnerd to make sure you have the tools you need to help prevent pneumonia. They include: a soft toothbrush and/or oral swabs, an antiseptic mouth rinse, a baking soda toothpaste and mouth moisturizer.

At Sparrow, there are three types of oral care kits available:

**Short-term Oral Care Kit**

Use this kit if you can:

- Swallow without difficulty
- Spit without difficulty

*Recommended for use at least four times per day, including after meals and at bedtime.*

**At-risk Oral Care Kit**

Use this kit if you can:

- Trouble swallowing
- Difficulty spitting
- Recent stroke
- Tracheostomy without a ventilator

*Recommended for use at least four times per day, including after meals and at bedtime. If you are unable to eat or drink, the recommended scheduled times are 8 a.m., noon, 4 p.m. and bedtime.*

*If you or your family are unable to provide your oral care, a staff member will assist you.*

**Ventilator Oral Care Kit**

Use this kit if you are on a ventilator, have a breathing tube (endotracheal tube) or a tracheostomy in place.

*The hospital staff will provide oral care every four hours and use a special chlorhexidine (CHG) mouth rinse every 12 hours.*

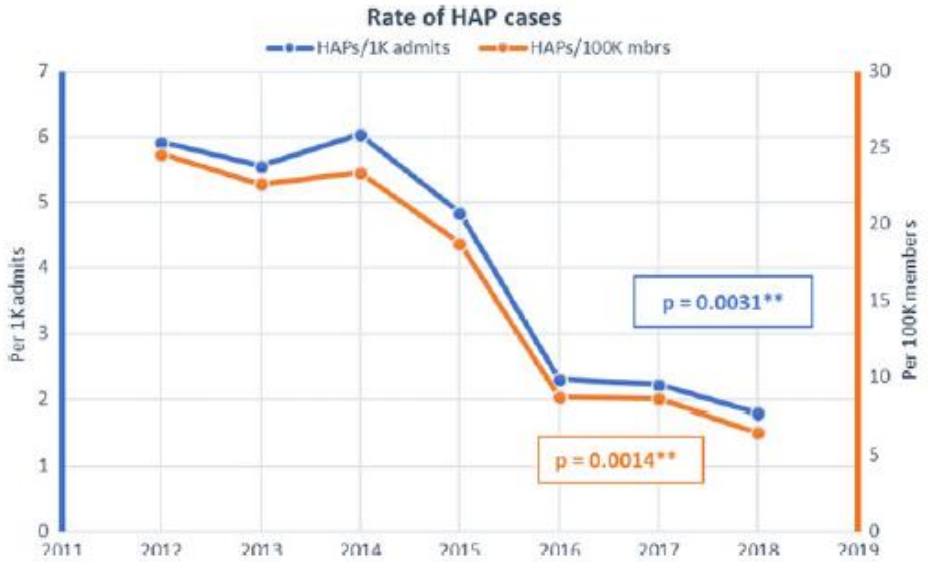
**For more information, please ask a nurse on any patient unit.**

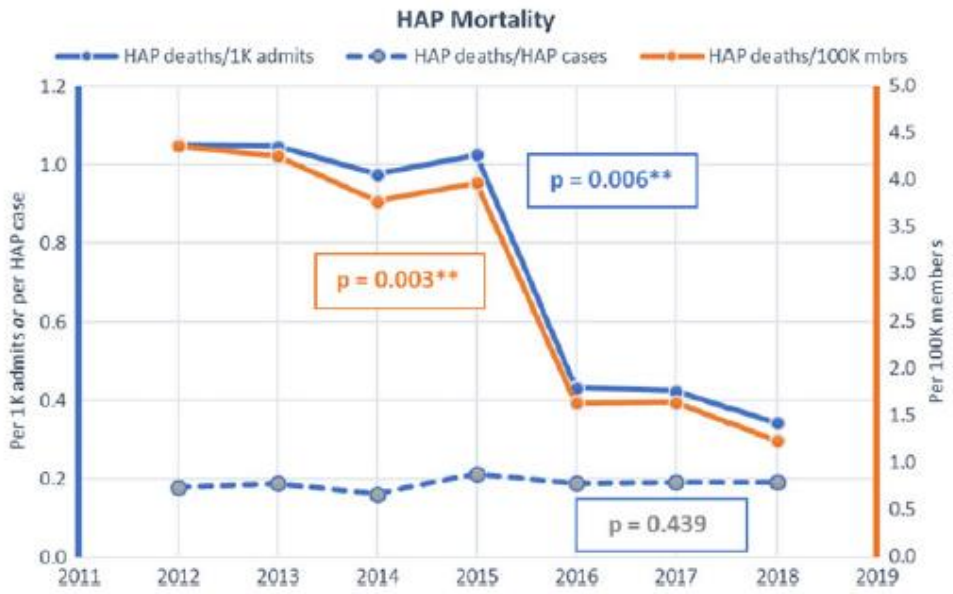
6300 v1 PA 8/15

Warren C et al. AJN 2019;119(2):44-51

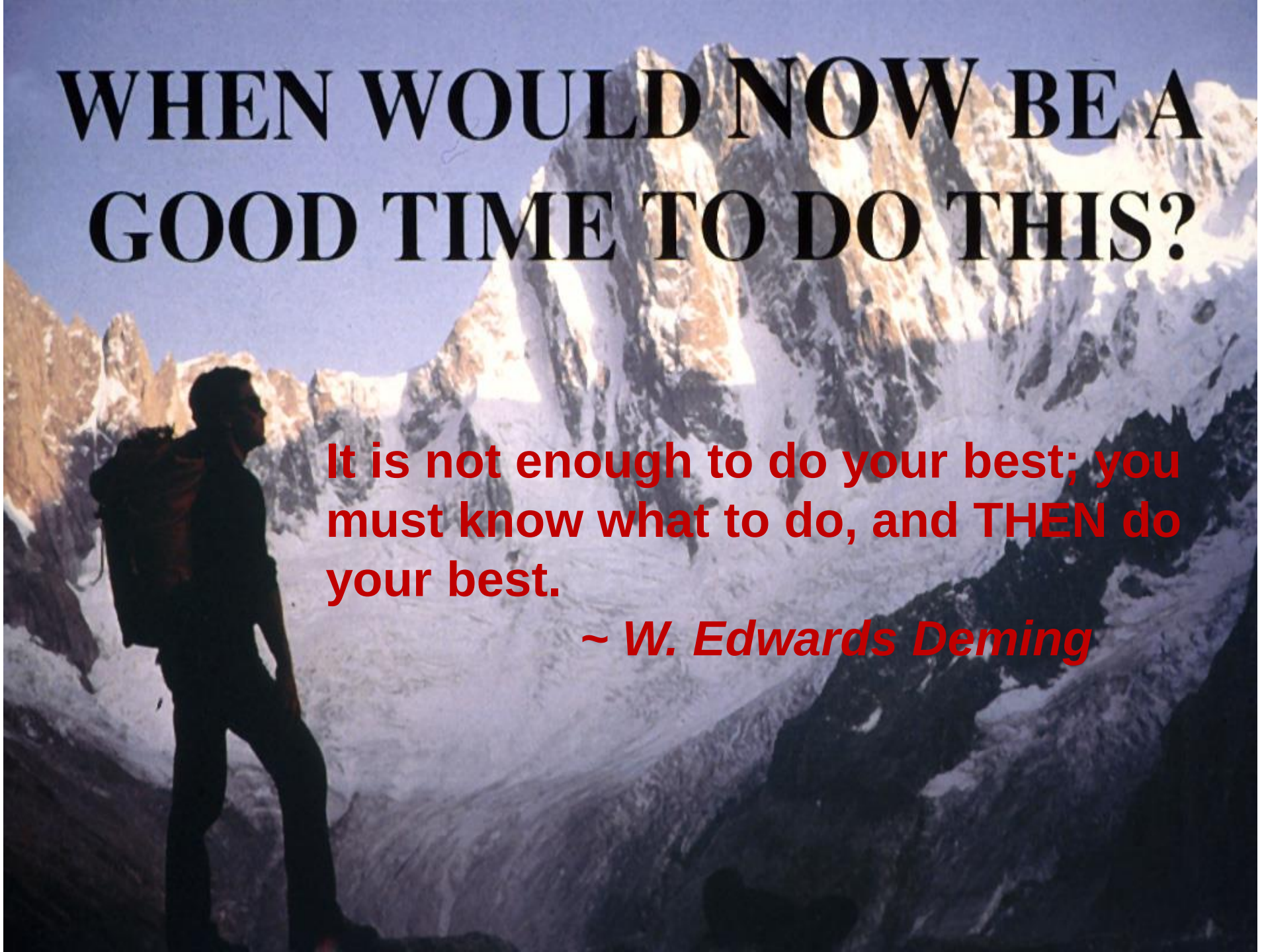
# A Successful Program to ↓ NVHAP in a Large Hospital System

- 21 hospital system
- Longitudinal observational design
- Intervention
  - Upright for meals, mobilization, swallow evaluation, sedation restrictions, rigorous oral care, feeding tube care (ROUTE)
- Additional results
  - Reduction in antibiotic days
    - Carbapenem, quinolone, aminoglycoside & vancomycin
  - ↓ Benzodiazepine use




Lacerna CC, et al. *Infection Control & Hospital Epidemiology*. 2020;41(5):547-552.


WHEN WOULD NOW BE A GOOD TIME TO DO THIS?
It is not enough to do your best; you must know what to do, and THEN do your best.
~ W. Edwards Deming

# 3 Steps YOU can Take to Address NV-HAP

Slide courtesy of Barb Quinn

# Two Options for Measuring NV-HAP Baseline and Outcome Metric

- A. International Classification of Diseases (ICD-10) for Pneumonia AND Not Present on Admission
  - J12 – 18.9 minus CAP, VAP, Pneumonitis
  - Use for tracking only
- B. ICD 10 NVHAP + NHSN definition for NVHAP
  - More labor-intensive; more accurate

Slide courtesy of Barb Quinn

# Metrics for NVHAP

- Percent NVHAP (#NVHAP / #patients X 100)
- NVHAP/1000 pt days (#NVHAP / # pt days X 1000)
- NVHAP Count
- No national benchmark so set internal goal
- Current literature:  1.22 – 5.9 / 1000 pt days

Slide courtesy of Barb Quinn

# Future State--Objective Surveillance Definitions for NV-HAP: Clinical Indicators in the EHR

| | Worsening oxygenation | ≥3 days of new antibiotics | Temp > 38ºC | White Blood Cell Count <4 or >12 | Chest-X-Ray or CT Chest | Respiratory culture |
|---|---|---|---|---|---|---|
| **Definition #1** | ✓ | | | | | |
| **Definition #2** | ✓ | ✓ | | | | |
| **Definition #3** | ✓ | ✓ | Either | | | |
| **Definition #4** | ✓ | ✓ | ✓ | | | |
| **Definition #5** | ✓ | ✓ | ✓ | ✓ | | |
| **Definition #6** | ✓ | ✓ | ✓ | ✓ | ✓ | |
| **Definition #7** | ✓ | ✓ | Either | | ✓ | |
| **Definition #8** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Definition #9** | ✓ | ✓ | Either | | Either | |
| **Definition #10** | ✓ | ✓ | ✓ | ✓ | Either | |

Identified 0.6 event per 100 admission and associated with a 6 fold higher risk of death compared with matched controls

Klompas, et. al (2018). ID Week Poster
Wenjing JI. Et al. JAMA Network Open, 2019;2(10)

# Process Metrics for NV-HAP
## (examples)

- Reducing germs in mouth:
  - Frequency of oral care delivered / per patient day
- Reducing aspiration risk:
  - % patients with swallow screens complete
  - % patients on continuous TF with HOB >30 degrees
  - % patients up in chair for meals
- Strengthen host defenses
  - % non-ICU patients with daily mobilization
  - % patients with BG 100-180
  - % patients not on stress ulcer prophylaxis
  - % patients on enteral feeding who receive >80% of ordered calories

Slide courtesy of Barb Quinn

# 2. GAP Analysis

# 3. Manage the Change

- Utilize a scientific model to provide structure  Include:
  - Sponsorship support
  - Communication
  - Education for staff and patients/families
  - Engagement of staff
  - Feedback
  - Accountability

Slide courtesy of Barb Quinn

**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.**

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