Zapping VAP at MCCG
Strategies to Reduce Hospital Acquired Infections

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"My presentation will be nothing but long, boring gibberish. It’s up to you to interpret it as informative and inspiring. That’s teamwork!"
Medical Center of Central Georgia - MCCG

- 637 bed, acute-care academic medical center
- 2nd largest hospital in Georgia
- Magnet designation 2005
- Level 1 trauma services
- 142 ICU beds: 5 adult, neonatal, pediatric
- Certified:
  - Hip & Knee replacement programs
  - Stroke program
  - Ventricular assist device (VAD)
  - Chest pain center
  - Palliative care program
Zapping VAP

1. Designing Actions for Impact
2. Engagement AND Accountability
3. 2013 & forward
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Zapping VAP

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Zapping VAP

1. Designing Actions for Impact
Problem 6 years ago / Baseline

• **Leading:**
  • < 90% compliance with vent bundle (HOB, turn, Hi Lo ETT, oral care)

• **Lagging:**
  • Experiencing > 100 VAP cases/year (2006 = 114)
  • Adult ICUs had higher than expected vent LOS (10-11 days)
Actions for Impact

View:

• Care of vent patients inconsistent
• Lack of evidence based practice
• Silo care versus interdisciplinary
• Not following guidelines for IHI, AACN, SSCM, APIC, NACHRI, and CMS

Root Cause Analysis (RCA)
Actions for Impact

Aspiration
- PUD prev
- High risk not ID’d
- During intubation
- Secretion management

Pneumonia Present on admit
- Family feeds ice chips
- During intubation
- HOB $\uparrow$ 30°

Management
- PUD prev
- Oral Care
- Change canisters
- HiLo ETT
- CLRT
- HOB $\uparrow$ 30°

Competing priorities
- Data not disseminated
- Results not emphasized
- Expectations unclear
- No accountability for results

Retrospective review
- CPIS missed
- Not doc POA
- Mini BAL missed
- Other facility transfer
- CAP

Hand Hygiene
- Separate Sx

Oral Care
- CLRT

Change canisters
Actions for Impact

**Supplies, equip, meds**
- PUD prev
- CHG not in stock
- Too few suction ports in ICU rooms
- Par stock too low
- Hard to find supplies
- Over sedation
- Lack of experience
- Outdated competency assessment
- Need quick ref info i.e. reinforcement
- Emergency Department

**Pre-existing DX, co-morbidities**
- Diabetes, COPD, ESRD, Heart Dz
- Bacterial colonization MRSA
- Altered mental status (AMS)
- Hx of smoking
- Cough or gag reflex
- CAP
- Nob-compliance with SAT/SBT
- Too few ICU beds
- Emergency vs. planned
- BiPAP vs. intubation
- Disagreement → patient & family re: intubation

**Coordination**
- RRT & RN for SAT/SBT

**Intubate / Extubate**
Assessment:

• Most of our infections preventable
• 2006 -2007 VAP reduction became a STRATEGIC focus on quality improvement
  • Initial goal to ↓ VAP by 50%
Actions for Impact

Donabedian Quality Model

Structure  Process  Outcomes

Cause  Effect

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Actions for Impact

Evidence-Based Best Practice

Goals of Care

Structure of Care
- Organizational Vent policy
  SAT/SBT guidelines
  Physician credentials

Process of Care
- Interaction: Emp - Pt
- Compliance
- Frequency & Coordination of care

Desired Outcomes
- ↓ vent times
- Prevent HAI = VAP
- ↓ Unplanned extubations
- ↓ ICU & hospital LOS

Hardwire Evidence Based Best Practice

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Actions for Impact: Recap

Process Structure → Evidence Based, Best Practice

Monitor Process effect on Outcome (Donabedian)

Value of Process = connect to outcome

Hardwire Process → make right process easy
Engagement/Accountability

1. Designing Actions for Impact
2. Engagement AND Accountability

Hardwiring the care process
Engagement/Accountability

Adherence & infection rates improve when either

A (Audit & feedback)
ADDED to
(provider reminder systems)

B (Audit & Feedback)
ADDED to
(organizational change)
AND (provider education)

AHRQ: Prevention of Healthcare-Associated Infections: Closing the Quality Gap
www.effectivehealthcare.ahrq.gov/reports/final.cfm
Engagement/Accountability

Hardwire Best Practice

Audit & feedback

Make delivery of evidence-based, best practice EASY AS POSSIBLE.

Create alerts (reminders, visual aids, peer pressure) to MAKE POOR CARE DELIVERY DIFFICULT.

Provider Reminder Systems
**Structure of Care**

- Changed par level & storage of mouth care kits to **assure availability & visual reminder**
- Vent bundle SAT/SBT guidelines
- Physician credentials
- Stock Hi-Lo ETT’s in ER, code carts & with EMS

**Process of Care**

- Met with anesthesia & CRNA groups: use Hi-Lo ETT for ICU surgery pts
- Compliance
- Frequency of care
- Coordination of care

**Hardwire Best Practice**

- Share responsibility for mouth care with resp; **scheduled via MAR & task scheduler**
- RT assesses vent bundle compliance 3X/week on all pts; **deficiencies immediately reported to RN Manager**

- Each time SBT not performed per criteria → RT manager f/u giving verbal or written warning

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**Zapping VAP at MCCG / February 2013**
MCCG Adult ICUs: Avg. Compliance with SAT/SBT
(excludes OHS)

Spont Breathing Trial

Goal: SAT/SBT Compliance > 90%

Data Source: APACHE IV millennium

Avg Vent Days:
FY09 Avg: 5.4 days
FY10 Avg: 5.5 days
FY11 Avg: 5.3 days

Zapping VAP at MCCG / February 2013
• Increased the rigor of goals
  • **2006**: process perfection
  • **2013**: process value → connected to outcome
  • **Interdisciplinary frontline** → Board involvement
  • Utilized the **Plan–Do-Check-Act** (PCDA) methodology
  • Continue to implement new strategies
  • Joined GHA Hospital Engagement Network HAI
    – continue to implement new strategies
MCCG Adult ICUs: Avg Vent Times (excludes OHS)

Data Source: APACHE IV millennium

Goal: Avg Vent Days ≤ 5.4 days

All Avg Times

Avg Vent Days:
FY09 Avg: 5.4 days
FY10 Avg: 5.5 days
FY11 Avg: 5.3 days

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Display together: shows the “WHY” of measuring

MCCG Adult ICUs: Avg Vent Time compared with Compliance with SBT

Data Source: APACHE IV millennium

Avg Vent Days:
FY09 Avg: 5.4 days
FY10 Avg: 5.5 days
FY11 Avg: 5.3 days

Time to kick b.. and take names

Talk, reports, policy review – all with no improvement.

Crit Care Committee: unacceptable!
MCCG Adult ICUs: Avg Vent Time compared to Spontaneous Breathing Trial Compliance

Data Source: APACHE IV millennium

**Goal:** Avg Vent Days ≤ 5.4 days

**Care**
- FY09 Avg: 5.4 days
- FY10 Avg: 5.5 days
- FY11 Avg: 5.3 days

**Outcome**
- Safer / improved outcomes
- Care best practice?
- Cause compliance
- Effect # vent days changes
Engagement /Accountability

# of VAP in MCCG ICU’s Critical Care 2006 - 2011

Number of VAP cases

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAP</td>
<td>114</td>
<td>44</td>
<td>19</td>
<td>9</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

2012 Nutrition Bundle Revisited

- Initial Vent Bundle
- Monitor Process/Outcomes
- PICU Bundle
- PUD, DVT
- SAT, SBT in Adult Critical Care
- Nutrition Bundle
- PICU SBT/SAT Research
- Disciplinary Action- SBT non-compliance
Communicate ➔ Hardwire “ease the path of EBP”

➔ Link Care Process & Outcomes

Communication with Individuals / Link performance to job

Med Staff Privileges ➔ vent management: individual or group

Employee performance ➔ individual compliance, accountability, warnings, & annual evaluation

KB & TN

Zapping VAP at MCCG / February 2013
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2013 & forward

Lagging → patient outcome

Surveillance for Vent Associated Events

– CDC Prevention Epicenters
  http://www.cdc.gov/hai/epicenters

– Critical Care Societies Collaborative
  http://ccsonline.org
Lagging: patient outcomes

Incidence

<table>
<thead>
<tr>
<th>Vent Associated Pneumonia (VAP) Population</th>
</tr>
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<tbody>
<tr>
<td>Acute &amp; long-term care hospitals</td>
</tr>
<tr>
<td>Inpatient rehab facilities</td>
</tr>
<tr>
<td>&gt; 18 years old</td>
</tr>
<tr>
<td>Mechanical vent time ≥ 3 calendar days</td>
</tr>
</tbody>
</table>

**EXCLUSIONS:** patients on rescue mechanical ventilation
- high-freq ventilation (HFV),
- extracorporeal membrane oxygenation (ECMO), &
- mechanical ventilation in prone position

**NHSN: National Healthcare Safety Network**
**Probable VAP Public Reporting Definition**

On or after **calendar day 3 of mechanical ventilation** AND within 2 calendar days before or after onset of **worsening oxygenation** ONE of the following is met:

- Purulent respiratory secretions AND one of the following
  - (+) culture of endotracheal aspirate ($\geq 10^5$ CFU/ml or equivalent)
  - (+) culture of bronchoalveolar lavage ($\geq 10^4$ CFU/ml or equivalent)
  - (+) culture of lung tissue ($\geq 10^4$ CFU/ml or equivalent)
  - (+) culture of protected specimen brush ($\geq 10^3$ CFU/ml or equivalent)

If no purulent secretions, then one of the following:

- (+) pleural fluid culture
- (+) lung histopathology
- (+) diagnostic test for *Legionella* spp.
- (+) diagnostic test for flu virus, RSV, adenovirus, parainfluenza virus

**NHSN: National Healthcare Safety Network**
Leading: consider these areas

- **Vent utilization** code status, patient/family communication & education
- **Mobility** HAPU, Fall prevention, restraint use
- **Infection prevention** oral care
- **Nutrition** tube feedings: start time, amount delivered vs. ordered, evidence based management
- **Delirium management** med management, noise levels, sleep deprivation (bundled care)
**MCCG Adult ICU Vent Utilization Ratio**

Comparison FY2010 - FY2012

<table>
<thead>
<tr>
<th>Year</th>
<th>MCCG</th>
<th>Nat'l Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>0.44</td>
<td>0.45</td>
</tr>
<tr>
<td>2011</td>
<td>0.43</td>
<td>0.43</td>
</tr>
<tr>
<td>2012</td>
<td>0.36</td>
<td>0.40</td>
</tr>
</tbody>
</table>

Data Sources: APACHE IV, PowerChart, Medipac

[MCCG Adult ICU Vent Utilization Ratio Graph](http://www.ajicjournal.org/article/S0196-6553(11)00373-7/fulltext)
Awareness → NHSN - vent utilization

→ Mobility - slow/stop de-conditioning

→ Delirium - age, withdrawal (tobacco, Rx, ETOH)

→ Nutrition - timeliness to start, calories Rx

→ NHSN - Vent Acquired Conditions (VACs)

possible & probable pneumonia
Recap

1. Actions for Impact
   - Cause → Care → Best Practice
   - Effect → Outcomes → Goals of Care
1. Actions for Impact
   - Cause \( \rightarrow \) Care \( \rightarrow \) Best Practice
   - Effect \( \rightarrow \) Outcomes \( \rightarrow \) Goals of Care

2. Engagement & Accountability
   - Engagement \( \rightarrow \) coordination of care
   - Accountability by caregivers: “where the buck stops”
1. Actions for Impact
   – Cause → Care → Best Practice
   – Effect → Outcomes → Goals of Care

2. Engagement & Accountability
   – Engagement → coordination of care
   – Accountability by caregivers: “where the buck stops”

3. 2013 & beyond
   – Vent utilization, delirium, mobility, nutrition
   – Vent Associated Conditions (VACs)
Take Away

• Ventilator care is a complex process
• Do not assume knowledge = application
• Measure care + outcomes → regular output
• Involve interdisciplinary bedside (point of care) staff
I believe a vision for quality must start with *ownership*.

We cannot just do what we are asked, but we must take it further by *looking for what we can do to improve*.

**Quality must be integrated into our every day caring.**

Betty Brown, MBA, MSN, RN, CPHQ, FNAHQ - VP Quality & PI, TriHealth, Inc.


