WEBINAR
Ventilator-Associated Pneumonia, Central Line Infections and Rapid Response Teams

Presenters: Faculty, Canadian ICU Collaborative

Moderator: Bruce Harries, Collaborative Director
Signing In

• Please dial in 15 minutes prior to start time

• Web Sign in

• Audio Sign in
  – Dial in: 1-866-443-4188
  – Participant Code: 4266799

• Complete Polls
Purpose

• By the end of this session, participants will be able to:
  – Understand what is possible and what changes appear to make the most difference for improving care
  – Plan a PDSA cycle to test one high leverage change
  – Have questions answered
Agenda

• *Pre-Call Activities*
• Welcome & Introduction
• Overview of Topic
• Results & Strategies for Accelerating Improvement
• Examples & Success Stories
• Questions & Answers
• Plan next PDSA Cycle
• Next Steps & Close Call
Welcome

• Web Functions
  – Presentations in PowerPoint
  – Polls
  – Chat
  – Notes

• Audio Information
  – Moderated line – opportunity to ask questions near end
  – Use CHAT function – ability to answer your questions in real-time
Overview of ICU-Related Interventions

Paule Bernier (VAP)
Peter Skippen (CLI)
Sherissa Microys/Mike Cass (RRT)
References

• Canadian ICU Collaborative, Improving Patient Care and Safety In the ICU. Improvement Guide. June 2007
Overall Charter – VAP

• Decrease VAP by x % by March 31 2008

• Reach and maintain 95% compliance to each of the elements of the bundle

• Reach and maintain a 95% compliance to the VAP bundle

OPTIONAL: For more experienced teams

• Reach 95% compliance to an additional component (ex oral decontamination, hand washing, nutrition)
Measures

1. **VAP:** according to definition

2. **COMPLIANCE:**
   - HOB $\geq 30^\circ$
   - ETT/OGT
   - SBT daily
   - EVAC

3. **COMPLIANCE TO BUNDLE**

1. **ALL** New cases per month reported as VAP/1000 ventilation-days

2. **From surveillance:** % of patients in survey compliant with element
   (do not include when medically contra-indicated)

3. **From surveillance:** % patients compliant to ALL elements of the bundle
Specific Changes Being Tested

- Design systems to avoid mistakes
- Develop alliances/cooperative skills
- Create a culture of collaboration and Team work
- Give people access to information
- All crash carts equipped with EVAC
- Poster on HOB in family room
- Give continuous feedback on performance with oral intubation to Anaesthesiologists
- Daily SBT: Chief RT notified when SBT not done for immediate feedback
Specific Changes Being Tested

• Standardize care

• Use checklist

• Establish reliable process

• HOB elevation as a pre-printed admission order

• MD use Daily goal sheet which include bundle at medical rounds

• RT monitors and document HOB elevation 2-3 times/shift
Overall Charter – CLI

Aim:
• To reduce the incidence of catheter related blood stream infections (CRBSI) within ICU

Goals/Objectives:
• To reduce the incidence of CRBSIs by 50% within 12 months within our ICU
Measures

• **Outcome measures**
  – Incidence of catheter related blood stream infections
  – Number of central lines
  – Number of central line days
  – Number of central line infections
  – Days between CRBSIs

• **Process measures**
  – Compliance with insertion bundle
  – Compliance with maintenance bundle

• **Balancing measures**
  – Length of stay
Change Concepts

- Hand hygiene
- Maximal barrier precautions
- Standardization of skin antisepsis products
- Optimal site selection
- Daily review of line necessity
- Dedicated TPN lumen
- Access lines aseptically (use of caps)
- Assessment of insertion site
- Standardized dressing
Specific Changes Being Tested

• Organization of a line cart with necessary supplies for insertion in one place
• Development and implementation of a central line insertion checklist to empower nurses to audit physician compliance to insertion bundle
• Standardize cleaning solution throughout unit (e.g., 2% chlorhexidine with 70% alcohol)
• Development and implementation of a daily checklist for:
  – Need for line
  – Dressing & caps
  – Dedicated TPN line
Overall Charter – RRT

- Reduce in-hospital cardiac arrests by 50% using Medical Emergency Teams (MET) / Rapid Response Teams (RRT).
Measures

Outcome Measures
• Cardiac arrests
• % Codes outside of ICU
• Deaths from cardiac arrest
• In-hospital deaths
• ICU bed-days occupied by survivors of cardiac arrest
• Hospital bed-days occupied by survivors of cardiac arrest
• ICU readmissions

Process Measures
• Number of MET calls
• Satisfaction surveys
• Time to arrival
• Time spent on calls
• Time pt developed calling criteria to time of actual call or code

Balancing Measures
• Costs
Some Change Concepts

• Develop a dedicated MET Team available anytime hospital wide
• Develop criteria or operational definitions for the MET Team based on simple physiologic criteria.
• Initiate process where anyone can activate the RRT without using hierarchy.
• Develop well-defined discipline-specific roles and responsibilities for each MET Team member.
Specific Changes Being Tested

• Many different models
  – MD, RN, RT
  – ED, ICU, hospitalist
  – 24/7, daytime
• Who can call
  – Staff, orderly, families
• Education
  – Rounds, email, letters
• Calling criteria
  – posters
• Pagers, overhead call
• ICU discharge follow-up for 2 days
• Follow-up on calls for 2 days
• Inform primary service
• Expand team and hours of operation over time
• Follow up with surveys
Examples

Because CRITICAL CARE is a NEED not a place

Call the MEDICAL EMERGENCY TEAM if there is a patient who meets any of the following criteria:

- Airway: Threatened Airway
- Breathing: Respiratory Rate <5 or >35
- Circulation: Heart Rate <40 or >140 or Systolic BP <90
- Neurologic: Decrease in level of consciousness (Drop in Glasgow Coma Score by >2) or Repeated or prolonged seizures
- Serious patient concern: Not responding to treatment or Unable to obtain assistance

The Medical Emergency Team (MET) is an ICU based team that any hospital staff may call when a patient is in need.

The MET responds to calls on all in-patient UNITS as well as out-patients in the Qualitas unit.

The MET will not respond to calls from the Outpatient clinics, the Emergency Department, Operating Rooms, or ICU.

To activate the Medical Emergency Team (MET), Dial 95 and call Code Blue. Tell the Operator the patient’s location. The MET will arrive within 10 minutes.

Procedures for cardiac and respiratory arrest have not changed. Dial 95 for Code Blue and the team will respond immediately.

The MEDICAL EMERGENCY TEAM Coming to a unit near you January 1, 2005, 24 Hours a day, 7 days a week

WHEN TO CALL MET
- Airway - Threatened - stridor
- Breathing - Acute change in RR <8 or >36
- Acute change in SaO2 <90 despite O2 at 10L/min.
- Circulation - Acute change in heart rate <40 or >140
- Acute change in BP<90mmHg
- LOC - Acute change in level of consciousness
- Worried about patient

TO ACTIVATE MET
- Dial 33# and ask for MET
- Charge nurse notifies attending resident

24hrs a day
7 days a week

LET ICU COME TO YOU
Progress and Strategies for Accelerating Improvement

Bruce Harries
VAP - SHN teams

**INTERVENTION - VAP MEASURE: 1.0 VAP Rate in ICU per 1000 Ventilator Days**

**INTERVENTION - VAP MEASURE: 2.0 VAP Bundle Compliance**

Source: SHN Quarterly Reports
CLI - SHN teams

INTERVENTION - CLI MEASURE: 1.0 Central Line-Associated Primary Bloodstream Infection (BSI) Rate per 1000 Central Line-Days

INTERVENTION - CLI MEASURE: 2.0 Central Line Insertion Bundle Compliance

INTERVENTION - CLI MEASURE: 3.0 Central Line Maintenance Bundle Compliance
RRT - SHN teams

INTERVENTION - RRT MEASURE: 1.0 Codes per 1000 Discharges

INTERVENTION - RRT MEASURE: 2.0 Percent of Codes Outside ICU

INTERVENTION - RRT MEASURE: 3.0 Utilization of Rapid Response Team
ICU Collaborative: Self-Assessments for VAP teams

Nine weeks remain to achieve your aims…
...How could we all be successful?

• Adapt High Leverage Changes Locally
  – Start with GSK and ICU Improvement Guide
  – Examples of Cancer Care CLI charters on CoP

• Spread Good Ideas More Quickly
  – Find good examples on website
  – Use discussion forums to ask for tools and templates
  – Post your good examples

• Divide & Conquer (Leverage the Learning)
  – Not every team needs to test all ideas
Continue the Conversation

• Communicate successes, challenges and learning via the list serve and CoP discussion board
What To Do When You Think You’ve Done It All!

Dr. Denny Laporta
Goal

• To identify additional strategies and ideas when a team has implemented all elements of the bundle and VAP rates have flattened (at more than zero) or increased.
1. Check your numbers
2. Check your definitions
3. Check your patients
4. Check your staff
5. Other tricks
1. Check your numbers

- **Outcome measure (VAP, CLI rate)**
  - how far are you from your target objective?
  - control chart: out of control?

- **Compliance**
  - >95%
    - Does compliance measurement reflect the reality (behaviors) of your unit? (time of measurement, number of measurements)
  - >90%
    - Can expect further improvement when >95%
    - Look for other reasons if far from your target objective
  - <90%
    - Work on improving compliance
2. Check your definitions

- Are the outcome measures (VAP, CLI) measured according to definition?

- Bundle elements (SBT, sedative infusions, HOB) are they performed according to protocol?
3. Check your patients

• Why would they have become more subject to the outcome measure (VAP or CLI)?
  – change in patient severity, risk factors for VAP?
  – diagnostic categories?
  – from other locations (health care facilities)?

• Review the carts of VAP cases: Was it plausible they would get a VAP? Can you identify areas for improvement in VAP prevention for this one case?
4. Check your staff (ICU and pre-ICU)

- New staff? to be educated …
- Old attitudes (re safety)?
- Other behaviours?
  - immobility/aspiration, more antibiotics, transport, oversedation/analgesia
5. Other tricks

• Some of these may be particularly pertinent in your ICU
  – Hand hygiene
  – Oral decontamination
  – Nutrition
  – PUD prophylaxis
  – VTE prophylaxis
Other ICU or SHN Topics

• Can these strategies be generalized to other topics?
There are No Easy Answers: How to Respond to Controversy

Dr. Denny Laporta
Bruce Harries
Ventilator-Associated Pneumonia

The Wrong Quality Measure for Benchmarking

Michael Klompas, MD, MPH, and Richard Platt, MD, MSc

Ann Intern Med. 2007;147:803-805

- VAP surveillance was proposed as quality-of-care indicator because it is common, morbid, and expensive.

- The concept of benchmarking outcomes to inspire improvements in care, reward best practices, and inform consumer choice is laudable.
Ventilator-Associated Pneumonia
The Wrong Quality Measure for Benchmarking
Michael Klompas, MD, MPH, and Richard Platt, MD, MSc
Ann Intern Med. 2007;147:803-805

HOWEVER…

• “The difficulty in rendering an accurate diagnosis of VAP\(^1\) and the subjective nature of the CDC criteria make VAP an unreliable basis for either internal quality control or interhospital benchmarking of quality of care.”

\(^1\)lack of specificity
Ventilator-Associated Pneumonia
The Wrong Quality Measure for Benchmarking
Michael Klompas, MD, MPH, and Richard Platt, MD, MSc
Ann Intern Med. 2007;147:803-805

HOWEVER:
“The...complexity of the definition also make surveillance expensive and time-consuming to implement, because it requires regular, detailed analysis by a clinically knowledgeable observer”.
HOWEVER:

VAP definition can be confounded by

- temporal variations in the ICU case mix
- interobserver variation
- shift in interpretations of clinical criteria
Diagnostic criteria for HAP

Radiologic signs
New, worsening or persistent infiltrate, consolidation or cavitation on CXR compatible with pneumonia

Clinical signs
At least 1 of the following:
• Fever (T>38°C) with no other recognized cause
• WBC ≥ 12,000 or < 4,000
• For adults >70 yo, altered mental status with no other cause
And ≥ 2 of the following:
• New onset of purulent sputum, or change in character of sputum, or increase in respiratory secretions or increase in suctioning requirements
• Inspiratory crackles or bronchial breath sounds on auscultation
• Worsening gas exchange (e.g., O2 desaturations, PaO2/FiO2 < 240, an increase in O2 requirements or an increase in minute ventilation

Defining VAP:
= HAP +
• ETT/tracheostomy + ventilator X ≥2 consecutive days AND within the last 48h

NOTE
- If multiple episodes, look for resolution of the initial infection.
- The addition of or change in pathogen alone is not indicative of a new episode of pneumonia.
- The combination of new signs and symptoms and radiographic evidence or other diagnostic testing is required.

* Data from the Centers for Disease Control and Prevention (11).
† In patients without underlying pulmonary or cardiac disease (e.g., respiratory distress syndrome, bronchopulmonary dysplasia, pulmonary edema, or chronic obstructive pulmonary disease), 1 definitive chest radiograph is acceptable.
“The Faculty acknowledges … (that) different opinions……may arise”.

“The difficulty in rendering an accurate diagnosis of VAP and the subjective…criteria make VAP…unreliable basis for either internal quality control or interhospital benchmarking of quality of care…complexity of the definition…make surveillance expensive and time-consuming…”.

Guidelines for the VAP prevention: developed with research results using different definitions.

“…critical care literature refers to VAP in patients who have been intubated for at least 48h…”
  – IHI-100K selected this definition, then changed to the CDC definition for the IHI-5M.

The CDC recommendation is to include patients supported by a breathing device within the 48h before the onset of the infection.

Purpose of Collaborative: improvement within each institution. NOT research NOT benchmarking and inter-center comparisons.
Recommendation 1

- To develop new quality measure(s) for ventilated patients
  - objectively measurable,
  - easily collected
  - more reliably reflect the relevant outcomes (serious, preventable complications of mechanical ventilation).
  - will reflect the provision of the best possible comprehensive care, rather than solely the prevention of pneumonia.
Recommendation 2

• Use an interim strategy of tracking evidence-based process-of-care measures,
  – daily cessation of sedation
  – appropriate patient positioning,
From a Measurement Perspective

- Operational Definitions – use? under what conditions?
- Measures for learning vs. measures for judgment
- Pay for performance
Additional Recommendations

• Stop bad practices of using data for judgment and pay for performance
• Avoid ranking, it is a farce (Deming)
• Use process level measures in addition to outcome measures
• Understand variation affects both the measurement process and the things being measured
• Continue to improve the measurement system
Questions

All
Plan Next PDSA Cycle

Bruce & All
Next PDSA Cycles

• What are the most promising ideas to test? (Use CHAT function)

• What questions are you trying to answer?

• Walk through one example. (Use NOTE function)
# PDSA Cycle Example

**PDSA Cycles**

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Cycle #:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective of this Cycle:</td>
<td></td>
</tr>
</tbody>
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### PLAN

- What change are we testing? What is our prediction and theory? Details of the plan (who, what, where, when and how).

### DO

- Carry out the plan. Record data and observations.

### STUDY

- Complete analysis and synthesis. Do the results agree with the predictions? Under what conditions could the results be different? Summarize new knowledge.

### ACT

- What action are we going to take as a result of this cycle (Adopt, Adapt or Abandon)? Are we ready to implement? What other processes or systems might be affected by this change?

### Objective of Next Cycle
Next Steps

- Adapt known solutions locally
- Test additional changes
- Report progress and learning through Collaborative monthly reports and Collaborative Calls (next one: February 12th)
- Share learning on Community of Practice (CoP)