Wake up and Breathe: A journey in quality improvement and unintended benefits

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Disclosures

• I am the recipient of an unrestricted quality improvement grant from Hospira
  – Delirium screening
  – Sedative protocols
  – Early mobility

• Honoraria from Snell Medical
Objectives

• Share a story of:
  – Quality Improvement
  – Humility in acknowledging there is a problem
  – What we did
  – What worked and didn’t work
Toronto Western Hospital

- Part of UHN
- 236 beds
- 26 bed MSNICU
  - 45% neuroscience
- Specialty Programs
  - Neurosurgery / Spine
  - Neurology / Stroke
  - Ortho / Hand
  - Bariatric
  - Ophthalmology
The ‘Tipping Point’

• Attending Rounds

• “Is this even a problem?…”
  (e.g. the patients are sick)

We had no idea
Why We Need to Care About Delirium

BRAIN NOT CLEAR!

HELP
Baseline: Awake

- Of all eligible patient-days with a sedative infusion:
  - 29% had an average SAS for the day below 2 (e.g. comatose)
  - 53% had an average SAS below target

- Only 27% of med-surg patients with coma and receiving infusions received a daily interruption of sedative infusions
Baseline: Breathing and Coordination

- Only 43% of ventilated patient-days had a spontaneous breathing trial
Baseline: Delirium

• Baseline delirium rates:
  – 12% of all patient-days
  – 27% of all admissions had at least one day of delirium

• But… 49% of patient days were not assessed because patient was comatose
ABCDE

A    Wake targeted sedation and daily awakening
B    Breathing spontaneous breathing trials
C    Coordination of SAT & SBT
D    Delirium Screening
E    Early Mobility
Timeline

Delirium  SAT  SAT / SBT Coordination  Early Mobilization

• Decision to address delirium first
• Education of ICU team and training in assessment tools
Quality Improvement Plan

• Goal:
  – To have every eligible patient assessed for delirium every day
  – To promote discussions on rounds about delirium and the ‘ABCDE’ s of critical care

• Approached Hospira for support
  – Summer student
  – Data collection
  – Educational materials
Intervention

- Interprofessional education on delirium
- Delirium assessment with validated assessment tool
- 2-day visit by world leaders in delirium from Vanderbilt University
- Bombarded with posters, announcements, lunches
Have You Assessed for Delirium This Shift?

What should you do?

Perform the CAM-ICU!

- Assess for delirium every shift
  - even if on sedatives
  - even if not agitated
- Up to 60% of delirium is hypoactive or mixed – and is frequently missed!
- Delirium is associated with:
  - 2-3 x risk of death
  - Increased ICU stay and ventilation
TWH Confusion Assessment Method for the ICU (CAM-ICU) Flowsheet

1. Does patient have adequate arousal for CAM-ICU?
   - SAS other than 1 or 2

2. Acute Change or Fluctuating Mental Status:
   - Acute change from mental status baseline? OR
   - Has the patient’s mental status fluctuated during the past 24 hours?

3. Inattention:
   - Ask: Squeeze my hand when I say the letter ‘A’
   - Read the following sequence of letters:
     S A V E A H A R T
   - ERRORS: No squeeze with ‘A’ & Squeeze on other letter other than ‘A’
   - If unable to complete —> Letters or Pictures

4. Altered Level of Consciousness
   - SAS other than 4

5. Disorganized Thinking:
   1. Will a stone float on water?
   2. Are there fish in the sea?
   3. Does one pound weigh more than two?
   4. Can you use a hammer to pound a nail?
   Or COMMANDS:
   “Hold up this many fingers” (Hold up 2 fingers)
   “Now do the same thing with the other hand” (Do NOT demonstrate)
   OR
   “Add one more finger” (If patient unable to move both arms)

CAM-ICU Negative NO DELIRIUM
CAM-ICU Positive DELIRIUM PRESENT
CAM-ICU Negative NO DELIRIUM

SAS 1-2 or NMJ Blockade
Unable to Assess (UTA)

No

0-2 Errors

MORE THAN 2 ERRORS

SAS other than 4

>1 Error

0-1 Error
Delirium Screening: 3 Months

- Fall 2011
  - Inconsistent performance
  - Recorded CAM-ICU = 60%
  - Agreement between trained observer and RN CAM-ICU
    - Kappa 0.57 (95% CI 0.35-0.79)
- Repeat education blitz
  - February 2012
    - Kappa 0.77 (95% CI 0.68-0.86)
## Delirium Screening : 6 Months

<table>
<thead>
<tr>
<th>CAM-ICU Screening (All observations)</th>
<th>Baseline (N=626)</th>
<th>6 month Audit (N =270)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delirium Present N (%)</td>
<td>86 (14%)</td>
<td>60 (22%)</td>
</tr>
<tr>
<td>Delirium Absent N (%)</td>
<td>254 (41%)</td>
<td>138 (51%)</td>
</tr>
<tr>
<td>Unable to Assess N (% UTA)</td>
<td>286 (46%)</td>
<td>72 (27%)</td>
</tr>
<tr>
<td>Proportion of Admissions With Any Delirium N (% UTA)</td>
<td>44 (30%)</td>
<td>38 (33%)</td>
</tr>
<tr>
<td>Duration of Delirium, days Mean ± SD</td>
<td>2.0 ± 1.3</td>
<td>1.6 ± 0.9</td>
</tr>
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</table>
# Delirium Screening: 12 months

<table>
<thead>
<tr>
<th>CAM-ICU (All observations)</th>
<th>Baseline (N=626)</th>
<th>6 month Audit (N=270)</th>
<th>12 month Audit (N=778)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delirium Present N (%)</td>
<td>86 (14%)</td>
<td>60 (22%)</td>
<td>98 (10%)</td>
</tr>
<tr>
<td>Delirium Absent N (%)</td>
<td>254 (41%)</td>
<td>138 (51%)</td>
<td>373 (43%)</td>
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<td>307 (33%)</td>
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<td>Duration of Delirium, days Mean ± SD</td>
<td>2.0 ± 1.3</td>
<td>1.6 ± 0.9</td>
<td>2.3 ± 1.4</td>
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Delirium Screening

• Unintended improvement in number of patients who could be assessed / decrease in coma rates
  – Improvement in sedation practices
  – Change in patient case-mix

Analysis pending…
‘A’ ‘B’ and ‘C’

- Daily SAT
- Daily SBT
- Done concurrently (e.g. coordinated)
<table>
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<tr>
<th>Patient Characteristics</th>
<th>Pre-Intervention June 4th - July 22nd N=145 patients N=944 patient days</th>
<th>Post-Intervention July 30th - August 20th N=75 patients N=443 patient days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years), median (IQR)</td>
<td>61 [45-76]</td>
<td>65 [45-76]</td>
</tr>
<tr>
<td>Male Gender (%)</td>
<td>52%</td>
<td>55%</td>
</tr>
<tr>
<td>APACHE II, median (IQR)</td>
<td>10 [8-16]</td>
<td>12 [8-16]</td>
</tr>
<tr>
<td>Length of ICU Stay (days), mean +/- SD</td>
<td>4 [2-9]</td>
<td>5 [2-9]</td>
</tr>
<tr>
<td>Duration of Mechanical Ventilation (days), mean +/- SD</td>
<td>1 [0-4]</td>
<td>1 [0-5]</td>
</tr>
<tr>
<td>ICU Mortality (%)</td>
<td>14%</td>
<td>13%</td>
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<tr>
<th>Clinical Data</th>
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<th>Post-Intervention July 30th - August 20th N=75 patients N=443 patient days</th>
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</thead>
<tbody>
<tr>
<td>SAS, median of means (IQR)</td>
<td>3.3 (2.8-4.0)</td>
<td>3.9 (3.0-4.0)</td>
</tr>
<tr>
<td>SAS in patients receiving sedative infusions, median of means (IQR)</td>
<td>2.6 (1.5-3.6)</td>
<td>2.7 (2.0-3.4)</td>
</tr>
<tr>
<td>Patient days with sedative infusion with mean SAS between 1 and 2, % (N)</td>
<td>40 (82)</td>
<td>40 (32)</td>
</tr>
<tr>
<td>Patient days with sedative infusion with mean SAS between 3 and 4, % (N)</td>
<td>38 (78)</td>
<td>40 (32)</td>
</tr>
<tr>
<td>Ventilator patient-days eligible for SBT, % (N)</td>
<td>46 (224)</td>
<td>47 (113)</td>
</tr>
<tr>
<td>SBT performed on eligible patient-days, % (N)</td>
<td>85 (190)</td>
<td>88 (100)</td>
</tr>
<tr>
<td>Patient-days eligible for SAT, % (N)</td>
<td>75 (150)</td>
<td>69 (55)</td>
</tr>
<tr>
<td>Eligible had SAT done, % (N)</td>
<td>68 (102)</td>
<td>78 (43)</td>
</tr>
<tr>
<td>SAT performed during SBT, % (N)</td>
<td>30 (14)</td>
<td>29 (7)</td>
</tr>
</tbody>
</table>
What We Learned

• Know your own unit
  – Local culture
  – Potential obstacles
• Identify champions
• Need to engage everyone
• Be persistent - momentum will build!
• Don’t reinvent the wheel, but personalize
Key Lesson

- You must must must measure outcomes

Otherwise you will have no idea what you are doing well, or what is working
Acknowledgements

Eddy Fan       Elizabeth Wilcox
Emma Mew       Paulina Farias
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Jennifer Bell

And All the ICU nurses!
“In God we trust; all others must bring data”

W. Edwards Deming

Slides? Questions?
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