Improving Blood Glucose Monitoring in the ICU

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Team Members

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Hawaii Pacific Health

- 4 acute care hospitals (2 years after merger)
- 5 adult ICUs
  - 3 ICUs managed by the same intensivists
- No shared evidence based protocols
Why blood glucose management?

- Tight control of hyperglycemia in hospitalized patients helps reduce morbidity and mortality
  - clear evidence in diabetics
  - clear evidence in CV surgery pts
  - growing evidence in all patients
Why Blood glucose management?

- It was “on the list” of issues our intensivists wanted to address
What is the current status of monitoring blood glucose in our ICUs?

- It is done when initiated by the physician as he or she remembers.
- Routinely measured and managed in the CV surgical patients.
Study Objective

To measure the blood glucose levels of acute care ICU patients in all adult ICUs in Hawaii Pacific Health hospitals on a regular basis during the first few days of an ICU admission.
Objectives Expanded

We wanted to create a collaborative working group of ICU nurses and physicians to evaluate and implement evidence based protocols for care of our adult ICU patients in all of our ICUs.
Aim Statement

To gain >90% compliance with blood glucose monitoring from 2.81 per 24 hours to at least 4 times per 24 hour period for the first three days of the ICU stay in all newly admitted ICU patients of the participating physicians within two months of implementation.
Hypotheses

1. If a team of ICU caregivers (who don’t usually work together) are able to recommend standardized blood glucose monitoring frequency for their acute ICU patients, then routine blood glucose monitoring will become standard practice.
Hypotheses

2. If the team agrees to standardized blood glucose monitoring, then they will find ways to incorporate the practice into their daily work flow.
Hypotheses

3. If the team regularly monitors blood glucose levels in their acute ICU patients, they will begin to recognize the need for standardized management of hyperglycemia.
Hypotheses

4. If a team of ICU caregivers who don’t work together have a successful experience with this project, then they will be more likely to work together on additional ICU protocols.
Intensive Care Management

- Ventilator Management
- Fluid Management
- Physiology Management
- Therapeutic Management
- Assessment
- Diagnostic
- Treatment
- Continuing Planning

- Laboratory
- Radiology
- Artery Lines
- Vital Signs
- Respiratory
- Blood glucose
- Glucose level Report
- Document level on designated form
- Glucose >150 or <60
- Non-Diabetic
- Diabetic
- Diabetic management
- Define Frequency
- Phlebotomy
## Where we started - baseline

<table>
<thead>
<tr>
<th>Hosp</th>
<th>#Pts</th>
<th>#BS done</th>
<th>#pt days with BS</th>
<th>Mean days/pt</th>
<th>Mean BS/pt day</th>
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<tr>
<td>PM</td>
<td>31</td>
<td>272</td>
<td>100</td>
<td>3.23</td>
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<tr>
<td>WC</td>
<td>30</td>
<td>122</td>
<td>42</td>
<td>1.40</td>
<td>2.90</td>
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<tr>
<td>Straub</td>
<td>30</td>
<td>147</td>
<td>53</td>
<td>1.77</td>
<td>2.77</td>
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</tbody>
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Data source: Point of care test reports and chart review
Our implementation plan

• Medical Directors and hospitalists will order blood sugar monitoring

• Nurses will track blood sugar on the daily monitoring form

• Tracking form created to provide a visual display of blood sugar results over time
Blood Sugar Daily Monitoring Form

* Blood sugar monitoring will be performed regularly for the first three days of a patients’ stay
* Regular monitoring will be defined as four (4) times a day and at least four (4) hours apart.

<table>
<thead>
<tr>
<th>Date Admit: ____________</th>
<th>Date</th>
<th>Time</th>
<th>Blood Sugar Tested</th>
<th>Blood Sugar Result</th>
<th>Time</th>
<th>Blood Sugar Tested</th>
<th>Blood Sugar Result</th>
<th>Time</th>
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Blood Sugar Tracking Form

Patient is a diabetic: Y___  N____
Patient is on insulin: Y___  N____
Admit date________
Admit time________
• All of the ICU patients cared for by the physicians who agreed to participate and were listed as team members for this project.
Sample Patient #1
BS ranges
Sample Patient #2
BS ranges

Day 1                                                   Day 2                                               Day 3
What was our impact?

Mean Blood Sugar Checks per Patient Day

- Baseline
- Post-Implementation

Pali Momi
Straub
Women & Children
What was our impact?

Mean Blood Sugar Checks per Patient Day

- Baseline
- Post-Implementation
- Excl First Day

- Pali Momi
- Straub
- Women & Children
What was our impact?

Mean Blood Sugar Checks per Patient Day

- **Pali Momi**
- **Straub**
- **Women & Children**
What did we learn?

- Intensivists were already aware of the issue....it was “on the list”
- They did not have the time to design a project
- Collaboration was not a problem
- They were anxious to provide improved care
What did we learn?

• Ordering blood sugars and documenting times and results were not part of the physician or nurses current work process

• Change is not easy

• # of participating physicians small
Next Steps - Work in Progress

• Choose a blood glucose management protocol
• Determine the desired range of blood glucose for our patients
• Adopt a blood glucose measurement flow sheet for use at the bedside in our ICU’s
Work in Progress

• Pilot the chosen blood glucose management protocols and guidelines among the same group of physicians as the measurement pilot.

• Finally, include all ICU patients at all HPH adult ICUs once the protocol found to be acceptable by the initial group.
Work in Progress

- Look at other protocols for care of our ICU populations as prioritized by our ICU care providers
Questions ?