

Improved Glucose Control

A Cardiac Surgery ICU's Pre- and Post-Education Intervention Approach to Improving Compliance

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Background

- Transplant and cardiac surgery patients are at **high risk for infection**.
 - Transplant patients are immunocompromised.
 - The **stress response** from surgery increases surgical patients' risk for infection.
- The risk for post surgical infection is increased **10 times** when the blood glucose is greater than 200 for just **2 hours** (1).
- Trends identified during hypoglycemia report root cause analysis showed **room for improvement** in compliance with the ICU Insulin Infusion protocol.
- Center for Medicare and Medicaid Services (CMS) will not pay for mismanaged glucose control (2).
- Mayo is part of the nationwide **Surgical Care Improvement Project (SCIP)**. One of its main goals is a blood glucose <200 on post-operative days 2 and 3 to **decrease infection risk**.

Objectives

1. Registered Nurse (RN) staff will verbalize the rationale for post-operative glucose control and complications of poor control.
2. RN staff will demonstrate increased compliance with following the ICU Insulin Infusion Protocol.
3. RN staff will prevent patient complications associated with hypo- and hyperglycemia.

Methods

Unit Baseline

January-April 2010

- The ICU quality coaches completed **23 chart reviews** (totaling 502 hours of data) to establish a **unit baseline** for:
 - Compliance with the ICU Insulin Infusion Protocol
 - Management of hypoglycemia
- **Areas for improvement** included increasing and decreasing infusion per RN protocol at the appropriate time and remembering to change the infusion rate each hour.

Interventions and Follow Up: Round One

May-August 2010

- The ICU quality coaches then created and presented **education** at the unit's Professional Development Days in May 2010. Topics included:
 - **Importance** of glycemetic control
 - **Consequences** of poor glycemetic control
 - **Case studies** to help nurses apply the concepts taught
 - Refresher on how to document **hypoglycemia treatment**
- ICU Quality Coaches also continued to review insulin infusions and provide **one-on-one education and follow up** with the unit's RN staff.
- After the education, the ICU quality coaches completed another **31 chart reviews** (totaling 554 hours of data) and analyzed the pre- and post-education data.
- RN staff were **updated** on the unit's progress.

Interventions and Follow Up: Round Two

September-November 2010

- After updating RN staff on the unit's progress, the ICU quality coaches completed another **19 chart reviews** (totaling 391 hours of data).
- ICU Quality Coaches designed **focused education** for Fall Skills Day based on staff's questions and areas of need.
- ICU Quality Coaches also continued to review insulin infusions and provide one-on-one coaching and follow up for staff.

Follow Up

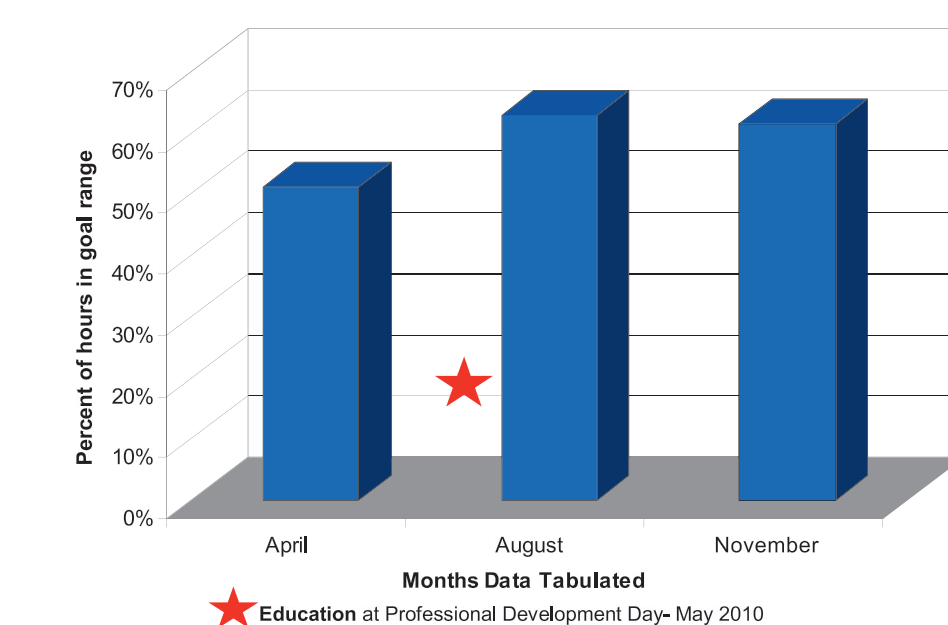
- ICU quality coaches continue to perform chart reviews **quarterly** and provide **feedback** to the RN staff.



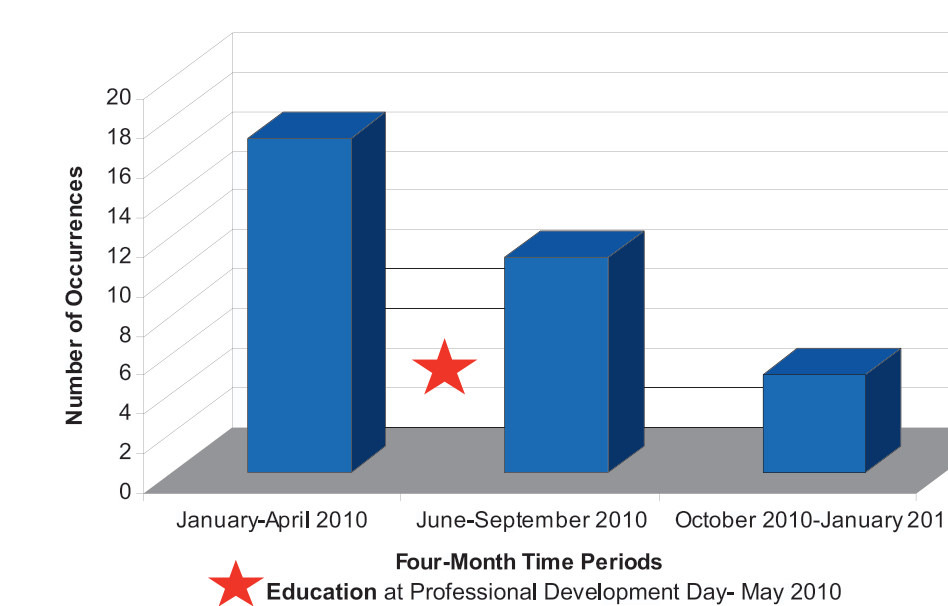
Results

- The pre-education review of charts revealed that the unit's RNs were following the ICU Intravenous Insulin Infusion Protocol only 51% of the time.
- After the education, compliance with the insulin protocol increased to 72% and 82% respectively in August and November 2010.
- The number of hypoglycemic occurrences in a four-month period decreased from 17 before the education to 11 after the initial education. There were only 5 hypoglycemic occurrences in the following four-month period.
- RN staff now utilize the ICU quality coaches for questions and feedback on the protocol.

Percentage of Time in Compliance with Protocol



Hypoglycemic Occurrences Pre and Post Education



Limitations

- The ICU Intravenous Insulin Infusion protocol changed in May. This coincided with the same week that RN staff were educated in Professional Development Days. It was difficult to tell whether some of the improvements came from the new protocol or the improved compliance.
- It was expected that post-education numbers might be lower because staff were learning a new protocol. It was anticipated that episodes of hypoglycemia may be lower because the new protocol aims for a higher blood glucose range.
- The patients' glucose values did not improve as much as anticipated when RN staff compliance with the protocol improved. The new protocol has a higher target glucose range than the previous protocol. It is possible the glucose values are a reflection of the new target range, not RN staff compliance with operationalizing the protocol.

Conclusions

- Pre- and post-education chart reviews showed increased knowledge and application of the protocol and hypoglycemia treatment.
- One on one peer coaching was found to improve RN staff compliance with following the insulin protocol correctly.
- Staff RN questions regarding the insulin protocol demonstrate their increased understanding of the protocol and its importance.

References

1. Kessler, C. (2009). Glycemic control in the hospital: How tight should it be? Nursing 39(11), 39-43.
2. Centers for Medicaid & Medicare Services. Obtained from www.cms.gov