Introduction & Background

The 2016 Joint Commission National Patient Safety Goals highlight safe medication administration as well as effective communication as domains of nationwide improvement. Inpatient hypoglycemia falls within both of these areas of improvement, and it is a predominantly preventable source of increased length of stay, cost, and morbidity and mortality.

At the Phoenix VA Healthcare System (PVAHCS), there was a concerning frequency of inpatient hypoglycemic events during 2015. Snapshot data from that timeframe indicated that the blood sugars of diabetics admitted to med/surg wards at the PVAHCS acute care facility were targeted below recommended ranges for inpatients. In contrast, it was noted that in the ICU, however, most blood sugars fell in line with these guidelines.

Causal Analysis

Causal analysis identified the local BMI insulin order set as a major root cause of many reported hypoglycemic events; several key reasons for concern were identified. (Figure 1)

- Relied upon outdated glycemic targets (90-120 mg/dL)
- When used as built, suggested generous insulin doses
- Defaulted to NPH and regular insulin regimens, which is rarely used by PVAHCS residents and hospitalists
- Existing order set only used for the Sliding Scale order and standing hypoglycemic orders
- Clinicians employed various non-standard workflows

Aims

Aim 1) To decrease inpatient adverse events related to non-standardized practice.
Aim 2) To maintain the percentage of inpatient blood glucose readings with normal blood sugars within goal (180) in line with high performing facilities per Society of Hospital Medicine by January 2017.

Methods

Two-step implementation

Elected for two-step approach with small tests of change:
A. Remove old order set and replaced with conservative sliding scale and hypoglycemia orders
B. Introduce evidence-based EMR care set

Outcome Monitoring

PVAHCS Analytics team assisted in creating glycemic control dashboard to monitor inpatient glycemic control in real-time.

- Results of all finger stick glucose measurements (non-ICU) from January 2015 to present.
- Compare pre and post intervention(s)
- Aggregate data into 2 week blocks
- U chart to represent event rates given variable sample sizes during each time period
- Excel QI macros to detect special cause variations after each step of implementation

Results

- 2016 Hyperglycemic rate U chart (Figure 6) showing first test of change with special cause variation of decreased rate following first change (removal of old order).
- 2015 mean tendency as a single data point for reference.
- 2016 central mean tendency of 0.02 (i.e. 2 hypoglycemic events <70mg/dL per 100 finger sticks); now < 0.01.

Conclusions

- Removing order set resulted in achieving Aim #1 ahead of goal, although at the cost of Aim #2 (hyperglycemia rates)
- Short term lag in achieving Aim #2 is acceptable given change in climate reflecting harm of hypoglycemia and lack of harm of short term permissive hyperglycemia. Dongo monitoring is necessary to ensure sustainability.

Limitations

- Short amount of time since intervention.
- Lack of national glucometric comparison.
- EMR’s functional limitations currently limit some aspects of implementing the ideal state fully.

- Implement evidence based insulin care set to stabilize hyperglycemic rates.
- Repeat test of change to evaluate project Aims.
- Development of glycemic control task force to evaluate, educate & assist with challenging cases in real-time.

Lessons Learned

This work highlights how using systematic approach to quality can identify ‘low hanging fruit/quick wins’ where a simple intervention (removing outdated orders) decreases rates of adverse events.
- Changing existing order set far more complex than anticipated
- Challenge to involve all the correct stakeholders from the outset
- EMR’s Glycemic Control workbook was essential in identifying relevant parties and planning this quality initiative

References: