THE UNIVERSITY OF CHICAGO
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Inpatient Hypoglycemic Events: A Root Cause Analysis

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Problem

- In an analysis of hospitalized Medicare patients, hypoglycemic events were the second most common overall adverse event and the most common medication-related adverse event.[1]
- Hypoglycemia is associated with poor patient outcomes, including increased inpatient mortality, length of stay, and short-term readmission.[2]
- Over the past several years, University of Chicago Medical Center (UCMC) has introduced several quality initiatives to reduce inpatient hypoglycemic events.
- We seek to constructively evaluate the current state of inpatient hypoglycemic events at UCMC to inform future work in this area.

Goals

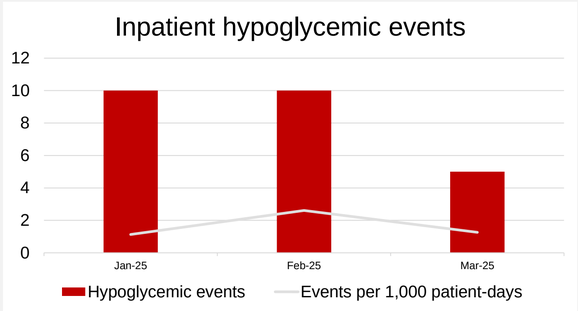
- Review inpatient severe hypoglycemic events, identify causes of the events, and evaluate effectiveness of existing quality initiatives.

Methods

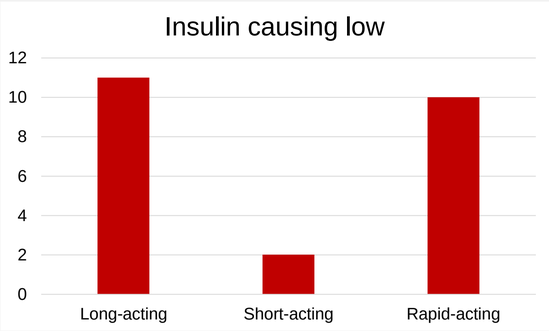
- All inpatient severe hypoglycemic events (serum or point of care glucose ≤40 mg/dL) at UCMC from Jan to March 2025 were reviewed through a data pull from Epic via Tableau.
- Patients who did not receive insulin or who were in shock were excluded from this sample.
- Type of insulin (long-, intermediate-, short-, or rapid-acting insulin) responsible for the hypoglycemic event was identified.
- Cause for each hypoglycemic event was identified and classified as “preventable,” “potentially preventable” and “unpreventable.”

Results

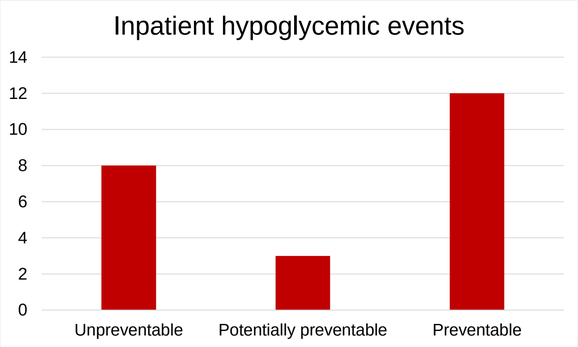
- There were 12,218 patient-days of inpatient insulin use at UCMC during the study period.
- There were 36 instances of severe hypoglycemia, of which 10 were excluded.
- UCMC had 26 eligible inpatient hypoglycemic events during this time, for an average of 2.12 events per 1,000 patient-days of insulin.



- Most events were caused by either long-acting or rapid-acting insulin, with a similar number caused by either type of insulin.
- Two events were caused by short-acting insulin, in both cases used for treatment of hyperkalemia.



- Of the 26 events, 8 (35%) were considered unpreventable, 3 (13%) potentially preventable and 12 (52%) preventable.



Preventable and potentially preventable causes included:

Reason	Number of cases
Sliding scales and correction factors were inconsistent with PTA and total daily insulin needs	4
Deviation from PTA regimen or regimen in recent admission	3
Not adjusting insulin for glucose below inpatient target (< 100 mg/dL)	2
Order inconsistent with treatment plan	2
10 units of insulin instead of 5 units for treatment of hyperkalemia	1
Multiple changes made at same time (e.g., diet restrictions and insulin up titration)	1
Lack of repeat glucose monitoring after hypoglycemia	1
D10 infusion discontinued without adjusting insulin	1

Conclusions

- Rates of iatrogenic inpatient hypoglycemia at UCMC are low.
- Long-acting and rapid-acting insulin were equally significant contributors to these events.
- Preventable causes include not adjusting insulin doses when glucose levels are below inpatient targets, insulin orders inconsistent with treatment plan, deviation from outpatient or previous inpatient insulin regimen, and lack of repeat glucose monitoring after hypoglycemia.
- Further education about the above causes may help reduce future hypoglycemic events.

Acknowledgements

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References:

1. Rodrick D, Timashenka A, Umscheid C. Adverse Events Among In-Hospital Medicare. Patients in 2021 and 2022. AHRQ Publication No. 24-0084.

2. Cruz, P. (2020). Inpatient hypoglycemia: the challenge remains. *Journal of diabetes science and technology*, *14*(3), 560-566.