DATA-DRIVEN IDENTIFICATION OF PATIENTS REQUIRING INSULIN REDUCTION USING CONTINUOUS GLUCOSE MONITORING PRIOR TO GLP-1 RA INITIATION

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Background

Initiating GLP-1 receptor agonists (GLP-1 RAs) in insulin-treated diabetes patients can increase hypoglycemia. To combat hypoglycemia, literature[1] recommends insulin reduction for HbA1c <8%, but this does not account for glucose variability captured by continuous glucose monitors (CGM).

This study presents the use of CGM data before GLP-1 RA initiation to identify patients that would need insulin reduction.

Dataset

- CGM data from FreeStyle Libre 2 and medication claims from linked Inovalon Insights.
- GLP-1 RA initiation (first claim) and reinitiation (95 days after previous GLP-1 RA claim).
- Insulin claims in 90 days prior and 60 days post GLP-1 initiation/reinitiation.

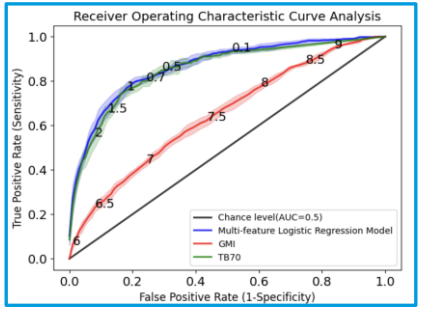
Methods

- Patients with time below 70 mg/dl (TB70) >= 2% in 30 days following initiation are identified as positive labels for prediction.
- Three binary classifiers are trained using features derived from CGM data within 30 days before initiation: GMI-only, TB70-only, Multi-feature: TB70, Median Glucose, Glucose Variability.
- Receiver Operating Characteristic Area Under the Curve (ROC AUC) after 5-fold stratified cross validation is reported.
- Higher ROC AUC indicates higher predictive performance.

Results

- Cohort size 4384 users
- Positive label: 1052 users
- False positives for similar sensitivity with GMI<8% (HbA1c surrogate)

Classifier	ROC AUC	Number of False positives
GMI-only	0.65	2032
TB70-only	0.86	700
Multi-feature	**0.87**	**633**



Conclusions

CGM data before GLP-1 RA initiation identifies patients at risk for post-initiation hypoglycemia, enabling pre-emptive insulin reduction. Minimizing false-positive predictions avoids unnecessary insulin decreases and preserves GLP-1 RA benefits. Continued CGM use after initiation may further support therapy adjustments.

References

[1] King, A., & Miller, E. M. (2023). Glucagon-Like Peptide 1 Receptor Agonists Have the Potential to Revolutionize the Attainment of Target A1C Levels in Type 2 Diabetes-So Why Is Their Uptake So Low?. *Clinical diabetes : a publication of the American Diabetes Association*, *41*(2), 226–238. https://doi.org/10.2337/cd22-0027.

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