**HypoHACs: Developing a Risk Stratification Model for Hospital-Acquired Hypoglycaemia in NSW Inpatients**

**Aim/s:**
Hypoglycaemia (blood glucose level <4.0 mmol/L) is a serious hospital-acquired complication associated with adverse outcomes. This study aimed to identify key risk factors for inpatient hypoglycaemia in NSW and develop a model to predict risk of hypoglycaemia at first admission.

**Methods:**
A retrospective cohort study was conducted on all adult inpatients at Royal North Shore Hospital in 2023. Demographic, medication, and blood glucose level (BGL) data were extracted from the electronic medical record using Discern Analytics and merged with daily glucose alert data. Univariate analysis was used to identify predictive variables, followed by stepwise multivariate logistic regression with oversampling.

**Results:**

A total of 256,051 BGLs were extracted from 41,983 admissions involving 28,367 inpatients, of which 1,574 (5.5%) had known diabetes. Overall, 1,014 inpatients (3.6%) experienced at least one hypoglycaemic episode during their first admission. The cohort was predominantly female (53.9%), with median age 70 (IQR 56-79) and median BMI 26.1 (IQR 22.5-30.7). Statistically significant predictors of hypoglycaemia included female sex, low body weight and BMI, diagnosed diabetes, insulin use, steroid use and hyperglycaemia within 24 hours of admission. Hypoglycaemia was also associated with greater BGL variability and higher incidence of hyperglycaemia during admission (p<0.001). The logistic regression model showed strong performance (accuracy 81.6%, sensitivity 78.5%, specificity 81.8%), with top predictors being known type 1 diabetes, use of multiple glucose-lowering medications, and number of hyperglycaemic episodes within the first 24 hours of admission (p<0.001). Inpatients who experienced hypoglycaemia during their first admission were more likely to be readmitted to hospital within 30 days and experience further hypoglycaemia and hyperglycaemia in subsequent admissions (p<0.001).

**Conclusion:**
This model enables early identification of inpatients at risk of hypoglycaemia, supporting targeted prevention strategies. Hypoglycaemia during initial admission was linked with higher risk of readmission and recurrent glycaemic events, underscoring the importance of early intervention.