

Introduction

- ‘Gestational diabetes mellitus (GDM) is common, contentious, costly, and challenging’
- ‘Early prediction and intervention in pregnancy help minimise risks to both mother and baby’
- ‘Differing recommendations in terms of who, when and how to screen’
- 'Early pregnancy glycaemic fluctuations and their relation to GDM risk are not well understood’
- There is limited research into the role of continuous glucose monitoring (CGM) in the diagnosis or prediction of GDM

Study question

Can CGM in early pregnancy predict the development of GDM?

Materials and methods

Recruitment <16 weeks
Women with risk factors for GDM
(n=208)

Application of CGM 14 days
Blinded version

GDM Diagnosis
OGTT 26-28 weeks
75 grams glucose

Data Analysis
Including regression and ROC analysis

Results

Key CGM metrics analysed included: glucose control (GC) and glycaemic variability (GV). As shown in the table below, all CGM metrics were significantly higher in women with GDM versus those who did not have GDM (n=208).

Parameter (mmol/l),median (IQR))	NO GDM (n=151)	GDM (n=57)	p-value
Median Glucose	5.2 (0.4)	5.5 (0.5)	<0.001
Standard deviation of glucose	0.8 (0.3)	0.97(0.3)	<0.001
Coefficient of variation	15.1 (5.0)	17.9 (4.7)	<0.001
Mean daily Glucose range	3.3 (1.0)	3.9 (1.2)	<0.001
HbA1c	37 (2.0)	39 (2.0)	<0.001
Mean day Glucose	5.4 (0.5)	5.6 (0.6)	<0.001
Mean Nocturnal Glucose	5.1 (0.4)	5.5 (0.7)	<0.001
Day time variability	0.8 (0.3)	1.0 (0.4)	<0.001
Nocturnal variability	0.7 (0.2)	0.9 (0.3)	<0.001
Mean Hourly Glucose	0.7 (0.1)	0.8 (0.2)	<0.001
Time within range (3.5-7.8) (TIR) (%age)	99 (96-99)	96 (93 - 98)	<0.001
Time above range > 7.8 (TAR) (%age)	1 (0-3)	2(1-7)	<0.001

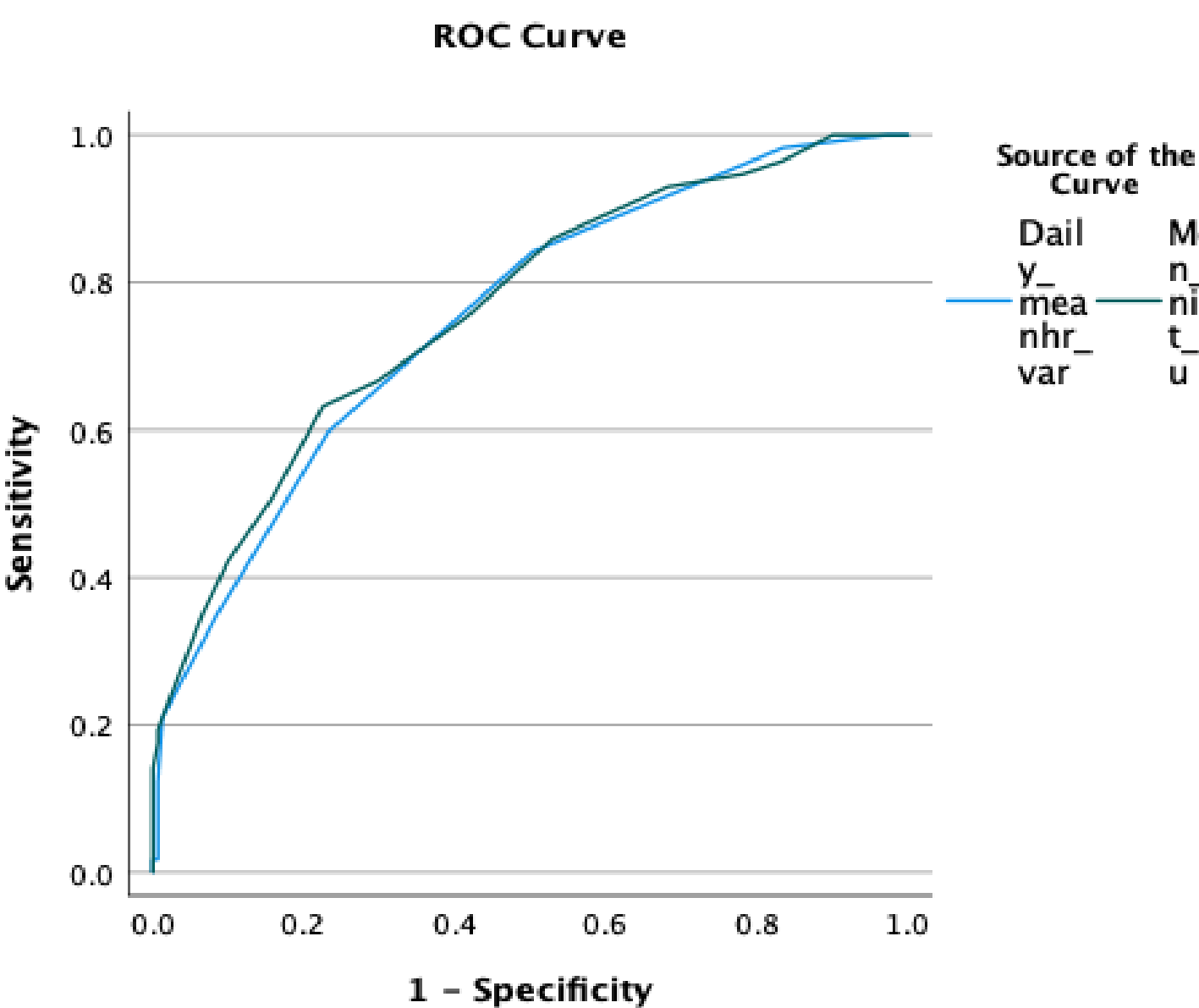
Predictive Models

Multivariate logistic regression analyses were performed using combination models to predict GDM.

Model 1

AUC = 0.812

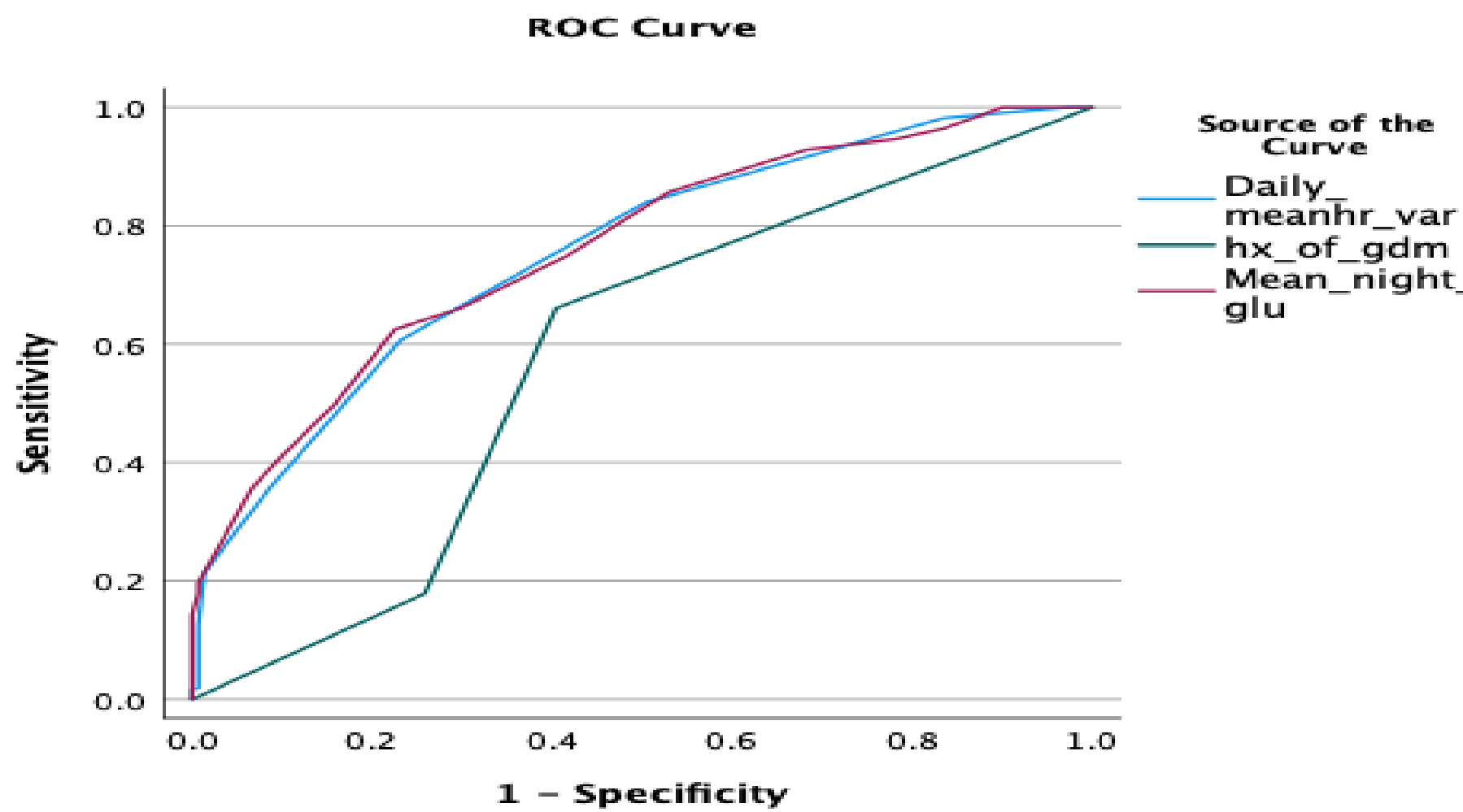
- CGM data
- Mean night glucose
- Mean hourly variability



Model 2

AUC = 0.845

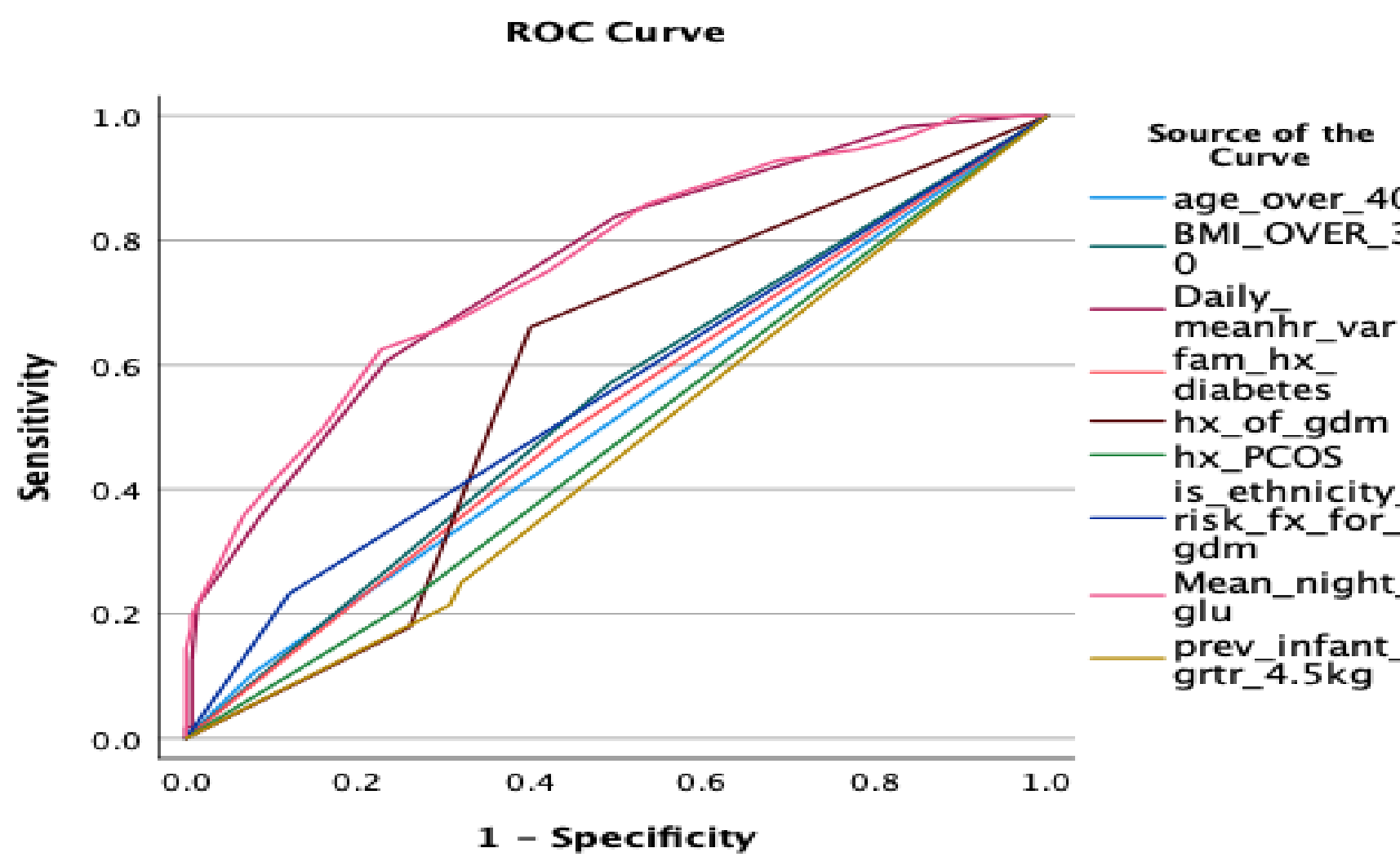
- Clinical data
- Previous history of GDM
- CGM data
- Mean nocturnal glucose
- Mean hourly variability



Model 3

AUC = 0.859

- Clinical data
- All clinical risk factors (n=7)
- CGM data
- Mean nocturnal glucose
- Mean hourly variability



Conclusions and future directions

This study highlights the potential of CGM to enable earlier identification of women at risk for GDM, facilitating timely interventions to improve maternal and neonatal outcomes. As the first comprehensive analysis of CGM metrics in non-diabetic pregnant women in Ireland, this research establishes a foundation for integrating CGM technology into clinical practice for GDM prediction. Further studies larger populations will be beneficial in validating these findings.

References

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- Campos Lopes, S., Brito, A. I., Barbosa, M., Matos, A. C., Lopes Pereira, M., Monteiro, A. M. & Fernandes, V. 2023. Flash glucose monitoring system in gestational diabetes: A study of accuracy and usability. Hormones, 22, 703-713.
- ACOG 2018. Acog practice bulletin no. 190: Gestational diabetes mellitus. Obstetrics & Gynecology, 131. ACOG. 2023. Updated acog guidance on gestational diabetes [Online]. Available: <https://www.obgproject.com/2023/01/02/acog-releases-updated-guidance-gestational-diabetes/> [Accessed 05/03/2024].