

## A Model for the Prediction of Therapy Type in women with Gestational Diabetes Mellitus

R.A. Barnes<sup>1</sup>, T. Wong<sup>1,2</sup>, G.P. Ross<sup>1,3</sup>, B.B. Jalaludin<sup>4,5</sup>, L MacDonald-Wicks<sup>6</sup>, C.Smart<sup>6</sup>, C Collins<sup>6</sup>, J.R. Flack<sup>1,2</sup>

<sup>1</sup> Diabetes Centre, Bankstown-Lidcombe Hospital, Bankstown NSW

<sup>2</sup> Faculty of Medicine, University of NSW, Sydney NSW

<sup>3</sup> Faculty of Medicine, University of Sydney, Sydney NSW

<sup>4</sup> Epidemiology, Healthy People and Places Unit, South Western Sydney Local Health District, Sydney, NSW

<sup>5</sup> School of Public Health and Community Medicine, University of New South Wales, Sydney NSW,

<sup>6</sup> Faculty of Health and Medicine, the University of Newcastle, Newcastle NSW

**Background:** Identification of women with Gestational Diabetes Mellitus (GDM) who are more likely to require insulin therapy versus those able to be managed by Medical Nutrition Therapy (MNT) alone could enable risk stratification and triaging into risk-based models of care. This has previously been attempted with limited success(1-3).

**Aim:** To develop a model to predict therapeutic management in women with GDM.

**Methods:** We analysed de-identified prospectively collected data (1993-2014), for women diagnosed with GDM by ADIPS (1998) Australian criteria(4) in our multi-ethnic high-risk cohort. We chose clinically relevant variables previously found to be statistically significant in predicting insulin initiation. Seven dichotomous items were included in a multiple regression model: maternal age >30 years, family history of diabetes, pre-pregnancy obesity (BMI  $\geq 30$  kg/m<sup>2</sup>), prior GDM, early diagnosis of GDM (<24 weeks gestation), fasting BGL  $\geq 5.3$  mmol/L, and HbA1c at GDM diagnosis  $\geq 5.5\%$ . A receiver operator curve (ROC) of sensitivity plotted against 1-specificity was constructed based on the number of predictors present (0-7) versus therapy outcome.

**Results:** Of 4023 women, a total of 3317 had complete data. All variables assessed remained significant as predictors of therapy type in the model. The Table shows the number of predictors present and the corresponding percentage of women requiring MNT only versus MNT+Insulin (MNT+I) therapy. The area under the ROC (AUC) was: AUC 0.712 (95%CI 0.693–0.731).

Number of predictors present	MNT only n= (%)	MNT+I n= (%)
0	175 (90.7)	18 (9.3)
1	522 (85.3)	90 (14.7)
2	620 (75.3)	203 (24.7)
3	549 (69.1)	246 (30.9)
4	265 (52.0)	245 (48.0)
5	107 (39.5)	164 (60.5)
6	12 (14.3)	72 (85.7)
7	2 (6.9)	27 (93.1)
Total	2252 (67.9)	1065 (32.1)

MNT=Medical Nutrition Therapy

MNT+I=Medical Nutrition Therapy plus Insulin

**Conclusion:** In this GDM cohort, prediction of therapy type could be determined based on the number of predictors present, with 85.7-93.1% requiring MNT+I when 6-7 predictors were present compared to 85.3-90.7% treated with MNT only when 0-1 predictors were present. Assessment of these readily available clinical variables could assist risk stratification and triaging. In this model, almost one quarter (24.3%) could be considered low-risk for MNT+I (0-1 variables present) and considered for management in a low-risk setting.

**Acknowledgements:** We wish to thank all the Diabetes Educators who have collected data and maintained the database.

## References:

1. Pertot T, Molyneaux L, Kris T et al. Can Common Clinical Parameters Be Used to Identify Patients Who Will Need Insulin Treatment in Gestational Diabetes Mellitus. *Diabetes Care*, 2011; **34**: 2214-2216.
2. Wong V and Jalaludin B. Gestational diabetes mellitus: Who requires insulin therapy? *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 2011; **51**: 432-436.
3. Sapienza AD, Fransisco RPV, Trindade TC, Zugaib M. Factors predicting the need for insulin therapy in patients with gestational diabetes mellitus. *Diabetes Research and Clinical Practice*, 2010; **88**: 81-86.
4. Hoffman L, Nolan, C, Wilson, JD, Oats JJN, Simmons D. Gestational diabetes mellitus management guidelines. The Australasian Diabetes In Pregnancy Society. *MJA* 1998; **169**: 93-97.