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**Title:** Evaluation of the Latest New Zealand Guidelines for Screening for Persistent Postpartum Hyperglycaemia following Gestational Diabetes

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### **Introduction:**

Gestational diabetes mellitus (GDM), affecting around 5% of pregnancies, is defined by the World Health Organisation as 'carbohydrate intolerance resulting in hyperglycaemia of variable severity with onset or recognition during pregnancy'. In plain English, GDM is a recognition of excess blood sugar levels during pregnancy, whether this be a pre-existing condition or as a result of the pregnancy.

GDM usually resolves following delivery, with blood sugar levels returning to normal in the first 24–48 hours postpartum. However, all women with GDM are routinely screened for persistent elevated blood sugar postpartum, as GDM is inclusive of previously undiagnosed diabetes. Local practice is to screen women at 6 weeks after delivery using the 2 hour oral glucose tolerance test (OGTT), which measures blood sugar levels in response to a carbohydrate load. If the test is abnormal, the woman is referred back to her GP for management of her pre-diabetes or diabetes. In November 2014, the NZ Ministry of Health introduced new guidelines, which recommended that the OGTT, a time consuming test with around 75-85% attendance locally, be replaced with a simple HbA1c screening test at 12 weeks postpartum.

There is, however, very little evidence to suggest that HbA1c is an appropriate postpartum screening test for diabetes. HbA1c is a protein found in red blood cells, which can be used to assess the average blood glucose levels over the life span of a red blood cell (roughly 12 weeks). There are significant changes to red blood cell turnover at the time of delivery with blood loss, iron deficiency, and blood and/or iron transfusions all contributing factors. This in turn has a direct effect on HbA1c measurement. The evidence thus far suggests that there is no correlation between the 'gold standard' OGTT and HbA1c at 6 weeks postpartum, with HbA1c tests tending to under-diagnose the true prevalence of 'pre-diabetes'. We might expect to see better correlation between the two tests at 12 weeks postpartum, once the confounding effects of delivery have been controlled for, but as yet there is no evidence to support the new recommendations.

### **Aims:**

The aim of this study was therefore to evaluate the correlation between HbA1c and OGTT at 12 weeks postpartum, with the 10 week summer studentship period forming the pilot stage of the study.

### **Methods:**

Women with a diagnosis of GDM were identified through antenatal clinics with the diabetes midwives at Christchurch Women's Hospital. They were booked as per usual care for a postpartum OGTT together with an HbA1c, but this test was delayed until 12 weeks postpartum (c.f. the usual 6 weeks). Clinical records were used to collect data on maternal characteristics (age, ethnicity, BMI), diagnosis and treatment of GDM, family history of Type II diabetes, delivery method ± complications and transfusions received. Health Connect South was used to determine whether there was a diagnosis of/treatment for iron deficiency and anaemia throughout the pregnancy. This information was used to establish a database that, in the longer term, will be used for statistical analysis by a biostatistician to determine the correlation between OGTT and HbA1c after adjustment for confounding factors.

At this stage of the study, the correlation between OGTT and HbA1c results was crudely evaluated as n=13 was not sufficient for statistical analysis.

### **Results:**

At the time of writing, full datasets were available for 13 women who had been diagnosed with GDM. Of these 13 women, 9 returned normal results for both the OGTT and the HbA1c tests. The remaining 4 had OGTT results indicative of pre-diabetes, yet normal HbA1c results.

### **Conclusion:**

I successfully set-up this study to evaluate the correlation between HbA1c and OGTT at 12 weeks postpartum for women with GDM. It is too early to draw meaningful conclusions from the study at this stage, with just 13 datasets completed. The full study will continue until 140 women have participated, which is the minimum number recommended by a biostatistician for statistical analysis.

Tentatively, the results thus far appear to reflect previous studies, which have found that HbA1c tests tend to under-diagnose cases of pre-diabetes. If this indeed is the case then, under the new recommendations from the Ministry of Health, some women with pre-diabetes will be falsely reassured and potentially miss an opportunity to implement lifestyle modifications to reverse their pre-diabetes and prevent a diagnosis of Type II diabetes. Around 30-40% of women with GDM have persistent excess blood sugar levels and it is important that these women are identified and appropriate management strategies be put in place to reduce long-term risks to their health.