Gestational diabetes mellitus screening and diagnosis criteria before and during the COVID-19 pandemic: a retrospective pre–post study

To the Editor: Meloncelli and colleagues[1] have provided clear evidence that a fasting venous plasma glucose (FVPG) assessment may be used to decrease the number of unnecessary oral glucose tolerance tests (OGTTs) for low risk women. This would be a very welcome step forward. However, it does not directly address the problem of the discrepant results and false positives when only the OGTT is used for the diagnosis. How should we interpret a woman with a screening FVPG value of 4.8 mmol/L, but whose FVPG value is 5.1 mmol/L on a subsequent OGTT when the one- and two-hour results are normal? Given the test–retest (un)reliability of FVPG, such discrepant results will be common. We can quantify this using results from a recent meta-analysis,[2] which estimated that the average coefficient of variation of FVPG was 5.7%. This implies that 95% of FVPG results (using 1.96 times the coefficient of variation) would be in a ± 11.4% range. For example, if a woman's true FVPG value was 5.0 mmol/L, then 95% of her results (noting that $0.114 \times 5.0 = 0.57$) would be 5.0 ± 0.57, that is, 4.43–5.57 mmol/L, which seems unreliable given the thresholds. The further from the threshold, the less likely a false positive becomes; the Box shows our calculation of the proportion of false positive FVPG values for different true average values.

The Box suggests if our hypothetical woman's first FVPG level of 4.8 mmol/L was indeed her true value, then a follow-up FVPG (eg, within the OGTT) will incorrectly suggest gestational diabetes mellitus (GDM) about 14% of the time. Particularly for borderline results, this unreliability of the OGTT is well described. For example, in the control arm of a recent trial,[3] about one-third of women diagnosed with GDM at their early test (but not told) had a normal OGTT result when retested at 24 weeks. That is, they were no longer considered to have GDM. Similar rates have been seen in other studies with shorter time frames between testing.[4]

For any biochemically defined condition, it unwise to make a diagnosis based on a single borderline result from screening. Hence, while FVPG assessment would be very welcome, any revised testing process for GDM should require some means for confirming borderline results.

The proportion of false positive FVPG retest values (≥ 5.1 mmol/L; alone or within OGTT) for different true average FVPG values

True average FVPG value*	Proportion of false positive FVPG retest values
5.0 mmol/L	36%
4.9 mmol/L	24%
4.8 mmol/L	14%
4.7 mmol/L	7%
4.6 mmol/L	3%
4.5 mmol/L	1%

FVPG = fasting venous plasma glucose; OGGT = oral glucose tolerance test. *Average of a hypothetical very large number of FVPG tests. ◆

Paul P Glasziou[1]
Jenny A Doust[2]

1 Centre for Research in Evidence-Based Practice, Bond University, Gold Coast, QLD.
2 Australian Women and Girls' Health Research Centre, University of Queensland, Brisbane, QLD.

pglaszio@bond.edu.au

Acknowledgements: Paul Glasziou is supported by NHMRC grant APP1175487.

Open access: Open access publishing facilitated by Bond University, as part of the Wiley - Bond University agreement via the Council of Australian University Librarians.

Competing interests: No relevant disclosures.

doi: 10.5694/mja2.52252

1 Meloncelli NJ, Barnett AG, Cameron CM, et al. Gestational diabetes mellitus screening and diagnosis criteria before and during the COVID-19 pandemic: a retrospective pre–post study. *Med J Aust* 2023; 219: 467-474. https://www.mja.com.au/journal/2023/219/10/gestational-diabetes-mellitus-screening-and-diagnosis-criteria-and-during-covid
2 White S, Gong H, Zhu L, et al. Simulations found within-subject measurement variation in glycaemic measures may cause overdiagnosis of prediabetes and diabetes. *J Clin Epidemiol* 2022; 145: 20-28.
3 Simmons D, Immanuel J, Hague WM, et al. Treatment of gestational diabetes mellitus diagnosed early in pregnancy. *N Engl J Med* 2023; 388: 2132-2144.
4 Nakanishi S, Aoki S, Kasai J, et al. High probability of false-positive gestational diabetes mellitus diagnosis during early pregnancy. *BMJ Open Diabetes Res Care* 2020; 8: e001234. ■