PRESS RELEASE

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First-trimester blood test significantly improves prediction of gestational diabetes

A non-fasting blood test taken in the first trimester may allow earlier detection of gestational diabetes, paving the way for timelier and less invasive screening and earlier interventions.

Singapore, 18 August 2025 — Researchers from the Global Centre for Asian Women's Health (GloW) and the Department of Obstetrics and Gynecology at the Yong Loo Lin School of Medicine, National University of Singapore (NUS Medicine) have found that selected maternal biomarkers from first-trimester random blood samples can effectively predict a woman's risk of gestational diabetes mellitus (GDM).

In Singapore, GDM — which affects one in five pregnant women—is typically diagnosed with a three-point oral glucose tolerance test between 24 and 28 weeks of pregnancy. The test requires overnight fasting and takes around 2-3 hours. The new study, led by a research team at the NUS GloW and recently published in [BMC Medicine](#), assessed nearly 100 different biomarkers — substances in the blood that reflect metabolism, inflammation, and hormone activity — from both random (non-fasting) blood samples taken in the first trimester and fasting blood samples from the second trimester. The aim was to find an earlier and more convenient way to accurately identify women at high risk of developing GDM.

The team found that just seven first-trimester biomarkers from random blood samples — including common tests like HbA1c (a measure of blood sugar over time), certain hormone and fat-related proteins, and specific fatty and amino acids — could significantly improve GDM risk prediction beyond conventional factors such as maternal age, pre-pregnancy body mass index, and family history of diabetes. Promisingly, these biomarkers performed just as well as those from second-trimester fasting blood samples, showing strong ability to distinguish high-risk from low-risk pregnancies and demonstrating a strong level of clinical usefulness.

"Our findings suggest that a simple, non-fasting blood test in early pregnancy may one day help identify women at risk of GDM — well before symptoms appear or complications arise," said Dr Yang Jiaxi, Senior Research Fellow at GloW and first author of the study. "With more studies, we can envision a future where testing and prevention start early—well before symptoms or complications set in."

Recognising the need for efficient and clinically feasible prediction tools, the team categorised biomarkers into three groups based on clinical accessibility: 1) Routinely tested and commonly available at low cost, 2) Available upon request at reasonable cost, but not routinely measuredd, 3) Targeted metabolomics of amino acids and fatty acids, which require specialised laboratory analysis and are not yet clinically accessible. They evaluated prediction models using different combinations of these biomarkers. While the model including all three groups (including metabolomic markers) achieved the highest predictive power, a model using only clinically accessible markers — whether routinely available or available upon request — still delivered strong prediction performance. Many of these biomarkers are already available in clinics, making rapid adoption feasible.

"Clinical accessibility is crucial when developing prediction tools," said Dr Yang. "A model should not only be accurate but also practical and widely accessible. Different tools may be used in different clinical contexts, but feasibility is key for broader application".

Until now, most women at risk were only identified midway through pregnancy, often too late to prevent adverse effects such as high blood pressure, large babies, or premature delivery[1]. GDM has also been linked to lifelong risks of type 2 diabetes and heart disease for both mothers and their children[2].

"With further validation, our approach could empower women and clinicians with a simple early blood test — using markers already routine in many clinics — to determine GDM risk. Interventions like tailored nutrition and lifestyle changes could begin sooner, potentially reducing the long-term health burdens of GDM for women by disrupting the "diabetes begets diabetes" cycle," said Professor Cuilin Zhang, who is Chair Professor in Women's Health at the NUS Medicine's Department of Obstetrics and Gynaecology, Director of GloW, and senior author of the study.

As maternal ages and obesity rates rise in Asia, the number of women affected by GDM is expected to increase[3] [4]. Early, simple, and effective GDM screening could be key to reversing that trend. By enabling women to make pre-emptive nutrition and lifestyle changes earlier, this breakthrough also contributes to reducing their risk of future type 2 diabetes and cardiovascular disease.

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For media enquiries, please contact:

Xuan LEE
Manager
Yong Loo Lin School of Medicine,
National University of Singapore
DID: +65 8288 1237
Email: lxuan@nus.edu.sg

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Our multidisciplinary and real-world approach to education, research and entrepreneurship enables us to work closely with industry, governments and academia to address crucial and complex issues relevant to Asia and the world. Researchers in our faculties, 30 university-level research institutes, research centres of excellence and corporate labs focus on themes that include energy; environmental and urban sustainability; treatment and prevention of diseases; active ageing; advanced materials; risk management and resilience of financial systems; Asian studies; and Smart Nation capabilities such as artificial intelligence, data science, operations research and cybersecurity.

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