OBSTETRICS

# The impact of adoption of the International Association of Diabetes in Pregnancy Study Group criteria for the screening and diagnosis of gestational diabetes

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**OBJECTIVE:** The objective of the study was to compare the International Association of Diabetes in Pregnancy Study Group (IADPSG) and the Canadian Diabetes Association (CDA) criteria for the diagnosis of gestational diabetes mellitus (GDM).

**STUDY DESIGN:** This was a retrospective cohort study involving all pregnant women who underwent screening for GDM at a tertiary medical center between 2008 and 2011. Diagnosis of GDM during the study period was based on the CDA 2008 recommendations of universal screening with a 50 g oral glucose challenge test (GCT; threshold 140 mg/dL [7.8 mmol/L]) and a diagnostic test using a fasting 2 hour, 75 g oral glucose tolerance test (OGTT). Diagnosis of GDM required the presence of 2 or more abnormal values, whereas a single abnormal value was diagnostic of impaired glucose intolerance. Because the OGTT thresholds based on the IADPSG criteria are lower than the CDA 2008 thresholds (92 mg/dL [5.1 mmol], 180 mg/dL [10.0 mmol/L], and 153 mg/dL [8.5 mmol/L]), we identified a group of women who would have been diagnosed as GDM based on the IADPSG criteria but not the CDA 2008 criteria (OGTT-IADPSG group). The pregnancy outcome of that group as well as that of women with a positive OGTT according to the CDA 2008 criteria (OGTT-CDA group) and women with a negative OGTT (OGTT-NEGATIVE group) was compared with that of a control group consisting of women with a negative GCT (GCT-NEGATIVE group).

**RESULTS:** Overall, 5429 women were eligible for the study, of which 4183 were included in the GCT-NEGATIVE group, 526 in the OGTT-NEGATIVE group, 155 in the OGTT-IADPSG group, and 385 in the OGTT-CDA group. Applying the IADPSG criteria to the study population would increase the rate of GDM from 3.2% (7.3% when including impaired glucose intolerance) to 10.3%. The majority of the increase in the rate of GDM was attributed to the use of a single abnormal value to define GDM (5.3% increase) rather than the use of lower threshold values (1.8% increase). Of the 3 threshold values, the lower 1 hour threshold was the most significant contributor to the higher GDM rate. A positive OGTT in both the OGTT-IADPSG group and the OGTT-CDA group was independently associated with a higher rate of the composite adverse outcome (odds ratio, 1.4; 95% confidence interval, 1.1—1.9).

**CONCLUSION:** The use of the IADPSG criteria instead of the CDA criteria would result in a considerable increase in the rate of GDM, but this also appears to identify additional women at similar risk of adverse pregnancy outcome. Further studies are needed to determine whether this observation persists after controlling for confounders such as body mass index as well as whether treatment in these cases would improve perinatal outcome.

**Key words:** criteria, diagnosis, gestational diabetes, screening

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There is a considerable variation in the definition, screening, and diagnostic criteria for gestational diabetes mellitus (GDM).[1-9] The diagnosis of GDM at our institution during the study period 2008-2011 was based on the Canadian Diabetes Association 2008[5] (CDA) recommendations (Figure 1).

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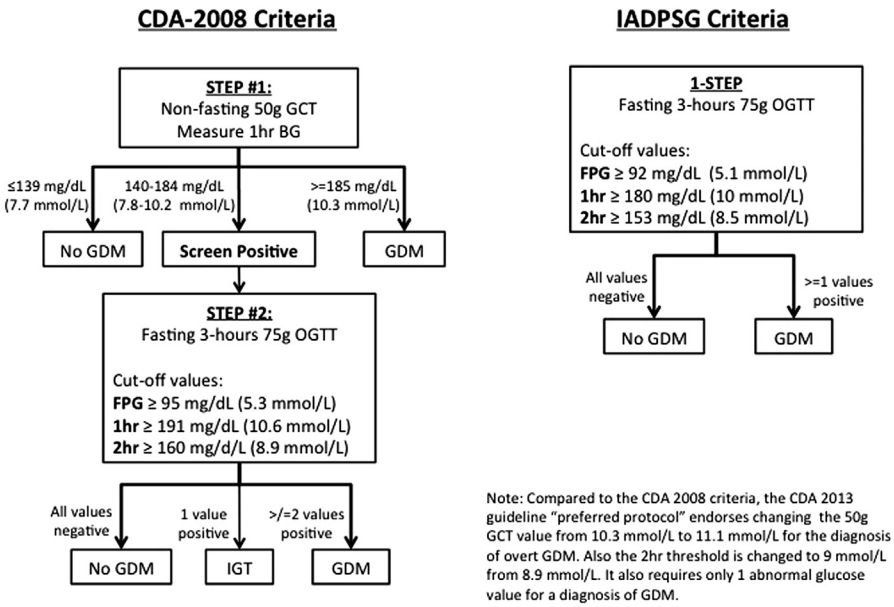
FIGURE 1
**CDA 2008 and IADPSG decision trees for diagnosis of GDM**




Note: Compared to the CDA 2008 criteria, the CDA 2013 guideline "preferred protocol" endorses changing the 50g GCT value from 10.3 mmol/L to 11.1 mmol/L for the diagnosis of overt GDM. Also the 2hr threshold is changed to 9 mmol/L from 8.9 mmol/L. It also requires only 1 abnormal glucose value for a diagnosis of GDM.

*CDA*, Canadian Diabetes Association; *GDM*, gestational diabetes mellitus; *IADPSG*, International Association of Diabetes in Pregnancy Study Group.

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The Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study was a large prospective cohort study that aimed to provide data on the associations between degrees of maternal glycemia and the risk of select adverse perinatal outcomes. These data were to be used to develop much needed internationally acceptable criteria for the diagnosis of GDM based on the 75 g oral glucose tolerance test (OGTT).[10]

As shown previously in the Toronto Tri-Hospital Study,[11] HAPO demonstrated the relationship between OGTT results and the rate of adverse pregnancy outcomes was of a continuous nature; thus, no obvious threshold could be determined. Despite this, in 2010, the International Association of Diabetes and Pregnancy Study Group (IADPSG) consensus panel published a new set of criteria for the diagnosis of GDM.[3] The panel supported a 1-step approach using the 75 g OGTT and new threshold values. These cutoff points were based on the OGTT glucose values that were associated with adverse outcomes in the HAPO trial. GDM was defined by the presence of 1 or more OGTT values exceeding these new thresholds.[3] This was an attempt to introduce a degree of conformity to GDM screening practices worldwide.

These new IADPSG threshold values are considerably lower than the OGTT thresholds usually used for the diagnosis of GDM in most countries, and along with the requirement for only a single abnormal value to define GDM, these new recommendations result in a considerable increase in the rate of GDM.[3,10] When these new thresholds are applied to the HAPO study population as a whole, the incidence of GDM is 17.8%.[3]

These consequences of using these new IADPSG recommendations, in the absence of evidence showing improved outcomes in this newly defined population, has led to conflicting opinions regarding the international adoption of these new criteria.[12-14] Naturally, the consequences of these new criteria may vary in different countries and are dependent on factors such as the current approach used for GDM diagnosis and the prevalence of obesity and type 2 diabetes mellitus in each specific population.

The aim of our study was to assess the potential impact of adoption of the IADPSG criteria on the rate of GDM and adverse pregnancy outcomes at our center.

## Materials and Methods

### Study population

This was a retrospective cohort study involving all pregnant women who underwent screening for GDM at St Michael's Hospital in Toronto, ON, Canada, a tertiary university affiliated medical center, between January 2008 and December 2011. The study protocol received approval from the institutional research ethics board (number 12-177[c]).

Women with multiple gestations, cases complicated by major anomalies, women who did not deliver in our medical center, women who underwent a 75 g OGTT in the presence of a negative 50 g glucose challenge test (GCT), and women who were diagnosed with GDM solely on the basis of an abnormal 50 g GCT were excluded from the study (Figure 2).

### Definitions

During the study period, the GDM screening and diagnosis strategy in our institution followed the CDA 2008 guidelines,[5] which are based on a 2-step screening approach (Figure 1). The first step involves universal screening at 24-28 weeks of gestational age using the 1 hour, 50 g GCT. Results are interpreted as screen negative (result <140 mg/dL; <7.8 mmol/L), screen positive (result between 140 and 184 mg/dL; 7.8-10.2 mmol/L), or diagnostic for GDM (result ≥185 mg/dL; ≥10.3 mmol/L). Of note, the new CDA 2013 guidelines raised the diagnostic threshold of the 50 g GCT to 200 mg/dL (11.1 mmol/L).

Patients screening positive undergo a fasting state 2 hour, 75 g OGTT with fasting, with 1 hour and 2 hour threshold values of 95 mg/dL (5.3 mmol/L), 191 mg/dL (10.6 mmol/L), and 160 mg/dL (8.9 mmol/L), respectively (Figure 1). The diagnostic 75 g OGTT is interpreted as positive for GDM if 2 or more values exceed their corresponding thresholds. Patients with only 1 abnormal value are diagnosed with impaired glucose tolerance (IGT) and were managed similarly to GDM patients in our medical center.