Screening and diagnosis of type 2 diabetes with HbA1c

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Clinical question
Is hemoglobin A1c (HbA1c) testing appropriate for screening and diagnosis of type 2 diabetes mellitus?

Evidence
- Agreement between HbA1c and fasting plasma glucose (FPG) or oral glucose tolerance testing (OGTT) is poor:
  - 25% to 27% agreement for HbA1c and FPG;1-2
  - 22% to 33% agreement for HbA1c and OGTT.1-3
- Some studies find HbA1c (≥ 6.5%) would diagnose less diabetes than OGTT,5,6 (eg, HbA1c missed 60% of the cases OGTT diagnosed); some find HbA1c (≥ 6.5%) would diagnose more diabetes than OGTT.5 (eg, OGTT missed 35% of the cases HbA1c diagnosed).
- In predicting outcomes of diabetes, HbA1c -performs as well as and often better than FPG7-10 and -might be similar to OGTT, but evidence is lacking.7,5 HbA1c levels for best prediction vary by study.7-10
- Using a diagnostic cutoff of HbA1c ≥ 6.5%:
  - Higher HbA1c improves specificity, lower improves sensitivity.
  - One study found HbA1c of ≥ 6.5% had a sensitivity and specificity of 44% and 79%, respectively.11
  - While some data suggest the cutoff could be lower,12-14 consistency is lacking,5 and racial differences do exist.15

Context
- Although FPG has been the preferred diagnostic test for diabetes for years, it requires patient compliance with fasting and has high intraindividual variability.7,16
- Agreement between FPG and OGTT is also poor.17,18
- HbA1c is more expensive and not reliable in certain conditions (eg, hemoglobinopathies),19 but does not require fasting and has less intraindividual variability than FPG.7
- Recent American,20 WHO,21 and Canadian Task Force on Preventive Health Care (CTFPHC)22 recommendations include HbA1c of ≥ 6.5% for screening and diagnosis.

- Screening and diagnostic tests are the same in diabetes.20
- Positive results (FPG, OGTT, or HbA1c) should be confirmed with repeat testing using the same test.20

Bottom line
An HbA1c cutoff of ≥ 6.5% can be used to screen for and diagnose type 2 diabetes. Controversy persists around appropriate cutoffs and agreement with other tests.

Implementation
There is no evidence that screening adults at low or moderate risk of diabetes will improve outcomes; low-quality evidence suggests that screening high-risk adults could reduce complications.23 The CTFPHC recently published new guidance on screening for diabetes, identifying HbA1c as the preferred test. The CTFPHC recommends using a validated risk calculator (preferably FINDRISC23) to identify adults at high or very high risk. High-risk adults should be screened with HbA1c every 3 to 5 years; those at very high risk should be screened annually. FINDRISC23 requires consideration of diet, exercise, and body weight, so using these risk calculators offers opportunities to discuss other risk factors.

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The opinions expressed in this Tools for Practice article are those of the authors and do not necessarily mirror the perspective and policy of the Alberta College of Family Physicians.

References

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