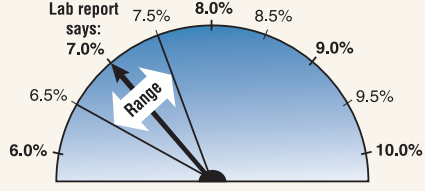
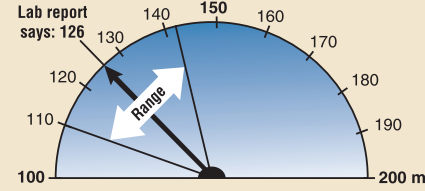


COMPARING DIABETES BLOOD TESTS[‡]

| Test | Uses | Technical Features | PROS | CONS |
|-----------------|---|--|---|---|
| A1C Test | <ul style="list-style-type: none"> Screening and diagnosis of prediabetes <ul style="list-style-type: none"> 5.7–6.4%[†] Screening and diagnosis of type 2 diabetes <ul style="list-style-type: none"> ≥ 6.5%[†] repeat for confirmation of diagnosis Monitoring of diabetes | <ul style="list-style-type: none"> Diagnosis requires a laboratory test certified by the NGSP; not meter—point-of-care A1C tests are only suitable for monitoring Sample any time of day, no fasting Sample: anticoagulated whole blood Sample stability: superior Sensitivity: less than the FPG test and the OGTT Coefficient of variation: assay variability, see www.ngsp.org  <p>Courtesy of David Aron, M.D., Louis Stokes Department of Veterans Affairs Medical Center</p> <p>With a coefficient of variation as large as that allowed by the National Glycohemoglobin Standardization Program, a reported A1C result of 7.0% could indicate a true A1C of anywhere from ~6.5 to 7.5%.</p> | <ul style="list-style-type: none"> Reflects long-term blood glucose concentration Unaffected by acute changes in glucose levels due to stress or illness Highly correlated with risks for complications such as retinopathy and cardiovascular disease (CVD) Convenient for patient and health care providers Most stable sample after collection Low within-patient variability Established international standardization of lab tests Accuracy of test is monitored | <ul style="list-style-type: none"> Lower sensitivity: identifies fewer cases of diabetes than the glucose tests Interference resulting in falsely increased or lowered results due to* <ul style="list-style-type: none"> genetic variants including HbS, HbC, HbD, and HbE traits and HbF:** affects people of African, Mediterranean, and Southeast Asian heritage kidney disease liver disease iron deficiency anemia heavy bleeding Not recommended for rapidly progressing diabetes, e.g., type 1 diabetes in children May not be available in some laboratories/areas of the world Expensive <p>*See www.ngsp.org for information on A1C interference and recommended testing methods. **See the NIDDK publication <i>The A1C Test and Diabetes</i> at www.diabetes.niddk.nih.gov.</p> |
| FPG Test | <ul style="list-style-type: none"> Screening and diagnosis of prediabetes or impaired fasting glucose (IFG) <ul style="list-style-type: none"> 100–125 mg/dL[†] Screening and diagnosis of diabetes <ul style="list-style-type: none"> ≥126 mg/dL[†] repeat for confirmation of diagnosis | <ul style="list-style-type: none"> Diagnosis requires a laboratory test, not meter Sample in morning, after 8-hour fast Sample: sodium fluoride plasma preferred Sample stability: low—requires processing within 30 minutes Sensitivity: greater than the A1C test, less than the OGTT Coefficient of variation: assay variability:  <p>Courtesy of David Aron, M.D., Louis Stokes Department of Veterans Affairs Medical Center</p> <p>With a coefficient of variation 5.7% (typical biological variation within the same person), an FPG test result of 126 mg/dL could indicate a true FPG of anywhere from ~110 to 142 mg/dL.</p> | <ul style="list-style-type: none"> Low cost Assay is widely available Assay is automated | <ul style="list-style-type: none"> Indicates single-point blood glucose level Affected by short-term lifestyle changes: stress or illness Less tightly linked to diabetes complications than A1C Not convenient for patient or health care provider: requires fasting and scheduling a morning appointment or return visit Diurnal variation Sample not stable after collection High within-patient variability Many laboratories measure serum, which is not recommended Inadequate standardization of assays |
| OGTT | <ul style="list-style-type: none"> Screening and diagnosis of prediabetes or impaired glucose tolerance (IGT) <ul style="list-style-type: none"> 140–199 mg/dL at 2 hr.[†] Screening and diagnosis of diabetes <ul style="list-style-type: none"> ≥200 mg/dL at 2 hr.[†] repeat for confirmation of diagnosis Screening and diagnosis of gestational diabetes mellitus (GDM)* | <ul style="list-style-type: none"> Sample in morning, after 8-hr. fast and 2 hrs. after glucose load Sample stability: low—requires processing within 30 minutes Patients should ingest at least 150 g/day of carbohydrates for 3 days prior Sensitivity: greater than the A1C or the FPG tests | <ul style="list-style-type: none"> Sensitive indicator of risk of developing diabetes Early marker of impaired glucose balance | <ul style="list-style-type: none"> Affected by short-term lifestyle changes: stress, illness, and medications Not convenient for patient or health care provider: requires fasting and scheduling a morning appointment or return visit Extensive patient preparation Sample not stable after collection High within-patient variability Low reproducibility Expensive |
| RPG Test | <ul style="list-style-type: none"> Diagnosis of diabetes—used only with classic symptoms of hyperglycemia or hyperglycemic crisis: <ul style="list-style-type: none"> polyuria, polydipsia, and unexplained weight loss 200 mg/dL[†] | <ul style="list-style-type: none"> Sample any time, no fasting Sample stability: low—requires processing in fewer than 2 hours | <ul style="list-style-type: none"> Convenient Part of basic metabolic panel screen | <ul style="list-style-type: none"> Indicates single-point blood glucose level Used only in symptomatic patients, not recommended for screening Insensitive measurement Greater within-patient variability Affected by short-term lifestyle changes and prandial state |

[‡]Adapted from Sacks DB. A1C versus glucose testing: a comparison. *Diabetes Care*. 2011;34(4):518–523.

[†]American Diabetes Association. Standards of medical care in diabetes—2011. *Diabetes Care*. 2011;34(Supp 1):S11–S61.

*Testing for GDM is not covered in this publication.