ACM Medical Laboratory

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Technical Bulletin

Detailed information concerning methodology, specimen requirements, and reference ranges on new and specialized tests

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- **Test Name:** **Glucose Tolerance Testing (2HGTT)**
- **Test Order Number:** 309
- **CPT code:** Varies
- **Department:** Clinical Chemistry (400)
- **Testing Schedule:** Monday-Saturday
- **Specimen Requirement:** 1mL plasma/serum (grey top or SST tube)
- **Reference Range:** 60-99 mg/dL
- **Methodology:** Spectrophotometry (hexokinase)

Revised Information:

ACM Medical Laboratory has adopted the American Diabetes Association major revision to the Diagnosis and Classification of Diabetes Mellitus.[1-4] A review of these changes are detailed here but additional information can be found in the references and at the ADA website www.diabetes.org where the information is available online in its entirety (go to ->Health Care Professionals ->Journals ->Diabetes Care -> January 2004.) **Note: The ADA has expanded the impaired levels to emphasize the "pre-diabetic" state by reducing the fasting normal range to less than 100 mg/dL. Follow-up hemoglobin A_{1c} measurement should be < 7.0% but is not used for diagnosis at this time.**

Laboratory Results:

Normal Levels: The normal fasting plasma glucose (FPG) is defined as **60 – 99 mg/dL**. Normal values after an oral glucose tolerance test (OGTT) at 2 hours (2hPG) are defined as **< 140 mg/dL.**

Impaired Levels: The fasting values from an intermediate group of patients too high to be called normal but not high enough to be classified as diabetics are **100 – 125 mg/dL** or those with OGTT at 2 hours **> 140 but < 200 mg/dL**.

Diabetes Mellitus: Those patients whose fasting plasma glucose (FPG) is **≥126 mg/dL** or with an OGTT at 2 hours **≥ 200 mg/dL**.

Diagnostic Criteria:

Table 1	American Diabetes Association Revised Criteria
1.	Symptoms of diabetes (polyuria, polydipsia and unexplained weight loss) with a **casual plasma glucose** concentration **≥ 200 mg/dL.** Casual is defined as any time of day without regard to time since last meal.
	OR
2. (Preferred)	Fasting plasma glucose (FPG) **≥ 126 mg/dL**. Fasting is defined as no caloric intake for at least 8 hours.
	OR
3.	2 Hour plasma glucose (2hPG) **≥ 200 mg/dL** during an oral glucose tolerance test (OGTT). The OGTT is performed as described by WHO[3] using a glucose load containing the equivalent of 75 grams of anhydrous glucose in water.

In the **absence of unequivocal hyperglycemia** with acute metabolic decompensation, these criteria should be **confirmed by repeat testing** on a different day. The third measure (OGTT) is **not** recommended for routine clinical use. Thus, there are three ways for the laboratory diagnosis of diabetes mellitus but the preferred (recommended) method measuring fasting plasma glucose is the simplest, most reproducible, least expensive and easiest for the patient.

An FPG **≥126 mg/dL (confirmed by repeat testing) is diagnostic for diabetes.** This recommendation is based on the population-based data showing a sharp rise in adverse outcomes (i.e., microvascular complications) at or near this glucose level and an increased risk of macrovascular disease.

LAB Test Criteria:

Table 2	Plasma Glucose Test Result (mg/dL)*		
	Normal	**Impaired**	**Diabetes**
Fasting	60 – 99	100 - 125	≥ 126
75 gm OGTT at 2 hours*	< 140	140 - 199	≥ 200
Casual	< 200	-	≥ 200

* Must be repeated on a different day to confirm the diagnosis.

Important Change to the Oral Glucose Tolerance Test (OGTT): Only a fasting sample and a single 2-hour sample are required, after 75 grams of glucose is administered, since no other limits are provided in the guidelines.

GDM Testing:

The American Diabetes Association recommends either the older two-step approach (50 gm followed by 100 gm OGTT, if needed)[1] or a newer 75 gm OGTT process with fewer blood samples[4]. In the first case, a patient must exceed the 140 limit to proceed to the 100 gm OGTT and have two or more values exceed the table values. In the second case, two or more values must exceed the table values. **If Jelly beans[6] are used for 50 gm screening, a 120 mg/dL limit is used in place of the 140 mg/dL cutoff.

Table 3	GESTATIONAL DIABETES CRITERIA*		
	50 gm Screen[4] and 100 gm OGTT[1,2,4]		**Or 75 gm OGTT[4]**
Fasting	-	< 95 mg/dL	< 95 mg/dL
1-hour	< 140 mg/dL**	< 180 mg/dL	< 180 mg/dL
2-hour	-	< 155 mg/dL	< 155 mg/dL
3-hour	-	< 140 mg/dL	-

* Screening is **not** necessary in pregnant women < 25 years old, with normal body weight, who have no first-degree relatives with diabetes and who are **not** Hispanic, Native-American, Asian, or Afro-American.

Questions/Information and References:

Call 247-3500 (Client Services) and ask for Chemistry (Rick Walton, Chemistry Manager) or Dr. David Hohnadel, ACM Technical Director at (585) 429-2399 or Dr. John D'Souza, ACM Medical Director at (585) 429-2246.

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1. American Diabetes Association - **Diagnosis and Classification of Diabetes Mellitus** (Position Statement) Diabetes Care, **27**: (Suppl. 1), S5-S10 (2004.)
2. American Diabetes Association – **Screening for type 2 Diabetes** (Position Statement) Diabetes Care, **27**: (Suppl. 1), S11-S14, (2004).
3. World Health Organization: **Diabetes Mellitus: Report of a WHO Study Group**, Geneva, World Health Org., (1985) (Tech. Rep. Ser., No. 727).
4. American Diabetes Association – **Gestational Diabetes Mellitus** (Position Statement) Diabetes Care, **27**: (Suppl. 1), S88-S90, (2004).
5. American Diabetes Association – **Standards of Medical Care** (Position Statement) Diabetes Care, **27**: (Suppl. 1), S15-S35, (2004).
6. Boyd, K etal **Jelly beans**,Am J Obstet Gynecol, **173**:1889-92, 1995.