

CLASSIFICATION AND MANAGEMENT OF DIABETES

This section contains summarized information from *The Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus* as printed in Diabetes Care, Volume 20, Number 7, July 1997, pp. 1183-1201. The summaries were prepared as a quick reference tool to assist providers in planning care for people with diabetes.

Acknowledgement and appreciation are given to John MacIndoe, MD, Robert Hoffman, MD, and Vicki Kraus, RN, MS, CDE from the University of Iowa for their invaluable assistance in preparing this material.

CLASSIFICATION*

- ◆ **Eliminate**
 - ◇ “insulin-dependent diabetes mellitus (IDDM) and
 - ◇ “non-insulin-dependent diabetes mellitus (NIDDM)

- ◆ **Change:** (from Roman numeral to Arabic numbers)
 - ◇ Type I diabetes **to Type 1 Diabetes**
 - ◇ Type II diabetes **to Type 2 Diabetes**

- ◆ **Type 1 Diabetes characterized by:**
 - ◇ **Beta cell destruction-leading to absolute insulin deficiency**
 - ◇ **Forms:**
 - **Immune-Mediated Diabetes Mellitus**
Cellular mediated autoimmune destruction of the beta cells of pancreas
 - **Idiopathic Diabetes Mellitus**
Forms of disease with no known etiologies

- ◆ **Type 2 Diabetes**
 - ◇ **Individuals with 1) insulin resistance and 2) relative insulin deficiency**
 - ◇ Range from predominantly insulin resistant with relative insulin deficiency to predominantly deficient in insulin secretion with insulin resistance.

- ◆ **Impaired Fasting Glucose IFG** (Impaired Glucose Homeostasis)
 - ◇ Fasting plasma glucose ≥ 110 mg/dl but < 126 mg/dl.

- ◆ **IGT (impaired glucose tolerance)** retained; defined as:
 - oral glucose tolerance test value of ≥ 140 mg/dl but < 200 mg/dl.

- ◆ Both IFG and IGT refer to metabolic stages of impaired glucose homeostasis that are intermediate between normal glucose homeostasis and diabetes.
 - ◆ Not clinical entities in their own right (in the absence of pregnancy)
 - ◆ Risk factors for future diabetes and cardiovascular disease.

- ◆ **“Normal” Fasting Plasma-110 mg/dl or below**

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DIAGNOSTIC CRITERIA FOR DIABETES*

- ◆ **Fasting plasma glucose (FPG) recommended.**
At this time hemoglobin A1c is **not recommended** for diagnosis.
- ◆ **FPG value \geq 126 mg/dl** (confirmed by repeat testing) **is diagnostic.**
- ◆ **Criteria are for *diagnosis*** and are **not** treatment criteria or goals of therapy.

STAGE	TEST		
	Fasting Plasma Glucose (FPG) (Preferred)*	Casual Plasma Glucose	Oral Glucose Tolerance Test (OGTT)
Diabetes	FPG \geq 126 mg/dl (7.0 mmol/l)**	Casual plasma glucose \geq 200 mg/dl (11.1mmol/l) plus symptoms***	Two-hour plasma glucose (2hPG) \geq 200 mg/dl****
Impaired Glucose Homeostasis	Impaired Fasting Glucose (IFG) =FPG \geq 110 and <126 mg/dl		Impaired Glucose Tolerance (IGT) = 2hPG \geq 140 and <200 mg/dl
Normal	FPG <110 mg/dl		2hPG <140 mg/dl

*The FPG is the preferred test for diagnosis, but any one of the three listed is acceptable. In the absence of unequivocal hyperglycemia with acute metabolic decompensation, one of these three tests should be used on a different day to confirm diagnosis.

**Fasting is defined as no caloric intake for at least 8 hours.

***Casual = any time of day without regard to time since last meal; symptoms are the classic ones of polyuria, polydipsia, and unexplained weight loss.

****OGTT should be performed using a glucose load containing the equivalent of 75g anhydrous glucose dissolved in water. The OGTT is not recommended for routine clinical use.

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CRITERIA FOR TESTING IN ASYMPTOMATIC, UNDIAGNOSED INDIVIDUALS*

◆ **Type 1 Diabetes: Testing Not Recommended**

- * Testing presumably healthy individuals for the presence of any immune markers, outside of a clinical trials setting, is not recommended.

◆ **Type 2 Diabetes:** In asymptomatic, undiagnosed individuals, testing should be considered in all individuals who are:

- Age 45 years and above - repeated at three year intervals if normal
- Younger age or more frequently IF
 - * **obese** [$\geq 120\%$ desirable body weight or a body mass index (BMI) $\geq 27 \text{ kg/m}^2$]
 - * **first degree relative** with diabetes
 - * members of a **high-risk ethnic population** (African American, Hispanic, Native American, Asian)
 - * delivered a **baby weighing > 9 lb.** or were **diagnosed with GDM**
 - * are **hypertensive** ($\geq 140/90$)
 - * have an **HDL cholesterol level $\leq 35 \text{ mg/dl}$** and/or a **triglyceride level $\geq 250 \text{ mg/dl}$** .
 - * on previous testing, **had IGT or IFG**

The FPG is the preferred diagnostic test because of its ease of administration, convenience, acceptability to patients, and lower cost.

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CRITERIA FOR DETECTION AND DIAGNOSIS OF GESTATIONAL DIABETES (GDM)

Gestational diabetes mellitus (GDM) refers to any degree of glucose intolerance with onset or first recognition during pregnancy.

Detection and Diagnosis of Gestational Diabetes (GDM)			
Plasma Glucose	50-g Screening Test	100-g Diagnostic Test* (NDDG)	100-g Diagnostic Test** (Carpenter & Coustan)
Fasting	-----	105 mg/dl	95 mg/dl
1 hour	140 mg/dl	190 mg/dl	180 mg/dl
2 hour	-----	165 mg/dl	155 mg/dl
3 hour	-----	145 mg/dl	140 mg/dl

*National Diabetes Data Group and Expert Committee Criteria

** Carpenter and Coustan and Fourth International Workshop-Conference Criteria

Detection

- ◆ Screening for GDM **may not be necessary** in pregnant women who meet **ALL** of the following criteria:
 - Less than 25 years of age
 - No first degree relative with Diabetes
 - Normal body weight
 - Not Hispanic, Native American, Asian- or African American
- ◆ Screening Test:
 - 50-gram oral glucose load followed by a plasma glucose determination 1 hour later
 - Perform (unless otherwise indicated) between 24 and 28 weeks of gestation
 - Patient need not be fasting
 - Value of ≥ 140 mg/dl 1 hour after the 50-gram load indicates need for an Oral Glucose Tolerance Test (OGTT).

Diagnosis

- ◆ 100-gram 3 hour OGTT performed in fasting state with fasting, 1 hour, 2 hour, and 3 hour glucose determinations.
- ◆ Requires any **two** of the four plasma glucose levels (fasting, 1 hour, 2 hour, or 3 hour) to meet or exceed the values indicated in the above table
- ◆ Criteria for diagnosis of GDM published by the National Diabetes Data Group in 1979 have been challenged as being too high and were modified by Carpenter and Coustan in 1984. These are the diagnostic criteria officially recommended by the Fourth International Workshop Conference on Gestational Diabetes held in 1997.

References:

Carpenter, M.W. & Coustan, D.R. (1982). Criteria for screening tests for gestational diabetes. American Journal of Obstetrics and Gynecology, 144, 768-773.

Metzger, B.E., Coustan, D.R. & The Organizing Committee (1998). Summary and recommendations of the Fourth International Workshop-Conference on Gestational Diabetes Mellitus. Diabetes Care, 21 (Supp. 2), B161-B167.

National Diabetes Data Group (1979). Classification and diagnosis of Diabetes Mellitus and other categories of Glucose Intolerance. Diabetes, 28 (December), 1039-1057.

The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus (1997). Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Diabetes Care, 20 (7), 1183-1197.

CRITERIA FOR MANAGEMENT OF PEDIATRIC TYPE 1 DIABETES

The following guidelines have been adapted and amended from the 1998 American Clinical Practice Recommendations by Robert Hoffman, M.D., University of Iowa.

Diagnosis

- ◆ Random blood sugar >200 mg/dl with symptoms of:
 - Polyuria
 - Polydypsia
 - Polyphagia
- ◆ Fasting blood sugar \geq 126 mg/dl

Overall Objectives

- ◆ Provide age-appropriate education directed at the child and family.
- ◆ Independent self-management through establishment of goals of care and self-management training.
- ◆ Team oriented education and treatment to meet educational, dietary, exercise, and psychological needs of children and adolescents.

Specific Pediatric Education Needs

- ◆ Modification of blood sugar goals for children less than 6 or 7 years due to inability to recognize hypoglycemia and potential adverse effects of hypoglycemia on long-term cognitive function.
- ◆ Sick day management for increased incidence of illness in children.
- ◆ Ketone testing and management with blood sugar greater than 240.

Pediatric Dietary Management

- ◆ Assess nutrition at diagnosis and yearly thereafter.
- ◆ Avoid overaggressive dietary management in order to provide adequate calories for good growth.

Insulin Regimen and Testing

- ◆ Age dependent
- ◆ Allow flexibility in schedule for special athletic, musical, academic and other events.
- ◆ Three to four injections per day improve flexibility particularly in adolescents.

School

- ◆ Work with parents and school staff to learn menu schedules and carbohydrate content of school lunches.
- ◆ Establish midday testing and injections policies as needed.
- ◆ Train school personnel on recognition and treatment of low blood sugars.