

Diagnosis of Diabetes and Pre-diabetes:

Condition	A1C (%)	Fasting Blood Glucose test mmol/L	Oral Glucose Tolerance Test mmol/L
Diabetic	$6.5 \leq$	$7 \leq$	$11.1 \leq$
Pre-Diabetic	6.4-5.7	6.9-5.5	11-7.8
Non-Diabetic	$5.7 >$	$5.4 >$	$7.7 >$



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Diabetes



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Diabetes

Diabetes is a condition characterized by hyperglycemia resulting from the body's inability to use blood glucose for energy. In Type 1 diabetes, the pancreas no longer makes insulin and therefore, blood glucose cannot enter the cells to be used for energy. In Type 2 diabetes, either the pancreas does not make enough insulin or the body is unable to use insulin correctly. Blood glucose determinations are the most frequently performed clinical chemistry laboratory procedures, commonly used as an aid in the diagnosis and treatment of diabetes.

The main tests used to diagnose diabetes are:

- Fasting Blood Glucose Test (FBG)
 - Oral Glucose Tolerance Test (OGTT)
 - HbA1c Test
 - Insulin Total Level
- **Fasting Blood Glucose test** is simply a blood glucose test that is conducted when the person has not had any caloric intake for approximately 8-10 hours (no longer than 16h), it should be obtained in the morning due to diurnal variation with the mean FBG higher in the morning than in the afternoon, diabetes in patients tested in the afternoon may be missed because of this variation.
- **The oral glucose tolerance** test is more complicated and is used less frequently for diagnosis than the fasting plasma glucose test. It requires that the person fasts (as described above) for the first blood sample and then drink a liquid containing a specified amount of glucose; a further blood sample is then taken after 2 hours.

Therapy for diabetes requires the long-term maintenance of a blood glucose level as close as possible to a normal level, minimizing the risk of long-term vascular consequences. A single fasting blood glucose measurement is an indication of the patient's immediate past condition (hours), but may not represent the true status of blood glucose regulation. The measurement of hemoglobin A1c (HbA1c) every two to three months has been accepted as a measure of glycemic control in the care and treatment of patients with diabetes mellitus.

- **Hemoglobin A1c**, is a hemoglobin with glucose attached. The A1c test evaluates the average amount of glucose in the blood over the last 2 to 3 months by measuring the percentage of glycated hemoglobin in the blood. The higher the level of glucose in the blood, the more glycated hemoglobin is formed.

- **Insulin Total Level**

Insulin is a polypeptide hormone produced and stored in the beta cells of the pancreas.

Insulin test is can help in the diagnosis of diabetes mellitus and other carbohydrate and lipid metabolism disorders. Increased insulin levels are observed in obese subjects, in women treated with oral contraceptives, hyperthyroidism. Decreased insulin levels are found mainly in diabetes mellitus.

Reference range: 3.2 – 16.3 uIU/ml.

- **C-peptide**

C-peptide is a short chain of amino acids, that is released into the blood as a byproduct of the formation of insulin by the pancreas.

This test can help to evaluate insulin production, wither the patient needs supplement oral medication with insulin injection or an insulin pump, or he have an insulin resistance .

Reference range: 0.8 – 4.2 ng/mL