

# Diabetes

*This information is provided as a general overview. Various countries use different terminology.*

## **Diabetes Mellitus (DM)**

Diabetes Mellitus is a metabolic disease characterized by reduced carbohydrate utilisation and enhanced fat and protein utilisation. It is caused by inadequate secretion of insulin, the secretion of abnormal insulin, or the inability of the tissues to respond to insulin. Symptoms include elevated blood sugar, excess sugar in urine, abundant urine production, thirst, dehydration and increased appetite. There are two forms of diabetes mellitus: type I or type II.

### ***Type I DM***

Type I diabetes is a response to a lack of insulin secretion from the pancreatic beta cells which leads to elevated levels of fat in the blood as a result of increased fat metabolism. It accounts for approximately 20% of all clinical cases of diabetes mellitus. It primarily occurs in the young and requires insulin treatment to maintain adequate blood sugar levels. There is some evidence to suggest that Type I diabetes, formerly known as Juvenile-onset diabetes may be caused by a virus that triggers an autoimmune destruction of the pancreatic beta cells. In addition, it is not yet clear if heredity plays a major role in the onset. Untreated type I diabetes is characterised by low blood insulin levels, and relative high levels of the pancreatic hormone glucagon in the blood, both despite high blood sugar levels. In normal individuals, increased blood sugar levels stimulate insulin secretion, whereas type I diabetics have little or no insulin to secrete. In addition, in normal individuals, high levels of blood sugar suppresses glucagon secretion, whereas this suppression does not occur in type I diabetes.

### ***Type II DM***

Type II diabetes is a less severe insulin deficiency that accounts for 80% of all clinical cases of diabetes mellitus. Formerly referred to as maturity-onset, it primarily occurs in older, often obese individuals. Although the cause is less well understood, it includes a genetic component. Research has indicated that these individuals have approximately 50% of their pancreatic beta cells. Type II diabetics are usually insulin resistant, where their tissues do not respond to insulin. In this context, it has been suggested that a combination of pancreatic beta cell damage and the resistance to the actions of the residual insulin secretion results in the increased blood sugar levels of type II diabetes. In type II DM, diet is commonly used to maintain adequate blood sugar levels.

## **Aviation Guidelines**

### ***Insulin treated pilots with Diabetes Mellitus***

The major consideration in licensing diabetics who are insulin treated (all Type I DM and Type II DM pilots who require insulin in addition to dietary management) or who require oral hypoglycemics, is the risk of sudden incapacitation, primarily caused by low blood sugar. The signs and symptoms of low blood sugar arise from an inadequate supply of blood sugar to the central nervous system and include weakness, palpitations, tremor, sweating, hunger, cognitive impairment, mental confusion, behavioral changes, and seizure.

The central nervous system effects of low blood sugar on information processing are of particular concern to the aeromedical community. The major issue in this group is assessing the risk of low blood sugar. In this context, insulin dependent-diabetics have previously not been eligible for any restricted or unrestricted medical certification.

### ***Non Insulin treated pilots with Diabetes Mellitus***

Individuals, who can control their blood sugar by diet alone, provided they have no cardiovascular, neurological, ophthalmological or renal complications of DM that could possibly result in subtle incapacitation can exercise class I medical privileges.



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