

# Diabetes Mellitus

## Checklist for persons taking insulin and applying for a Class 3 Medical Certificate

1. Have I had two or more episodes of low blood sugar within the last 5 years (and any in the last year) that caused me to lose consciousness have a seizure or convulsion, impaired my thinking, occurred without warning, or required another person's assistance? If the answer is "yes," then I am not qualified for a Class 3 Medical Certificate. If the answer is "no," then I may be qualified.
2. Undergo a complete examination by a physician, *preferably one specializing in the management of diabetes*, at as short a time as possible before my flight medical examination.
3. Obtain copies of *all medical records*, as well as records of any incidents or accidents (e.g., traffic accident reports, occupational incidents) pertinent to the history of diabetes.
4. Have at least two measurements of glycohemoglobin (sugar-coated hemoglobin in blood). These may be total A1 or A1c. The first test must be at least 90 days prior to the application. The test results and laboratory reference range ("normal range") for the tests used must be attached to the application.
5. Submit records that specifically describe insulin dosages and the diabetic diet prescribed for me.
6. Submit the medical report that specifically addresses whether or not there is any evidence that I have any disease of the brain or blood vessels (cerebrovascular disease); heart (cardiovascular disease); blood vessels of the extremities (peripheral vascular disease); or nerves (diabetic neuropathy).
7. Undergo an eye exam performed by a specialist, that examines me and determines the absence of *clinically significant* eye disease. Specifically, the doctor must determine that there is not an increased risk of acute bleeding in to the eyes that could cause instantaneous blindness in one or both eyes.
8. The medical records or letter submitted must document that I have been educated about and understand diabetes and its treatment; that I understand what actions to take to avoid or treat complications, especially low blood sugar; and that I have the ability and *willingness* to properly monitor and manage my diabetes.
9. If I am age 40 or older, I must undergo shortly before my flight examination, a heart stress test (maximal graded exercise stress test, or "treadmill"), and the electro-cardiogram (ECG) tracings must be submitted. Evidence of poor blood flow in the heart's blood vessels ("ischemia") will be disqualifying.
10. My physician, Aviation Medical Examiner, or "other knowledgeable person" (especially a certified Diabetes Educator) must attest that I know how to and am

able to measure my own blood sugar by recording glucose meter.

## **Diabetes Mellitus**

By Hunter Heath III, M.D.

### **What is Diabetes Mellitus?**

Diabetes mellitus, or just "diabetes" for short, is a group of disorders affecting the body's ability to store, release, and break down sugar (glucose). In addition, people suffering from diabetes have abnormalities of many other metabolic functions, such as regulation of various fats in the blood. The hallmark of diagnosis for diabetes is elevation of the concentration of glucose in the blood. The causes of diabetes are many, but the central problem is an absolute or relative shortage of the hormone *insulin*. Insulin is produced by an organ lying near the stomach, the *pancreas*. There may be a total lack of insulin production (Type I diabetes), or an impairment of insulin release combined with resistance to the actions of insulin in one's body (Type II diabetes).

### **What harm can diabetes do to me?**

Diabetes can cause harm both in the short term and the long term. In the short run, great elevations of blood sugar can cause excessive urination, as the sugar passing through the kidneys draws out water; thirst, due to the loss of water; dehydration; and increased acid levels in blood. In extreme circumstances, uncontrolled diabetes can lead to diabetic ketoacidosis, a life-threatening situation treated with insulin and fluids. There are also many long-term complications of diabetes, including heart attacks, strokes, kidney failure, blood vessel abnormalities of the eyes leading to blindness, destruction of nerves in the feet and legs, and blockage of arteries leading to amputation of limbs. Diabetes mellitus is the most common cause of blindness, kidney failure, and limb amputation in western countries.

### **If I have diabetes, will I get all these complications?**

Probably not, if you obtain and follow good medical advice. Modern techniques to control diabetes have been shown to reduce substantially the risks of kidney, eye, and nerve damage; and control of blood pressure and cholesterol reduce the risk of heart attack and stroke. While it's not a great thing to have diabetes, the good news is that it is treatable, complications may be prevented or delayed for many, many years, and most persons having diabetes lead long, healthy lives.

### **Can diabetics obtain medical certificates and pilot's licenses?**

The answer used to be, "No." However, progress in medical science, methods of treatment, and flight medical certification now allow most persons with diabetes to qualify for authorization to fly. The difficulty of obtaining a certificate depends on the severity of one's diabetes, and what treatments are required. The key issue is this: Is this person with diabetes more likely than a non-diabetic person to be incapacitated during flight? The main issues are risk of heart attacks, and risk of low blood sugar due to sugar-lowering treatment. The brain is critically dependent on sugar for its function, and, as blood sugar is lowered past a certain point, the brain begins to go haywire. This can lead to confusion, inappropriate acts, stupor, coma, convulsions, and death. Thus, it is obviously very important to regulate the blood sugar in the normal range, neither too high

nor too low!

### **How is diabetes treated today?**

Most people with diabetes (about 95%) have Type II diabetes, previously called "adult onset diabetes," or "non-insulin-dependent diabetes." Most people with Type II diabetes are over 40 years old and overweight by 25 pounds or more. Their pancreas still makes insulin, but not enough to overcome the resistance of their cells to insulin. Weight loss can cause dramatic improvement in this form of diabetes, because it reverses the insulin resistance. Many people with Type II diabetes, however, require additional help to normalize blood sugar. Treatments given as pills or capsules ("oral agents") may stimulate the pancreas to release more insulin, increase the body's sensitivity to insulin, decrease absorption of sugar, or decrease body weight. After some years, many patients no longer respond adequately to oral agents, at which time it is necessary to treat with daily injections of the missing hormone—insulin.

Type I diabetes, or insulin-dependent diabetes, formerly referred to as "juvenile-onset diabetes," because many who develop it are children. However, this form of diabetes also occurs commonly in adults. The key distinction is that persons with Type I diabetes have an absolute requirement for insulin injections in order to survive and not develop diabetic ketoacidosis and/or chronic complications. In the past, many diabetics took only one "shot" of insulin daily, but this method is now obsolete. A minimal treatment program would include two injections per day, but the best control is obtained with 3-4 injections, preferably before each meal, to mimic the body's own normal response to meals.

In addition to the above, all diabetics are strongly advised to obtain regular exercise, control their weight, control any other medical conditions such as hypertension (high blood pressure), or high blood lipids (cholesterol, etc.).

### **What is the effect of diabetes type and treatment on medical certification?**

Persons having Type II diabetes that is well controlled with diet and exercise can obtain any type of flight medical certificate. When Type II diabetes requires oral agents for control, requirements for good health go up, but most such individuals can be certified. However, any diabetic taking insulin (no matter if Type I or II) cannot be considered now for a Class 1 or 2 medical certificates. Diabetics taking insulin can be considered for a Class 3 (private) medical certificate. All persons reporting diabetes during a flight medical examination will be asked to provide additional information to assure the FAA that there is no undue risk of incapacitation, and that the individual does qualify for the class of certificate requested.

### **What else do I need to know about diabetes and flight medical certification while taking insulin?**

If you obtain a flight medical certificate, you will be required to measure your blood sugar before and during flight, record those numbers, and take appropriate steps to keep your blood sugar in a safe range. You will be required to work closely with a physician to maintain control of your diabetes and manage any complications that may develop. Most importantly, if you develop disqualifying conditions (such as having severe low blood sugar reactions or serious diabetic complications), you must stop flying as PIC at once, and be re-examined for qualifications to hold the medical certificate.