

The word *diabetes* generally refers to *diabetes mellitus* and is usually used to describe a range of metabolic diseases that result in persistent elevated blood sugar levels. Diabetes usually occurs either because the body does not produce enough insulin or because the insulin that is produced does not have the normal effect. Since insulin is necessary for the body to absorb and use sugar in the blood, less insulin effect leads to higher levels of sugar in the blood. This, in turn, results in frequent urination (polyuria), increased thirst (polydipsia), and increased hunger (polyphagia). Over time diabetes can also lead to damage to many parts of the body.

Different forms of diabetes, and different severities, are treated in a variety of ways. Sometimes careful dietary management and weight loss is enough to manage a milder case whereas some more severe cases use insulin and other medications every day.

This Medical Information Sheet discusses diabetes mellitus, from an aviation safety viewpoint, and provides some guidance concerning how the CAA approaches the medical certification of applicants (pilots and air traffic controllers) with a history of diabetes.

#### CAUTION

This Medical Information Sheet contains general advice concerning the CAA's regulatory handling of medical conditions. This sheet is not intended as clinical medical advice and should not ever be used as the basis of decisions concerning your medical care. You should consult your medical advisers and discuss your options thoroughly with them before making any decisions about your medical care.

### Why is diabetes an aviation safety problem?

While diabetes varies greatly in its severity and its cause, the features that can raise aviation safety concerns include the following:

High blood sugar levels can result in distraction and can interfere with your performance and decision-making.

Some treatments for diabetes can cause unexpected low blood sugar levels. Low blood sugar levels can interfere with performance, ranging from subtle impairment to complete loss of consciousness.

Diabetes leads to damage, over time, to a wide range of other parts of the body. This includes the heart, the eyes, the nerves, and the brain.

### Does CAA check for diabetes?

Yes. Blood sugar levels are required to be checked for class 1, 2, and 3 first-time applicants, and then periodically after that. A slightly different test, 'HbA1C', is a useful alternative to blood sugar tests, and is being used by some CAA Medical Examiners.

### Can diabetics fly in New Zealand?

Some diabetics are eligible for unrestricted class 1, 2, or 3 medical certification. Others are eligible for class 2 but not class 1 or 3, and still others are declined any form of CAA medical certification.

Generally, diabetics who are adequately managed using diet-only are eligible for unrestricted medical certification. Diabetics who are adequately managed with medications that have a very low risk of causing low blood sugar (e.g.

Metformin) may be eligible for unrestricted medical certification. Diabetics requiring other medication, not including insulin, may not be eligible for class 1 or 3 medical certification and may, depending on the details, be eligible for class 2 medical certification. Diabetics using insulin are not likely to be eligible for class 1 or 3 medical certification and some exceptional cases may be eligible for class 2 medical certification.

## What about insulin?

Insulin is a normal hormone that acts within our bodies. Some forms of diabetes are treated using injectable insulin to supplement the insulin produced by the body. Injected insulin acts to reduce the blood sugar levels and can sometimes lead to abnormally low blood sugar levels.

Class 2 applicants using insulin may be certificated if their diabetes control track record is excellent and if their risk of low blood sugar problems is very low. In such cases the CAA seeks long-term records to document the stability and safety of their diabetes management. Class 1 and 3 applicants using insulin are very rarely certificated. The exceptions are

applicants who do not have 'type 1' diabetes, who do not use short acting insulins, and who do not use long-acting insulins close to the time of their next flight or ATC shift.

## Can a diabetic meet the CAA medical standards?

Yes. A diabetic can meet the medical standards if they are adequately controlled without the use of any drugs, or they are using (non-insulin) drugs with a very low risk of causing unexpected falls in the blood sugar levels.

If an applicant's diabetes is not well controlled, requires insulin, or uses any drugs that have not been reliably shown to have a very low risk of causing unexpected low blood sugar levels, then they cannot be assessed as meeting the medical standards. That does not necessarily mean they will be declined a medical certificate but does mean that further consideration of their application will require the application of statutory flexibility and an Accredited Medical Conclusion (AMC)<sup>1</sup>.

## I have just been diagnosed with diabetes. I've lost weight and worked hard on my diet. My doctors says my control is good. Can I fly?

Yes. If your diabetes is adequately controlled without medication you are able to meet the medical standards and, everything else being ok, you can expect to be issued an unrestricted medical certificate. You will probably be asked for notes and reports from your treating doctor as a part of the certification process.

## I am a private pilot, and well controlled with insulin. What do I need to provide?

The following information will be a good start to demonstrating reliable control over time without an unacceptably elevated risk of low blood sugar episodes.

- Notes from GP and diabetologist covering the last five years.
- Diary records, from last five years, of blood sugar readings.
- Report from treating diabetologist including: at least two HbA1c assays at least three months apart with the most recent no more than three months ago, details concerning insulin dosage regimens and diet; assessment concerning the presence of any cerebrovascular, cardiovascular, peripheral vascular, or neuropathic disease.
- Report from an eye specialist confirming the absence of any diabetic eye disease;
- Confirmation (usually from diabetologist) that the applicant has been educated concerning their diabetes and its control, that they understand the detection and treatment of hypoglycaemia, and that they are able and willing to monitor and manage their diabetes.

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<sup>1</sup> <https://www.aviation.govt.nz/assets/publications/medical-information-sheets/mis001-accredited-medical-conclusion.pdf>

- If the applicant also has elevated cardiovascular risk, which is more likely in a diabetic, the tracings and report from a full Bruce protocol exercise stressed electrocardiogram.

Any medical certificate issued will carry a range of conditions and obligations, intended to ensure continued careful and safe management of the condition.

### I am a professional pilot with diabetes. My specialist says I may need insulin soon. Does that mean I will lose my medical certificate?

Possibly, but not necessarily. Some fastidiously controlled diabetic airline pilots who use only long-acting insulins in very specific circumstances have been issued restricted class 1 medical certificates.

### My specialist says that modern technology has improved the management of diabetes. Does this mean that I can fly?

Not necessarily. While there have been great advances in understanding, medication, and technology relating to diabetes the aviation safety risks of performance impairment and incapacitation risk remain a concern. Some of the modern technology equipment is very useful in the clinical management of diabetes but none of this equipment yet has a reliable enough track-record for aviation safety purposes. It is possible that that will change as time passes and more research is undertaken.

### What about the new drugs for diabetes?

There are many new drugs available for the management of diabetes. Some of them have a tendency to cause unexpected low blood sugar levels, not a good thing, others appear relatively safe, and still others are so new there is not a very good published track record to consider.

It is not possible to make any general aviation regulatory statements concerning the newer diabetic drugs, and each case is assessed individually based on the details of that case.

### What about my heart, and cardiovascular risk?

Diabetes causes disease in small and large blood vessels. The blood vessels that lead to the heart can be affected by diabetes and this leads to diabetics having an increased risk of heart problems, including heart attacks. The method that the CAA uses to calculate cardiovascular risk allows for an applicant's diabetic status.

What this means is that a diabetic, everything else being equal, is more likely to be required to undertake a stress test because of their elevated cardiovascular risk<sup>2</sup>.

Diabetes can also damage the nerves. This can lead to many different problems but two that are particularly important to aviation are that a diabetic may not be able to reliably recognise the symptoms of low blood sugar levels, or of heart disease, if the relevant nerves are damaged.

### What if I don't agree with a CAA medical decision concerning my diabetes?

You are always able to seek review of CAA medical certification decisions. For further information on review / appeal options you may wish to consult MIS 005 'What Are My Review Options?'<sup>3</sup> in the medical section of the CAA website.

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<sup>2</sup> <https://www.aviation.govt.nz/assets/publications/medical-information-sheets/mis007-cardiovascular-risk.pdf>

<sup>3</sup> <https://www.aviation.govt.nz/assets/publications/medical-information-sheets/mis005-what-are-my-review-options.pdf>

## Looking at the law

### Civil Aviation Act

The civil aviation act contains no direct references to diabetes.

### Civil Aviation Rule Part 67: Medical Standards

Rules 67.103(f) (Class 1), 67.105(f) (Class 2), and 67.107(f) (Class 3) include the medical standards relating to diabetes. The class 1 medical standards require that an applicant:

- have no history or diagnosis of any condition of the endocrine system that is of aeromedical significance;
- Have no endocrine disorder, including diabetes mellitus or abnormal glucose metabolism unless the condition is satisfactorily controlled without the use of any anti-diabetic drug; or
- if an oral anti-diabetic drug is used to control the condition and the condition is under on-going medical supervision, and insulin is not used, and
- having regard to any relevant general direction the oral drugs used, individually and in combination, do not, and are not likely to, interfere with the safe exercise of the privileges or the safe performance of the duties to which a class 1 medical certificate relates.

The class 2 and 3 medical standards are similarly worded.

### General Directions

There are no general directions that relate specifically to diabetes.

The 'timetable' general direction includes a requirement for how often tests for diabetes are undertaken as well as the requirements for cardiovascular risk assessment.

## Aviation Medicine Team

**Tel:** +64-4-560 9466

**Email:** [med@caa.govt.nz](mailto:med@caa.govt.nz)

**Website:** [www.aviation.govt.nz](http://www.aviation.govt.nz)

P O Box 3555, Wellington, 6140, New Zealand