

Kidney stones, or *renal calculi*, are usually solid collections of tiny crystals. Kidney stones can be made up of different substances and their size, shape, and number can vary widely. Kidney stones can form for a variety of reasons and can affect any part of your urinary tract—from the kidneys to the bladder and urethra.

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.

The term nephrolithiasis is sometimes used to refer to calculi in the kidneys and uretero- lithiasis to calculi that are in the ureters, having usually moved there from the kidneys.

What causes kidney stones?

Kidney stones start to form when substances, that are usually dissolved in the urine, precipitate out of solution and form small solid deposits within the urinary system. Over time those deposits enlarge as more substances precipitate out of solution and coalesce, forming 'stones' that can vary in size from millimetres to centimetres in diameter.

Kidney stones can form without any apparent cause. Some people have disorders of their metabolism, infections, or inflammatory conditions that make kidney stone formation more likely. In others the use of certain medications, or surgical treatments, can lead to kidney stone formation. Dehydration can result in the urine being more concentrated and make it more likely that dissolved substances will precipitate out as solids, forming kidney stones.

Why are kidney stones an aviation safety concern?

The main aviation safety concern with kidney stones is the risk of pain.

Kidney stones can cause pain and discomfort, usually called *renal colic*, and that pain can be very severe and incapacitating or, in milder forms, significantly distracting. The problem with kidney stones is that the occurrence of pain, and the nature and severity of that pain, cannot be reliably predicted.

I've just suffered a first episode of renal colic. What should I do?

You will probably need to seek medical care in the first instance. You will also need to advise the CAA of the episode of renal colic and not fly or control. CAA will probably suspend your medical certificate and follow-up, a couple of weeks later, with a disqualification.

CAA will ask you for reports from your medical care givers and will be looking at those reports to ensure that you have no remaining kidney stones that have the potential to cause further colic. This may involve you being asked to provide additional test or imaging (e.g. CT-scan) results.

Once CAA is satisfied that you are free of residual stones and do not have an underlying metabolic problem making further stone formation very likely, you will probably be re- turned to unrestricted medical certification. You may also have a condition placed on your medical certificate that requires some further medical tests at some time in the future, usually to confirm the on-going absence of kidney stones.

I've had several bouts of renal colic over the years, but my doctor says I have no stones now. Can I fly?

Probably. If someone has no kidney stones, then they are very unlikely to suffer renal colic. The risks here are that either: The tests have failed to detect stones that are present; or Further stones will form during the period of medical certification.

For these reasons the CAA may place a condition on your medical certificate requiring further imaging at some time in the future.

Similarly, people who have had recurrent bouts of renal colic are often required to submit further imaging results each time they apply for a medical certificate, to confirm that no further stones have formed.

I've had several bouts of renal colic over the years, and my doctor says the stones now in my kidneys are not likely to cause colic. Can I fly?

Probably not. With a history of recurrent renal colic, it is only very unusual kidney stones that can be relied upon to not cause future colic. In most cases residual kidney stones will be interpreted as representing an unacceptably high risk of future colic for CAA medical certification.

Your treating doctor may be entirely correct from the perspective of a medical professional involved in your health care. The risk associated with renal colic is very different when seen from a clinical health care point of view, as compared with an aviation medical safety point of view.

My doctor says that my kidney stones are small enough and are likely to pass. Can I fly?

Probably not. Small kidney stones (<5mm) with smooth contours can be expected to pass spontaneously. The problem is that they can cause potentially incapacitating symptoms as they pass, including pain, nausea, profuse sweating, or even shock.

I've had kidney stones, and my doctor says that the risk is low because of my increased fluid intake. Can I fly?

Probably, providing you do not have any remaining kidney stones.

If your treatment efforts have managed to ensure that you no longer have any kidney stones, then you are likely to be issued a medical certificate. Depending on your past history it is also likely that further tests will be sought in the future to ensure that you continue to be free from kidney stones.

I have a metabolic disorder that causes kidney stones to be formed. This problem is being treated with diet and medication and my doctor is very happy with my progress. Can I fly?

Possibly, providing you do not have any remaining kidney stones.

Such situations will need to be considered on a case-by-case basis. Some will be compatible with unrestricted medical certification, and some will not. Most such cases, if issued a medical certificate, will be required to provide future imaging results and possibly other reports to confirm the absence of kidney stones and the on-going success of the treatment.

I feel fine. Can I fly?

If you have residual kidney stones, then it is unlikely you will be eligible for a CAA medical certificate. If you have a history of kidney stones, and even of renal colic, but are currently free of any stones then it is likely that you will be eligible for a CAA medical certificate. Any certificate issued may also be subject to on-going medical surveillance requirements, such as repeat x-rays or CT-scan, or repeat blood tests or specialist report.

Will my application be sent to CAA?

Usually, a medical certificate application from someone with a history of renal colic is handled via the statutory flexibility provisions provided under the civil aviation legislation. This requires involvement of the CAA, at least in the initial stages.

Often, however, if your history is well known and stable and all the usual results are available, your Medical Examiner will be identified to handle the necessary Accredited Medical Conclusion (see MIS 001—Accredited Medical Conclusion¹).

What if I don't agree with a CAA medical decision concerning my kidney stones?

You are always able to seek review of CAA medical certification decisions. For further information on review / appeal options you may wish to consult the 'What Are My Review Options?'² Medical Information Sheet.

Looking at the law

Civil Aviation Act

Schedule 2, clause 5(2) of the Act allows for a medical certificate to be issued to an applicant who meets the medical standards "unless the Director has reasonable ground to believe that the applicant has any characteristic that may interfere with the safe exercise of the privileges to which the medical certificate relates".

Civil Aviation Rule Part 67: Medical Standards

Rules 67.103 (Class 1), 67.105 (Class 2), and 67.107 (Class 3) include provisions that relate, directly or indirectly, to kidney stones. For example, the Civil Aviation Medical Standards include requirements that an applicant:

- "Have no medical condition that is of aeromedical significance" - 67.103(b)(1) ;
- "Have no history or diagnosis of any condition of the genitourinary system that is of aeromedical significance" - 67.103(h)(1) ; and
- Have no history or diagnosis, to an extent that is of aeromedical significance, of "obstruction, or elevated risk of obstruction, to the kidneys or urinary tract." - 67.103(h)(2)(iii).

This term 'aeromedical significance' is expanded further in Rule 67.3(a): "A medical condition is of aeromedical significance if, having regard to any relevant general direction, it interferes or is likely to interfere with the safe exercise of the privileges or the safe performance of the duties to which the relevant medical certificate relates".

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

² <https://www.aviation.govt.nz/assets/publications/medical-information-sheets/mis005-what-are-my-review-options.pdf>