

Do you think you have a penicillin allergy? You might be wrong

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Antimicrobial resistance is [one of the biggest global threats](#) to health, food security and development. This month, The Conversation's experts explore how we got here and the potential solutions.

Penicillins are the most prescribed class of antibiotics in Australia. Originally derived from a fungus, [penicillin](#) antibiotics such as amoxicillin are used to treat common infections, including chest, sinus, ear, [urinary tract](#) and [skin infections](#).

Penicillins are effective against a wide range of bacteria that cause common infections. But their activity is not so broad as to impact on good bacteria in our gut like other antibiotic classes do. They're also cheap and readily accessible.

Up to [20%](#) of Australians admitted in hospital say they have a [penicillin allergy](#).

But not everyone who thinks they're allergic to penicillin actually is. Research from [our team](#) and others suggests that if we assess all these patients, up to 90% are not allergic to it.

Why does it matter?

People who mistakenly think they're allergic to penicillin may not get the most effective or safest antibiotics to treat their [infection](#).

They are also at greater risk of developing [multidrug-resistant infections](#) or "superbugs." This is because the antibiotic will kill off the bacteria that are susceptible to it, but the resistant bacteria are left behind to proliferate and cause further infection.

People who receive second-line antibiotics are more likely to have complications, such as [antibiotic-induced gut infections](#). Second-line antibiotics tend to have a wider range of activity, killing both the bacteria causing infection, and the good bacteria required to keep our gut in balance. This allows bugs like *Clostridium difficile*, which normally lives in our gut but is controlled by other bacteria, to overgrow

and cause inflammation.

For the health system, using second-line antibiotics means longer, more complicated hospital stays. Hospital stays for patients with penicillin allergies cost up to [63% more](#) more than those without. It also results in greater costs for medications and greater resources required to treat the patient.

Why do people think they're allergic?

People incorrectly believe they are allergic to penicillin for a number of reasons.

They may have experienced side effects from penicillin, such as nausea or diarrhea. But though unpleasant, this doesn't mean an allergy.

Others had a rash as a child, but this could have been due to the illness itself or an interaction between the virus and the antibiotic. An Epstein-Barr viral infection treated with amoxicillin, for example, [causes](#) a fine, red rash.

Some believe a family history of reactions to penicillin means they cannot take them. But there is no evidence penicillin allergy is inherited.

If some time has passed between exposure, people can lose the [allergic response](#). This is typically seen in adults who had a mild allergy as a child, but lose the response with time, so are said to have "grown out" of their allergy.

Then there are people who have had a genuine and serious reaction to penicillin. This includes anaphylaxis, with profound swelling, breathing difficulties and [low blood pressure](#), and severe life-threatening reactions such as [Steven-Johnson's syndrome](#), which causes widespread blisters

and wounds that resemble burns.

Testing for penicillin

When someone says they have a penicillin allergy, we first get them to explain what happened with the reaction, including to what antibiotic, in what context and how severe it was.

Then we perform skin tests to further assess the person's risk of reaction. If skin tests are negative, we can then give the patient the penicillin in question under supervision (a "challenge") to see if they react.

Some people can skip the skin tests altogether and go straight to the challenge if the history tells us they are at low risk of reacting.

[Our study](#) followed 195 patients who reported a penicillin allergy across six Sydney hospitals. In the first phase, we assessed 85 people and found 82% weren't allergic to penicillin.

In the second phase, we assessed 110 people, of whom 69% weren't allergic. This is slightly lower than research on the population as a whole, because we only looked at people who were referred for an allergy assessment. Many more patients carry an allergy label than those referred for testing.

In our study, eight weeks after their test, just 54% of participants in phase one correctly knew their [penicillin allergy](#) status. Some allergic people believed they were not allergic, and many non-allergic people believed they were allergic.

For phase two, we ensured people received a standardized letter outlining their results in addition to having a doctor or nurse explain them. This time, 92% were correct in their understanding when

contacted eight weeks later.

Reducing long waits for allergy tests

Ruling out allergies among people who think they can't have penicillin is time- and labor-intensive. The wait time from someone first being referred to an allergy clinic to having testing can be [up to two years](#). And it's usually not available outside major metropolitan hospitals.

We need to improve access to testing and also look at 'when' people can access allergy services. When a person is sick in hospital with a serious infection, it's not the right time for testing.

We also need to ensure the results of allergy tests translate to the [real world](#) so people know their true allergy status. The fragmentation of our medical records are a barrier to clear and effective communication of a patient's true allergy status, and urgently need to be improved.

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