

What is tularemia and can I catch it from a possum?

June 27 2017, by John-Sebastian Eden



Researchers have found Australia's first confirmed case of tularemia in a ringtail possum. Credit: Andrew Mercer/flickr, CC BY-NC-SA

Tularemia is a disease that affects humans and other animals. It is caused by infection with the bacterium *Francisella tularensis* and is commonly spread by biting insects or by direct contact with an infected animal.

Human infection is less common than infection in small [animals](#) like rabbits and rodents. But it is important [human](#) cases are recognised and

diagnosed quickly because without appropriate treatment the disease can be life-threatening.

Our team has recently [confirmed its presence](#) in Australia in samples taken from ringtail possums who died in two outbreaks in early 2000.

While this is clearly a newly identified risk to public health, it's important to recognise how rare the disease is and how well the infection responds to treatment.

How is it transmitted to humans?

Tularemia is a "zoonotic disease", an animal disease that can be transmitted to humans. The most common way someone might be infected is by being directly exposed to an infected animal through a bite or scratch, or even handling infected tissue, like when hunters skin animals.

Human infections can also occur indirectly from an animal through a biting insect vector, like ticks or deer flies. So, a fly might feed on an infected animal then also bite a human, transferring the bacterium via its mouth parts.

Humans can also catch the disease from animals by coming into contact with environmental sources such as water or soil that have been contaminated by an infected carcass. The bacteria might then infect humans through the eye, or an open wound, or even if digested from contaminated food.

How rare is tularemia in humans?

Fortunately, human cases of [tularemia](#) are relatively rare and appear to

be limited to the [Northern Hemisphere](#). Yet, even in the US, where the disease is well described, [human cases rarely exceed 100-200 a year](#).

Australia has long been considered tularemia-free. So, it was surprising when, in 2011, two human cases [were reported](#) in Tasmania after exposure to ringtail possums.

While diagnostic tests on the patients' samples suggested an infection with the bacterium, no samples were obtained from the offending possums to corroborate the unusual infection.

More importantly, researchers couldn't grow and isolate the bacteria from any of the patients' samples. Follow-up surveys of native animals in the area failed to detect the organism. So, the story of tularemia in Australia had, until recently, remained somewhat of a mystery.

How can I protect myself?

While our study has confirmed the presence of tularemia in Australia and identified ringtail possums as a reservoir for the disease, no-one knows if it's present in other wildlife along the east coast.



An ulcer forms at the site of infection, like this one on someone's hand. Credit: CDC Public Health Image Library/Wikimedia

So, to [minimise the chances of infection](#), take care when handling sick, distressed or dead animals. Similarly, when travelling in an area with ticks or other biting insects, wear protective clothing and repellents.

How do I know if I'm infected?

In humans, tularaemia symptoms [can vary](#) but typically depend on how someone was exposed.

The most common form of disease in humans is known as

[ulceroglandular tularemia](#), which develops after an infected animal or insect bites or wounds you. As the name suggests, you develop a sudden fever, an ulcer forms at the site of infection, and the lymph glands near the wound swell.

Another and perhaps more serious form of the disease is [pneumonic tularemia](#). This can occur when you breathe in bacteria from contaminated dust or aerosols, and your lungs become infected. Symptoms include cough, chest pain and difficulty breathing, and can be difficult to treat.

Yes, it can be treated

While infection can potentially cause severe disease and can kill, timely treatment with commonly available antibiotics should clear the infection. However, it is important the disease is correctly diagnosed as the most effective antibiotics (such as streptomycin) are often different to those used to treat other bacterial skin or wound infections.

There have been no reported cases of humans infecting other humans. While being exposed to someone infected with tularemia might pose some risk, the rarity of the cases and the effectiveness of antibiotic treatments to control the [infection](#) minimise this.

Looking to the future

What our study highlights more than anything is the need to investigate wildlife disease to understand potential risks to our environment and our own health.

So, we plan to conduct further surveys of animal and tick-borne diseases to explore undiscovered pathogens that may affect [public health](#) or

impact our native animal populations.

We are also applying the same technology used to confirm the presence of tularemia in Australian wildlife for the first time to investigate other cold cases of the animal [disease](#) world – neglected and undiagnosed animal diseases.

We do this using a powerful technique called "[RNA-Seq](#)", short for RNA sequencing, to analyse samples. With RNA-Seq, there's no need to know what diseases might be present; researchers sequence *all* the genetic material in the sample, whether it has come from a host such as a human or animal, or from an infecting organism such as a virus, bacteria, or parasite.

This "metagenome" data is then pieced together and compared to databases containing genome data from previously sequenced pathogens.

Through these studies, we hope to reveal the full diversity of pathogens present in our native wildlife, and particularly, those that sit at the human-animal interface, a fault line that allows microbes to flow from one host to another. Most novel emerging diseases are spill-overs from zoonotic sources, so this research is critical for human health.

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