

WARTHOGS

and the Spread of Bovine Tuberculosis

By Dr Eduard Roos, Stellenbosch University

Tuberculosis is not just a human disease. Cattle also contract a similar type of bacteria, called bovine tuberculosis. Evidence suggests that it can be transmitted from cattle to humans as well as wildlife and vice versa.

Bovine tuberculosis has been well-studied in cattle. This is particularly true in Europe where the disease was very prevalent during the 19th and 20th centuries. It's estimated that the agricultural sector, globally, has a total loss of more than US\$3 billion annually due to bovine tuberculosis. In the UK more than 39 000 cattle were slaughtered after testing positive for the disease in 2016.

The disease made its way into Africa during the 18th and 19th centuries through the importation of cattle from the UK, Europe and Australia. Now wildlife, such as lions and wild dogs which prey on potentially infected animals, such as buffalo and warthogs, have also become infected.

The disease's impact on vulnerable and endangered species such as lion, rhino and elephants with human TB is now coming under the spotlight.

Lions potentially become infected through eating

infected animals and rhino may become infected through environmental spillover when sharing their grazing with infected animals such as buffalo.

There's also focus on the disease and warthogs, believed to be potential hosts of bovine TB. I set out to study the role warthogs play when it comes to disease prevalence and to find out their susceptibility to bovine TB.

Warthogs have a high disease prevalence in bovine TB endemic regions and are susceptible to the disease in the wild. This is important information that will help us to develop effective disease management strategies to reduce and control the spread of bovine TB in South Africa.

Why warthogs?

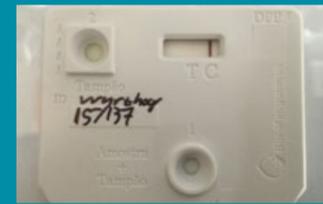
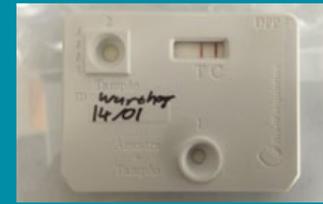
Warthogs in South Africa are not threatened, with a population of about 22 250. They are also useful in studying the dynamics of tuberculosis as they're free-roaming, i.e. they aren't kept in by barriers, such as fences, and can move freely between parks, reserves and farm land, potentially increasing their chances of contact with livestock and humans.

My research, which was funded through the South African Medical Research

Tuberculosis is not just a human disease. Cattle also contract a similar type of bacteria, called bovine tuberculosis



Sedated warthogs undergoing TB intradermal test.



Council as well as the DSI-NRF Research Chair in Animal TB grant and Scarce Skills bursary, involved accurately determining which individuals were infected and which ones weren't by evaluating tests that were developed for other species. I then optimised and modified them to develop new diagnostic tests for warthogs. An example was the Quantiferon assay used in humans that we modified to be used in warthogs.

One of these tests was used to investigate the disease prevalence from historically banked warthog samples, allowing me to study the extent of the disease in warthog populations.

The high prevalence of the disease, in some cases more than 60%, suggests that warthogs are either prone to infection through contact with other infected species, or that they are spreading the disease within their own populations.

My research suggests that the answer is probably something in between the two scenarios. This is because warthogs are frequently seen scavenging on carcasses of other animals, such as buffalo, which are a potential source of infection. In addition, their burrowing behaviour allows for close contact between individuals in confined spaces, increasing

the risk of transmission.

I found that adult warthogs were at a higher risk of having the disease than either sub-adults or juveniles. There are two possibilities for this:

- Adults have been exposed for a longer period of time; or,
- Younger individuals may die before being tested.

Both scenarios could increase the risk of spreading the disease to other species indirectly.

Warthogs can be used as disease sentinels. Sentinel species are used to monitor the spread of a disease, and its presence or absence. Using sentinels is useful because it means that we don't need to resort to testing valuable or endangered animals which can be risky.

Warthogs are a perfect sentinel species as there are lots of them, they're highly susceptible, they survive the disease and with the help of my new test, have easily detectable signs of infection. This makes warthogs an important species in managing the disease. ■

A longer version of this article originally appeared in [The Conversation](#)