

Maasai man with goats
Image Sarah Cleaveland



Sheep and goats pinpointed as source of human brucellosis in northern Tanzania

Maasai Woman Milking
Image Tiziana Lembo



Team members walking to a patient's house in Boma
Image Becca Bodenham



Team members taking a break in the field.
From left to right: Gabriel Shirima, Shama Cash-Goldwasser, Jo Halliday, Becca Bodenham
Image Jo Halliday

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Human brucellosis is a significant public health challenge in Tanzania, where the disease is widespread yet commonly misdiagnosed. It is usually contracted via direct contact with infected animals, or by eating or drinking contaminated animal products such as unpasteurised milk.

When the ZELS project **Molecular epidemiology of brucellosis in northern Tanzania** started work, significant question marks hung over the nature of the particular form of the disease that afflicted people in this region of the world. Neither the exact species of the disease-causing *Brucella* bacteria, nor the livestock source of it, were clearly described – and such uncertainty hampered both prevention and control efforts.

Working with a community hospital in an area believed to have a high incidence of brucellosis, the ZELS researchers successfully identified two species of *Brucella* bacteria in acutely ill hospital patients. Most human brucellosis cases were caused by *B. melitensis*. Brucellosis was identified as the most common bloodstream infection in the local population.

In addition, modelling analyses identified goats and sheep as the most likely source of human exposure. This was a particularly interesting finding as research by another ZELS project, **Social, Economic and Environmental Drivers of Zoonoses in Tanzania**, shows

“Our results are now feeding directly into Tanzanian policy and control programme development, informing development of policies that can ultimately improve the lives of patients and livestock keepers.”

Dr Gabriel Shirima, Project Investigator

that there is a shift in northern Tanzania from keeping cattle to keeping goats and sheep. Sheep and goats are less drought vulnerable than cattle and may be seen as the more preferable livelihoods option as the frequency and duration of droughts increase as a result of climate change. The findings show that sheep and goats, therefore, are an important target for livestock disease control strategies, including possible livestock vaccination. Project members helped develop and write Tanzania’s National Strategy for Brucellosis, feeding the results of their research directly into the development of control strategies for the disease at national level.

At a more local level, another important element of the project’s work was capacity building. The team’s work with the hospital staff where they carried out their research has helped to improve diagnostic processes and inform treatment decision-making for patients with suspected brucellosis. Diagnostic protocols for human and animal brucellosis have also been established at the

Moshi Zoonoses Laboratory, itself set up as part of this and other ZELS-funded projects in northern Tanzania, and training opportunities have been provided for nurses, doctors, lab technicians, and PhD students. Furthermore, the approaches applied in this project are now generating data on other zoonotic causes of fever, including leptospirosis.

Molecular epidemiology of brucellosis in northern Tanzania

Principal Investigator: Professor Dan Haydon

Partners:

- University of Glasgow, UK (lead)
- Animal and Plant Health Agency, UK
- Sokoine University of Agriculture, Tanzania
- Kilimanjaro Christian Medical College, Tanzania
- Ministry of Livestock Development, Tanzania
- Central Veterinary Laboratory, Tanzania
- University of Otago, New Zealand