

## 1 ZOOBOTIC AND VECTOR-BORNE DISEASES

### a Zoonosis survey in Mpumalanga Province

Zoonotic agents account for more than 60% of emerging human pathogens. Despite this, zoonoses remain largely neglected. Epidemiologists and public health programmes have poor knowledge of disease burden, clinicians rarely consider zoonoses in their differential diagnoses and laboratory diagnostics are often limited. Presently, the NICD is conducting a zoonosis survey in Hluvukani, a small village near the Kruger National Park in the Bushbuckridge Municipality, Mpumalanga Province, in order to understand the burden of these diseases in South African rural communities.

The Hluvukani project fits into the broader Mnisi Community One Health Programme, an initiative established by the University of Pretoria Veterinary Department, Mnisi Traditional Authority, SANParks and the Mpumalanga Provincial Government. The Mnisi community covers an area of 86 km<sup>2</sup> with 69 km bordering proclaimed conservation areas. The population of around 80 000 people are mostly pastoculturists who generate their livelihood from livestock farming. Hluvukani village (Figure 1) covers about 8 km<sup>2</sup> and has approximately 9 000 residents. Hluvukani Clinic, a community health care (CHC) centre, serves the health needs of the greater Mnisi community. Tinstwalo Hospital is the closest referral centre.

Adult patients with acute febrile illness presenting to Hluvukani CHC are offered enrolment into the study. Participants complete a questionnaire related to exposure to disease vectors, and blood specimens (acute and convalescent) are screened for a selected panel of bacterial and viral zoonotic conditions at the Centre for Emerging and Zoonotic Diseases (CEZD) at the NICD.

Between September 2014 and June 2015, 43 participants were enrolled in the study. Thirty-four (80%) of cases tested demonstrated prior exposure (IgG positive) to *Rickettsia* species (the cause of tick bite fever), and 5 cases demonstrated IgM positivity against *Rickettsia conorii*. Background seroprevalence (IgG positive) of 10-20% was found for Sindbis and West Nile viruses. Four of 31 participants tested (13%) were IgG positive for *Coxiella burnetii*, the cause of Q-Fever. Amongst 30 patients tested, two were diagnosed with chikungunya infection. One case of 30 (3%) tested was positive for prior exposure to Rift Valley fever

virus.

High seroprevalence of antibodies against *Rickettsia* species (the causative agent of tick bite fever) has been shown in several previous South African studies. Most rickettsial infections are subclinical. When symptomatic, persons with tick bite fever complain of malaise, fever, headache and myalgia. An eschar at the site of a tick bite is often present. Patients with tick bite fever respond well to doxycycline treatment.

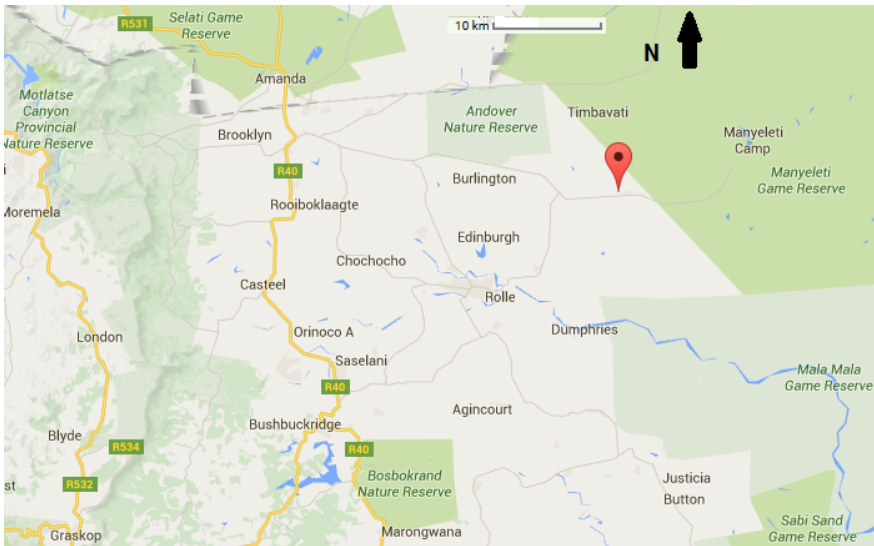
In South Africa, chikungunya is primarily diagnosed in travellers returning from other endemic locations including the Indian Ocean islands, India and several sub-Saharan African countries. However, previous studies have shown the presence of chikungunya virus in *Aedes furcifer* mosquitoes in South Africa. Chikungunya presents as an acute febrile illness with debilitating myalgia and arthralgia which may persist for weeks to months to years.

Q fever is distributed almost ubiquitously across the globe and is most commonly associated with livestock such as cattle and goats. It has also been reported from a variety of ticks, birds and rodents. Infection in humans is often asymptomatic, but patients may report acute fever with headache and myalgia. Rare cases may progress with pneumonia, meningoencephalitis, myocarditis, pericarditis or fatal hepatitis.

No evidence of previous or current brucellosis has been found amongst participants. However, there is an active vaccination programme for livestock in the Hluvukani area that may explain this finding.

Enrolment in the study is ongoing. However these early findings suggest that zoonoses, particularly tick bite fever, need to be considered in the investigation of febrile adult patients presenting for care in rural areas of South Africa.

**Source:** Centre for Emerging and Zoonotic Diseases, Division of Public Health Surveillance and Response, NICD-NHLS; Mnisi Project, Faculty of Veterinary Science, University of Pretoria



**Figure 1.** A screenshot from Google Maps indicating the location of Hluvukani village (red drop point) in Mpumalanga Province, Bushbuckridge District