

LONDON  
SCHOOL of  
HYGIENE  
& TROPICAL  
MEDICINE



Hang'ombe, BM; Ziwa, M; Haule, M; Nakamura, I; Samui, KL; Kaile, D; Mweene, AS; Kilonzo, BS; Lyamuya, EF; Matee, M; Sugimoto, C; Sawa, H; Wren, BW (2014) Surveillance and diagnosis of plague and anthrax in Tanzania and Zambia. AOSIS.

Downloaded from: <http://researchonline.lshtm.ac.uk/3553223/>

DOI: [10.4102/ojvr.v81i2.722](https://doi.org/10.4102/ojvr.v81i2.722)

#### Usage Guidelines

Please refer to usage guidelines at <http://researchonline.lshtm.ac.uk/policies.html> or alternatively contact [researchonline@lshtm.ac.uk](mailto:researchonline@lshtm.ac.uk).

Available under license: <http://creativecommons.org/licenses/by/2.5/>



# Surveillance and diagnosis of plague and anthrax in Tanzania and Zambia

**Authors:**

B.M. Hang'ombe<sup>1</sup>  
M. Ziwa<sup>2</sup>  
M. Haule<sup>2</sup>  
I. Nakamura<sup>3</sup>  
K.L. Samui<sup>1</sup>  
D. Kaile<sup>4</sup>  
A.S. Mweene<sup>1</sup>  
B.S. Kilonzo<sup>5</sup>  
E.F. Lyamuya<sup>2</sup>  
M. Matee<sup>2</sup>  
C. Sugimoto<sup>3</sup>  
H. Sawa<sup>3</sup>  
B.W. Wren<sup>6</sup>

**Affiliations:**

<sup>1</sup>School of Veterinary Medicine, University of Zambia, Zambia

<sup>2</sup>Muhimbili University of Health and Allied Sciences, Tanzania

<sup>3</sup>Hokkaido University Research Center for Zoonosis Control, Japan

<sup>4</sup>Namwala District Medical office, Namwala District, Zambia

<sup>5</sup>Sokoine University of Agriculture, Tanzania

<sup>6</sup>London School of Hygiene and Tropical Medicine, United Kingdom

**Correspondence to:**

B. Hang'ombe

**Email:**

mudenda68@yahoo.com

**Postal address:**

PO Box 30972, Lusaka, Zambia

**How to cite this article:**

Hang'ombe, B.M., Ziwa, M., Haule, M., Nakamura, I., Samui, K.L., Kaile, D. *et al.*, 2014, 'Surveillance and diagnosis of plague and anthrax in Tanzania and Zambia', *Onderstepoort Journal of Veterinary Research* 81(2), Art. #722, 1 page. <http://dx.doi.org/10.4102/ojvr.v81i2.722>

**Read online:**

Scan this QR code with your smart phone or mobile device to read online.

*Yersinia pestis* and *Bacillus anthracis* are diseases that rarely occur, with devastating consequences. In Africa, despite the diseases being rare, they are reported on a yearly basis in remote areas of the continent due to lack of proper surveillance and detection systems. In Tanzania and Zambia, studies have been ongoing to understand these pathogens in endemic areas.

The studies apply the well established polymerase chain reaction (PCR) for detecting *Yersinia pestis* DNA in suspected human specimens, rodents and their fleas by DNA extraction and primers targeting the plasminogen activator gene. In Tanzania, 516 rodent and nine human samples were analysed for the presence of *Yersinia pestis* DNA. Of these samples, four rodent samples belonging to *Mastomys* and *Tatera* species and two human specimens were found positive. As for Zambia, 810 rodent samples were collected and analysed. *Yersinia pestis* DNA was detected in 33 samples, belonging to the *Tatera*, *Rattus* and *Mastomys* species. As for fleas, the *Xenopsylla* species from rodents were positive for *Yersinia pestis* DNA. The isolated bacteria were subjected to antimicrobial sensitivity tests, with results indicating a response pattern as recommended by the World Health Organization in the treatment of plague. In case of anthrax, suspected samples from hippopotamuses, soil and humans were screened through bacteria culture and confirmation by PCR targeting the pXO1 (protective antigen gene) and pXO2 (capsule) virulence plasmids. Anthrax was detected in hippopotamuses, soil and humans, with the epidemiological link being confirmed through Variable Number of Tandem Repeats analysis.

The presence of *Yersinia pestis* DNA in rodents and fleas may represent evidence that infected rodents and fleas are being maintained in plague endemic areas, consistent with the hypothesised enzootic maintenance of plague elsewhere, whilst *Bacillus anthracis* is amplified by animals from soil into the human population.

## Acknowledgements

This work was supported by the Wellcome Trust Grant WT087546MA to the Southern African Centre for Infectious Diseases & Surveillance (SACIDS).

**Note:** Proceedings of the 2nd One Health Conference in Africa. Jointly organised by the Southern African Centre for Infectious Disease Surveillance and the Tanzania National Institute for Medical Research, held at the Snow Crest Hotel in Arusha, Tanzania from 16th to 19th April 2013: <http://www.sacids.org/kms/frontend/index.php?m=119>.

**Copyright:** © 2014. The Authors. Licensee: AOSIS OpenJournals. This work is licensed under the Creative Commons Attribution License.