



TechnoHealth Surveillance Newsletter



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Editorial address

TechnoHealth Surveillance
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From the Editor's Desk

Dear reader,

The Editorial Committee welcomes you to the 8th edition of *TechnoHealth surveillance*.

We would like to share with you investigation of diseases that killed thousands of goats and sheep in Ngorongoro. You will find in this issue a set of features of *AfyaData* tools that have been improved to enhance exploration of health data.

The Southern African Centre for Infectious Disease Surveillance has designed intervention plan to support national cholera control efforts, which is presented in this issue.

Kindly find in this issue the clinical manifestations reported by the Community Health Reporters in humans and animals from Morogoro and Ngorongoro in September 2016.

We keep to looking forward to your feedback and comments on this 8th edition.

Kindly do not hesitate to share with us stories on health related events occurring in humans, animals and environment for the sustainability of our newsletter.

We wish you an informative read!

Enjoy your reading!

SACIDS investigates outbreak of diseases that killed thousands of goats and sheep in Ngorongoro Tanzania

The mystery disease outbreak that killed thousands of goats and sheep (shoats) in Loliondo division, Ngorongoro district northern Tanzania from August 2015 to March 2016 was reported in the second issue of *TechnoHealth Surveillance*.

A team of scientists from the Southern African Centre for Infectious Disease Surveillance (SACIDS), Sokoine University of Agriculture in Morogoro (Prof. Gerald Misinzo and Dr. Tebogo Kgotlele), Nelson Mandela African Institution of Science and Technology in Arusha (Dr. Andrew Chota), Ngorongoro District Council (Dr. Choby Clement Chubwa) and Zonal Veterinary Centre in Arusha (Dr. Obed Malangu Nyasebwa) investigated the outbreak. This investigation was commissioned by the Canadian International Development Centre (IDRC) project that is being implemented in Tanzania by SACIDS on 'Integrated Human and Animal Disease Control for Tanzanian Pastoralists Facing Settlement Challenges'.

The Sukenya, Mondorosi, Ololosokwan and Sero villages were the most affected by outbreak and were included in the investigation. Clinical examination was conducted in 1,602 shoats from June to July, 2016. The disease affected all age groups of goats and sheep. The major clinical signs observed were severe yellowish-green (mucopurulent) nasal discharge tinged with blood, nodular skin lesions, salivation, staggering gait, lesions around the mouth and gums, severe diarrhea, sneezing, emaciations, sub-mandibular oedema and corneal opacity.

Based on the clinical manifestations, Peste des Petits Ruminants (PPR) and Contagious Caprine Pleuropneumonia (CCPP) were suspected. Blood samples were collected from 240 unvaccinated clinically sick shoats for laboratory investigation using Enzyme

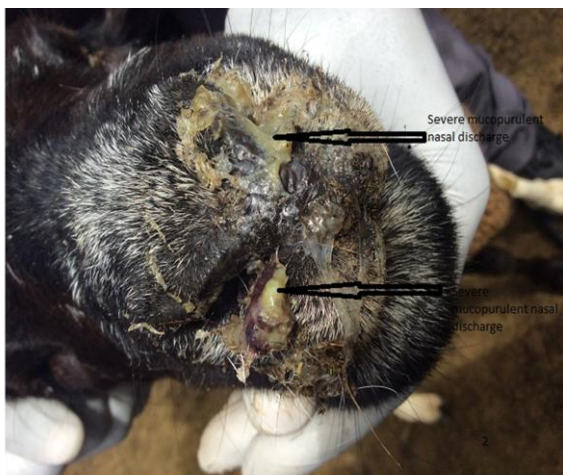
Linked Immunosorbent Assay (ELISA) assays specific for PPR and CCPP.

Almost two-third (63%, n=240) of examined blood samples were positive for PPR and almost half (48.1%, n=183) were positive for CCPP.

PPR, also known as “goat plaque”, is a viral disease of mainly goats and occasionally sheep. The disease is caused by morbilivirus in the family paramyxoviruses. Animals get infected mainly through inhalation of infective air and ingestion of contaminated materials. Close contact and movement of animals facilitate disease transmission and spread. Reservoir animals are the source of infection as they shed viruses in the feces, saliva eyes and nasal discharges.

CCPP is a highly contagious disease of goats that mainly affect the respiratory system hence characterized by breathing difficulties. It is caused by bacteria *Mycoplasma capricolum* subspecies *capripneumoniae*. The disease affects large number of animals and causes massive deaths within a short period of time. Animals get infected through inhalation of the infective air. Therefore transmission is enhanced by close contact between animals.

Based on the results, it was recommended that strategic surveillance and vaccination should be conducted to prevent outbreaks in the study area in future. Since the affected villages border with Kenya in the north, collaborative disease surveillance, prevention and control strategies between Tanzania and Kenya were recommended. Once outbreaks have occurred, thorough cleaning and disinfection of the premises is recommended. Investigation of other diseases including contagious ecthyma and goat and sheep pox was recommended.



Severe mucopurulent nasal discharge in sheep



Severe diarrhea in goat

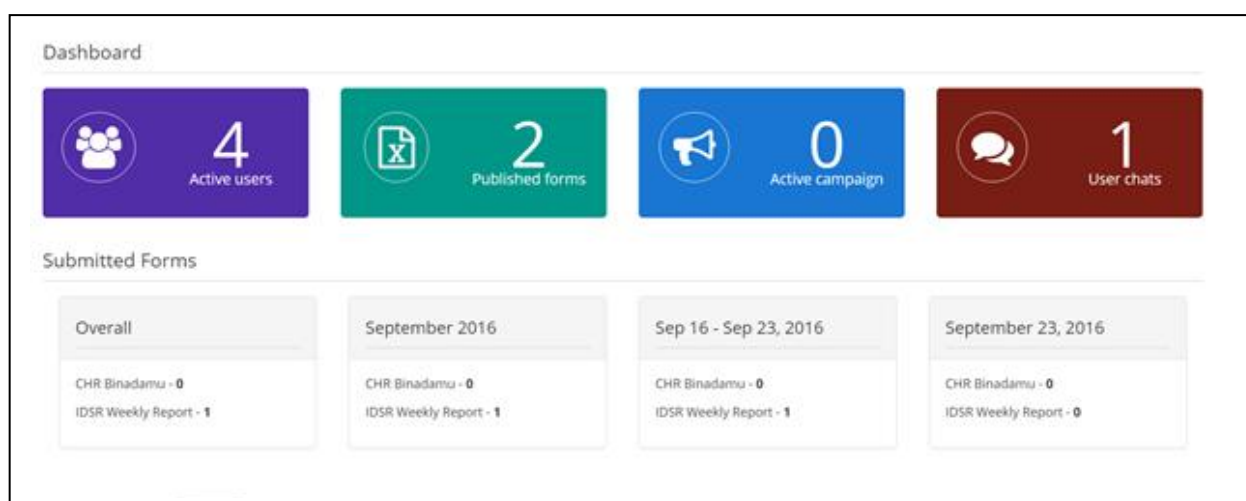
SACIDS has improved users' interface features of AfyaData tool

AfyaData is a set of two applications; a mobile android-based client and a web-based application acting as a server. The mobile client is inspired by Open Data Kit (ODK), used for collecting and submitting syndromic data and receiving and/or tracking feedback from health officials. The server component consists of a set of web service that handles the entire lifecycle for initializing, collecting, registering and managing forms ready for AfyaData mobile client to utilize.

The Southern African Centre for Infectious Disease Surveillance (SACIDS) has quietly pushed-out improved users' interface of AfyaData tools since its field deployment in July 2016. The features that have been improved include:

Dashboard

This feature shows statistics summary of activities that have been done in system. It shows summary on the number of active users, campaigns, published forms, feedback and submitted forms.



Campaign

This feature promotes different campaign advertised in AfyaData, for instance “Stop cholera” campaign. The campaign is linked to data collection forms to simplify access to forms, data entry and submission to server.

Data Visualization

This feature offers a set of different graphical tools such as maps and charts for data analysts and epidemiologists to simplify analysis and interpretation process.

User notification

This feature provides automatic real-time notification to users’ mobile phones on data that has been submitted into the system by Community Health Reporters (CHR). It provides summary of submitted data, location, and name and contacts of CHR. This prompts the users, for instance District

Medical and Veterinary Officers to login into the system to visualize details of submitted data.

Feedback

This feature helps to track response/outcome for each submitted data. AfyaData users can instantly chat and ask questions or inquire more information on submitted data

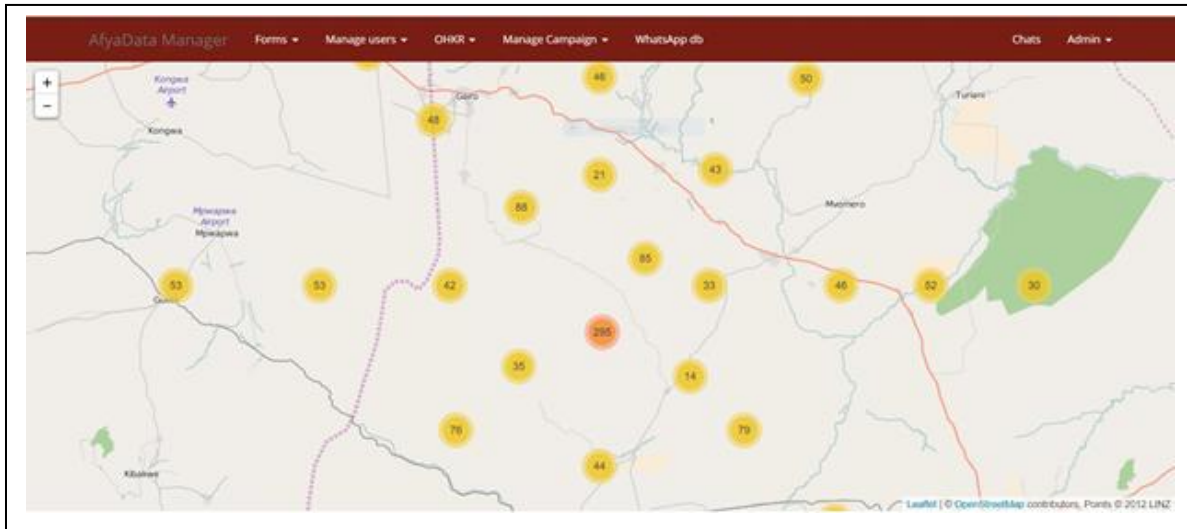
Internationalization and localization

This feature supports multiple languages interface. Currently the AfyaData system supports English and Kiswahili

The screenshot shows the 'Add Campaign Details' form in the AfyaData system. The form has a dark red header with the AfyaData logo and navigation links: Forms, Manage users, OHKR, Manage Campaign, WhatsApp db, and Blog. The form fields are: Title (text input), Icon (Choose File button, No file chosen), Type (radio buttons for General Campaign and Form Campaign), Featured (dropdown menu), and Description (rich text editor with a toolbar). The toolbar includes icons for source, undo, redo, bold, italic, underline, strikethrough, link, unlink, list, indent, outdent, quote, code, link, unlink, and a help icon. The Description field is currently empty.

The screenshot shows the 'Feedback List' page in the AfyaData system. The page has a dark red header with the AfyaData logo and navigation links: Forms, Manage Users, OHKR, Manage Campaigns, WhatsApp db, Blog, Chats, and Admin Demo. The page contains a search bar with filters for 'Search by form title' and 'Search by username', and a 'Search' button. Below the search bar is a table with the following data:

Form name	Last Message	Chat User	Username	Last Chat Date	
CHR Binadamu	We have received your form, these are suspected diseases from form details: 1.Cholera 2.Malaria	GODLUCK AKYOO	255712404118	29-09-2016 16:39:23	Conversation
CHR Binadamu	We have received your form, summary of reported diseases trend 1. Cholera 2. Typhoid 3. Malaria	GODLUCK AKYOO	255712404118	29-09-2016 16:33:21	Conversation



SACIDS designs intervention plan to support cholera control

The Southern African Centre for Infectious Disease Surveillance (SACIDS) through the Enhancing Community-based Disease Outbreak Detection and Response in East and Southern Africa (DODRES) project supported by Skoll Global Threats Fund has designed intervention plan to support national cholera control efforts.

For administrative purposes, Tanzania is divided into regions. Each region is subdivided into districts. The districts are sub-divided into divisions and further into wards. Wards are further subdivided into streets (for urban wards) and into villages (for rural wards). A village/street is the lowest government administrative structure at the community level.

To support national cholera control efforts Community Health Reporters (CHRs) also known as Community Health Workers, located at village/street level, and ward Health Officers (HOs), located at ward level, have been identified as key stakeholders. It is however not known explicitly whether engagement of either CHRs or HOs will provide optimal support in the surveillance of cholera and cholera-like diseases at community level. It is therefore proposed that the two models of engagement be

tested concurrently in Morogoro and Dar es Salaam regions.

To start with, the focus will be on the districts in Morogoro and Dar es Salaam that have been most hit by recent (2015/2016) cholera epidemic including (number of CHRs to be engaged in parentheses) Morogoro Urban (10), Mvomero (6) and Kilosa (5) districts in Morogoro, and Temeke (8) and Ilala (7) districts in Dar es Salaam. One ward HO from each of districts in Morogoro, and three ward HOs from each of the districts in Dar es Salaam, will be engaged in community-based cholera surveillance.

One officer in-charge, a nurse and laboratory technician from cholera treatment camps (CTC) in each district, and laboratory technicians from Morogoro Regional Referral Hospital (one) and National Health Laboratory (one) will be engaged in community-based cholera surveillance. The CHRs, HOs, nurses, officer in-charges and laboratory technicians will be trained on the application of Information, Communication and Technology (ICT) tool in cholera surveillance, ethics and best practices during the provision of health care services, collection and submission of reports to relevant authorities. They will be trained on

how to recognize clinical manifestations of cholera and cholera-like events in the community and potential environmental risk factors for cholera outbreak. In addition, they will be trained on cholera prevention and control measures.

All trainees will be provided with android phones installed with *AfyaData*, which is a SACIDS digital surveillance tool designed for capturing and reporting of health events from the community to district levels using smart mobile phones. Data capture forms for environmental and household/individual cholera surveillance will be installed in the smart phones, and stakeholders will be trained on how to use the forms to capture and submit disease data to district level.

All CHRs and ward HOs will be trained on how to refer patients to health care facilities/CTC and will be provided with referral forms. In addition, the trainees-specialist WhatsApp group network will be established to facilitate sharing of experience, challenges and solutions.

Consumables will be supplied to Morogoro Regional Referral Hospital and National Health Laboratories to support isolation and confirmation of *Vibrio cholerae* and differential diagnosis. In addition, antibiotic susceptibility testing of the *Vibrio* isolates will be conducted to support effective cholera case management. The National Institute for Medical Research (NIMR) laboratory facility, also based at the Morogoro Regional hospital, will provide additional support by performing advanced molecular characterization of isolated *Vibrio cholerae* and other enteric pathogens under differential diagnosis. These include bacterial pathogens such as *Salmonella*, *Campylobacter*, *Escherichia coli* and *Shigella* spp. using conventional bacteriological diagnostic approaches. Other support will be identification and quantification of viral enteric pathogens such as *Adenovirus* and *Rotavirus* species using real time polymerase chain reaction (PCR). The *Cryptosporidium* protozoan parasites will also be screened.

Clinical manifestations reported by CHRs in humans and animals in Morogoro and Ngorongoro, September 2016

Community Health Reporters (CHR) have continued using *AfyaData* tools to report health events in humans and animals in Morogoro Urban and Ngorongoro districts in Tanzania. The CHRs were trained and equipped with android mobile phones installed with *AfyaData* tools through *Enhancing Community-based Disease Outbreak Detection and Response in East and Southern Africa (DODRES)* project supported by Skoll Global Threats Fund (SGTF). The *AfyaData* is a SACIDS mobile phone digital surveillance tool designed for capturing and reporting of health events from the community to district levels. The collected data are submitted to the SACIDS server located at Sokoine University of Agriculture. The *AfyaData* is integrated with One Health

Knowledge Repository (OHKR), which is a knowledge-based decision support tool, to enhance early detection, timely reporting and prompt response to disease outbreaks.

In this issue, we report clinical manifestations that were frequently reported by CHRs in humans and animals from Morogoro and Ngorongoro in September 2016, and potential likely disease conditions as identified by OHKR.

Overall, clinical manifestations in humans were reported from equal number of villages (3-each) from Morogoro Urban (n=7) and Ngorongoro (n=11) districts. The villages in Ngorongoro that frequently reported clinical manifestations in humans were Kisangiro

(5), Ololosokwan (3) and Jema (2). Those from Morogoro Urban were Bigwa (2), Mikoroshini (2) and Kasanga (1). The most frequently reported clinical manifestations in humans from Ngorongoro included coughing (6), loss of appetite (4), vomiting (3), difficulty breathing (3) and sleep disorder (3). Those from Morogoro included constipation (4) and body weakness (3) (Figure 1).

Likewise, clinical manifestations in livestock were reported from equal number of villages (2-each) from Morogoro Urban and Ngorongoro districts. The villages in Morogoro urban that reported clinical manifestations in livestock were Kindibwa (2) and Bigwa-barabarani (1). Those in Ngorongoro were Jema (2) and Kisangiro (1). The clinical manifestations reported in livestock included abortion (goats), loss of appetite (sheep, goats and cattle), diarrhea

(goats and pigs), reluctant to move (cattle), rapid breathing (cattle and pigs), sneezing (sheep and goats), fever (pigs), reduced milk production (goats), swollen joints and head (chicken), twisted neck and circling (sheep) (Figure 2).

Based on the clinical manifestations reported, the most probable infectious conditions identified in humans by OHKR and likelihood percentage (p) were malaria (50%), typhoid fever (50%) and cholera (50%).

The most probable infectious disease in cattle was Contagious Bovine Pleuropneumonia (40%). The most probable infectious diseases in goats and sheep were Peste des Petits Ruminants (50%) and Contagious Caprine Pleuropneumonia (50%). The most probable disease in chicken was Newcastle disease (70%), and in pig was African swine fever (20%).

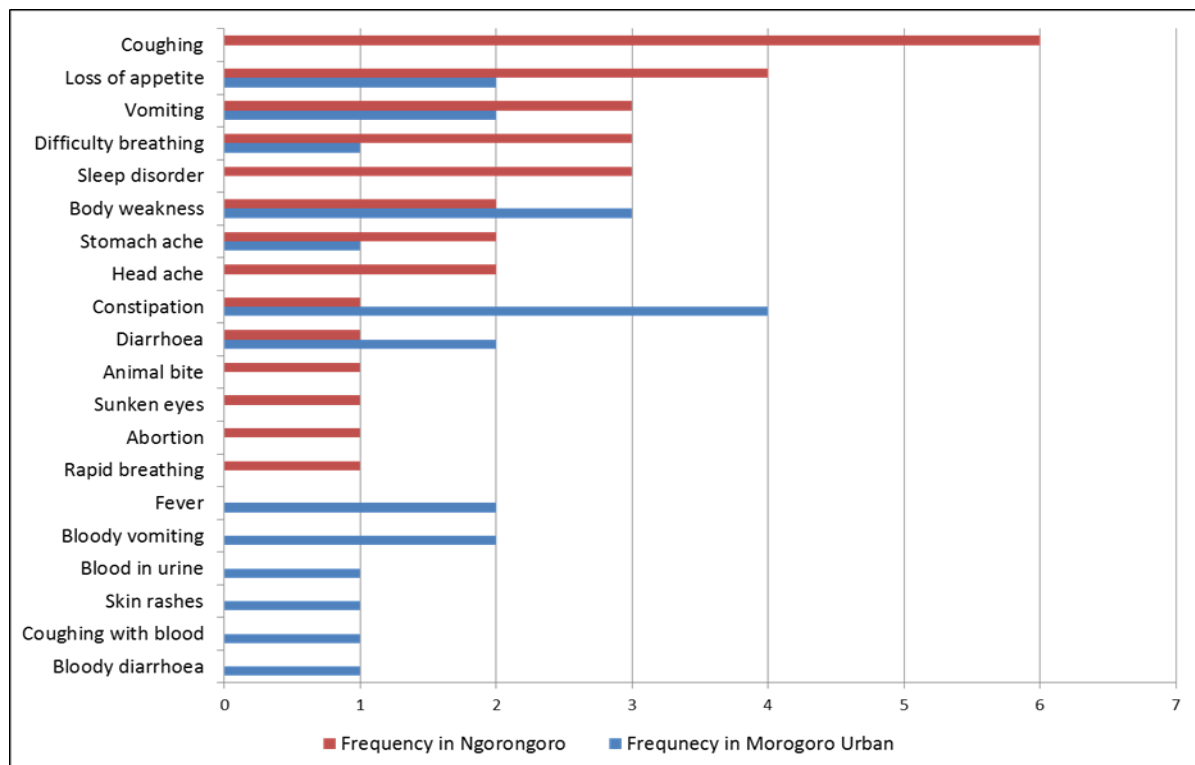


Figure 1: Clinical manifestations reported in humans from Morogoro Urban and Ngorongoro districts

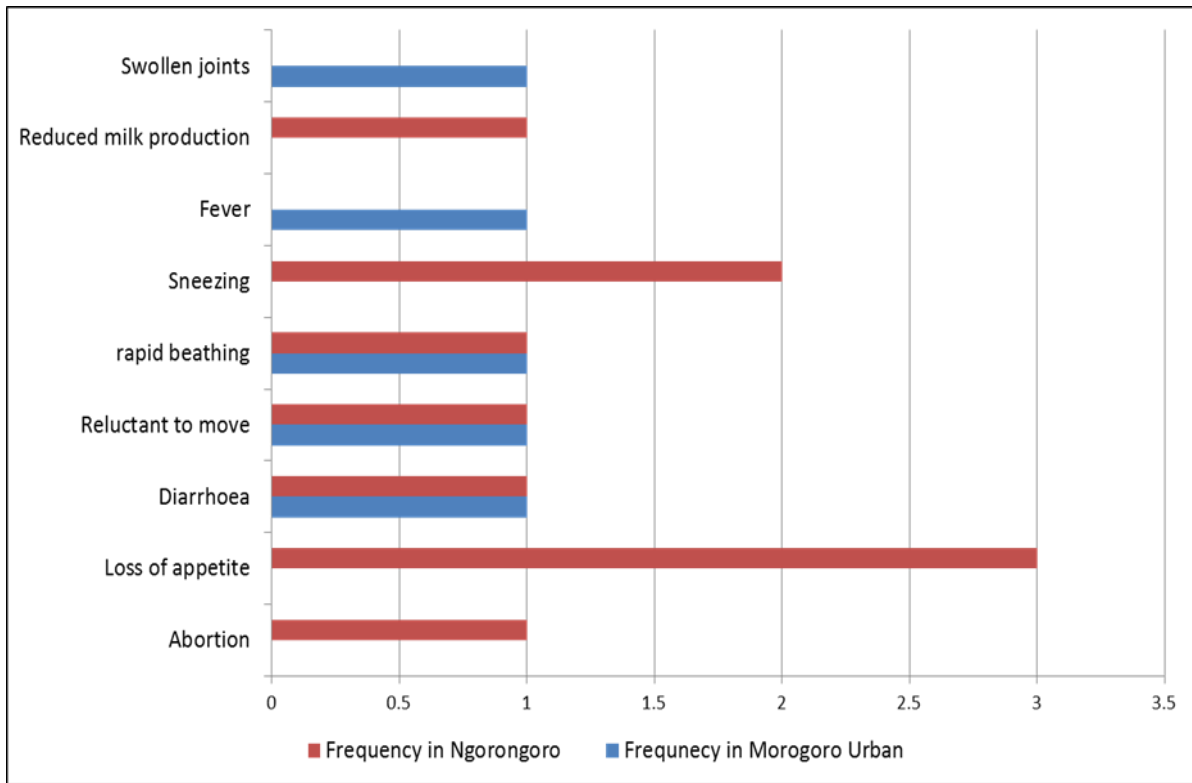


Figure 2: Clinical manifestations reported in livestock from Morogoro Urban and Ngorongoro districts

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