



TechnoHealth Surveillance



Newsletter

Volume1, Number2

April 2016

Editorial address

TechnoHealth Surveillance
Newsletter
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From the Editor's Desk

Dear reader,
Welcome to the second issue of our TechnoHealth Surveillance newsletter. As we highlighted in the first issue, our ambition is to promote community level One Health security contributing to disease detection and response at all levels. We have been motivated by the feedbacks received from our readers following the release of the first issue of TechnoHealth Surveillance, which suggest the potentiality of the newsletter to provide a platform for information exchange on disease surveillance in the region.

We once again invite all the stakeholders to continuously submit stories on health related events occurring in humans, animals and environment for the sustainability of our newsletter.

Inside this issue:

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- Prompt Community health action averts home-based nursing of ill-health in a family member turning into a community cholera tragedy
- A mystery disease kills thousands of goats in Ngorongoro district: Need for Technology Bridge between Local and National expertise for prompt action
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WhatsApp Group Networking Supports Community Health Reporters in Ngorongoro and Kibaha districts, Tanzania

It started as a small group created in January 2016 connected by the WhatsApp real-time messaging application. The group is moderated by Mpoki Mwabukusi, Peter Mangesho and Eric Beda of the Southern African Centre for Infectious Diseases (SACIDS) based at Sokoine University of Agriculture in Tanzania. The need for creating such a group was realized after conducting training of community health reporters (CHRs) on application of mobile phones in disease surveillance in Ngorongoro and Kibaha districts, Tanzania. The training was organized to address the challenges of delayed detection, reporting and response to disease events occurring in human and animal populations in the districts. A team of information, communication and technology (ICT) specialists, medical socio-anthropologist and district medical and veterinary officers supported training of CHRs who were empowered with skills to detect and report disease events happening in their communities using mobile phone technology.

The group has significantly grown from initial 21 to 30 members actively exchanging information, questions and responses in real-time on health challenges facing the communities. Experience between January and March 2016 includes:

- Sharing of real-time information on events happening in Ngorongoro and Kibaha districts. Some key disease events reported from Ngorongoro district include hernia in heavily pregnant goat (photo 1), unconfirmed outgrowth in cattle suspected to be a tumour (photo 2) and suspected case of rabies that was confirmed by the Ngorongoro Veterinary office to be East Coast fever (ECF) in cattle (photo 3). Other disease conditions reported included Contagious Ecthyma (orf)

in kids and Coenurosis (*ormillo in Maasai language*) in goats and sheep.

- Report of disease outbreaks in Ngorongoro district. These included Peste des Petits Ruminants (PPR) in goats (photo 4), anthrax (in cattle and humans) and cholera (reported in humans in neighbouring Karatu district).
- Sharing challenges faced by CHRs related to management of diseases in the community.
- Technical support by Ngorongoro district and Sokoine University of Agriculture (SUA)-based specialists in responding to CHRs' questions related to management and control of diseases.

Interesting are the findings that the CHRs in pastoral communities are more excited to report events in animal than in human populations. This implies that animal health surveillance could be used as an entry point for improving public health surveillance in pastoral communities. Some socio-anthropological studies are needed to identify issues and factors to consider for enhancement of reporting of public health events by CHRs.

Through this experience, it is believed that the WhatsApp-supported group networking has potential to be used as a powerful platform to support animal and human health care promotion as well as timely capture of disease events, including epidemics occurring in underserved areas in rural areas of most of African countries.

This work was supported by the Canadian International Development Centre (IDRC) project on 'Integrated Human and Animal Disease Control for Tanzanian Pastoralists Facing Settlement Challenges'.



1. Hernia in pregnant goat in Endulen, Ngorongoro



2. Cervical neck outgrowth in a cow in Oloirobi, Ngorongoro



3. Rabies suspected cases confirmed to be ECF at Endulen, Ngorongoro



4. PPR cases in goats in Malambo, Ngorongoro

Prompt Community health action averts home-based nursing of ill-health in a family member turning into a community cholera tragedy

It was on December 22nd 2015 when a 32-year-old lady travelled from Dar es Salaam to join her family to celebrate the Christmas festival in Mgaza Street, Mindu ward in Morogoro Municipality. The following day, she experienced severe diarrhoea. Her mom thought that it was a transient illness related to weather differences between Dar es Salaam and Morogoro (about 200 km apart), and therefore decided to opt for home-based nursing for her daughter. Two siblings also took active role in caring for their ill-health sister. Subsequently, on the third day the mom and two siblings started experiencing severe diarrhoea, turning the whole family ill while leaving the home-based nursing service to be provided by the neighbours and other distant relatives. Realising that the home-based nursing was not stopping the diarrhoea, the Mgaza

Street Chairperson reported the cases to Mindu Health Officer, and the patients were immediately taken to a local dispensary in Mindu. Within 24 hours the patients were referred to a cholera camp in Morogoro Municipality where they were treated successfully.

By December 31st 2015, additional four cases of cholera were confirmed in Mindu ward among the individuals who had provided care to the ill-health family. These cases were also managed successfully at the cholera treatment camp in Morogoro Municipality.

A week later from the date the index case was reported in Mgaza Street, the health committee and local Health Officer with support from Morogoro Municipality

disinfected the premises of the victims and neighbours. Public health education and water sanitation were provided to 489 households in Mindu to control further spread of cholera. Community members were prohibited to collect water directly from Mindu dam that supplies water to Morogoro Municipality, and were advised to collect and use treated water from catchment tanks. Other control measures included closure of local brew clubs and prohibiting the community to go swimming in the Mindu dam.

The Mgaza street health committee claimed that cholera was introduced into their area from Dar es Salaam (where cholera outbreak began in late August 2015). Poor hygiene, inadequate awareness and limited resources were reported to have contributed to local spread and persistence of cholera in Morogoro. Overall, the response measures

implemented in Mindu were perceived to be effective. The street health committee highlighted that, while community members provided good cooperation to control the disease in Mindu, it has remained challenging for them to take up some recommendations from the district health authorities. Community members continued collecting untreated water directly from the Mindu dam for domestic use, as there is poor supply of piped water in the ward. The health committee recommended that, the most effective strategy would be to educate community members to boil water for domestic purposes and immediately report any ill-health to nearest health facilities. The health committee recommended further that, to be one step ahead of cholera and other disease outbreaks, there is a need to sustain preventive measures including regular public health education and by-law enforcement.

A mystery disease kills thousands of goats in Ngorongoro district: Need for Technology Bridge between Local and National expertise for prompt action

It has been estimated that from August 2015 to March 2016, the unknown fast spreading disease has killed thousands of goats in Ngorongoro district northern Tanzania leaving pastoralists puzzled. This was reported by the health committee in Sukenya village, Ngorongoro district emphasising that the disease outbreak was extraordinary and never experienced before.

A visit to the Maasai pastoralist in Sukenya who was reported to have lost almost the entire flock, found that only 22 goats survived out of 250 goats he owned before. This pastoralist also reported further that he keeps over 200 sheep and 70 cattle that were not affected by the disastrous disease. Although sheep and goats were grazed together during the day, they were kept separately during the night, which was reported to be a common practice in the village.

The animal owner reported that he observed an average of six goats in his flock dying daily from September to October 2015. He (animal owner) attempted to treat sick goats using Oxytetracycline injectable solution for two weeks unsuccessfully.

Exploring further about the disease outbreak, the livestock owner reported that all age groups of goats were affected, and the major clinical manifestations included weakness, discharge from the nose, coughing, diarrhoea and sneezing. The livestock owner reported further that some goats died suddenly without obvious clinical manifestations. The animal cadavers were consumed by the household members, and as more goats were dying the cadavers were shared with the neighbours for food consumption.

Besides the appalling trend of mortalities, the livestock owner did not sell the healthy

animals before falling sick, and had highlighted that by doing so he would have sold the animals that would have otherwise survived the episode. *“I could not predict which animal in my flock would fall sick next so that I could sell it out in advance; I was worried that I could sell out my improved breed of goats and only to find the animals have survived in the buyers’ flocks. That would make me feel very sad. You know, I thought that not so many goats would die as had never experienced such an unexplained mortality rate before. Furthermore, we the Maasai would opt to sell out the weak/unproductive animals and not the healthier ones. However, no one was available to buy weak animals during the period of this disease outbreak in our village”*. The farmer lamented.

When over 50 goats had died, the owner reported the event to a local private veterinary paraprofessional who suspected the disease to be Peste des Petits Ruminants (PPR), and therefore decided to vaccinate the entire flock against PPR. However, the mortality rate kept on the increase. Two weeks later, the livestock owner reported the event to Ngorongoro district office. The investigation team from

the district examined affected goats and suspected Contagious Caprine Pleuropneumonia (CCPP) based on post-mortem lesions.

The village health committee asked for research to establish whether the survived goats were exposed to the pathogen that caused an outbreak, and establish further why they survived such a deadly disease. The committee recommended further that the Government should consider providing re-stocking support to pastoralists who have been left without hope by the disease outbreak.

At the time of going to press, the Ngorongoro District Office has reported the outbreak to the Ministry of Agriculture, Livestock and Fisheries, seeking support to investigate the disease. The aetiology of the disease is being investigated by the Directorate of Veterinary Services (DVS), Tanzania Veterinary Laboratory Agency (TVLA) and our IDRC-funded project; the results of the specialist investigation will follow in the next edition of our TechnoHealth Surveillance newsletter.

SACIDS trains community health reporters on digital technology-based disease surveillance in Tanzania

The Southern African Centre for Infectious Disease Surveillance (SACIDS) has documented the remarkable impact on the implementation of its innovative idea of training and engaging community health reporters (CHRs) in the detection, recording and reporting health events in humans and livestock population using digital technology, mobile phones in particular.

Through a SACIDS programme supported by the Canadian International Development

Centre (IDRC), there has been increase in the number of health events being reported in real-time from 2014 to 2016 in Ngorongoro and Kibaha districts, Tanzania. The aim of the programme is to promote community level One Health security through improved outbreak detection, early communication and rapid response to enhance disease prevention and control at the source.

Initially the programme started with six CHRs who were recruited in collaboration with local community leaders and district medical and veterinary officers. They were each provided with android phones and

trained to use Open Data Kit (ODK) to record and submit health events in humans and animals occurring in their respective villages.

To expand the programme implementation, SACIDS has recently (in January and February, 2016) trained additional 21 CHRs, and encouraged women to take part, as the programme is an equal opportunity. A total of 17 (including three women) and four (including one woman) CHRs were trained in Ngorongoro and Kibaha districts, respectively. The trainees were provided

with first aid kits to provide immediate health care support to community. In addition to training, the CHRs group network was established using WhatsApp to facilitate sharing of experience and challenges resolutions amongst themselves, and with health specialists. Furthermore, SACIDS addressed some of the challenges experienced during the initial phase of the programme including provision of solar chargers to CHRs to facilitate charging the mobile phones in their remote locations where there is no alternative power source.



SACIDS digital technology specialists with community health reporters in Ngorongoro



A CHR charging her mobile device using solar charger

SACIDS designs and releases AfyaData

SACIDS introduces *AfyaData* alpha release. Afya is the Kiswahili word for Health.

What is AfyaData?

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.

Why AfyaData Alpha release?

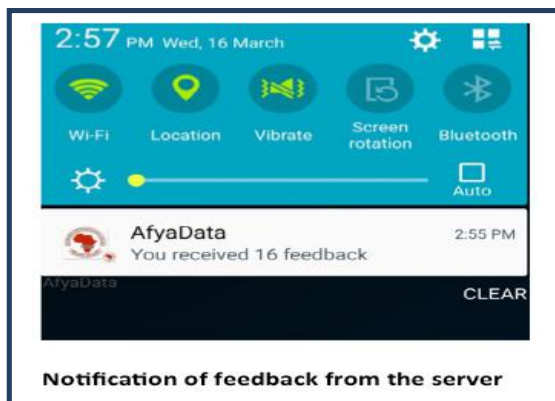
Paper-based disease reporting has been associated with a number of challenges. These include difficulties to submit hard copies of the disease surveillance forms because of poor road infrastructure, weather conditions or challenging terrain, particularly in the developing countries. The system demands re-entry of the data at data processing and analysis points, thus making it prone to introduction of errors. All these challenges contribute to delayed acquisition, processing, response to disease events and providing feedback.

A number of mobile applications have been developed to address challenges of reporting surveillance data timely and

efficiently, ODK Collect being among the most popular and developed tools.

We describe herewith the SACIDS experience of adapting the ODK Collect for disease surveillance to address the above listed challenges. The experience of working with community health reporters (CHRs) in syndromic disease surveillance helped us realize, first hand, challenges on the ground related to disease surveillance and the need to have feedback and/or two way communication between CHRs and health specialists/officials on submitted data. We developed *AfyaData* to address this and many more challenges we experienced.

Following an agile development cycle, this alpha release has minimal feature set. Here we set out to have a turnkey solution for managing system users and data collectors, deploying surveillance forms, collecting and submitting surveillance data and receiving feedback. We hope that this release will entice the open source community of



On other side, once the web application system detects any indicators of abnormal patterns, it will send notifications to the respective health specialists.

Users (from community to district levels) will be able to access, view and analyse received data, and send feedback accordingly to different users.

What is in the work?

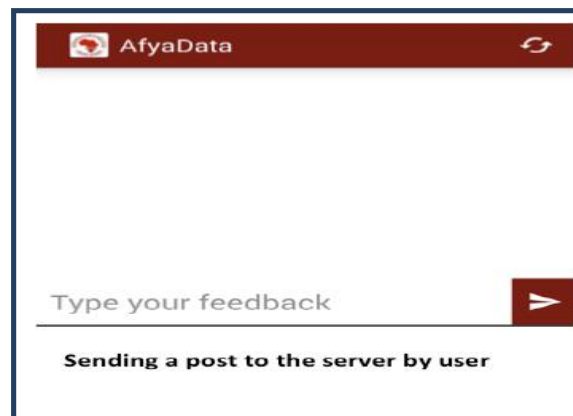
We are currently exploring on how we may modify the current *AfyaData* alpha release into a tool for aiding health workers and

developers to join in the development, bug fixes and assist in building new great features into the system.

How it works

User can download application on mobile phones with all connection configuration pre-set. Since the application is open source, users can always reset the configuration according to their settings. For the first time once installed, mobile user will be required to request for form needed for collecting data. Once they have form, data can be collected, along with this exercise picture and GPS location can be attached to the form. User could perform data collection without network and save all collected data and send once there is network connection.

As soon as data are received in the server, user will get received status/notification. There is also a functionality of receiving feedback from specialists as well as posting questions/queries in format of chat.



inspectors in routine monitoring and control of the disease outbreaks. Our initial thinking is to add a mapping ability to the data interface that automatically clusters points close together providing darker dots where there are more reported cases.

These cases should be time-based so that we may interpolate this data on a time-scale, thus be able to produce a time-map based trend view of disease incidences within the district.

What is next for AlphaData?

Within the next three weeks, we will be deploying *AfyaData* in Morogoro Municipality and get 3rd party feedback on our system, ideas on how to improve what we currently have, clear up bug fixes before we embark on the beta release which will include some new cool features. One of the innovative features is to build an intelligent algorithm that will be used to predict diagnosis of diseases from a combination of signs/symptoms and geographical data as submitted by the user. Then, we will integrate these results with One Health Knowledge Repository to produce relevant

targeted automatic feedback to persons who submitted report to the system. This feedback will include health tips, numbers and/or addresses to closest health facilities etc. We hope this will also motivate and encourage CHRs to collect and submit more data.

AfyaData is a monster of an application with endless possibilities and uses in the public health arena. We need more developers to chip in and help. If you want to join in the fun of putting the public back into public health with the overall goal of ending pandemics email us at afyadata@sacids.org

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