TechnoHealth Surveillance

Newsletter

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Editorial address

TechnoHealth Surveillance Newsletter
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From the Editor's Desk

Dear reader,

The Southern African Centre for Infectious Disease Surveillance (SACIDS) has made a great start on its strategy to share disease surveillance information with key stakeholders through the TechnoHealth Surveillance newsletter to promote community level One Health security. The recent experiences are covered in this third issue of *TechnoHealth Surveillance*. We are happy to have learnt from our esteemed readers that the information we have being sharing has the potential to contribute to disease detection and response at all levels.

We appreciate for the contribution of stories and reflections from stakeholders on health related events occurring in humans, animals and environment. We are keen to keep to receiving stories for the sustainability of our newsletter.

We hope that you will find the third issue of *TechnoHealth Surveillance* informative and educative.

Enjoy your reading!

Inside this issue:

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IDRC CRDI

SACIDS meets Morogoro Municipal Authority to discuss on joint strategy to control cholera outbreak

The Southern African Centre for Infectious Disease Surveillance (SACIDS) based at Sokoine University of Agriculture in Morogoro, in collaboration with the Tanzanian National Institute for Medical Research (NIMR), is implementing a capacity-building project titled "Enhancing community-based disease outbreak detection and response in East and Southern Africa (DODRES)" with financial support from the Skoll Global Threats Fund (SGTF). The purpose of this research project is to strengthen the capacity to detect and respond to human and animal diseases at community level through a One Health Approach.

In line with the project objectives, a team of SACIDS experts met with the Morogoro Municipal Outbreak Response Team in Morogoro on April 12th 2016 to explore and discuss the challenges in the management and response to the current cholera outbreak. It was anticipated that reflections from this meeting will inform the SACIDS strategy to support and facilitate the containment of the outbreak.

Mapping of the performance of response team under each pillar of cholera outbreak control revealed the following challenges:

Surveillance and disease detection

The cholera response team reported that although the disease control strategy during the epidemic phase has been to manage all the diarrheal cases as cholera until laboratory confirmation, the cholera suspected patients were not screened before being introduced into cholera treatment camp (CTC) because there was no unit established for this purpose. At CTC, all patients are managed as cholera cases on arrival until when laboratory results are obtained within 24 hours when non-cholera cases are referred to routine in-patient or out-patient departments. It was observed that because of this practice, some suspected cases in Morogoro were confirmed negative for cholera after they have been introduced to cholera camp, and therefore increasing the risk of contracting and spreading cholera. Establishment of the cholera screening unit was recommended. It was agreed that only the confirmed cases should be introduced to CTC.

The cholera response team reported further that some health workers were not aware of the cholera standard case definition highlighting on the training needs. It was however reported that use of the common cholera standard case definition has been problematic because it excludes the under-two-year children. It should be noted that in the current outbreak cholera was reported even in children less than two years of age.

Contaminated water source has been confirmed to be the main source of cholera outbreak and persistence in Morogoro Municipality. In addition, some individuals in the Municipality were reported to irrigate vegetables using waste water, and this was highlighted as an additional risky practice for cholera outbreak. It was reported further that the continued influx of patients, mainly through self-referral, from the neighboring districts has contributed to continued introduction of cholera into Municipality, and delayed case presentation. In addition, contact tracing has remained a challenge because some patients do not provide correct physical addresses. It was recommended that community should be actively engaged in the surveillance and control of cholera.

Diagnosis and Treatment of Cholera

The resources for diagnosis and case management were reported to be sufficiently available within Morogoro Municipality. However, for unknown reasons some patients do not complete the prescribed dose regimen making the treatment ineffective.

Interventions on drinking water, sanitation and hygiene

The cholera response team reported that there was limited supply of piped water in most of the areas of Morogoro Municipality, and water from shallow wells has remained the alternative source, although not safe. There has been no effective collaboration with other relevant sectors in the control of cholera, including water supply authority to support provision of safe water in locations, especially at the periphery of the municipality, without piped water supply.

Some households, especially in the periphery of the municipality, do not have toilets/latrines, and therefore increasing the risk of cholera outbreak and spread. Even with public health education being conducted, some community members were reported to be reluctant to boil water for drinking purpose, appealing that water loses taste when it is boiled. Communities have been sensitized to use *Water Guard* to treat water for domestic use. However, the chemical was not available either from the Municipal Council or from shops. Moreover, the use of sanitizers to wash hands is rarely practiced by the majority of residents. Given that cholera is a multi-sectoral problem, it was recommended that there is a need to sensitize and encourage other relevant sectors to actively participate in the surveillance, prevention and control initiatives.

Information, Education, Communication and Behaviour Change

The information, education and communication were reported to have not been very effective to influence behavioral change in the community. It was recommended to actively involve the religious leaders, street leaders and politicians in the provision of public health education as they have potential to influence community behavioral change. Likewise, public health education can be provided through primary and secondary school pupils. Public health education should be an on-going activity even during the inter-epidemic period.

Monitoring and Evaluation of interventions

It was highlighted that there is a need to strengthen the capacity of monitoring and evaluation (M&E) of epidemics

within the Municipality. This include developing of M&E indicators to monitor and evaluate cholera outbreak interventions as well as strengthen the council's capacity in data analysis and interpretation of trends of cholera by space and time in the municipality.

Proclaiming the spread and persistence of cholera outbreaks, and associated challenges in disease control in Morogoro Municipality, SACIDS pledged to collaborate with the cholera outbreak response team to facilitate early detection, reporting, confirmation and case management. SACIDS has designed and released the *AfyaData* ICT tools that will be deployed soon to enhance early disease outbreak detection, reporting and response at all levels.

SACIDS will therefore facilitate:

- Early detection and reporting of cholera cases using syndrome digital surveillance system with geo-mapping.
- Multi-agent differential diagnosis of diarrhoea.
- Data analysis, interpretation and feedback to relevant sectors.
- Capacity strengthening of health workers on data management.
- Public health education using ICT.

Real-time reporting enables experts to promptly dispel the witch and curse craze of a strange disease

Astonishingly in the morning of January 28th 2016, a pastoralist in the Nasipaorio village in Ngorongoro Conservation Area (NCA), Ngorongoro district, northern Tanzania found that out of 50 cattle he owned, seven adult (five bulls and two cows) aged > three years were yawning and nervous. In the afternoon on the same day, these cattle started dribbling out lots of watery fluid from their mouths that later tuned frothy. The pastoralist thought that the cattle had run mad. In fact, the sick animals were attacking him as he approached them for a closer inspection. This was a strange event to community and they had never experienced a similar condition before. The *Morani* (Maasai warrior) managed to restrain the animals and the owner administered 20% oxytetracycline to each

through jugular vein. There was however, no improvement. Shockingly, the animals started racing after people in the village.

The household members then thought that it was rabies or coenurosis. As these cattle were becoming more aggressive and unmanageable by the *Morani*, the owner and other villagers associated the strange event with witchcraft and curse, claiming that; *"why only seven cattle were affected in the herd, and why there were no similar cases in the neighboring herds that grazed in the same location. This must be the witch or curse event"*. The villagers moaned and blamed some fellow villagers to be behind the event.

Recognizing that the prognosis was grave, and after six cattle had died, the owner reported [using phone] the event to local community health reporter (CHR) [who was not available in the village during the time of event] on the third day. On the same day, the CHR reported the case to an online information system, established by SACIDS and accessible to human and animal health specialists. The CHR also shared the case with WhatsApp group of community health reporters and health specialists. The case was then shared with the NCA Authority (NCAA) and Ngorongoro District Council on the same day.

Experts from the NCAA and Ngorongoro district council visited the herd on the fourth day, and collected blood sample from the seventh cattle that was in coma stage before it died on the same day. Even though the disease event was associated with witchcraft, the uninspected cadavers were consumed by the household members and the neighbours.

The witch and curse rumors finally came to an end three days later, from the date the blood sample was taken, when experts confirmed the disease to be East Coast fever, a disease caused by *Theileria parva* and transmitted by brown ear ticks!

SACIDS develops One Health Knowledge Repository

One of the most common challenges in the traditional infectious disease surveillance systems in human and animal health is lack of timely feedback. In particular, feedback to persons collecting and submitting surveillance data is critical in order to encourage them to continue to report quality data, as well as initiate quick actions to prevent or mitigate the extent of possible epidemics.

Having recognized the importance of prompt detection, reporting and feedback, SACIDS has developed One Health Knowledge Repository (OHKR) to improve public health management. OHKR is a decision making expert system that helps local communities, ministries responsible for human and animal health as well as regional animal and human health desks to make prompt and appropriate decision required to prevent and control diseases.

To start with, SACIDS has engaged specialists in the fields of human and animal health to develop OHKR contents

for priority endemic and epidemic prone diseases. For human disease conditions, OHKR has been developed for Dengue, Ebola virus disease, Marburg Virus Disease, Crimerian-Congo Haemorrhagic fever, Rift Valley fever, Cerebrospinal Meningitis, Anthrax, Rabies, Avian Influenza, Plaque, Measles, Typhoid fever, Cholera, Malaria and Yellow fever.

For animal diseases, OHKR has been developed for Foot and Mouth Disease, Rift Valley fever, Malignant Catarrhal fever, African swine fever, Peste des petits ruminants, Brucellosis, Trypanosomosis, Newcastle Disease, Contagious Bovine Pleuropneumonia, Contagious Caprine Pleuropneumonia, Lumpy Skin Disease, Anthrax, Rabies and Avian Influenza.

The contents of OHKR include specific disease standard case definition, percentage weight of clinical signs for each disease, and answers to frequently asked questions.

A list of recommended action has been created per targeted user (community health workers/reporters, livestock extension officers, in-charge of health facilities, and district medical/veterinary officers). The contents for OHKR in English and Kiswahili formats will be archived in the multilingual web based interface at SACIDS server. The OHKR archiving system will be programmed to receive data from the community (through community health workers/reporters), and automatically send messages to relevant user on artificial intelligence and alerts of possible disease conditions occurring in human and animal populations. This will enable the user to quickly establish the trend in terms of host, space (location) and time (date) of disease occurrence, and take necessary actions to manage the disease. Deployment of this innovative idea will be conducted in Ngorongoro and Morogoro-Urban districts in Tanzania and Narok district in Kenya with ambition to scale it up to improve the national and regional Integrated Disease Surveillance and Response (IDRS) and veterinary surveillance systems.

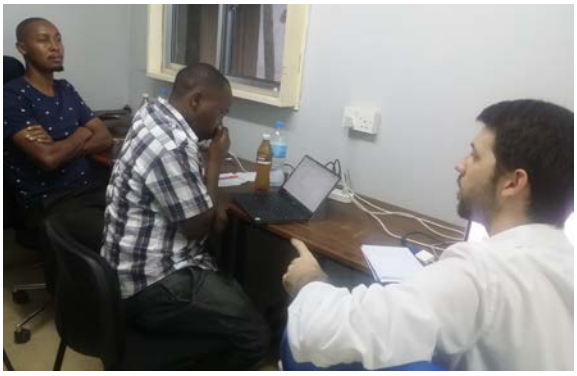
SACIDS and InSTEDD in One Health software development mission

From April 4th to 8th 2016, Mr. Brian J. Cardiff from Innovative Support to Emergencies Disease and Disasters (InSTEDD) joined the ICT team (Eric Beda, Renfrid Ngolongolo, Godluck Akyoo and Mpoki Mwabukusi) from the Southern African Centre for Infectious Disease Surveillance (SACIDS) in Morogoro Tanzania to share experience/knowledge in development approaches and best practices in software development and management of open source projects.

This interactive exercise covered the following areas in software development methodologies:

User stories

Discussions were made on how to write user stories and advantages of user stories in a software development process. The important elements that were discussed include Role, Action, and Reason; see example [*As a* ***<<role>>*** *i want to* ***<<action>>*** *so that* ***<<reason>>***]. User stories should be defined in early stage of software development for a user centric design i.e. based on user interactions with the software as focal point of functionality and features. Some benefits of user stories include helping to; prioritize important things/features in a project, pre-assess the system before it is fully created/developed, to track project progress at any point in time and enhance regular release of tool for user testing and feedback.



Version Control

The best practice of using Version Control in the management of open source projects was highlighted. The ICT team practiced github version control for managing *AfyaData* tool (for reference see https://github.com/sacids). Furthermore, the ICT team explored the use of different tools (source tree) that are used in parallel with github for fetching, pulling, pushing, merging, forking and creating repository. Reflections from these discussions will improve management of the SACIDS' open source project (*AfyaData* App and *AfyaData* Manager) in github.

Unit Testing

The ICT team had opportunity to share experiences in Unit Testing, which involves testing each smallest components of application independently to stabilize and facilitate rapid software development. In this section the team explored use of CodeIgniter PHPUnit library in testing different components of *AfyaData* project.

Continuous Integration (CI)

Continuous Integration (CI) is a development practice that requires developers to integrate code into a shared repository several times a day. Each check-in is then verified by an automated build, allowing teams to detect problems early. In this section the ICT team discussed on how to conduct CI to promptly detect errors in software development. Some benefits of CI were highlighted that included increasing visibility to enable greater communication, detect and fix errors/problems promptly, spend less time debugging and more time adding features, increasing the confidence on the performance of the codes under development and reducing integration problems enhancing rapid development of software.

User Interface/User Experience (UI/UX).

In this section the ICT team discussed on how the end user (target system user) will be interacting with the application that SACIDS is building. That is how easy is it to use or navigate, how easily should the user be able to use the application.

Important features were highlighted including making the instructions to user sufficiently descriptive and making navigation links sufficiently visible.

Community Health Reporter detects twin pregnancy- Serves as lifeline for pregnant woman with twins

"By visiting the pregnant women in their homes, I have managed to sensitize the community and some have accepted and utilized the antenatal services, and delivered at a nearby health facility. It is uncommon for the Maasai pregnant woman to attend antenatal clinics, and it is a common tradition for us to deliver at home. These have been common practices in the Maasai community over many years before modern health care services were introduced to our areas. When we educate and encourage the community to attend antenatal clinics and deliver at health facility, they see little or no value as some of advices received from health care workers are not in line with the way Maasai cares for pregnancy to delivery. For instance, whereas modern health care workers advise eating well in terms of quality and quantity during pregnancy, the Maasai community believes that the pregnant woman should be starved a bit to limit over-growth of the baby to avoid delivery difficulties. You should also note that it is a sense of being strong when the Maasai woman delivers at home without much support". These were the remarks from the *community health reporter* (CHR) in Nasipaorio village in Ngorongoro Conservation Area, northern Tanzania when she was sharing her experience in promoting the community uptake of facility-based health care services. This CHR works under the initiatives of the Southern African Centre for Infectious Disease Surveillance for early detection, reporting and response to health events in human and animal populations.

Describing the recent successful health event, the CHR narrated that; in December 2015 she discovered a 29-year-old woman in her village was pregnant. She encouraged her to attend antenatal care and delivery at Endulen hospital, located about 10 kilometres from Nasipaorio village. However, the pregnant woman and her husband did not see sense of attending antenatal clinic and delivering at health facility recalling that the woman had successfully delivered her other six children at home. The CHR had estimated the date when the woman was likely to deliver, and kept encouraging here for health facility delivery, especially when it was about two months to term.

On palpation during the 8th month of pregnancy, the CHR detected that it was a twin pregnancy. She kept encouraging for delivery at health facility as she felt it was risky for twin-pregnant woman to deliver at home. As twin pregnancies were uncommon in the Maasai community, the husband accepted. However, the pregnant woman was still reluctant to deliver at health facility and did not believe it was a twin pregnancy, but rather the tactic from CHR to accomplish the mission for health facility

delivery. The pregnant woman lamented further that she knew of another woman who had successfully delivered twins at home, and therefore she was not worried.

Understanding how much was the risk for the twin delivery at home, and as she had experience and traditional skills to attend home delivery, the CHR decided to spend much more time with the pregnant woman during the 9th month of pregnancy. After repeated counselling sessions, the CHR managed to take the pregnant woman to Endulen hospital on April 15th 2016, where the twin pregnancy was confirmed. The pregnant woman was hospitalized and went into labor after a week. However, she could not deliver normally and a caesarean section was performed successfully. At the time of going to press the twin new-borns, mother and father were in good health.

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