TechnoHealth Surveillance Newsletter

Editorial address

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From the Editor's Desk

Infectious diseases have a significant impact on vulnerable populations and children across the world. Outbreaks of emerging diseases pose enormous challenges to affected countries. The negative impact of disease can be reduced by facilitating effective communication and early dialogues between countries. Early communication between sectors and neighbouring countries, leading to faster detection and response to disease outbreaks, is a critical step to make a difference to emerging global public health threats.

The Southern African Centre for Infectious Disease Surveillance (SACIDS) established in 2008, is implementing research project titled *Enhancing community-based disease outbreak detection and response in East and Southern Africa (DODRES)*. This work is supported by Skoll Global Threats Fund (SGTF) and implemented collaboratively by different institutions including the Tanzanian National Institute for Medical Research (NIMR), Kenya Medical Research Institute (KEMRI), Morogoro Municipal and Ngorongoro District Councils (Tanzania), Narok County Government (Kenya) and Ministries responsible for Health and Livestock Development in Tanzania and Kenya. The USA-based Innovative Support to Emergencies, Diseases and Disasters (InSTEDD) plays an important role as mentor for information, communication and technology (ICT) programmers working with SACIDS. The project is based on a theory of change that aims at promoting community level One Health security that will progressively contribute to disease detection and response at community level and thence national, regional and global levels. Through improved outbreak detection, early communication between sectors and neighboring countries coupled with rapid response at source, the project will contribute to reduction of outbreaks, which will consequently eliminate or reduce pandemic occurrences or likelihood. To enhance sharing information on One Health activities in the Region, SACIDS is introducing a TechnoHealth Surveillance Newsletter.

The production of this newsletter is one of the channels SACIDS will utilise to disseminate disease surveillance information among partners and the general public. It is our hope that the newsletter will provide a platform for information exchange on disease epidemics occurring in the region. In addition, SACIDS will employ other channels of information exchange including use of e-notifications from the mobile tools developed by the project.

We would like to invite all our stakeholders to constantly submit relevant articles for the sustainability of our newsletter. We call upon technology enthusiasts, health experts and anyone interested in public health to join the TechnoHealth Surveillance community of practice for an epidemic free Africa. Please send us your articles, comments and views.

DODRES Project team. From left to right: Renfrid Ngolongolo, Mpoki Mwabukusi, Robert Maduka, Godluck Akyoo, Esron Karimuribo, Calvin Sindato and Rric Beda (Photo by yunus Karan)

Morogoro and Ngorongoro Districts identify barriers and opportunities to improve "One Health" surveillance

Morogoro Municipal and Ngorongoro District Councils have identified that disease surveillance is hampered by a lack of reporting technology, untrained personnel, limited facilities, equipment, and supplies, all of which result in underreporting of disease event occurrences. Participants of the 'mapping of disease surveillance functions' workshops were of the opinion that the paper-based system currently being used for disease surveillance should be replaced by digital technology. This was revealed in recent workshops organized by the SACIDS DODRES project.

The workshops held in Morogoro in January 2016 and in Ngorongoro in February 2016 aimed at identifying enabling and constraining factors in animal and human disease surveillance system in the two districts. The elements of disease surveillance system that were evaluated included identification and recording of disease events, reporting, investigation, data analysis, interpretation and use, response and feedback. Participants of the mapping exercise were drawn from the departments of

health, agriculture and livestock development, environment, education and planning.

Workshop participants recommended the need to:

- Initiate a dialogue to update Tanzanian Animal Disease Act 2003 and Tanzania Public Health Act 2009 to reflect a 'One Health Approach' that will facilitate cross-sector reporting of disease events.
- Strengthen capacity for the sub-national One Health workforce involved in surveillance and reporting of diseases.
- Adopt the use of mobile technologies in disease surveillance to ensure early detection and prompt response to outbreaks at community level.
- Develop and make available job aids for disease surveillance including guidelines/protocols/ standard-operating procedures for priority diseases at all levels.
- Enhance disease outbreak communication/ response/feedback between and across sectors and other relevant authorities.

Late reporting and political interference are barriers in prompt response to cholera outbreaks in Morogoro

Officials of the Morogoro Municipal Council admitted that the persistent of cholera cases in Morogoro is contributed to late case detection. Carrying out self-assessment of their capacity for early detection and prompt response to diseases, they reported that although patients from lower level health facilities were referred to the Morogoro regional referral hospital, there was late case identification and recording at the community level that may have contributed to delayed response. Some of factors that contributed to late case identification at the community level included inadequate level of awareness on cholera among the community members and front line health workers. Unfortunately, even some of the health workers who attended the index case subsequently suffered from cholera. Furthermore, some patients did not provide correct physical address that affected the contact tracing efforts. Some of the response measures that were taken to control cholera include chlorination of water, community health education and case management. Establishment of cholera treatment camp was reported to be one of the crucial enabling factors for appropriate and timely case management. However, unreliable transport and inadequate beds were among the challenges on the performance of the treatment camp.

On the other hand, communication between district and regional levels was considered to have worked well. Involvement of food vendors, department of water, local leaders and media was effective in disseminating information and public health education, and the implementation of necessary actions.

Availability of skilled personnel and laboratory reagents were reported as enabling factors in the confirmation of the cholera cases. Although data analysis, interpretation and data use were implemented, these exercises faced some challenges including inadequate skills in data analysis and limited availability of cholera guidelines at the health care settings.

Other challenges encountered during the recent cholera outbreak in 2015/2016 included failure to enforce the ban on street food vending due to interference from some local political leaders. It was highlighted that security guards and public health officers were attempting to implement the by-laws to control spread of cholera, but the exercise was less effective. Besides the efforts to ban the food vending activities to control cholera, some political leaders in some areas protected and facilitated food vendors to proceed with their activities. Some members of the community attacked the security guards while implementing the relevant by-laws.

The frequent and persistent occurrence of foot-and-mouth disease (FMD) in cattle was described as common disease Morogoro Municipality. Narrating on the most recent outbreaks in the district in 2015/2016, participants in a workshop to assess the performance of the disease surveillance system reported that FMD outbreak that had occurred in Kingolwira in September 2015 was reported after 30 days instead of the requirement of 24 hours. Yet, although the report was submitted to the Ministry of Agriculture, Livestock and Fisheries Epidemiology Unit, it was not made available at the regional level.

Usually, responses to the FMD outbreak include provision of advices to famers to vaccinate unaffected cattle, sheep and goats at risk. During the outbreak in question, quarantine measures were imposed although they were not officially documented. There were no biological samples collected for further investigation, and there was no feedback provided to famers. It was highlighted further that the quarantine has never been uplifted for over seven-month period before the workshop because of absence of data on the status and trend of FMD in the area.

Participants highlighted unreliable transport, inappropriate recording and reporting of cases and absence of laboratory at district level with capacity to confirm FMD as the most important challenges in outbreak management. Furthermore, information about FMD outbreak was reported very late and not shared with relevant actors. Also, it was reported that mass media were not involved to facilitate wide dissemination. Participants reported further that there were no guidelines for outbreak investigation and therefore were not able to conduct investigation appropriately.

Overall, investigations of animal disease outbreaks were reported to be poorly coordinated. Participants agreed that with the current initiative, strong collaboration needs to be established to be able to utilize nearby laboratories at Sokoine University of Agriculture for confirmation of future FMD cases.

Wearisome efforts in responding to anthrax outbreak: experience from Medical and Livestock Departments in Ngorongoro

It was in September 2015 when anthrax cases hit Ngorongoro district. Faced with the disease challenge, the Maasai pastoral community in Osinoni village reported the event to the Environmental health officer working with the Ngorongoro District Council more than 250 kilometres away in Loliondo, the district capital. The officer informed the Livestock Department staff who rushed to the affected village, just to find that community members had consumed meat from affected cattle and there was nothing to inspect. The team also found that the disease had claimed one human life and managed to trace back another victim who had been admitted at the nearby Enduleni hospital. Initial attempt to collect appropriate samples from the hospitalized person failed. It was further noted that a dog that contracted the disease after feeding on meat from infected cattle died, and similarly a donkey that carried meat from infected cattle developed skin lesions and was abandoned to die in a bush. As this investigation was going on, another anthrax outbreak was reported among humans in Piyaya village. The district outbreak investigation team arrived at the affected village

within 48 hours. Due to lack of experience, the laboratory technician could not collect appropriate sample and it was decided to refer the patient to the Wasso Designated District Hospital where the patient was attended. The Ngorongoro district officials identified constraining factors in outbreak investigation to include lack of surveillance and sample collection guidelines, distance and difficult terrain between district office and the affected villages (Osinoni and Piyaya). Moreover, the low community awareness on health risks associated with consumption of meat from anthrax-infected cattle was common among the pastoralists. Other challenges were failure of contact tracing and limited resources including lack of reliable transport.

Because of the use of paper-based system to record and submit health events data in resource poor countries, such data may take up to 6 months to reach national authorities for action to be directed. Hence most of the surveillance systems are merely used to analyse historical trends and not hence rarely used for early detection and prompt response.

It is also common practice in African cultures that the health care pathway does not start off at official health facilities but rather at home or traditional healers. There is often use of local remedies and obtaining drugs from local stores without consulting health care workers. Thus most health events within community are not captured in the official health system.

The quest for an early warning system calls for community members to be directly involved in the surveillance and detection of health events (i.e. participatory epidemiology). Innovative solutions are therefore needed to bridge the gap of capturing health events at community level that should inform the relevant authorities to provide appropriate responses timely.

At the recent EpiHack Tanzania 2014 event co-hosted by the SACIDS, Eastern African Integrated Disease Surveillance Network (EAIDSNet), Connecting Organizations for Regional Disease Surveillance Network (CORDS) and Innovative Support to Emergencies, Diseases and Disasters and funded by SGTF, animal and human health experts came together with technology enthusiasts and developers to discuss challenges in the animal and human disease surveillance and develop mobile technology programmes to solve the challenges.

The EpiHack Tanzania 2014 achievements included production of four prototypes that attempt to tackle key challenges for one health surveillance activities which are (a) Official data collection; (b) Contact tracing; (c) Community-based participatory disease surveillance and; (d) a two-way feedback communications.

The success from EpiHack Tanzania 2014 culminated in SGTF approval of a grant to support development of functional ICT tools from the prototypes and putting them to test in the field. In August 2015 SACIDS and CORDS co-hosted project inception workshop which brought together key stakeholders including community members to discuss and agree on project implementation in the next 12 months. During this event, a TechnoHealth Surveillance community of practice (CoP) was formed to enhance frequent interactions and engagement of members using different communication channels including.

ICT tools that will be developed are geared towards enabling and simplifying data collection, promoting community-based participatory surveillance and feedback. As a requirement the tools developed are to be compatible and applicable to work on every day devices that are accessible and affordable to the public. Thus the technology of choice is the mobile phone; both smart and feature phones, due to network ubiquity and accessibility to the masses.

SACIDS through DODRES project has initiated development of a One Health Knowledge Repository (OHKR). The repository is a database of expertly authored health content, which includes guidelines, fact sheets, standard case definitions, response protocols and recommendation and first aid advice from livestock and human health perspectives. Content will be made available in audio, video and text format. With such a huge information resource, intelligent applications may be developed, taking advantage of this database and thus creating automatic targeted responses to key public health stakeholders and community at large.

The OHKR is an attempt to address the theory of economies of "something for something", which explains behaviour that most individuals only prefer to engage in deeds that they benefit from. In this context, the theory refers to the apathy of communities to engage in reporting local disease events to government, represented by district officials, as neither feedback nor response is often provided. Thus the question 'Why should I report?' needs to be addressed.

OHKR addresses this challenge by collecting, organizing and storing health information on priority human and animal diseases in a manner that enables rapid, simple and efficient extraction of relevant knowledge that may be used as an immediate response to reported events.

For example, a pastoralist reporting un-explained sudden death in his/her cattle, submitted data will be synthesized and analysed. Based on this analysis different responses will be automatically generated and sent to relevant stakeholders in the surveillance chain, including regional, district and village level officials. Most importantly, is a response targeted to pastoralist, who submitted the data, detailing on how to utilize local available resources to contain and control effects of the event. This may come in form of a text message with directions of dialling a number to listen to an audio recording of appropriate resources or a link to download an audio/video recording (if equipped with a smartphone) or directions and/or number to a nearby local expert who may assist.

With Free and Openly Accessible Application Programmers Interface (APIs) built into OHKR coupled with Open Source nature of data collection, Artificial Intelligence and feedback/notification tools; the possibility of extending these resources into new innovative applications is endless.