



TechnoHealth Surveillance Newsletter



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Editorial address

TechnoHealth Surveillance
Newsletter,
Southern African Centre for
Infectious Disease Surveillance,
Sokoine University of
Agriculture,
P.O. Box 3297,
Chuo Kikuu, Morogoro, Tanzania
E-mail: onehealthnews@sacids.org

Editorial Committee

Dr. Calvin Sindato
Prof. Eson Karimuribo
Dr. Leonard Mboera
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From Editors' desk

Dear reader,

We thank you for the opportunities you gave us in 2017 to share with you, through *TechnoHealth Surveillance*, our research and training activities to enhance community-based participatory One Health disease surveillance using digital technology. Thank you for all your opinions and feedback which have contributed to our improved performance. We are looking forward to a New Year 2018 filled with more opportunities to enhance community One Health security in-line with the Global Health Security Agenda.

We are delighted to have expanded the scope of community engagement in participatory community-based disease surveillance, which is described in this issue. We have continued receiving data on health events occurring in the community through Community Health Reporters (CHRs). We present in this issue the most probable diseases in human and livestock populations which have been identified using One Health Knowledge Repository based on the information submitted by CHRs from January to December 2017.

The following articles are covered in this issue:

1. Training Manual on Disease Surveillance for Community Health Workers
2. Policy briefs to addressing disease surveillance in Tanzania
3. *AfyaData* as a recommended tool to support the implementation of disease surveillance strategy
4. International upcoming events that SACIDS plans to showcase its research and training activities

We keep to looking forward to your feedback and comments on this and other issues of *TechnoHealth Surveillance*. 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 a Happy New Year as you enjoy reading this issue!

Enjoy your reading!

Training Manual on Disease Surveillance for Community Health Worker

The impact posed by emerging pandemic threats calls for strengthening capacity for disease surveillance and response systems. A well-functioning disease surveillance system requires timely availability of relevant data to make informed decision. The Southern African Centre for Infectious Disease Surveillance (SACIDS), through financial support from the Skoll Global Threats Fund (*Ending Pandemics*), developed open-source digital disease surveillance tool packaged and branded as *AfyaData* to enhance early detection, timely submission and prompt response to health events in human and animal populations.

In order to facilitate participatory community-based One Health disease surveillance, SACIDS developed a training manual for Community Health Reporters (CHRs) and other stakeholders in the human and animal health sectors. The manual describes the salient clinical manifestations and standard case definitions of priority human and animal infectious diseases including the trade-sensitive diseases and those transmissible between animals and humans. In addition, the training manual describes characteristic and roles of CHRs, strategies for their integration in the community, ethical consideration during the provision of health care services, and collection and submission of health data to relevant authorities.

The manual has descriptive images to facilitate recognition of clinical signs in human and animal populations.

Furthermore, prevention and control measures for each priority human and animal diseases have been included in the training manual. The training manual describes the application of Information, Technology and Communication (ICT), including use of *AfyaData* in disease surveillance to enhance early detection, timely reporting and prompt response to disease outbreaks. Another tool that has been described in the manual is the *WhatsApp* messaging application to facilitate active exchange of information, questions and responses between CHRs, health and ICT specialists in real-time to address human and animal health challenges facing the communities.

To date, a total of 423 stakeholders in Tanzania have been trained on the use of *AfyaData* in participatory community-based One Health disease surveillance. The trained stakeholders included CHRs (132), Livestock Field Officers (123) and Clinicians from primary health care facilities (112). Others included Data managers (14), Ward Health Officers (12), Laboratory Technicians (11), District Medical Officers (8), District Veterinary Officers (7), Integrated Disease Surveillance and Response Focal Persons (4) and post-graduate students (2).

Almost all trained individuals were provided with android phones installed with *AfyaData*. The CHRs were trained on how to refer patients to health care facilities and were provided with referral forms. Those from locations without electricity were provided with solar

chargers to facilitate charging the mobile phones as an alternative power source.

The population in Tanzania which is under active surveillance using AfyaData includes humans (1,971,611), goats (429, 297), chicken (403,888), cattle (388, 440)

and pigs (11,087). Our plan in 2018 is to promote the utilization of AfyaData in disease surveillance in Tanzania and neighboring countries to enhance participatory One Health community-based and cross-border disease surveillance.

AfyaData is an open source digital disease surveillance tool developed by SACIDS. It is a set of two applications - a mobile android based client and a web-based application acting as a server. The mobile client is used for collecting and submitting surveillance data, and receiving and/or tracking feedback from various levels. The server component caters for data storing/hosting and management. AfyaData toolset has the capability to manage entire data collection lifecycle, from managing users, loading forms, collecting data in the field, sending collected data to server, and viewing data on the server and providing feedback to data collectors and/or persons of interest. The system is designed to collect georeferenced data online or offline in locations without internet and data can be submitted at location with internet. In addition, the system supports prompt analysis and visualization of data. The system can integrate data from multiple sources and is enhanced with an early warning short message service (sms) for notification to decision makers on health events through their mobile phones. AfyaData supports multiple languages and is powered by One Health Knowledge Repository (OHKR), which is a decision-making system with expert-authored content that helps to support the prediction of likely disease conditions based on the reported signs and symptoms. The collected data are accessed near to real-time by all relevant authorities through specific access code.

The priority human disease conditions included in the manual are Dengue, Ebola Virus Disease, Marburg Virus Disease, Crimerian-Congo Haemorrhagic fever, Rift Valley fever, Cerebrospinal meningitis, Anthrax, Rabies, Avian Influenza, Plague, Measles, Typhoid fever, Cholera, Malaria and Yellow fever.

The priority animal diseases include 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.

Participatory disease surveillance from the community perspectives

Complementing the national disease surveillance strategies with participatory engagement of local communities has potential contribution to timely capture, reporting and prompt response of disease events occurring at the community level. In 2017, the Southern African Centre for Infectious Disease Surveillance (SACIDS) continued to document noteworthy performance of its initiatives in engaging community in disease surveillance.

Through *Enhancing Community-based Disease Outbreak Detection and Response in East and Southern Africa (DODRES)*, SACIDS has been implementing participatory One Health community-based disease surveillance to enhance early detection, timely submission and prompt response to health events in human and animal populations using *AfyaData*. *AfyaData* has been deployed in different areas in Tanzania including Ngorongoro, Morogoro-Urban, Kilosa, Malinyi, Ulanga, Mvomero, Kinondoni and Temeke districts.

In this issue, we report clinical manifestations that have been reported by trained Community Health Reporters (CHRs) from Ngorongoro and Morogoro Urban districts from January to December 2017, and potential likely disease conditions as identified by One Health Knowledge Repository (OHKR).

Overall, in 2017, a total of 4,115 livestock cases were reported by CHRs from a total population of 6,407 animals in 14 of 18 the study villages in Ngorongoro and Morogoro Urban districts. Of the 4,115 cases, 244 animals died translating to a livestock population morbidity rate and case fatality rate (CFR) of 64% and 6%, respectively. Largest number of cases in Morogoro Urban district were reported in November (2,051) and September (1,614) whereas in Ngorongoro were reported in January (128), July (69) and May (66) (Figure 1). Overall, the highest CFRs were recorded in May (70%), February (67%) and March (60%).

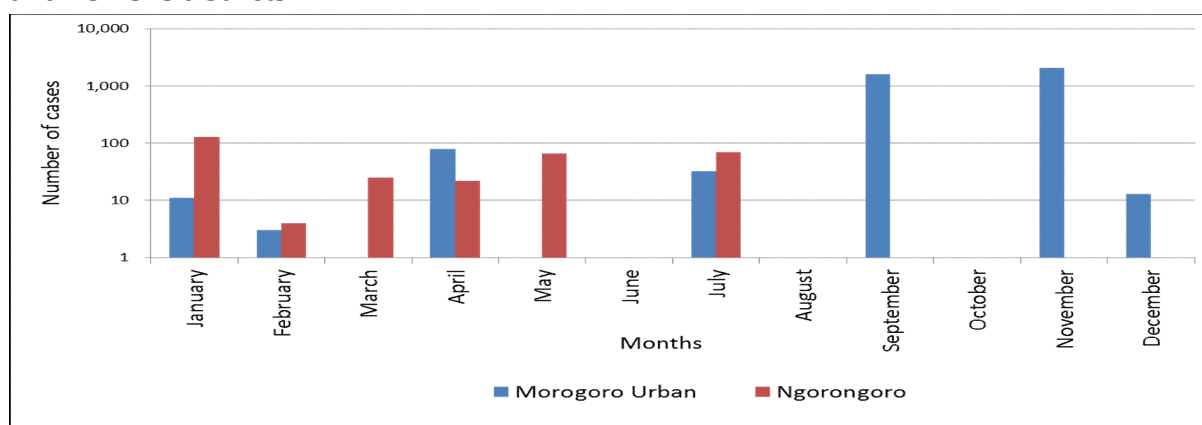


Figure 1: Number livestock cases reported in Ngorongoro and Morogoro Urban districts from January to December 2017

During the period, majority (90%, (N=4,115) of the cases were reported in chicken. Domestic ruminants accounted for 7% of all cases, which were of goats (183), cattle (51) and sheep (45). Other cases were reported in pigs (85), rabbits (4) and dog (1). Overall, the highest morbidity rates were recorded in chicken (99%) and pigs (68%) while the highest CFR were recorded in sheep (51%), rabbits (50%) and goats (48%).

Out of 3,719 cases of chicken, 3,682 (99%) were reported in Morogoro and 37 (1%) were reported in Ngorongoro. Almost all (99%) the cases of chicken were aged < 6 months old. The morbidity rates were 99% and 57% in chicken aged < 6 and ≥ 6 months old, respectively. The CFRs were 51% and 3% in chicken aged ≥ 6 and < 6 months old, respectively.

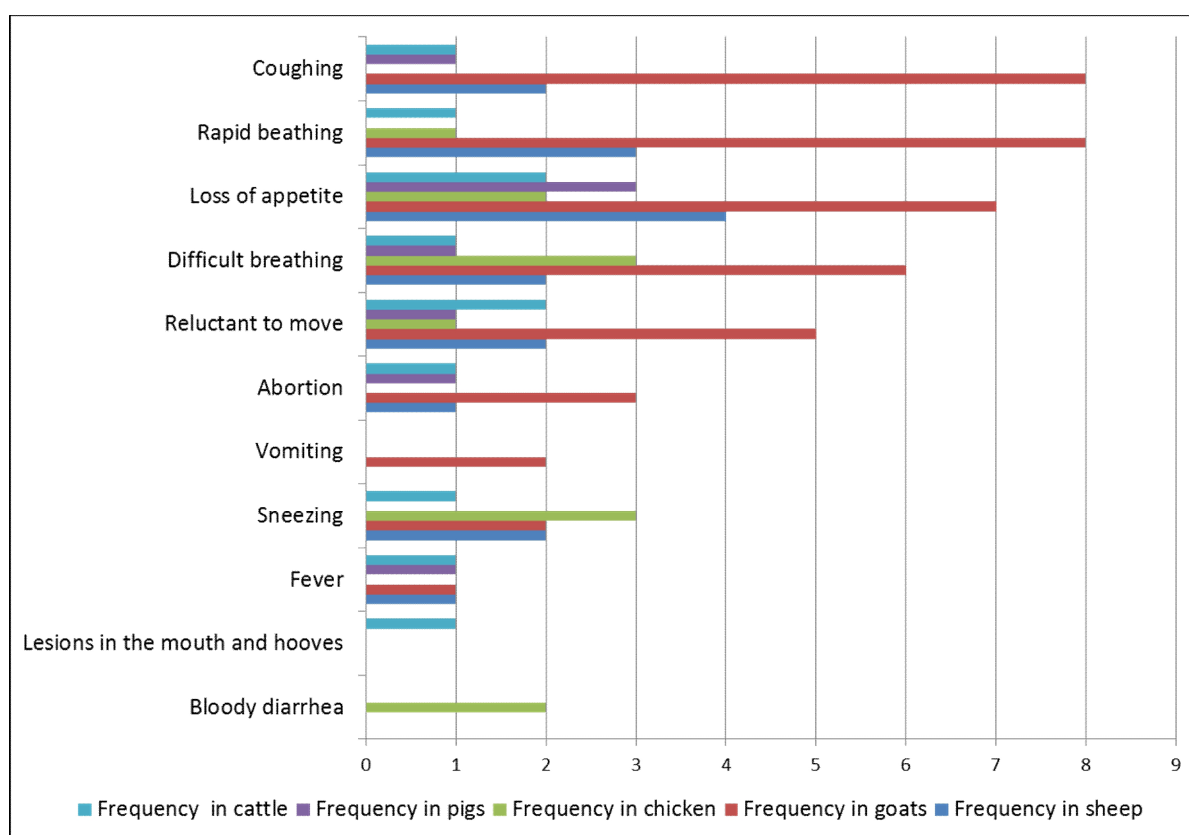


Figure 2: Clinical manifestations reported in livestock in Ngorongoro and Morogoro Urban districts

Over three-quarter (83%, n=279) of domestic ruminant cases was reported in Ngorongoro of which 176 (76%, n=231) were cases of goats. Over half (59%, n=279) of domestic ruminant cases were reported in animals aged ≥ 1 year, and 85% (n=85) of the cases of pigs were aged < 1 year old. The overall morbidity rate in domestic ruminants was 12%, and it was higher in animals aged < 1 year old (39%) than those aged ≥ 1 year old (8%).

The overall CFR in domestic ruminants was 45% with CFR for the animals aged < 1 and ≥ 1 year old being 47% and 43%, respectively. The overall morbidity rate and CFR in pigs were 68% and 2%, respectively with age-specific morbidity rate and CFR being 87% and 1% for the animals aged < 1 year old, and 31% and 8% for the animals aged ≥ 1 year old.

The clinical manifestations reported frequently in goats and sheep included diarrhea, coughing, rapid breathing, loss of appetite and difficulty breathing. Those in cattle included reluctant to move, loss of appetite, lesions in the mouth and hooves, diarrhea, body weakness, difficulty breathing, sneezing and fever. The clinical manifestations in pigs included loss of appetite, diarrhea, body weakness and fever; and in chicken included sneezing, difficulty breathing and loss of appetite (Figure 2).

Based on the clinical manifestations reported, the most probable infectious conditions identified by OHKR and

likelihood percentage (p) in goats and sheep were Peste des Petits Ruminants (80%) and Contagious Caprine Pleural Pneumonia (80%). The most probable diseases in cattle included Malignant Catarrhal Fever (60%), Contagious Bovine Pleural Pneumonia (80%), brucellosis (70%), Trypanosomiasis (60%), Foot and Mouth Disease (70%), Lumpy Skin Disease (50%), anthrax (50%) and Rift Valley fever (20%). The most probable infectious disease in chicken was New Castle Disease (50%). The most probable disease in pigs was African Swine Fever (25%).

From January to December 2017, a total of 49 cases (males=27; females=22) were reported among humans from Ngorongoro (30) and Morogoro Urban (19), with over two-third (34/49) of the cases been reported among individuals aged ≥ 5 years old. Larger number of cases were reported during January (9) and August (9) and only two cases were reported in April (1) and May (1). No cases were reported in November and December (Figure 3).

Clinical manifestations reported in humans included body weakness, loss of appetite, headache, difficulty breathing, diarrhea, dysentery, coughing, body weakness and fever (Figure 4).

The most probable infectious diseases in humans were typhoid fever (40%), malaria (40%) and cholera (20%).

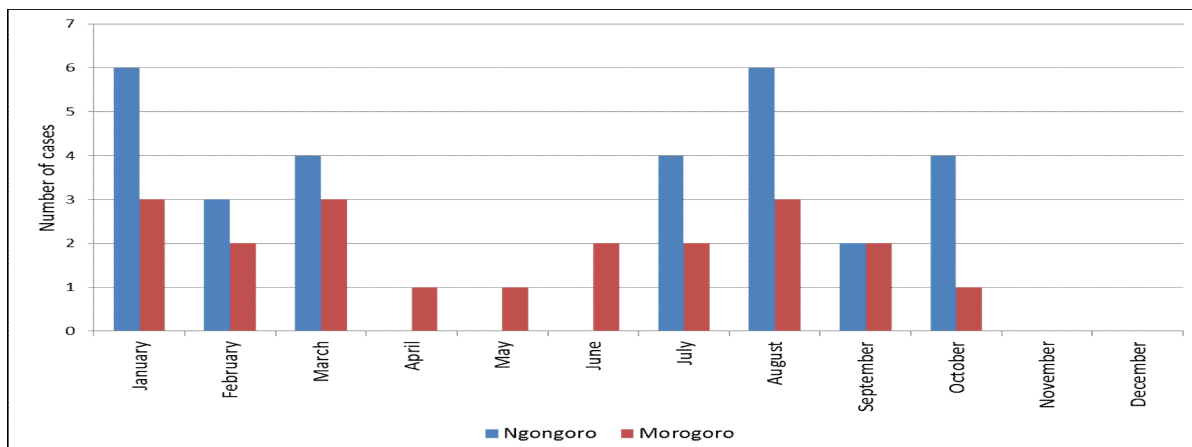


Figure 3. Number of human cases reported in Ngorongoro and Morogoro Urban districts from January to December 2017

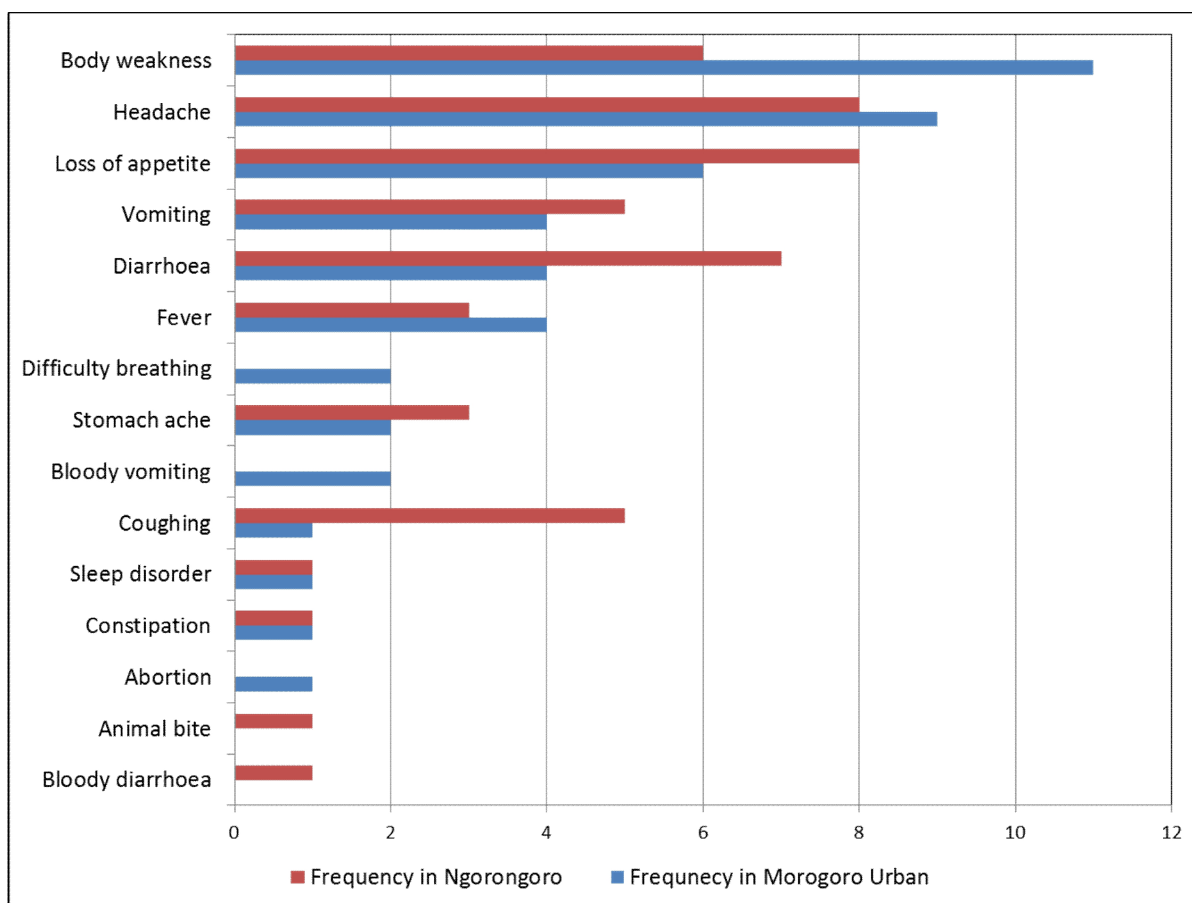


Figure 4: Clinical manifestations reported in humans in Ngorongoro and Morogoro Urban districts

National Institute for Medical Research publishes policy briefs to enhance National Disease Surveillance Systems

The National Institute for Medical Research (NIMR) in collaboration with the Southern African Centre for Infectious Disease Surveillance-Sokoine University of Agriculture, Kilimanjaro Christian Medical University College (KCMUCo) through the National Health Policy and Systems Research Hub (NAHEPOS) marked the end of the year 2017 with publication of a set of policy briefs to advocate for improvement of disease surveillance systems in Tanzania.

Publication of the policy briefs stems back to a Policy Dialogue on “*Disease Surveillance and Outbreak Management Priority Policy Agenda for 2017 and beyond*”, which was held on December 16, 2016 in Dar es Salaam, Tanzania (*TechnoHealth Surveillance Newsletter* 2(1), 2017). Briefly, the policy dialogue provided opportunity to potential stakeholders including policy makers and researchers to discuss and deliberate on the key disease surveillance issues. The focus of the dialogue was on issues related to use of Mobile Technology and Participatory Approaches in disease surveillance, Community-based Disease Surveillance and Integrated multi-sectoral disease surveillance platform.

Participants of the policy dialogue were of the opinion that the current approach in implementing disease surveillance strategy is inadequate to optimally

detect and respond to disease outbreaks timely. It was highlighted that the current procedures of data collection at facility and community levels and reporting to higher levels is of minimum use.

Participants concurred with the recommendations that Tanzania should adopt the use of mobile phones coupled with intelligent mobile and web apps to improve the electronic Integrated Disease Surveillance and Response strategy (e-IDSR).

It was strongly recommended that utilization of mobile technologies and engagement of the community in disease surveillance have potential role in timely capture of suspected cases and risky events contributing to the occurrence and spread of diseases in the community. Participants emphasized further that it is now crucial that collected data through the routine health management information system is analyzed to determine the pattern of various priority diseases for decision making. For community surveillance to be reliable, the introduction of national unique identifier was agreed to be very important.

The policy briefs prepared, which were subsequently published during the last quarter of 2017 included (i) Community-

based One Health participatory disease surveillance using digital and mobile technologies, (ii) Increase efficiency and reduce cost of disease surveillance by using smart phones coupled with intelligent mobile app for data collection, (iii) Use of ICT and mobile technologies to support specific disease surveillance: using cholera as an exemplar disease, (iv) How can the prevention and Control of non-Communicable diseases be integrated with Communicable disease control strategies, (v) A 3Ms national

surveillance platform to detect and respond effectively to public health events in Tanzania, (vi) Towards the development of infectious disease early warning system in Tanzania, (vii) The risk factor surveillance for prevention and control of cholera outbreaks in Tanzania, and (viii) Introduction of congenital viral infections screening services for pregnant women in Tanzania. The policy briefs may be accessed from www.sacids.org and www.nimr.or.tz



Participants of the policy dialogue. Source: *TechnoHealth Surveillance Newsletter* 2(1), 2017

AfyaData recommended as a tool to collect and report disease surveillance data

A joint presentation entitled “Towards the application of digital technologies to enhance early detection, timely reporting and prompt response and long term strategic management of animal diseases in Tanzania” was presented by

DODRES (Prof. Esron Karimuribo) and Food and Agriculture Organization (FAO) Tanzania (Dr. Niwael Mtui-Malamsha) at the 35th Tanzania Veterinary Association (TVA) Annual Scientific Conference on December 5-7, 2017. The TVA Scientific

Conference was held at the Arusha International Conference Centre in Tanzania and attended by more than 200 participants. The TVA conference is an annual event that attracts private and state veterinarians from within and outside Tanzania as well as researchers, scientists and policy makers from all over the world. The 35th TVA conference was graced by the Tanzanian Deputy Minister for Livestock and Fisheries, Hon. Abdallah H. Ulega (MP) who not only served as Guest of Honor but also chaired the “TVA 35th Recommendations” session. He was accompanied by the Permanent Secretary of the Ministry of Livestock and Fisheries, Dr. Mary Mashingo.

One of the recommendations made by the conference was the need to address timely availability of animal disease

surveillance information using the *AfyaData*. The recommendation was made after conference participants appreciated the ability and features of the *AfyaData* to capture, record and report disease events in animal populations. The tool has additional functionality of providing immediate feedback and promoting interactions between data collectors and officials responsible for disease monitoring and response at district, zonal and national levels. It was unanimously agreed that the tool can support monitoring, detection and management of health risks associated with epidemic-prone and emerging infectious diseases. As we go to the press, the DODRES team is planning to meet senior officials of the Ministry of Livestock and Fisheries to showcase the application of the *AfyaData* in Dodoma.



Upcoming events: CORDS Conference in Bangkok

The Connecting Organizations for Regional Disease Surveillance (CORDS) has organized a conference to be held in Bangkok, Thailand on the January 29-30, 2018. CORDS is an international non-governmental organization comprised of six international networks, working together to reduce and prevent the spread of infectious diseases by exchanging information between surveillance systems globally.

The CORDS conference will be attended by members and representatives from six networks namely: the Asia Partnership on Emerging Infectious

Diseases Research (APEIR), the East African Integrated Disease Surveillance Network (EAIDSNet), the Mekong Basin Disease Surveillance (MBDS), the Middle East Consortium on Infectious Disease Surveillance (MECIDS), the Southern African Centre for Infectious Disease Surveillance (SACIDS) and the South East European Center for Surveillance and Control of Infectious Diseases (SECIDS).

The conference will be co-organized and supported by Ending Pandemics (formerly the Skoll Global Threats Fund) and the Rockefeller Foundation. The CORDS Conference will be a side event

of the Prince Mahidol Award Conference (PMAC). It will be under the PMAC sub-theme: ‘Harnessing the Power of Public-Private-Community Partnerships for Preventing, Detecting, and Responding to Zoonotic Diseases and Antimicrobial Resistance.

The panel discussions will include topics on ‘Innovating in surveillance using a digital approach’, ‘Making One Health surveillance work’ and ‘Addressing antimicrobial resistance using the One Health Approach’.

SACIDS plans to take active participation in this event showcasing its research and training activities including innovative approaches in community-based participatory One Health Disease Surveillance. More information on the CORDS and PMAC conferences available at:

<https://www.cordsnetwork.org/conference-bangkok-2018/> and

<http://www.pmaconference.mahidol.ac.th/>, respectively.

Key Partners:

