Digital health information and data collection at the community level in cross-border areas

Final Report

July 2019
Abstract

Background: With its six member Networks, Connecting Organisations for Regional Disease Surveillance (CORDS – www.cordsnetwork.org) aims to contain outbreaks at the source and keep communities safe from the spread of infectious diseases in animals and humans. One of its strategies is to promote innovations that strengthen event based surveillance (EBS) at community level. Supported by a grant from The Rockefeller Foundation, and a collaboration with Ending Pandemics, the CORDS member Networks assessed EBS systems and practices, with a focus on cross-border sites in selected countries in Sub-Saharan Africa, Southeast Asia, the Middle East and Southeast Europe. The purposes of which were to share current information on current collection methods of human and animal health events in relation to EBS, identify areas of improvement and share best practices.

Methods: This was a descriptive mixed methods project that used a standardised assessment tool (the INP Surveillance Evaluation Tool) in web and paper-based formats. The tool was developed with the input of the six CORDS Networks and included both quantitative and qualitative questions. The primary focus was to apply the tool within selected countries (2-3) and sites (cross-border/cross-island) at national, district and community levels within countries in each Network. Supplementary data collection methods of structured interviews with key stakeholders, a desk review of documents and observations of surveillance systems were also used to obtain information required for the assessment. The types of systems assessed within this project included digital and other alert systems, and both pilot and national systems. The assessment captured information on the quality of data and systems, with a focus on the quality of current practices and capturing best practices in the Networks. This project focused on the assessment of event based surveillance systems and the use of digital tools to generate data. The purpose of the assessment was to identify gaps and act as a roadmap for improvement of these systems. Access to such data was seen to contribute towards shortening the time to detect and time to respond to an outbreak and provide important information on current systems and practices of data collection in relation to event based surveillance. The work of this project intended to add direct value by strengthening countries within CORDS networks’ ability to meet the wider global health security agenda and ability to meet IHR.

Results: The project involved 14 of the 28 CORDS Member Network countries and 41 cross-border areas in those countries. The results demonstrate the event based surveillance systems exist at national and cross border levels, and to some extent there are processes and guidelines present. Official reports of public health events exist in all countries at national and cross-border level, but there is a need to strengthen rumour logs or databases to record suspected public health events from information sources. The media and the community play an important role in public health reporting. The ability of the surveillance system to record and report public health events requires strengthening. The main types of data collection systems at national and cross border levels were paper-based data collection tools. In 10 of the 14 countries, digital systems were also identified and in half of the 41 cross-border areas. In the majority of cross-border areas, there was evidence of intersectoral collaboration within the disease surveillance system, and a relevant pattern of sharing disease surveillance information between different sectors.

Conclusion: To our knowledge, the INP is the first multi-country assessment of event-based surveillance systems and process with an emphasis on cross-border areas. While event based surveillance was identified to take place at both national and cross-border levels in the assessed countries, there is a need to strengthen systems, guidelines and processes in key domains including outbreak detection and defined action thresholds, data collection systems.
and rumour logs and the development of guidelines and procedures to operationalise areas such as data sharing in relation to disease surveillance information and legal policy authorities. The community and the media were identified as an important source of community reporting for public health events that should be further explored.
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<tr>
<td>ALERT</td>
<td>Albania Electronic Reporting Tool</td>
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<td>APEIR</td>
<td>Asia Partnership on Emerging Infectious Diseases Research</td>
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<td>CORDS</td>
<td>Connecting Organisations for Regional Disease Surveillance</td>
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<td>DHIS2</td>
<td>District Health Information Software2</td>
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<td>DHO</td>
<td>District Health Office</td>
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<tr>
<td>DODRES</td>
<td>Disease Outbreak Detection and Response in East and Southern Africa</td>
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<td>EAIDSNet</td>
<td>East African Integrated Disease Surveillance Network</td>
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<td>EBS</td>
<td>Event Based Surveillance</td>
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<td>ECDS</td>
<td>Communicable Disease Surveillance System</td>
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<td>eIDSR</td>
<td>Electronic Integrated Disease Surveillance</td>
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<td>EMA-i</td>
<td>Event Mobile Application</td>
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<td>EWAR</td>
<td>Early Warning and Response</td>
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<td>ICDC</td>
<td>Israeli Centers for Disease Control</td>
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<td>IERS</td>
<td>Interactive Electronic Reporting System</td>
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<td>IIS</td>
<td>Immunisation Information System</td>
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<td>JEE</td>
<td>Joint External Evaluation</td>
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<td>JIDIS</td>
<td>Jordan Infectious Disease Information System</td>
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<td>OIE</td>
<td>World Organisation for Animal Health</td>
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<td>PHEIC</td>
<td>Public Health Emergency of International Concern</td>
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<td>PODD</td>
<td>Participatory One Health Disease Detection project</td>
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<tr>
<td>SACIDS</td>
<td>The Southern African Centre for Infectious Disease Surveillance</td>
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<tr>
<td>SARS</td>
<td>Severe Acute Respiratory Syndrome</td>
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<tr>
<td>SC</td>
<td>Steering Committee (INP)</td>
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<td>SECID</td>
<td>Southeast European Center for Surveillance and Control of Infectious Diseases</td>
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<td>SOPs</td>
<td>Standard Operating Procedures</td>
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<td>TWG</td>
<td>Technical Working Group</td>
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<td>IBS</td>
<td>Indicator Based Surveillance</td>
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<td>IDIS</td>
<td>Infectious Disease Information System</td>
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<td>IHR</td>
<td>International Health Regulations</td>
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<td>INP</td>
<td>InterNetwork Project</td>
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<td>Acronym</td>
<td>Description</td>
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<tr>
<td>MBDS</td>
<td>Mekong Basin Disease Surveillance</td>
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<td>MECIDS</td>
<td>Middle East Consortium on Infectious Disease Surveillance</td>
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<td>MoH</td>
<td>Ministry of Health</td>
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<td>MoL</td>
<td>Ministry of Livestock</td>
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<td>ODK</td>
<td>Open Data Kit</td>
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<td>PHE</td>
<td>Public Health Event</td>
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<td>PHEOC</td>
<td>Public Health Emergency Operations Centre</td>
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<td>SKDR</td>
<td>Sistem Kewaspadaan Dini dan Respon</td>
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<td>VEOC</td>
<td>Virtual Emergency Operations Centre</td>
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<td>USSD</td>
<td>Unstructured Supplementary Service Data</td>
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<td>WHO</td>
<td>World Health Organization</td>
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### Key definitions

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<td><strong>Action thresholds</strong></td>
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<td><strong>Acute public health event</strong></td>
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<td><strong>Alert</strong></td>
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<td><strong>Cross-border region</strong></td>
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<td><strong>Early warning system</strong></td>
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<td><strong>Epidemic</strong></td>
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<td><strong>Event</strong></td>
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<td><strong>Event based surveillance</strong></td>
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<td><strong>Indicator</strong></td>
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<td><strong>National IHR Focal Point</strong></td>
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<td><strong>Notification</strong></td>
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<td><strong>Priority diseases</strong></td>
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<td><strong>Public health emergency of international concern (PHEIC)</strong></td>
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<td><strong>Reporting</strong></td>
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<td><strong>Response</strong></td>
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<td><strong>Signal</strong></td>
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<td><strong>Surveillance</strong></td>
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<td><strong>Verification</strong></td>
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Source: WHO 2014, WHO 2019
1 Overview

Rationale and public health justification

Cross-border disease transmission has been identified as a key challenge for the prevention and control of disease outbreaks, particularly infectious diseases. These areas remain particularly vulnerable and at risk due to a variety of factors including variations in surveillance structures and national guidelines [1][2]. Recent multinational disease outbreaks including the 2014-2016 Ebola virus disease epidemic in Liberia, Guinea and Sierra Leone, which was the largest recorded Ebola outbreak, resulting in over 28,000 reported cases and over 11,000 deaths highlights the vulnerability of cross-border areas [3]. Within weeks of the first Ebola case in a remote area of Guinea, the epidemic had spread across land borders to Liberia and Sierra Leone, with a further limited number of cases spreading to Senegal and Mali, and through air travel to Nigeria, Spain and the United States [4]. Other epidemic prone disease have also caused international concern including Severe Acute Respiratory Syndrome (SARS) and Avian Influenza. Other emerging diseases, for example Marburg haemorrhagic fever and Nipah virus also pose major threats to public health and global public health security [5].

Globally, approximately 60% of all human diseases are thought to be of zoonotic origin, and up to 75% of all newly emerging diseases [6]. The revised International Health Regulations (IHR) of 2007 represent an international framework for strengthening and maintaining the capacities of early detection and response. It is a legally binding agreement among 196 States Parties, including the Member States of the World Health Organization. It defines the obligations of Member States and the WHO, to identify, report and when possible, contain all public health events that may constitute a “public health emergency of international concern”. The revised IHR recognises that public health incidents can pose threats beyond national borders and that Member States bear a responsibility to the global community to identify, report and when possible, contain public health threats before they become “public health emergencies of international concern”. The IHR and related policy guidance suggest that countries build capacities for early warning and response functions through the integration of systems for indicator and event based surveillance [7].

Against this background, a necessary first step was to assess the events reporting mechanisms and structures that exist not only within cross-border areas, but nationally and within countries and identifying strategies to strengthening disease surveillance capacities at all levels. The digital era offers great opportunity to use and apply digital tools, for example, smartphones to strengthen disease surveillance activities. There is increasing evidence that use of mobile devices to support medical and public health practice (mHealth) can improve health outcomes in low-income settings [1-4], due to the low cost of roll-out, mobility of devices, ease of use and flexible deployment compared with other methods e.g. computers. The portability of mobile phones in terms of their “always on” status and ability to instantaneously transmit data anywhere where there is a functioning mobile phone or wifi network enables greater reach than computers and wired internet. mHealth applications have the potential to reach rural populations with low levels of income and literacy [5], and to reduce time to collect data, distance travelled to collect and return information and the cost of information delivery [1, 2, 6, 7].
CORS experience

The Connecting Organisation for Regional Disease Surveillance (CORDS) is a non-government organisation comprised of six international networks working in 28 countries. CORDS works to reduce and prevent the spread of infectious diseases by sharing information between surveillance systems globally. Its vision is a world united against disease. Early detection is vitally important in preventing the spread of infectious disease. Collective expertise of the six member Networks and their close relationship with local communities facilitate timely detection and response to outbreaks.

Committed to a One-Health approach, CORDS recognises that the health of humans is closely connected to the health of animals and the environment and aims to fill gaps in global surveillance communities. It moves useful information amongst disease surveillance experts in different continents through following four strategic objectives of:

1. Improving capacity
2. Advancing One Health
3. Building Sustainable Networks
4. Promoting Innovation

Over the past five years, CORDS has connected surveillance experts from three continents, six regional networks and 28 countries to reduce and prevent the spread of infectious diseases by facilitating the sharing of useful information among them. Listening closely to network member interests, needs, and knowledge, making relevant connections across the regions, and designing opportunities for members to connect and co-create around areas of shared interest and expertise has been critical for building trust and maintaining relationships across networks.

The CORDS InterNetwork Project

The CORDS InterNetwork Project (INP) was a cross network project that included all of the six member networks. Conceptualised in November 2017 during a Board Meeting in Bali, and funded by The Rockefeller Foundation, the project built of the strengths of the Networks and previous projects undertaken but was the first Network wide project. The ultimate goal of the project was to enable the real-time detection of, and response to, One Health priorities, in order to strengthen health and security among local communities in cross-border areas. The first phase of this project involved an assessment of the practices and systems of event based surveillance with a particular focus on digital tools used for this surveillance.

Based on the experience of the CORDS Networks – the SACIDS/EAIDSNET DODRES and AfyaData digital projects in East Africa; the MBDS cross-border event based surveillance project in the Mekong Basin, PODD in Thailand, SECID’s platforms (ALERT, IIS, IDIS) in South Eastern Europe – CORDS Network chairs agreed during the November Board meeting, to develop a new pilot project on digital event information and data collection at the community-level to enable real-time detection of, and response to, One Health priorities, in order to strengthen health and security among local communities in cross-border areas.

It was anticipated that community mobile participatory surveillance and access to digital actionable data would improve epidemiologic intelligence, preparedness and response capacities at community and regional levels and shorten the time to detect and time to respond
to an outbreak. This project will add direct value by strengthening countries within CORDS networks’ ability to meet IHR and contribute to filling JEE’s identified gaps. The health data collected will feed national platforms and WHO/OIE surveillance systems.

This project focused on the assessment of systems and process that focus on the organised and rapid capture of information about events that are a potential risk to public health using mainly unstructured sources of information through event based surveillance [8], with a focus on a One Health approach. The focus on event based surveillance as opposed to indicator based surveillance was that indicator based surveillance focuses on the routine reporting of cases of diseases based on notifiable disease surveillance systems, sentinel surveillance and laboratory based surveillance, which are commonly health care facility based and rely on weekly and monthly reporting. It is well established the early detection and timely reporting of outbreaks and important public health events is critical, however indicator based surveillance systems often fail in this regard, and are not suited to rare, but high impact outbreaks, emerging disease and unknown diseases. Given that event based surveillance systems rely on immediate reporting and use of non-routine sources of reporting and these forms of reporting are particularly important at community level, the focus of this project was on this form of surveillance system.

Event Based Surveillance

Event based surveillance (EBS) is a key component of early warning and response systems and is one of the two main types of surveillance used to identify and track infectious diseases and other public health events [REF]. While indicator based surveillance (IBS) involves reports of specific diseases from healthcare providers and is typically a more structured and traditional process, EBS relies on unstructured reports, stories, rumours and other information on events that could pose a serious risk to public health.
Figure 1: Overview of public health surveillance and response functions

Source: WHO 2008
### Table 1: Comparison of key attributes and components of event based versus indicator based surveillance

<table>
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<th>Event based</th>
<th>Indicator based</th>
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| **Definitions**         | Broad definitions, such as ‘a cluster of deaths in the same village during the same period’ can be used to help guide reporting. Event based definitions are more sensitive than those used in indicator based surveillance. | Diseases and syndromes have a corresponding case definition, more specific than the definitions used in event-based surveillance. These definitions may include one/ all of the following:  
  • Clinical presentation  
  • Characteristics of people affected  
  • Laboratory criteria |
| **Timeliness**          | All events should be reported to the system immediately.                     | Data is continuously reported at given time intervals: normally each week or each month. Delays are often present between case identification and when the aggregated data is reported to the system by a health facility (even in the case of electronic reporting). Specific diseases and symptoms may be immediately notifiable |
| **Data/Information**    | Format of the data is not pre-defined and as much information is collected for each event as possible. In an attempt to obtain key information (i.e., time place and person) designated staff assist with event confirmation and assessment. | For each disease/ syndrome data in a pre-defined format is aggregated. Data format is predefined and may include a breakdown of demographic variables and other variables (i.e. number of cases of 0-4 and > 5 years of age). |
| **Reporting structure** | Reporting structure is loose and reports are unstructured. These reports, used to capture the event information, can enter the system at any time. The format of these forms is sufficiently flexible to collect both qualitative and quantitative data.  
  A unit/team is designated to triage, confirm and assess each reported event and trigger responses as it is deemed appropriate to do so. | Reporting structure is clearly defined. Reporting forms are used by reporting units to pass information through the system, often at predefined times (such as a specific day of the week/ week of the month). Zero reporting is often used. A unit/ team is designated to analyse the surveillance data at regular intervals. |
| **Reporting units**     | Reporting units are open, meaning the general public can report to the system. Sometimes these units are undefined. | Facility-based, closed. |
| **Trigger for initial action** | A report that is confirmed and assessed as a potential risk to public health. | Pre-defined thresholds. |
| **Analysis**            | Rapid risk assessment.                                                      | Pre-defined intervals (weekly, monthly). |
| **Response**            | Immediate, with the response to the event being built into the surveillance system. | May be delayed as a result of the time taken to collect and analyse data.  
  The response to an outbreak is built into the surveillance system (as with event based surveillance). |

Source: WHO 2008
2 Project Objectives

General objective

The overall objective of this project was to enable the real-time detection of, and respond to, One Health priorities, in order to strengthen health and security among local communities in cross-border areas.

Specific objectives

There were three specific objectives that focus broadly on the following areas:

1. To assess, in each Network, current event based surveillance systems and practices in human and animal health events from cross-border communities (includes pilot mobile projects).
2. To exchange best practices across and within regions and identify how to further empower communities and enhance cross-border health security.
3. To develop a new follow-up project where best practices would be scaled up and replicated across Networks in different regions of the world.

Project phases

The project included four phases as featured below.

Phase 1: Establishment of structures and process to oversee the project’s delivery

This phase of the project was concerned with the establishment of structures and processes to oversee the delivery of the project through the development of a functional steering committee and technical working group.

Phase 2: Assessment of event based surveillance systems and practices in each Network

The focus of this phase was on the assessment within each Network of current event based surveillance systems and practices in human and animal health events from cross-border communities, including in pilot mobile projects. The assessment performed in each network was based upon an agreed methodology and tools.

Phase 3: Exchange of best practices across and within regions

The third phase of the project was the exchange of best practices across and within regions to identify how to further empower communities and enhance cross-border health security by improving digital community detection and response in different cross-border Network areas. This involved the identification of best practices and how to transfer them in other countries and regions. The two exchange visits and their outcomes (written report) and Internetwork meetings and their outcomes (meeting minutes) were documented.
Phase 4: Development of a new follow-up project

The last phase of this project focused on the development of a follow-up project where best practices would be scaled-up and replicated across the different Networks in other regions of the world. The purpose of the follow-up project would be to scale-up digital event information and data collection at the community level.

Structure of this report

This report summarises the methodology and results of the project with a particular focus on Phases 2 to 4 of the project, the assessment of event based surveillance systems and practices in each Network and the implementation and results from each Network, the exchange visits and a summary of the follow-up project from each Network.
Establishment of structure and processes to oversee project delivery (Phase 1)

Project Coordination and governance structure

To oversee the delivery of the INP, a functional Steering Committee (SC) and Technical Working Group (TWG) were established at the beginning of May 2018. The role of the SC, chaired by Dr Silvia Bino, was to provide strategic oversight to the project, and ensuring that the project was aligned with CORDS and the individual Networks objectives. The TWG, chaired by Dr Calvin Sindato, had the role of operationalising the project through the development of a tool and methodology for assessing current event based surveillance (EBS) systems and practices in human and animal health in cross-border communities. The SC met remotely every two to four weeks, or as needed by the project, and the TWG, met on a weekly or bi-monthly basis, or dependent on the needs of the project. Both groups also met face-to-face at the workshops arranged for the project and during the exchange visits. Dr Lisa Danquah was the Project Manager for the project. Her role was to oversee and coordinate the project and work closely with the CORDS Executive Director, Dr Christophe Longuet and other Secretariat staff (Sabrina Salem and Océane Andriamanarivo), the SC and TWG members to ensure the delivery of the project. A guidance document detailing the roles and responsibilities of both groups was also developed (Appendix 1).

Development of core documents and log frame

A core document detailing the scope and purpose of the project was developed and a detailed log frame outlining the aims and objectives of the project, activities, outputs, performance indicators for all activities related to the project. In addition, a project protocol document was also developed and distributed to all Networks and standardised training slides for the INP Surveillance Evaluation Tool. As much as possible throughout the project, standardised data analysis, report and presentation templates were provided to Networks to standardise the data collection and reporting process.

Workplans and budgets

Each Network was provided with a standard template to develop a workplan and budget related to the project that they were asked to complete. The workplan provided a detailed outline of the proposed implementation of the INP in their Network and the budget outlining the key areas in which the funds allocated to each Network for the implementation would be spent. This was then checked and approved by the CORDS Secretariat, contracts were sent to each Network for signature and then following this, funds were sent to the Networks for the implementation of the INP in their Network.
4 Network assessment of event based surveillance systems and practices (Phase 2)

Overview

The second phase of this project was on the assessment within each Network of current event based surveillance systems and practices in human and animal health events from cross-border communities, including in pilot mobile projects. The assessment performed in each network was based upon an agreed methodology and tools.

Overall project design

The overall design of this project was mixed methods employing the use of both quantitative and qualitative techniques to address the project’s aims and objectives. The main approach of the project was descriptive in nature and an information gathering exercise to assess event based surveillance in the context of selected countries in the six CORDS member Networks. The assessment focused on national, district (cross-border) and community levels within each Network.

4.1.1 Methods

The methods used to collect the data required for the INP included structured interviews (single and group) using the INP Surveillance Evaluation Tool designed for this project, document review, workshops (in some Networks), site visits, observations and secondary data analysis. Each method used is explained in further detail. The methods used in each Network varied slightly, but the main method was through structured interviews, document review, site visits and analysis of secondary data.

4.1.1.1 Structured interviews

For the INP assessment at national, cross-border and community level, structured interviews with key individuals were conducted. This method was used to administer the INP Surveillance Evaluation Tool. This process involved either group level or single interviews with key stakeholders who were identified to be interviewed as part of the assessment at each level. The typical process was that following initial contact by the project team for each Network to conduct the interview, the project team typically conducted the interviews face-to-face, but where this was not possible, remote interviews were also conducted. During the face-to-face interview, a paper-version of the INP Surveillance Evaluation Tool was typically used.

During the interview, the person designated to conduct the interview administered the tool and asked the questions that were relevant to the level of administration of the tool, e.g. if the interview was a national level interview then only the national level questions were asked. For the remote interviews, interview participants received an electronic version of the tool prior to the interview and then the interviewer, typically the project manager or data collector, then read through each question through their own electronic version of the tool and then the interviewee was then asked to provide answers to each question. To complement this
approach and ensure that all the necessary information was collected during the interview, additional methods including reviewing of documents, extraction of data from existing paper-based/electronic or digital means were also used, in addition to observational methods e.g. demonstration of systems and processes.

4.1.1.2 Document review

The INP assessment also included the review of documents from existing sources including documents, guidance, standard operating procedures and other relevant documents related to disease surveillance generally and event based surveillance. This included documents at national, district and local (community) levels. To identify the required information, the project coordination team devised a list of relevant documents based on the requirements of the assessment tool and used this process to systematically identify documents. This process typically involved drawing up a list of potential sources of this data and their location. This could include, for example, offline sources, for example, hard copies of guidance documents for example within Ministries of Health, and/or online searches, for example, of government websites or internal sources. To complement this process, during the structured interviews, the key stakeholder(s) identified to be interviewed were also asked whether there were particular documents that were relevant and were requested to either provide copies or links to online documents.

4.1.1.3 Site visits

The methods used for the INP assessment also included site visits. This was an essential component of the assessment and involved the project team visiting, for example, national level sites including national ministry of health surveillance offices, district health facilities and community level sites, for example, primary health care facilities to meet with disease surveillance representatives in the human and animal health domains. The purpose of these sites visits was to conduct the assessment and administer the INP Surveillance Evaluation Tool on the identified individuals.

4.1.1.4 Secondary data analysis

The collection of secondary data was also an essential part of the data collection process. The secondary data that was collected as part of the assessment involved the collection of secondary information, i.e. information that has already been collected for event based surveillance. This included, for example, data related to verification and response to outbreaks and data for an event log to record information on the last 50 public health events that had occurred within the disease surveillance system under assessment e.g. the last 50 public health events that had occurred at cross-border level that were collected for the purposes of event based surveillance. The process involved the data collection team liaising with disease surveillance officials at the relevant levels e.g. national, district and community to collect and collate this information. This involved either the direct extraction from existing databases for electronic systems or collating information from paper-based systems and inputting it into the event log template provided as part of the assessment.
4.1.1.5 Workshops

In some Networks, dissemination and information gathering workshops were conducted, either during the data collection process or afterwards to disseminate the results.

Table 2: Summary of Network methods for the INP

<table>
<thead>
<tr>
<th>Network</th>
<th>Countries</th>
<th>Methods</th>
<th>General INP Tool use</th>
</tr>
</thead>
<tbody>
<tr>
<td>APEIR</td>
<td>Indonesia, Vietnam</td>
<td>• Interviews &lt;br&gt; • Document review &lt;br&gt; • Observations &lt;br&gt; • Site visits &lt;br&gt; • Secondary data analysis</td>
<td>Yes, paper-version + data entry onto web-based version</td>
</tr>
<tr>
<td>EAIDSNet</td>
<td>Burundi, Kenya, Tanzania, Uganda</td>
<td>• Key stakeholder meetings &lt;br&gt; • Interviews &lt;br&gt; • Document review &lt;br&gt; • Observations &lt;br&gt; • Site visits &lt;br&gt; • Workshop &lt;br&gt; • Secondary data analysis</td>
<td>Yes, paper-version + data entry onto web-based version</td>
</tr>
<tr>
<td>MBDS</td>
<td>Laos, Thailand, Vietnam</td>
<td>• Interviews &lt;br&gt; • Document review &lt;br&gt; • Observations &lt;br&gt; • Site visits &lt;br&gt; • Secondary data analysis</td>
<td>Yes, paper-version + data entry onto web-based version</td>
</tr>
<tr>
<td>MECIDS</td>
<td>Israel, Jordan, Palestine</td>
<td>• Interviews &lt;br&gt; • Document review &lt;br&gt; • Observations</td>
<td>Yes, paper-version + data entry onto web-based version</td>
</tr>
<tr>
<td></td>
<td>Secondary data analysis</td>
<td>SACIDS</td>
<td>SECID</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Burundi</td>
<td>Albania</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tanzania</td>
<td>Kosovo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Uganda</td>
<td>Macedonia</td>
</tr>
<tr>
<td></td>
<td>Key stakeholder meetings</td>
<td></td>
<td>Interviews</td>
</tr>
<tr>
<td></td>
<td>Interviews</td>
<td></td>
<td>Document review</td>
</tr>
<tr>
<td></td>
<td>Document review</td>
<td></td>
<td>Observations</td>
</tr>
<tr>
<td></td>
<td>Observations</td>
<td></td>
<td>Site visits</td>
</tr>
<tr>
<td></td>
<td>Site visits</td>
<td></td>
<td>Workshop</td>
</tr>
<tr>
<td></td>
<td>Secondary data analysis</td>
<td></td>
<td>Secondary data analysis</td>
</tr>
<tr>
<td>AfyaData</td>
<td></td>
<td></td>
<td>Yes, paper-version + data entry onto web-based version</td>
</tr>
</tbody>
</table>

5 INP Implementation and data collection

The INP involved the 6 CORDS Member Network of APEIR, EAIDSNet, MBDS, MECIDS, SACIDS and SECIDS. A total of 14 countries were included in the assessment. For APEIR, the assessment countries were Indonesia and Vietnam, for EAIDSNet, the assessment countries were Burundi, Kenya, Tanzania and Uganda, for MBDS, the assessment countries were Laos, Vietnam* and Thailand. For MECIDS, the countries were Jordan, the Palestinian Authority and Israel, for SACIDS, the countries were Tanzania* and Uganda* and for SECID, the countries were Albania, Kosovo and Macedonia. Four Networks had countries that overlapped, EAIDSNet and SACIDS both conducted assessment for Tanzania and Uganda and APEIR and MBDS both conducted assessments for Vietnam.

The INP also involved the inclusion of cross-border level assessment sites in each Network. The aim was to include approximately 2-3 cross border sites per Network, and to include sites on each side of the country border, if possible. In total, 41 cross-border sites were included in the INP from across the 14 countries. For some Networks, community level sites were also included, however, this was not standard across all Networks as the inclusion of the community level within the INP was discussed after the cross-border sites were chosen and some Networks had already started data collection.
Figure 2 Map of the INP assessment sites
Rationale for selection of countries and assessment sites

The countries included in the INP assessment are countries that comprise the CORDS Member Networks, hence their inclusion. In total, half of the 28 CORDS Member Network countries were included in the INP. These countries were chosen by the Networks. Within each country, national level sites typically comprised Ministries of Health and Ministries of Livestock. These were selected for inclusion as they typically represent the national level coordination for disease surveillance and control, including event based surveillance. The cross-border sites in each country were selected for inclusion based on specific rationale.

Table 3: Summary of the Network scope of the INP

<table>
<thead>
<tr>
<th>Network</th>
<th>Countries</th>
<th>Scope</th>
<th>Human/Animal domain</th>
<th>National</th>
<th>Cross border</th>
<th>Neighbouring CB sites</th>
<th>Community level</th>
</tr>
</thead>
<tbody>
<tr>
<td>APEIR</td>
<td>Indonesia Vietnam</td>
<td>Priority diseases</td>
<td>Human</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>EAIDSNet</td>
<td>Burundi Kenya Tanzania Uganda</td>
<td>All</td>
<td>Human/Animal</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>MBDS</td>
<td>Laos Thailand Vietnam</td>
<td>All</td>
<td>Human</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>MECIDS</td>
<td>Israel Jordan Palestinian Authorities</td>
<td>Priority diseases</td>
<td>Human</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>SACIDS</td>
<td>Burundi Tanzania Uganda</td>
<td>All</td>
<td>Human/Animal</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>SECID</td>
<td>Albania Kosovo Macedonia</td>
<td>Priority diseases</td>
<td>Human/Animal</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Project participants and recruitment

The project participants for the INP project varied across the Networks but the interviewed individuals at the different levels e.g. national, regional depending on the administrative categorisation of the country, cross-border and community level included individuals representing ministries of health, livestock and agriculture, particularly those in the field of disease surveillance related to human and animal health. At the community level, some Networks also interviewed community health workers. Some Networks interviewed groups of individuals for using the INP assessment tool and others interviewed individuals on an individual basis. This resulted in a variation in the total number of participants interviewed by each Network. Further details can be found in the individual Network reports.
6 Data collection

This section of the report describes the data collection process, project coordination, data collection training, the data collection tool and pre-testing and implementation of the project.

Tool development

The INP Surveillance Evaluation Tool was designed to collect information required for the project. The tool was developed in collaboration with the Networks and based on the existing literature. An initial range of questions and indicators were developed from May to June 2019. Once the main list of questions and indicators were drafted in Microsoft Excel, the Networks were then asked to rank the tools in terms of priority questions. An external consultant was then employed to develop the tool with the following system requirements.

6.1.1 System requirements

The initial systems requirements were as follows

- A data collection tool that could capture a large data set comprising a variety of data types (i.e. numerical, free text, multiple choice etc)
- Should work on a wide range of operating systems and devices.
- Should be available in online/ offline/ and printable formats.
- Should be user friendly, with clear instruction, and should ideally have the capacity to hide/ show questions/ sections of questions based on previous responses.
- There should be some data validation capacity within the system to ensure that information is provided in a consistent and accurate format.
- Users should be able to save an incomplete version of the tool and return to it later
- The system should allow nominated users within each network to access uploaded data.
- The system should have some analytical functionality.
- Ideally the system should allow supporting documents to be uploaded along with the completed questionnaire (e.g. data definitions, system specifications where appropriate)

6.1.2 System selection

Initially there were discussions regarding the viability of creating the tool using Microsoft Excel, as this would have been fit for purpose and cost effective, however this would still require that respondents have MS Excel on their system in order to use the electronic version of the tool; additionally, the various VBA macros necessary to provide all the types of questions required had the potential to become unstable/ unusable if the respondents were using an older version of Excel.

Therefore, a determination was made that a web-based form building system would be the most appropriate solution, being accessible to any end user with an internet connection and
requiring no other specific computer programme to run. This type of system would also be
cost-effective, and possible to set up in the limited time available. There were two major online
form building systems which were initially considered, which were broadly similar in
functionality. These were Cognito Forms and Jotform, both of which offered the following key
features:

- Unlike many similar systems there were no limitations on the number of questions
  which could be included in each survey, or the number of respondents.
- Both included all the types of questions required.
- Both had the capacity to collapse sections of questions depending on previous
  responses.
- Neither required that respondents had any specific software to use the electronic
  version.
- Both permitted extraction of a printable PDF version of the form for respondents unable
  to complete the web-based version.
- Both systems provided some level of free trial/ low volume service which would permit
  testing/ approval of the tool without a financial commitment.

Ultimately however, it was determined that of the two systems, Jotform was the most suitable
as it offered the following functional advantages-

- Remote document access.
- Rules-based workflow.
- Multi-user/ admin access.
- File upload and document management capacity- it was possible to add a button to
  the online tool which would allow documents of nearly any format to be uploaded
  automatically.

When developing the tool, the greatest challenge was the need to collect a coherent,
consistent data set from a range of Networks, countries, and disciplines, and across data
collectors with a broad range of existing IT systems, programmes, degrees of internet
connectivity and technological infrastructure.

6.1.3 System description

To accommodate the varying levels of technical capacity/ connectivity between the sites, the
INP Surveillance Evaluation Tool incorporated two different front-end user interfaces (online,
and paper-based. The online Jotform interface was simple to fill in, automatically populated a
central database and yielded excellent data quality due to self-validating nature of the system;
the only drawback of this data collection method was the necessity for the user to have a
computer/ mobile device with an internet connection. In order to accommodate those
respondents who had no access to a computer, a facility to create a paper version of each
form needed to be incorporated. This was done by adding a “print” button to the online
webform.

6.1.4 Pre-testing

The INP Surveillance Evaluation Tool was beta-tested among the Networks in mid-July. This
involved testing the tool to assess the logic, flow, comprehension and usability of the tool. A
local pre-test was then conducted among the Networks to test the tool at national and local
(cross border) levels. This was a short pre-test of 1 – 3 days. The results of both the beta test
and local pre-test were then fed back to the TWG and relevant updates and changes were made allowing for the development of the final version of the tool. An online training session on the INP Surveillance Evaluation Tool was conducted on the 24th July: this was attended by all Networks and was led by Victoria Sandiford.

6.1.5 Training

Following the training of the Networks on the INP Surveillance Evaluation Tool, the Networks then trained their data collection teams on the use of the tool.
7 Results

National level results

The findings in this section relate to the national level questions of the INP Surveillance Evaluation Tool including areas on national level standards and definitions for monitoring public health events and priority diseases, the existence of standard outbreak detection guidelines and standard operating procedures compatible with the IHR or other international guidelines. Other topics in this section include event based surveillance, sources of surveillance data, data collection tools, verification and response and intersectoral and cross-border surveillance.

7.1.1 National level standards and practices

In all 14 countries, systems and processes were identified for monitoring public health events and all countries were identified to have a list of priority diseases under surveillance. Standard outbreak detection guidelines were identified in 13 of the 14 assessed countries, with Macedonia not having standard outbreak detection guidelines available. Defined action thresholds for selected indicator diseases were identified in 13 of the 14 countries with Kosovo being the exception. Eleven of the fourteen countries had SOPs compatible with IHR or other international guidelines at national level. The countries where this was not present were Kenya (EAIDSNet), Albania and Kosovo (SECID).

Table 4: Summary of key results for national standards and practices

<table>
<thead>
<tr>
<th>Summary of results</th>
</tr>
</thead>
<tbody>
<tr>
<td>• In all 14 countries, systems and processes were identified for monitoring public health events.</td>
</tr>
<tr>
<td>• All countries were identified to have a list of priority diseases under surveillance.</td>
</tr>
<tr>
<td>• Standard outbreak detection guidelines were identified in 13 of the 14 assessed countries, with Macedonia not having standard outbreak detection guidelines available.</td>
</tr>
<tr>
<td>• Defined action thresholds for selected indicator diseases were identified in 13 of the 14 countries with Kosovo being the exception.</td>
</tr>
<tr>
<td>• 11 of the 14 countries had SOPs compatible with IHR or other international guidelines at national level. The countries where this was not present were Kenya (EAIDSNet), Albania and Kosovo (SECID).</td>
</tr>
</tbody>
</table>
7.1.2 National level event based surveillance

Event based surveillance was conducted in all 14 countries. The assessment identified that there were clear objectives for event based surveillance in place in the communicable disease surveillance system in 11 of the 14 countries. Standard operating procedures for event based surveillance were present in 13 of the 14 countries, and an operational event based surveillance coordination unit existed in 13 of the 14 countries. There were dedicated staff for coordinating event based surveillance in 13 of the 14 countries. Event based surveillance related to a National Focal Point as defined by International Health Regulations (IHR) and included in IHR National Focal Point document are present in 13 of the 14 countries. Centralised/standard or any other type of localised database in use to record information about disease events exist in 12 of the 14 countries.

Table 5: Summary of key results on national level event based surveillance

<table>
<thead>
<tr>
<th>Summary of results</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Event based surveillance is conducted in all 14 countries.</td>
</tr>
<tr>
<td>• Clear objectives for event based surveillance in place in the communicable disease surveillance system in 11 of the 14 countries.</td>
</tr>
<tr>
<td>• Standard operating procedures for event based surveillance were present in 13 of the 14 countries.</td>
</tr>
<tr>
<td>• An operational event based surveillance coordination unit existed in 13 of the 14 countries.</td>
</tr>
<tr>
<td>• Dedicated staff for coordinating event based surveillance in 13 of the 14 countries.</td>
</tr>
<tr>
<td>• Event based surveillance related to a National Focal Point as defined by International Health Regulations (IHR) and included in IHR National Focal Point document are present in 13 of the 14 countries.</td>
</tr>
<tr>
<td>• Centralised/standard or any other type of localised database in use to record information about disease events exist in 12 of the 14 countries.</td>
</tr>
</tbody>
</table>
7.1.3 National level sources of surveillance data

The results of the assessment identified that in all 14 countries official reports of public health events exist, and in 10 of the 14 countries there is existence of a rumour log or database in use to record to record suspected PHE from information sources. The main forms of sources of public health reporting were identified as the media and the community in all 14 countries, followed by social media (11 countries), blogs (7 countries) and other (3 countries). The assessment identified that the surveillance system in 9 of the 14 countries records novel/unexpected (signals) health events for immediate reporting. The sensitivity rating of the surveillance systems for detecting outbreaks were reported for 12 of the 14 countries. Seven reported their sensitivity rating as 7 and 4 gave a score of 4 and one gave a score of 5.

- 1: Not sensitive enough, positive cases are frequently missed.
- 3: Optimum sensitivity
- 5: Too sensitive resulting in frequent false positives.

In seven countries, standard operating procedures (SOPs) for the detection of signals during public health events exist.

Table 6: Summary of results on national sources of surveillance data

<table>
<thead>
<tr>
<th>Summary of results</th>
</tr>
</thead>
<tbody>
<tr>
<td>In all 14 countries official reports of public health events exist.</td>
</tr>
<tr>
<td>In 10 of the 14 countries there is existence of a rumour log or database in use to record to record suspected PHE from information sources.</td>
</tr>
<tr>
<td>The main forms of sources of public health reporting were identified as the media and the community in all 14 countries, followed by social media (11 countries), blogs (7 countries) and other (3 countries).</td>
</tr>
<tr>
<td>The surveillance system in 9 of the 14 countries records novel/unexpected (signals) health events for immediate reporting.</td>
</tr>
<tr>
<td>The sensitivity rating of the surveillance systems for detecting outbreaks were reported for 12 of the 14 countries. Seven reported their sensitivity rating as 7 and 4 gave a score of 4 and one gave a score of 5.</td>
</tr>
</tbody>
</table>

- 1: Not sensitive enough, positive cases are frequently missed.
- 3: Optimum sensitivity
- 5: Too sensitive resulting in frequent false positives.

In 7 countries, standard operating procedures (SOPs) for the detection of signals during public health events exist.
7.1.4 National level data collection tools

The main types of data collection systems identified in the 14 countries were paper-based and digital systems. In all countries, paper based systems were identified and in 10 of the 14 countries, digital systems were identified. The countries where digital systems were not present were the three countries in the SECID Network of Albania, Kosovo and Macedonia and Indonesia for the APEIR Network.

Table 7: Summary of results on national level data collection tools

<table>
<thead>
<tr>
<th>Summary of results</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The main types of data collection systems identified in the 14 countries were paper-based and digital systems.</td>
</tr>
<tr>
<td>- In all countries, paper based systems were identified.</td>
</tr>
<tr>
<td>- In 10 of the 14 countries, digital systems were identified. The countries where digital systems were not present were the three countries in the SECID Network of Albania, Kosovo and Macedonia and Indonesia for the APEIR Network.</td>
</tr>
</tbody>
</table>

Overview of National Event Based Surveillance data collection systems

7.1.5 APEIR

The electronic SKDR (Sistem Kewaspadaan Dini dan Respon/ EWARS) is used within Indonesia for IBS. The system receives aggregated reports from the sub-district, district and province level through a web based and SMS system. All data provided to the SKDR tool comes from healthcare facilities. Data collection for the SKDR tool occurs via both an active manner with data coming directly from the source but also passively through a hotline using official hotline numbers and emails. Data from SKDR, along with aggregate and case-based EBS data are reported to the centralised system, PHEOC (Public Health Emergency Operating Centre). Additional data from media, community and health care offices also provide the PHEOC system with IBS and EBS data. Both the SKDR and PHEOC systems collect data on a daily basis and report these findings on a weekly basis. The media do not provide data to the SKDR tool, only the PHEOC tool. Both systems reach a national level of coverage and the whole Indonesian population is under surveillance. Data collected at the national level as undergone verification at the provincial or district health offices. Coding variables are not within the PHEOC system to relate a disease to a health event; however, this does occur via SMS via the SKDR system relating diseases to 24 categories.
A centralised electronic IBS system exists within Vietnam, the second of the two countries included within the APEIR network. This system, entitled ECDS (Communicable Disease Surveillance System), receives data from case-based reports from the sub-district, district and provinces on a nationwide scale via a web-based system. Data entry occurs via the web through the ECDS system also with data obtained from media, community groups and healthcare facilities. EBS still occurs via paper systems at the national level in Vietnam. EBS occurs solely at the national level within Vietnam via the use of aggregate data.

Photo: SKDR system in Indonesia

7.1.6 EAIDSNet

At the national level in Burundi, Tanzania and Kenya the DHIS2 system performs EBS. This system uses a centralized database that captures aggregated event data from nationwide health care facilities. Users have the ability to exchange data, feedback on data and discuss and concerns that have arisen about the data. All disease surveillance data received at the national level within Tanzania passes through the DHIS2 system. The EOC have also introduced Virtual EOC (VEOC) for the purpose of recording disease events throughout the country. VEOC is used for tracking incidence progression, meetings, messages, conversations and personnel deployment. Additionally, VEOC can be used as a chatting service for discussions surrounding EBS data. In Uganda the MoH receives disease surveillance data via the DHIS2 platform. Through this platform (in addition to the eIDSR platform), the EOC applies eIDSR to collate data on reportable public health events nationwide.

Within Kenya, in addition to the use of DHIS2 another system is used to supervise the process of data collection for polio, this is called Open Data Kit (ODK). The ODK system allows for users to send data from nationwide facilities via the use of smart phones. Through the use of these smart phones the GPS location of the facilities can be recorded. From then on, the system can send messages to the smart phone registered in the facility. This system has the ability to be modified for other conditions if required.
Summary

At the national level in all EAIDSNet countries assessed (Burundi, Kenya, Tanzania, Uganda) all data entry is web based, although both paper and electronic database systems are still in use. Aggregated and case base data flows to national level surveillance systems from health care facilities, community groups and media/published sources within all of these countries, but not from community services or any other sources. All systems focus on the general population and not specific target groups and coverage reaches the whole national level with data collection and reporting occurring on a daily, weekly and monthly basis. Variables are specified within all systems via a coded system.

7.1.7 MBDS

7.1.7.1 Laos

A national level data base (LaoEwarn) was found to exist within Laos. EBS data was seen to be supplied to this system via provincial health departments, whom receive paper-based EBS data from all district health departments. Once situated in the LaoEwarn database EBS data can be mapped and analysed, partially via the use of District Health Information Software2 (DHIS2)
Photo: Lao Ewarn system

Photo: DHIS2 in Laos

DHIS2 (District Health Information software2)
https://hmis.gov.la

Dress board

User and password

Tool
7.1.7.2 Thailand

Within Thailand EBS data collection often occurs at the provincial level. At the national level the R506 Program exists. This program involves the collection of health care data from patients at health care centres and hospitals district level health for a total of 61 diseases.

Photo: R506 Program

7.1.7.3 Vietnam

Within Vietnam EBS reporting occurs at the provincial level from medical units. Infectious disease data recorded at the site level is then transferred to a national level software system that creates disease maps by province, districts and communes. All assessed countries within the MBDS network (Laos, Thailand, Vietnam) stated that they use both paper and electronic systems for EBS, although in all cases data entry occurs via a web-based platform.

Summary

All national level EBS systems studied within the MBDS network record both case-based and aggregate level data focusing on the general population at the national level rather than targeting specific groups. Data collection for all three systems occurs on a daily, weekly and monthly basis through the use of specific coded variables. None of the assessed MBDS countries provided information on Data sources/ data flow.
7.1.8 MECIDS

7.1.8.1 Jordan

Within Jordan the national level surveillance system covers approximately 543 sites. These 543 sites include 100% of all public health centres within Jordan and the majority of the 30 private hospitals within Jordan. The central database for this system is found at the Ministry of Health (MoH), managed by the data management department. Data collection occurs on a systematic basis every day/month, primarily through paper-based forms that include information of demographics and residence. The web-based system used at the national level for recording and storing EBS data within Jordan is entitled JIDIS (Jordan Infectious Disease Information System). Once data is stored within the JIDIS system it can be analysed. Information reaches the JIDIS system through specific focal points at public health centres and hospitals. Plans are in place for Jordan to update their national level data collection system to an Interactive Electronic Reporting System (IERS) that will facilitate the real time reporting and analysis of case-based data. This updated system will also have the ability to generate SMS messages, email alerts, individual notifications and weekly epidemiological reports which the system will also have the ability to publish. Finally, the IERS system will also allow for the exportation of data into the excel sheets.
7.1.8.2 Palestinian Authority

The national EBS system within the Palestinian Authority covers the entire population and obtains information from health clinics and hospitals throughout the country. Data is collected in both a paper and digital format and is then reported to a central database located at the MoH. In situations when data is recorded in a paper-based format it is transferred to a digital format before being analysed by exporting data in a common format (.xml/.csv/SQL) Through this data collection system, the data collection can receive and obtain information and advice from the data centre (the point in which data was verified), although GPS coordinates of these data points are not obtainable. Additionally, data collectors have no means to communicate with each other via SMS or WhatsApp channels.

7.1.8.3 Israel

The MoH are responsible for national level data collection and surveillance for the whole population within Israel. Information is obtained for a specific list of communicable diseases that have been classified as ‘mandatory’ by the MoH. Within the MoH, the Division of Epidemiology is responsible for EBS data collection from local district health office (DHO). This data is obtained by the DHO from reporting physicians attending both public and private health clinics as well as hospitals, primarily via standardised paper-based forms provided by the MoH. Data is then digitalised and transferred to the central MoH repository and used to produce weekly reports for the MoH’s Division of Epidemiology’s website.
For the mandatory list of communicable diseases public and private medical centres are required to inform the MoH with all positive test results for these diseases as well as providing microbiology isolates for the MoH to analyse at their reference laboratories. These reference laboratories inform the DHO’s, the lab that sent the sample and the Division of Epidemiology of their results once the testing stage has been completed. The verified results then help to determine epidemiological trends and the occurrence of outbreaks and epidemics within the population. The transferring of this location back to the reporting sites/ relevant stakeholders primarily occurs through paper-based formats however it has been stated that a conscious effort is being made for this process of data transfer to be digitalised. In addition to this data transfer process the Israeli CDC (ICDC) has implements a net community of sentinel clinical microbiology labs in the previous years. On a weekly basis this community produces aggregated data reports for selected pathogens in order to facilitate the real time monitoring of certain pathogens. These weekly reports are mainly paper based but can also be found on the MoH’s website.

Summary

At the national level in all MECIDS assessed countries (Jordan, Palestinian Authority and Israel) aggregate and case-based data covers the whole population and data entry occurs via a web-based application although variables are not specified in this process. Within the Palestinian Authority and Israel healthcare facilities, community groups and community services provide data to the national level system whereas in Jordan EBS data only reaches the national level only through healthcare facilities. Additionally, data is recorded within Jordan on daily, weekly and monthly basis whilst in the Palestinian Authority and Israel data recording occurs at arbitrary times as well as on a daily, weekly and monthly basis. All assessed MECIDS countries report to have stable national level data collection systems that have the capacity to collect, manage and provide data for public health disease surveillance when needed in a timely manner on some occurrences. SACIDS

7.1.8.4 Tanzania

Within Tanzania the Ministry of Health (MoH) log rumours and phone call conversations regarding EBS in a paper format. For IBS an electronic IDSR system using the open-source USSD technology. Data entry also occurs via web-based applications. Data for EBS reaches the national level within Tanzania via Healthcare facilities, media and publishing sources, community services as well as others. This IBS system is managed by a DHIS2 system. Meanwhile the Ministry of Livestock (MoL) use paper-based disease surveillance forms as a means of official EBS reporting. Official reporting digital systems are also used for EBS; these electronic EBS systems involve the use of Event Mobile Applications (EMA-i) and AfyaData in given locations.
7.1.8.5 Uganda

Both digital and paper-based systems are used for EBS in Uganda by both the MoH and the MoL. The names of these electronic systems are m-Trac and EMA-I respectively. In some locations in hotlines to enhance EBS exist in the form of vertical programmes. Electronic data
entry occurs via SMS and APP within Uganda. Data for EBS reaches the national level within Uganda via Healthcare facilities, media and publishing sources, community services as well as others.

Photo: Mtrac

Summary

The general population is subjected to EBS surveillance in both Tanzania and Uganda using data at the aggregate level collected on a weekly and monthly basis and involve the use of prespecified variable. National level EBS within Tanzania and Uganda has been classified as being simple, acceptable, useful and timely. This characterisation corresponds to systems that can be operated with ease (partially due to their simple structure), a system with the ability to adapt to change with regard to resource limitation, public health needs and changes in data availability and a system that meets the health needs of the general public. Additionally, these EBS tools were also found to be representative of the health-related events that occur within their respective countries whilst also being found to operate in a stable and reliable manner to collect, manage and process EBS data when needed. In both countries assess a national level, centralised electronic database was seen to exist that helped facilitate international collaboration and efficient data capture at the district level.

7.1.9 National level intersectoral and cross-border collaboration

In all 14 countries, the INP assessment identified that there was evidence of intersectoral collaboration within the disease surveillance systems. In 13 of the 14 countries, with the exception of Indonesia, there was evidence of a pattern of sharing relevant disease surveillance information between different sectors. In 10 of the 14 countries, the surveillance system was identified to work in a cross-border area. The countries that this was not the case are Indonesia, Jordan, the Palestinian Authorities and Kosovo.
Table 8: Summary of national level intersectoral and cross-border collaboration

<table>
<thead>
<tr>
<th>Summary of results</th>
</tr>
</thead>
<tbody>
<tr>
<td>In all 14 countries there was evidence of intersectoral collaboration within the disease surveillance system</td>
</tr>
<tr>
<td>In 13 of the 14 countries, there was evidence of a pattern of sharing disease surveillance information between different sectors.</td>
</tr>
<tr>
<td>In 10 of the 14 countries, the surveillance system was identified to work in a cross-border area.</td>
</tr>
</tbody>
</table>

Cross-border results

7.1.10 Cross-border level event based surveillance

Event based surveillance was identified to be conducted in over 80% of the cross-border areas included in the project. In total, 34 of the 41 cross-border areas were identified to conduct this form of surveillance. However, in 16 of those 34 cross-border areas, there were clear objectives for EBS within the communicable disease surveillance system. There was limited existence of standard operating procedure for EBS, with only 9 cross-border areas having SOPs present. The existence of an operational EBS coordination unit was present in 19 of the cross-border areas, and dedicated staff for coordinating EBS was present in 22 cross-border areas. The existence of EBS system that is related to a National Focal Point as defined by IHR and included in IHR Focal Point documents was present in 21 cross-border areas and existence of a centralised/standard/ or any type of database to record information about disease events was present in 22 cross-border areas.

Table 9: Summary of cross-border level event based surveillance

<table>
<thead>
<tr>
<th>Summary of key results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event based surveillance was conducted in 34 of the 41 cross border areas included in the project</td>
</tr>
<tr>
<td>Clear objectives for EBS within the communicable disease surveillance system were identified in 16 of the cross border areas</td>
</tr>
<tr>
<td>Existence of Standard Operating Procedures for EBS exist in 9 cross-border areas</td>
</tr>
<tr>
<td>Existence of an operational EBS coordination unit was present in 19 cross-border areas</td>
</tr>
<tr>
<td>Existence of dedicated staff for coordinating EBS was present in 22 cross-border areas</td>
</tr>
<tr>
<td>Existence of EBS system that is related to a National Focal Point as defined by IHR and included in IHR Focal Point documents was present in 21 cross-border areas</td>
</tr>
<tr>
<td>Existence of a centralised/standard/ or any type of database of localised database in use to record information about disease events was present in 22 cross-border areas</td>
</tr>
</tbody>
</table>
7.1.11 Cross-border level sources of surveillance data

For the cross-border levels sources of surveillance data, the main findings were that there were official reports of public health events in the majority of cross-border areas, with 36 of the 41 cross-border areas where this was present. The existence of a rumour log or database in use to record suspected PHE from information sources was identified in 20 cross-border areas. The main forms of public health reporting included the media and the community which were reported in 38 cross-border areas. This was followed by social media (10 cross-border areas), other forms of reporting and blogs. Only one cross-border area was reported to have no form of public health reporting. In 24 of the 41 cross-border areas, the surveillance system records novel/unexpected (signals) health events for immediate reporting. The sensitivity rating of the surveillance systems for 13 cross-border areas was rated as 3 (Optimum sensitivity), 12 were rated as 4 between optimum sensitivity and too sensitive (frequent false positives) and 10 were rated as 2 between optimum sensitivity and being too sensitive. One cross-border area surveillance system was rated as being too sensitive (frequent false positives). In 19 of the 41 cross-border areas, there were SOPs for the detection of signals during events

Table 10: Summary of cross-border level sources of surveillance data

<table>
<thead>
<tr>
<th>Summary of key results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Official reports of public health events were present in 36 of the 41 cross-border areas</td>
</tr>
<tr>
<td>Existence of a rumour log or database in use to record suspected PHE from information sources was identified in 20 cross-border areas</td>
</tr>
<tr>
<td>The main forms of public health reporting included the media and the community which were reported in 38 cross-border areas. This was followed by social media (10 cross-border areas), other forms of reporting and blogs. Only one cross-border area was reported to have no form of public health reporting.</td>
</tr>
<tr>
<td>In 24 of the 41 cross-border areas, the surveillance system records novel/unexpected (signals) health events for immediate reporting</td>
</tr>
<tr>
<td>The sensitivity rating of the surveillance systems for 13 cross-border areas was rated as 3 (Optimum sensitivity), 12 were rated as 4 between optimum sensitivity and too sensitive (frequent false positives) and 10 were rated as 2 between optimum sensitivity and being too sensitive. One cross-border area surveillance system was rated as being too sensitive (frequent false positives)</td>
</tr>
<tr>
<td>19 of the 41 cross-border areas had SOPs for the detection of signals during events</td>
</tr>
</tbody>
</table>
7.1.12 Cross-border data collection tools

The cross-border data collection tools identified were largely paper-based. In over 80% of the cross-border areas (35 of the 41 cross-border areas), this form of data collection tool was being used. However, digital data collection tools were used to a lesser extent with over 50% (22 of the 41 cross-border areas reporting that this form of data collection tool was being used. In four cross-border areas, other data collection tools were reported.

Table 1: Summary of cross-border data collection tools

<table>
<thead>
<tr>
<th>Summary of key results</th>
</tr>
</thead>
<tbody>
<tr>
<td>The main form of data collection tools identified were paper-based tools with 35 of the 41 cross-border areas having these tools in use.</td>
</tr>
<tr>
<td>Digital data collection tools were identified in 22 of the 41 cross-border areas and 4 cross-border areas reported other data collection tools to be in place e.g. electronic data collection tools.</td>
</tr>
</tbody>
</table>

7.1.13 Cross-border level intersectoral and cross-border collaboration

The cross-border level results related to intersectoral and cross-border collaboration identified that in the majority of cross-border areas (39 of the 41 cross-border areas), there was evidence of intersectoral collaboration within the disease surveillance systems of the regions. Similarly, but to a slightly lesser extent, there was also evidence of a pattern of sharing relevant disease surveillance information between different sectors. In less than 40% of the cross-border areas (16 out of 41), the surveillance system was identified to operate.

In the following three domains, approximately 50% or less of cross border areas had existence of an established framework/standard protocol for intercountry/cross-border collaboration relating to disease surveillance, existence of capacity within the region for coordinated cross-border activity in relation to outbreaks, epidemics, events etc and existence of legal/policy authority for the cross-border exchange of disease surveillance data within the region. The existence of an established pattern of routinely sharing relevant disease surveillance data and information with neighbouring countries was present in only 10 cross-border areas.

Table 12: Summary of cross-border level intersectoral and cross-border collaboration

<table>
<thead>
<tr>
<th>Summary of key results</th>
</tr>
</thead>
<tbody>
<tr>
<td>In 39 cross-border areas there was evidence of intersectoral collaboration within the disease surveillance systems of the regions.</td>
</tr>
<tr>
<td>In 31 cross-border areas there was evidence of a pattern of sharing relevant disease surveillance information between different sectors.</td>
</tr>
<tr>
<td>In 16 cross-border areas, the surveillance system was reported to operate.</td>
</tr>
</tbody>
</table>
In 20 cross-border areas, there is existence of an established framework/standard protocol for intercountry/cross-border collaboration relating to disease surveillance

In 21 cross-border areas, there is existence of capacity within the region for coordinated cross-border activity in relation to outbreaks, epidemics, events etc

In 19 cross-border areas, there is existence of a legal/policy authority for cross-border exchange of disease surveillance data within the region

In 10 cross-border areas, there is existence of an established pattern of routinely sharing relevant disease surveillance data and information with neighbouring countries.

8 Discussion

Event based surveillance is an essential component of early warning and response that involves the use of unstructured sources of information. It involves the organised and rapid capture of information about events that are a potential risk to public health. This information can be rumours and other ad-hoc reports transmitted through formal channels (i.e. established routine reporting systems) and informal channels (i.e. media, health workers and non-governmental organisations reports). Its use goes beyond indicator based surveillance that typically relies on routine sources of xxx. Event based surveillance is therefore an essential component of a comprehensive surveillance system, and it is argued that this form of surveillance can provide early warning on events that are a potential risk to national, regional and global health security.

The overall objective of this project was to ‘enhance digital event information and data collection at community-level to enable real-time detection of, and response to, One Health priorities, in order to strengthen health and security among local communities in cross-border areas’.

The aim of the second phase of the project was to assess, in each Network, current event based surveillance (EBS) systems and practices in human and animal health events from cross border communities (includes pilot mobile projects). The results of the INP implementation phase across the six Member Networks and the 14 countries in Sub-Saharan Africa, the Middle East, Southeast Asia and South Eastern Europe demonstrates that in general at the national level, systems and process for monitoring public health events are present in all countries and there is a list of priority diseases under surveillance. There is also a clear presence of standard outbreak detection guidelines and defined action thresholds, and the vast majority of countries had SOPs that are compatible with IHR or other international guidelines. The results at this level demonstrate that further strengthening of standard outbreak detection guidelines, defined action thresholds and SOPs that are compatible with IHR or other guidelines require further strengthening in certain EAIDSNet and SECID countries.

Event based surveillance is conducted in all countries and in the vast majority, there are clear objectives for its use. Similarly, SOPs for event based surveillance exist in most countries. It is clear from other indicators that assess event based surveillance that at the national level there are systems and process in place to facilitate event based surveillance, for example an
operational coordination unit, dedicated staff and event based surveillance that is related to a National Focal Point as defined by International Health Regulations and included in IHR National Focal Point document and a centralised database.

In all countries, official reports of public health events exist, however in only 10 of the 14 countries was there existence of a rumour log or database in use to record suspected public health events from information sources. The media and the community play a strong role in public health reporting, and also social media and to a lesser extent blogs. The specific way in which they report requires further exploration. An area that requires strengthening is the ability of the surveillance system to record novel/unexpected (signals) health events for immediate reporting, with only 9 of the 14 countries having surveillance systems that have the ability to do so. In only half of the countries were there SOPs for the detection of signals during public health events.

The main types of data collection tools at national level are paper-based systems. This type of data collection system was identified in all countries. In 10 countries, digital systems were identified. Further strengthening and support for the development of digital systems is required in the SECID Network countries of Albania, Macedonia and Kosovo and in Indonesia for the APEIR Network. Further examination of the digital systems identified outside of the main assessment tool identified that there is a diversity of tools used within the project countries, however assessment of the core features and components of the tools was not within the scope of this project and was not assessed in depth by the INP Surveillance Evaluation tool. A commonly used tool in the sub-Saharan African countries included in this project is the use of the District Health Information System 2 (DHIS 2), a free and open source software platform for health data management.

In all of the countries assessed, there was evidence of intersectoral collaboration and a pattern of sharing disease surveillance information 913 of the 14 countries. Further work is required to strengthen the capacity of the disease surveillance system to work in cross-border areas, with 10 of the 14 countries demonstrating the capacity to do so.

At the cross-border level, there is strong evidence of event based surveillance in the majority of cross-border areas, however from the results of the assessment, it is clear that there is a lack of clear objectives for event based surveillance and SOPs, and that these areas require further strengthening. Furthermore, while there was evidence of operational coordination units in some cross-border areas and dedicated staff, this was not the case throughout all of the cross-border areas examined. Other areas that were identified to require further capacity and strengthening included the existence of event based surveillance systems that are related to a National Focal Point as defined by IHR and included in IHR Focal Point documents and the existence of a centralised/standard/ or any type of localised database to record information about disease events.

At the cross-border level, there was strong evidence of official reports of public health events and the community was identified to be a strong source of public health reporting. The role of social media and other forms of digital media including blogs were also identified but appeared to be underutilised. Areas that were identified to require further strengthening include developing further capacity and systems for rumour logs or databases to record suspected PHE from information sources and developing the ability of surveillance systems to record novel/unexpected (signals) health events for immediate reporting and the sensitivity of surveillance systems. In line with this, it is also necessary to develop SOPs for the detection of signals during events.
Data collection systems at the cross-border level were largely paper-based. Digital tools were identified in approximately half of the cross-border areas examined, but further development of digital tools is needed to strengthen data collection approaches.

In the majority of cross-border areas, there was evidence of intersectoral collaboration within the disease surveillance system, and a pattern of sharing relevant disease surveillance information between different sectors. Further work is needed to develop the ability of surveillance systems to work in cross-border areas, the establishment of frameworks/standard protocols for intercountry/cross-border collaboration relating to disease surveillance and the development of capacity for coordinated cross-border activity in relation to outbreaks, epidemics and events etc. This links in with developing an established pattern of routinely sharing relevant disease surveillance data and information with neighbouring countries and the further establishment of legal/policy authorities for cross-border exchange of disease surveillance data within regions.

Strengths and Weaknesses

8.1.1 Strengths

The INP was the first cross-network project conducted among the six CORDS Member Networks. The key strengths of this project were that it was a project that that involved half (14) of the 28 CORDS Member Network countries and involved a diverse range of countries in Sub-Saharan Africa, the Middle East, Southeast Asia and South Eastern Europe and the assessment of event based surveillance systems and practices in these settings. We were able to demonstrate through this project that it is possible to conduct a large scale systematic assessment across different countries and this was enabled through the development of processes and practices to facilitate the involvement and work of the six Member Networks. This was achieved through the development of a functional Steering Committee and Technical Working Group, who were both involved in the oversight, development and implementation of the project. The commitment of the Networks to work towards a common aim facilitated the project’s aims and objectives.

The development of a standardised methodological approach and protocol and the development and use of a standardised data collection tool across the Networks, ‘the INP Surveillance Evaluation Tool’ enabled a harmonised approach to data collection. A standardised training approach for Networks was also conducted in early July whereby all Networks involved in the project were trained on the tool by the Consultant that developed it. In addition to regular weekly and/or bi-monthly meetings of the Steering Committee and Technical Working Group, all Networks involved in the project attended face-to-face meetings regarding the project to discuss and present on implementation of the data collection process within their Networks and presentation of the preliminary and final results. The Networks were able to implement the data collection within their chosen project countries through developing detailed work plans and related budgets and assigning a core project team to implement the data collection at the national, regional and cross-border levels. This was achieved, even against the short timeframe of the data collection element of the project which for most Networks started between July – September 2018. Data collection ended in December and preliminary results were presented at a workshop held in Tanzania. This was also combined with the exchange visit component of the project.

A standardised approach to data analysis was also agreed among the Networks following the August workshop held in Atlanta. This enabled a standardised approach to the analysis of the
data collected from the INP Surveillance Evaluation Tool. From this approach and the preliminary results presented by the Networks in December 2018, it became apparent that while the scope of the project was to assess digital tools, the assessment tool did not fully capture the types of digital tools in terms of their specific scope. In order to address this, further

8.1.2 Limitations

The main limitations of this project were mainly related to the methodology and the way in which it was applied across the six Networks involved in the project. While a standardised assessment tool was developed and overall project protocol, the main difficulty was the way in which the design of the project and methodology was applied across the six Networks. Each Network was required to submit a work plan and budget before implementation and data collection of the INP commenced. In this work plan, Networks were required to propose countries within their Network (between 2-3), and within these countries, between 2 – 3 cross border (and cross-island) sites at district level and a selection of sites at community level from each cross border site. Ideally, the assessment at cross border level would be conducted at assessment sites at both sides of the border.

In addition, a rationale as to why those countries and cross-border areas were chosen also formed part of this. While to some extent the rationale was clear as to why particular countries and cross-border areas were chosen, the priorities of the Networks differed in terms of the scope and focus of diseases, with some Networks being quite specific and focused on particular diseases (for example, one to two) and other taking a more general approach and focusing on a range or all infectious diseases. This lack of standardisation affected the number of assessment sites chosen for each Network, with some Networks having more and some having less. This was also the case for the different levels at which the assessment was conducted at – all Networks had national level assessments, and some had overlapping countries at this level, but due to differences in the geographical administrative units of each country, it was difficult to find equivalents within each country for example as to what constituted the district or regional level. Following discussions at the project workshop in August where all Networks met, it was decided that the community level would also be included to understand event based surveillance at this level. However, it was not possible to include this level for all Networks as some Networks had near completed data collection by this stage. With these issues and the earlier ones discussed in mind, the generalisability of the results of the assessment are not fully generalisable within and across countries.

The countries and assessment sites chosen were also purposively sampled and this also affects the generalisability of the results.

The INP assessment tool developed for this project also had limitations. Initially, a single Network wide version of the tool was developed for use by all Networks, however, following concerns about data sharing and privacy by the Networks, the decision was taken to develop individual versions of the tool that featured the same indicators, but each Network would have its data stored separately. This change caused delays to the earlier phase of the project and meant that changes from the singular to the individual tool required development of six individual tools in Jotform which took time as the tool could not be easily replicated from the singular tool. Updated training and guidance were also needed for the singular tool and new links to access the individual versions of the tool. In addition, there were problems with Jotform during the data entry process for some Networks and one Network with extensive experience in the design of applications chose to develop their own version of the tool using the same indicators.
The way in which the tool was administered also differed across the Networks. All Networks chose to use the paper-based version of the tool, and then input the information from the paper-based version of the tool to the online version at a later time. Other issues included the way in which the tool was administered, for some Networks, the tool was administered to a group of individuals and then consensus was reached on the individual indicator answers, and for others, it was administered to an individual. It was also established that the assessment tool did not typically lend itself to being completed in a single sitting and required information from different sources. This approach therefore required planning by the project teams in each Network. This mixed methods nature of the project design meant that a range of different methods were needed to complete the assessment including structured interviews, document review, site visits and secondary data analysis. Within the short data collection time frame for the project, this was sometimes complex to complete and in the future would need to be simplified. The quality of the results overall should be interpreted with caution due to the assessment methodology not being fully similar across Networks, for example, the interviews using the INP assessment tool are not always objective and consistent.

One of the major drawbacks of the tool that became apparent during the discussions at the August project workshop and during the data collection process was that the assessment tool was mainly focused on human health. While some Networks did also conduct an assessment for animal health, this was not standard among the Networks.

The timeframe of the project was also short and meant that a range of activities needed to be fitted into a short duration including data collection, workshops, analysis and final report writing. It is recommended that future projects develop substantial time for data collection piloting of the assessment tool as the time for piloting the tool was short and the refinements that could be made to the tool were limited due to timing and also the complexity of Jotform.

9 Conclusion

To our knowledge, the INP is the first multi-country assessment of event-based surveillance systems and process with an emphasis on cross-border areas. In summary, the results of the INP demonstrate that event based surveillance systems exist at national and cross-border level, and to some extent there are there processes and guidelines present, but further work is needed to develop standard guidelines and operating procedures in key domains, including but not limited to, outbreak detection and defined action thresholds.

There is a clear need to develop data collection systems and processes with regard to event based surveillance at both the national and cross-border level that are able to enable the real-time collection and transmission of data. While a variety of digital tools were identified nationally, paper-based data collection systems are standard across all countries and in the majority of cross-border areas. Further work is needed to develop the use of rumour logs and to record data from this source. The community is an important source of public health reporting and it is important to explore and develop their role in reporting and improve the systems and tools in which they report.

While there is evidence of intersectoral collaboration at the national and cross-border level, further development of guidelines and procedures is needed to operationalise particular areas with regard to sharing relevant disease surveillance data and information and the legal/policy authorities who are responsible for this.
10 Exchange visits

InterNetwork Project field visits in Tanzania

During the InterNetwork Project (INP) visit to Tanzania in December 2018, the six CORDS member networks and members of the Secretariat including Lisa Danquah the Project Manager, undertook several field visits. The objective of these visits was community engagement and identification of gaps in the field experience of AfyaData use in the field, appreciation of the One Health need, and to understand event based surveillance (EBS) within cross-border areas and the opportunities and challenges related to it.

On the 18th of December they visited the Ngorongoro Conversation Area and met with Sarah, a local Maasai community health reporter, who discussed her experience of using AfyaData within the area. The team also visited the local community radio station (Korongoro FM) that is to be launched soon. Colleagues and locals discussed the challenges and opportunities involved in EBS surveillance in the One Health domain, for example, in the case of Sarah, she explained to CORDS team that AfyaData has facilitate her in being able to conduct community level reporting of human and animal health events in her community. She explained that she enjoyed using AfyaData and the feedback it provides her. Some of the challenges she discussed included the geographical distances she has to cover in her community and their health needs.

Photos: Meeting with Sarah (Maasai community health worker) and Korongoro FM Radio station visit
The next visit was to Loliondo on the 19th of December, to the Ngorongoro District Headquarters where they met with District Officials before moving on to Ololosokwan where they met with the local councillor. The District officials presented on the challenges they face in relation to monitoring and reporting animal health events, and again issues including distance, the workload and delays associated with a paper-based system and geographical distance covered were discussed. They then visited the main cross-border Tanzania-Kenya site of Njoroi village – Ololosokwan Ward, where they discussed border activities and opportunities to strengthen local EBS. Key issues discussed here including the distances travelled to health facilities for community members, particularly pregnant woman and the benefits of using AfyaData in this context.

Photo: Meeting with the community leader and community members in Ololosokwan Ward

SACIDS and CORDS Secretariat visit to Thailand

Following the December exchange visit to Tanzania of the sixteen individuals from the six CORDS Member Networks to learn experiences, good practices and challenges on the use of digital technology (AfyaData) in EBS. Successively, from February 23-25, 2019, Calvin Sindato and Eric Beda from SACIDS Foundation for One Health accompanied with Sabrina Salem from CORDS visited Thailand to learn and exchange experiences on the use of digital technology in EBS in exchange for the SACIDS Foundation for One Health hosting the December exchange visit. They visited Mukdahan Province Health Office, Mukdahan Province Hospital, a health centre in Mukdahan Province, and a health promotion hospital in Mukdahan Province.
Photo: Visitation at health promotion hospital in Mukdahan Province

Photo: Visitation at Mukdahan Province Health Office, in Mukdahan Province
They also visited the Thai-Lao cross-border ecosystem to learn practices on disease prevention strategies. They ended the trip by visiting Chiang Mai University to learn and exchange experiences on the use of PODD and AfyaData in disease surveillance in human and animal populations and their environment.

Photo: Visitation at Chiang Mai University
During the trip, collaborative opportunities were identified including the potential to revolutionise the paper-based reporting system to digital system to enhance early containment of disease outbreaks.

11 Phase 3 – Development of a follow-up project

Overview

The final phase of the project was for each Network to develop a concept note for a follow-up project based on the consensus reached for the key elements that a follow-up project should address. The purpose of the follow-up project to the INP was for each Network to propose a follow-up project that is specific to their Network based on the results of the INP in their Network, and overall scope and considerations discussed and agreed at the INP Workshop in Tanzania in December 2018.

Consensus of the follow-up project

At the INP Tanzania workshop, the following consensus was reached for the focus of the follow-up project by the Technical Working Group (TWG):

- Event Based Surveillance (EBS) focused
- Capacity building
- Community level reporting
• Cross-border areas
• Use of digital and other tools for early warning
• Improving laboratory verification
• Improving time to detect

Scope of the follow-up project

The scope of the project as agreed by the Networks at the workshop was as follows:

• The TWG proposed that each Network identifies two countries willing to collaborate at cross-border level for a pilot EBS project

• Collaboration with WHO, FAO and OIE from the project onset and collaborative work with the Ministries of Health, Agriculture and Livestock from the onset to build ownership and sustainability

• Allow for Network specificities to be taken into account

• Best digital tools to be used in each Network and possible transfer of tools between Networks

Network-specific follow-up project background and aims/objectives

The rationale from each Network is described and a brief description of how they propose to conduct their project. The full concept notes for MECIDS and SECID were not received so the information presented here is taken from their presentations on their proposed follow-up projects given in February 2019.

APEIR

Background

Infectious diseases that continue to burden on public health around the world has potential to increase the morbidity and mortality. At least 25% of about 60 million deaths that occur worldwide each year are estimated to be due to infectious diseases (Bhatta et al, 2014). On the other hand, new resistance mechanisms of antimicrobial are emerging and spreading globally, threatening the ability to treat common infectious diseases and resulting in prolonged illness, disability and death (WHO, 2019). Without effective antimicrobials for prevention and treatment of infections, medical procedures become very high-risk (WHO, 2019).

In tackling those issues, an effective surveillance system is critical to inform early detection, prevention, and control measures of health-related data needed for the planning, implementation, and evaluation of public health practice (Nii Trebi, 2017). The essential need for robust centre surveillance systems is emphasized by World Health Organization to allow early recognition of new infections and also monitoring growing resistance to antimicrobial drugs (WHO, 2019). Each country is encouraged to have an information system for public health surveillance that aims to monitor and clarify the epidemiology of health problems, to allow priorities to be set and to inform public health policy and strategies (WHO, 2018).
In Indonesia and Vietnam, the surveillance system is in place under the Ministry of Health for human health and under the Ministry of Agriculture for animal health. However, each of surveillance system has its own format and sometimes the reporting format from the local, regional, and laboratory does not align with the national format. Moreover, in Indonesia, integrated surveillance system has been initiated by Coordinating Ministry for Human Development and Cultural Affairs (HDC), but the implementation has not completed. As the result, early detection and response have not been achieved since the information gathered is unstructured, not real-time, and unconnected.

The follow-up project proposed seeks to address these issues by establishing standardised, real-time and integrated reporting and surveillance system. This reporting system will be based at community level (community health centre, disease investigation centre, hospital, or clinic). This project also aims to enhance community empowerment through monitoring media reports, blogs, or social media in reporting public health event related to infectious disease cases. This event-based surveillance is also important because events reported through informal channels commonly involve unconfirmed media reports, they must be verified before any action is taken. Thus, this system is significant for developing early detection and response in order to prevent and control infectious disease and AMR threats in the countries.

Aim/objective

To enhance standardised and integrated surveillance system to provide a more complete picture of potential disease and allow relevant institution(s) to take early detection of and response to potential infectious disease event and AMR surveillance in order to strengthen health and security among local and national areas.

EAIDSNet

Background

Each of the Partner States of the East African Community experiences several outbreaks due to communicable diseases every year. The outbreaks that include cholera, anthrax, measles, dengue fever, yellow fever, Rift Valley fever and Marburg and Ebola virus fever are a common threat. Typically, these outbreaks are reported late, and response is also provided too late which results in high morbidity, mortality and human suffering. The outbreaks also involve both livestock and wild animals and sometimes cross-borders, resulting in economic loss to a poor region.

The CORDS Internetwork Project (INP) found that at the national level are Public Health Emergency Operation Centres (PHEOC) which coordinate event-based surveillance and receive information on public health events from the entirety of their respective countries. There was evidence to show that disease occurrence data are shared among relevant sectors and also with neighbouring countries. At the cross-border level, and especially in neighbourhoods of busy points of entry with elevated potential for cross-border transmission of disease, the INP found that the systems for reporting of acute public health events were inadequate. The health facilities did not make use of rumour logs and they did not have dedicated staff to manage disease surveillance. The reporting of public health events followed the IDSR guidelines of indicator-based surveillance, where conditions were reported mainly in accordance with case definitions already provided. Digital systems were used for transmission of aggregated data that had mainly been collected on paper-based forms. There were hardly any datasets at the cross-border facilities. The ones noted in a few cases were of vertical
research programs. Inter-sectoral collaboration was conducted on ad-hoc mode during outbreaks and emergencies. Otherwise, ordinarily sectors rarely worked jointly. The low level health workers did not know that there were mechanisms for cross-border collaboration between countries.

Given the above, the opinion was made that even if national systems appeared to be elaborate and well resourced, the source of information at the community level was not good enough. Therefore, data collected at national level may not be complete. There is therefore need to strengthen early warning and response systems at community level, and especially in cross-border areas. This would go a great length in satisfying the vision and ideals of the international Health Regulations 2005—to build capacities in Member States to contain events with potential to become public health emergencies of international concern. Many approaches may be adopted including increasing personnel quantity and quality. Using digital systems for data collection in a One Health approach would also form a cost-effective mechanism to collect data on animal, human and environmental conditions thus avoiding vertical actions. A system that would allow data to be easily shared among relevant sectors would thus avoiding duplication of effort.

Aim

The aim of this project would be to develop and pilot an effective digital system for community-based surveillance to enable the real-time detection of, and respond to, One Health priorities in order to strengthen health and security in cross-border areas of East Africa.

MBDS

Background

Three Mekong Basin Disease Surveillance (MBDS) countries, Lao P.D.R, Thailand and Vietnam, were included in the implementation for INP Phase I. The afore-mentioned countries’ health officials at national and cross border level from Ministry of Health were involved for disease surveillance and control, including event-based surveillance.

Seeing the benefits of assessment tool, the following cross border provinces from Phase I will be continued for sustainability and maintain their capacity in EBS.

- Mukdahan Province (Thailand) - Savannakhet Province (Lao P.D.R)
- Savannakhet Province (Lao P.D.R) - Quang Tri Province (Vietnam)
- Nongkhai Province (Thailand) – Vientiane Province (Lao P.D.R)
- Khammouane Province (Lao P.D.R) – Nakorn Panom Province (Thailand)

Those cross-border provinces have been initially selected in this activity for several reasons: they are international border check points and are situated in the special economic zones. As a result, those border areas play very important role in socio economics aspects, cultural aspects and health aspects. Very active daily cross border crossings, and different social dynamism in the population will also be found. Most importantly, the border sites share disease surveillance information as a collaborative effort to detect public health emergency of international concern.
With INP Phase II, those provinces will continue the momentum of reporting, strengthen and collaborate in early detection and outbreak responses activities among cross border sites. In addition, the best practices of the border sites can also be shared with other border sites while capacity for one health activity

Aim/objective

General objective

The overall objective of this project is to enable the real-time detection of, and respond to, One Health priorities, in order to strengthen health and security among local communities in cross-border areas.

Specific objectives

- To identify current event-based surveillance systems and practices in human and animal health events from international cross-border provinces
- To exchange best practices across and within regions to enhance cross-border health security
- To strengthen local capacity in one health collaboration

MECIDS

Background

In a follow up project to the initial CORDS project using the INP tool, the MECIDS Network propose to enhance regional surveillance through providing surveillance data at a timeline not achieved by WHO with the aim of complementing the data obtained by WHO. To achieve this a list of priority diseases will be selected based on the expertise of individuals at each specific network.

Aim/objective

To improve on the gaps identified in the pilot INP study in order to enhance intersectoral collaboration and interactions between members of the CORDS Network. Through laboratory confirmation both IBS and EBS can be improved through the characterisation of an etiological agent.

SACIDS

Background

The World Health Organization has defined two main types of surveillance systems used to identify and track infectious diseases and other public health events, specifically the (i) indicator based surveillance (IBS), which is typically a structured and traditional process that involves reports of specific diseases from healthcare providers and (ii) Event-based surveillance (EBS) that relies on unstructured reports, stories, rumours and other information on events that could pose a serious risk to public health. The ability to take prompt and effective action to contain threats to national and global health security depends on the ability of surveillance systems to provide early warning of outbreaks and other events. Event-based surveillance scans through reports, stories, rumours, and other information about health
events that could be a serious risk to public health before the cases occur or before the events are detected through IBS. The primary goal of EBS is to detect as early as possible unusual events before they turn to outbreak, and therefore as a key component of early warning and response system, it significantly increases sensitivity of IBS.

Assessment of presence and functionalities of EBS has been conducted in human and animal health domains in the cross-border ecosystems of Tanzania and Uganda by SACIDS Foundation for One Health through Connecting Organization for Regional Disease Surveillance in 2018. The assessment detected strengths regarding EBS, which included presence of EBS in human health domain in the countries, staff working on EBS at national level, coordination units at national level, electronic data capture mechanism for data been submitted from district level to national level and centralised electronic database to record EBS data at national level. One Health coordination desk was in place at national level in Tanzania. Community Health Attendants (CHAs) were in place and working on voluntary basis at community level in Tanzania and Uganda.

The challenges/gaps detected at all levels included absence of standard operating procedures for EBS, One Health approach in EBS and data sharing practices between relevant sectors within and between countries. At district and community levels, EBS was in place for specific public health programmes and not for general public health events. Event-based surveillance was not in place in animal health domain at all levels. Community Health Attendants were working for specific public health programmes and not on general health events surveillance. The mechanism of EBS data capture at community level was paper-based and data was submitted by physical visitation to higher levels mainly on monthly basis and therefore not enhancing early warning system. There was no feedback to data collectors at all levels. There was no operational EBS coordination unit at district and community levels. In addition, there were no dedicated staff for EBS at district and community levels. There was no evidence of established frameworks or standard protocols for intercountry/cross-border collaboration relating to disease surveillance. The relatively well established EBS at national level was not reflected at district and community levels. The recording systems at all levels could not support abstraction of outbreaks detected by EBS. From primary health care facilities to the national level, it was not clear at what stage the EBS data was treated as IBS data. Cross-border disease surveillance committees were in place but not operational. Understaffing, insufficient training at all levels and inadequate engagement of community were reported as the factors negatively affecting the operationalization and performance of EBS.

Based on the results of the assessment, it is reasonable to suggest that the EBS was relatively much more strengthened at the national level than the district and community levels. This observation suggests that EBS strategies in the sites were not set to support early detection, timely reporting and prompt response. Based on the fact that disease outbreaks typically erupt at community level, and that most communities are located in the remote locations with poor infrastructure, it is plausible to suggest that there is a need for system rethinking for innovative approaches to enhance active participation of community and ownership of disease prevention and control strategies. To be cost-effective, CHAs (also been referred in this proposal as community-based volunteers) could be targeted for training initiatives to enhance implementation of EBS for general public health using One Health approach.

The cross-border areas reported in this assessment were characterised by features which could be amongst the factors promoting interaction between humans and animals. These features, which were unevenly distributed, included some border areas serving as entry point for importation of commodities and presence in some border areas of groceries and shopping centres. This observation highlights the need for collaborative implementation of EBS in the cross-border areas. However, the results of assessment have shown further that there was limited intersectoral collaboration and data sharing practices within and between the countries were not in place. Intersectoral collaboration should be strengthened within and between
countries using One Health approach to make EBS strategies more effective. This recommendation is supported by the fact that approximately 70% of emerging diseases of humans we are witnessing today originated from animals.

Absence of the guidelines and standard operating procedures (SOPs) for EBS at community level could be amongst the limiting factors for appropriate implementation of EBS. Incidentally, the ministry responsible for human health in Tanzania is currently developing guidelines and SOPs for EBS. Development and implementation of EBS through One Health approach would be more effective. There is a need to establish frameworks and standard protocols for intercountry/cross-border collaboration relating to disease surveillance. The cross-border disease surveillance committees which have been formulated should be activated to support EBS in the cross-border ecosystems. To meet the early warning and alert requirements of the International Health Regulations, there is a need to strengthen EBS at all levels. Based on our experience at the SACIDS Foundation for One Health on the use of digital technology to enhance EBS, community mobile participatory surveillance and access to digital actionable data will improve epidemiologic intelligence, preparedness and response capacities at all levels and shorten the time to detect and time to respond to an outbreak. It is therefore against this background we are proposing the strategies to contribute to the strengthening of EBS in the communities of cross-border ecosystems.

Aim

The overall aim is to enhance community-level One Health security in the cross-border ecosystems

SECID

Background

Event based Surveillance systems have been assessed in three cross-border countries namely Albania, Kosovo and Macedonia and results were discussed with all SECID member countries. Similar findings on the EBS practices were observed in other member and the situation appears comparable for the whole cross-border areas in the SEE region.

The cross-border assessment of EBS in Albania, Kosovo* and Macedonia showed the lack of appropriate notification of events at both community and cross-border level. Two main elements which currently are missing have been identified as crucial to enable the EBS at community level, namely: i) the guidelines and protocols establishing EBS and ii) the digitalization of the system. While some examples of good practice in detecting and following-up events currently exist, there are, however, no definitions in place, no reporting means and no standard procedures to verify, follow-up and respond to events. There is some degree of digitalization of the information through e-mails from the district level upwards, but this is not a substitute of a regular system. Meanwhile from the community level up to district structures, formal means of communication are missing. There is therefore a clear need to prepare guidelines and protocols and to create appropriate digital tools to enable event reporting.

From the assessment, it was evident that human and animal health sectors do not have a continuous exchange of information and usually communicate only for major outbreaks. Cross notification of events from both sides is neglected and thus the capability for early detection of events is decreased. In principle, each case of any zoonotic disease in animals is considered
an event of public health significance and vice versa; therefore, real-time exchange of information between human and veterinary services is essential. To this end, standardised SOPs for data sharing and joint investigation protocols should be developed and implemented in order to enable cross-sectoral collaboration.

Cross-border collaboration exists only at national level and is missing between adjoining districts at border level. Direct communication and cross-border notification at bordering districts would facilitate a faster event verification procedure on each side of the border thus enabling a parallel and coordinated response at each level. Joint and standardized cross-border event notification protocols need to be developed and respective local staff should be trained jointly to increase the capacities and capabilities for early detection and response of events at cross-border district levels.

Aim/objective

Aim

Empowering cross-border communities and local public health structures to improve early detection and response to cross-border events and ensure health and security in cross-border areas.

Improve the capacity of the vet and Puh service of the SECID member states for the rapid detection and response to transboundary cross-border disease threats

Objectives

- To establish One Health event-based surveillance at community level in cross-border areas of SEE Region by implementing new ITC solutions;
- To improve the capacities for risk analysis both for events and indicators;
- To design and coordinate an effective cross-border all hazard threats response capacity;
- To enhance and formalise the communication and collaboration among professionals of different sectors in cross-border areas;
- To increase the level of knowledge and awareness of the importance of health event detection and reporting in communities in cross-border areas.
Appendices

Appendix 1 Governance of the INP

**Project Steering Committee (SC)**

- **Role of the SC**

  The role of the InterNetwork Project (INP) Steering Committee was as follows:
  
  ✓ Ensure that the project is aligned with CORDS strategy, and the one of individual Networks;
  
  ✓ Set goals, desired outcomes, and strategic approach to the project;
  
  ✓ Agree on success indicators, project deliverables and M&E framework;
  
  ✓ Represent the interests of project stakeholders;
  
  ✓ Establish a Technical Working Group (TWG), composed of staff from every Network who are responsible for leading on technical aspects of the project;
  
  ✓ Attend regular meetings of the SC and actively participate through discussion, and review of minutes, papers and other documents;
  
  ✓ Review and approve regular Technical Working Group reports;
  
  ✓ Assess project progress and report on project to CORDS Board;
  
  ✓ Ensure project makes good use of resources;
  
  ✓ Use influence and authority to assist the project in achieving its outcomes;
  
  ✓ Assist with resolving strategic level issues and risks;
  
  ✓ Approve or reject changes to the project with a high impact on timelines and budget;
  
  ✓ Approve final project deliverables;
  
  ✓ Act on opportunities to communicate about the project.

- **SC Membership**

  The table below lists the membership of the INP Steering Committee.

<table>
<thead>
<tr>
<th>Member</th>
<th>Organization</th>
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<tbody>
<tr>
<td>Silvia Bino (SC Chair)</td>
<td>SECID</td>
</tr>
<tr>
<td>Amin Soebandrio</td>
<td>APEIR</td>
</tr>
<tr>
<td>Julius Lutwama</td>
<td>EAIDSNet</td>
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<tr>
<td>Moe Ko Oo</td>
<td>MBDS</td>
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Technical working group (TWG)

- Role of the TWG

The role of the INP Technical Working Group is as follows:

- Develop a framework and methodology for assessing current early warning and response systems and practices in human and animal health events from cross-border communities, taking into account the “Time to Detect- Time to Respond” indicators (inter alia);

- Organize, in each of the Network regions, the assessment of the EWAR systems, including paper-based, digital and other mechanisms of early detection of outbreaks. Each TWG member will be responsible for implementing the assessment in her/his Network;

- Make monthly progress reports for the Steering Committee;

- Make a general report to the SC on the results of the assessment of the alert and response systems in each of the Networks;

- Organize exchange of best practices across regions by convening internetwork meetings and exchange visits;

- Identify promising EWAR digital tools and systems which can further empower communities and enhance cross-border health security in the different Networks;

- Draft and submit to the SC, for further discussion and validation, a new follow-up project where identified best practices would be scaled-up and replicated with adaptation in different Networks.

- TWG Membership

The table below lists the membership of the INP Technical Working Group.

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
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<tbody>
<tr>
<td>Calvin Sindato (TWG Chair)</td>
<td>SACIDS</td>
</tr>
<tr>
<td>Eric Beda</td>
<td>SACIDS</td>
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<tr>
<td>Nurul Huda</td>
<td>APEIR</td>
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<tr>
<td>Name</td>
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<tr>
<td>Jonilda Sulo</td>
<td>SECID</td>
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<tr>
<td>Jittra Thajeen</td>
<td>MBDS</td>
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<tr>
<td>Ruthi Yishai</td>
<td>MECIDS</td>
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<tr>
<td>Willy Were</td>
<td>EAIDSNet</td>
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<tr>
<td>Louise Gresham</td>
<td>Ending Pandemics</td>
</tr>
<tr>
<td>Lisa Danquah (project manager)</td>
<td>CORDS</td>
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<tr>
<td>Sabrina Salem</td>
<td>CORDS</td>
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