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Assessing Event-based Surveillance Capacity in Siaya County, Kenya for Detection of Respiratory Events

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2013

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Abstract

Assessing Event-based Surveillance Capacity in Siaya County, Kenya for Detection of Respiratory Events

Background: Emerging diseases with potential to cause pandemics such as MERS and influenza virus H7N9 are a constant threat to the world. Centers for Disease Control and Prevention (CDC) is working with the Kenyan Ministry of Health (MoH) to help strengthen their global health security for respiratory threats. Detecting and Responding to Respiratory Events (DaRRE), a CDC initiative, is focused on strengthening and improving respiratory surveillance in Kenya by expanding the number of hospitals with severe acute respiratory infection (SARI) surveillance, increasing laboratory and outbreak capacity, and implementing event-based surveillance (EBS) for rapid detection and response to respiratory events. This special studies project aims to learn Kenya's current system of respiratory event reporting and develop training materials for the implementation of EBS.

Project Objective: To assess the current situation of respiratory event reporting in communities in Kenya and to increase knowledge of CHVs on respiratory events of interest

Methods: Questionnaires were given to 44 community health volunteers (CHVs) in Siaya County, Kenya. Semi-structured interviews were held with the community health extensions worker (CHEW) at Mulaha Dispensary and the county surveillance officer of Siaya County. Information obtained from the questionnaires and interviews were used to help determine what training materials are necessary for implementing EBS at the community level.

Deliverables: Deliverables include a comprehensive training manual for community health volunteers (CHVs) to learn about EBS and how it is conducted in the community. A list of important events of public health importance is detailed in the manual for CHVs to detect and report according to proper EBS guidelines.

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List of Acronyms

CDC – Centers for Disease Control and Prevention

CEBS – Community Event-based Surveillance

CHEW – Community Health Extension Worker

CHW – Community Health Volunteer

DaRRE – Detecting and Responding to Respiratory Events

DHMT – District Health Management Team

EBS – Event-based Surveillance

EVD – Ebola Virus Disease

FELTP – Field Epidemiology Leadership Training Pogram

IBS – Indicator-based Surveillance

IHR – International Health Regulations

IRC – International Rescue Committee

MERS-CoV – Middle East Respiratory Syndrome Corona Virus

MoH – Ministry of Health

PAHO- Pan America Health Organization

SARI – Severe Acute Respiratory Infections

SARS-CoV – Severe Acute Respiratory Syndorme Corona Virus

VHV – Village Health Volunteers

WHO – World Health Organization

Chapter One: Introduction

Background

Kenya is a lower middle-income country located in Eastern Africa and has a GDP per capita of $3,400. Kenya is home to 47.6 million people. The average life expectancy of the population is 64 years and the average literacy rate is 78%. Kenya has a high rate of water-borne and mosquito-borne diseases. The top three causes of mortality in Kenya are from HIV/AIDS, diarrheal diseases, and lower respiratory infections. Unsafe sex, child and maternal malnutrition, unsafe water, sanitation, and hygiene are the leading risk factors contributing to mortality and morbidity in the country.

Health Service Structure in Kenya

The Kenyan Ministry of Health (MoH) has implemented a community-based approach to increase community access to healthcare in order to reduce poverty, hunger, and child and maternal deaths. The community approach enables community members without readily available health services to strengthen their role in health related issues through increase of knowledge and skills. As a result, individuals actively engaged in the health activities focused on the individual and household level are able to contribute effectively to the country's socio-economic development.

The community based approach functions on a multi-level structure. The different levels of the health structure differ in resources, types of services provided, and the number of skilled health professionals available. Higher levels in the health system structure are able to provide specialized and complex services. Complicated cases that cannot be treated at a lower level are referred to the next level up.

Level one of the health structure consist of the community that includes services at the village, household, family, and individual level. Community health volunteers (CHVs) are the main service providers in the community and are the primary link between the household and the national health system. Generally, a CHV is someone who is well respected and known throughout the community. They are responsible for visiting each household in a community to assess the health situation and needs of the home and are responsible for teaching them healthy practices. CHVs educate the community on reproductive health, nutrition, immunizations, and other health related topics. They treat common ailments but refer cases that are more serious to the nearest health facility. CHVs are also required to maintain and keep records of all house visits, patient referrals, and other community health related events.

Community health extension workers (CHEWs) supervise the CHVs. They work at clinics/dispensaries, which are part of the second level of the health structure. CHEWs facilitate the provision of quality services by CHWs and ensure a smooth referral process for linking the community to level 2 and level 3 health facilities. Unlike CHVs, a CHEW has some type of formal training in nursing, public health, or community development. They are responsible for training the CHVs and meeting with them on a regular basis. CHEWs monitor trends of key health data and submit monthly reports to the sub-county health officials.

Level 4 and level 5 of the health structure are situated at the sub-county and county level. Level 4 health services are provided at primary hospitals and level 5 health services are provided at secondary hospitals. The last level of the structure, level 6, consists of tertiary hospitals and teaching hospitals.

Centers for Disease Control and Prevention in Kenya

Centers for Disease Control and Prevention (CDC) is working to strengthen global health security for respiratory threats in Kenya through their multi-component project, Detecting and Responding to Respiratory Events (DaRRE). In collaboration with MoH, CDC would like to build upon the existing severe acute respiratory infections (SARI) surveillance at six sentinel surveillance hospitals and increase laboratory and outbreak response capacity. DaRRE's strategy is to develop a toolkit that will include training materials and guidelines on risk assessment, specimen collection and transport, data management, contact tracing, diagnostic testing, and disease control.

Through DaRRE initiatives, CDC has provided two BACTEC machines at two health facilitates sites, conducted laboratory visits, and provided laboratory training. In addition, Field Epidemiology Leadership Training Program (FELTP) have been trained on DaRRE's mission and goals. Plans for DaRRE include adding additional sites to the existing group of sentinel surveillance hospitals, enhancing laboratory capacity to include multi-pathogen testing, and improving detection to respiratory events through implementation of event based surveillance (EBS).

Problem Statement

The emergence of novel respiratory pathogens such as severe acute respiratory syndrome coronavirus (SARS-CoV), Middle East respiratory syndrome coronavirus (MERS-CoV), and influenza H7N9 have great potential to cause pandemics and are a constant threat to Kenya's health security. Specifically, MERS-CoV is of high concern because detecting novel pathogens as early as possible is one way to prevent outbreaks of diseases from becoming epidemics and possibly pandemics. Therefore, there is a need to implement EBS in Kenya for improved and early detection of respiratory events.

Purpose Statement

The purpose of this project is to understand how respiratory events are detected and reported at the community level and to develop training materials for raising awareness of respiratory events among CHVs.

Objectives

- To assess the current situation of respiratory event reporting in communities in Kenya
- To increase knowledge of CHVs on respiratory events of interest

Significance Statement

This special studies project will help fulfill one of the aims of DaRRE by enhancing respiratory illness surveillance through the implementation of EBS at the community level by training CHVs to detect unusual respiratory events

Chapter Two: Literature Review

The purpose of this literature review is to provide background information on the specific details of EBS. A description of what EBS is and how it works will be discussed. In addition, several examples of implementation and evaluation of EBS systems in different settings will be looked at. Information obtained from this literature review is helpful for understanding how to successfully and efficiently implement EBS in Kenya for the detection of unusual respiratory events.

Background

EBS is the "organized and rapid capture of information about events that are a potential risk to public health" (WHO, 2008). It involves the detection, reporting, confirmation, and assessment of public health events through unstructured reports (MacDonald, 2011; Keller, 2009). An event can be anything related to the occurrence of disease in humans or related to potential exposure for humans. A cluster of cases of a certain disease, unexpected deaths in a community, deaths in animals, or environmental hazards are all considered reportable events. Information about such events can be received either through formal channels such as routine surveillance systems or informal channels such as rumors, media, internet, or health workers (Keller, 2009). For example, text messages from a community in New York City were used to capture acute respiratory infections and electronic sources like HealthMap and Google were used to monitor Dengue in Latin America (Stockwell, 2014; Hoen, 2012).

EBS is complementary to indicator-based surveillance (IBS) as it is designed to detect rare and new events that are not included in routine IBS or it can also be useful for detecting events occurring in populations without access to health care (WHO, 2008). IBS which is a routine reporting system of cases is primarily conducted at health facilities. Typically IBS reporting is done on a weekly or monthly basis; however, EBS reporting is done immediately

and responses to reported events are done immediately. Response time in IBS is delayed because of the time that that is taken to collect and analyze data. IBS definitions of reportable cases are clearly delineated based on clinical presentation and laboratory criteria while events in EBS are broad and less specific. A country should have a functioning IBS system in place before it can implement EBS. Ideally they should work together as single national surveillance system (WHO, 2008).

Before EBS can be implemented in a country, an event assessment team and rapid response team should exist (WHO, 2008). Capacity for EBS involves having a team to assess each reported event and a separate team to respond rapidly to each event. Because data collected through EBS is unstructured and can come directly from the general public, every event that is reported needs to be verified. At a minimum, a national and local response team should exist with access to specialist skills such as infection control and risk communication. Capacity for managing the hotline number should be established and an efficient data management system is required to ensure all calls are logged and basic information is collected. A designated team responsible for screening the media is needed on a daily basis to search for possible alerts on news channels, online sources, and other media outlets. Additional information on events of concern can be obtained by visiting hospitals, laboratories, or schools. If the event is confirmed as a risk to public health, further action is taken to appropriately respond to the event.

An essential part to EBS is the method of communication that is used for event reporting. A toll-free hotline number where people can call in 24 hours a day, 7 days a week is optimal. This number should be accessible to the general public or to anyone that is expected to participate in reporting events. Other methods of communication can include SMS, HF/VHF

radio communication, fax, and emails. A single number for phone calls and SMS should be used to avoid confusion.

Each event that is reported should be captured in a database where the outcomes, assessment, and subsequent responses are logged (WHO, 2008). Information recorded for each event should include a unique identifier, geographical area, date and time of the event, and description of the event. Additional information on the event is often obtained during the event confirmation and should also be recorded in the database. It is imperative that every event reported is followed up on and that every action taken regarding the event is recorded in the database. Following up on an event includes confirming the event as a risk to the public, implementing appropriate control measures, and providing data to all the stakeholders involved in the event response. Missing information in the database or failing to follow up on an event can hinder the competence of EBS as can limited human and financial resources. In that event, resources available at the national level become essential if resources at the local level are limited.

The revised International Health Regulations (IHR) (2005) first introduced EBS to WHO member states to mandate reporting of any event that may constitute as a public health emergency of international concern (PHEIC) (Li, 2013). By 2012, WHO member states were expected to have established EBS for reporting events involving disease or death above expected levels and to report essential information to the appropriate public health authority. IHR (2005) advises countries to implement EBS at the community level but event reporting can also be done by health professionals including clinicians and laboratories. A toolkit was developed to educate and raise awareness of event reporting among healthcare workers and health professionals (MacDonald, 2011). The toolkit includes training materials and an implementation plan. Key

messages on why unusual reports should be reported, what events are reportable, how to report an unusual event, and what happens after reporting an event is detailed in the toolkit. Awareness campaign tools such as leaflets and posters were created for clinicians and laboratories. Educational and training materials included lecture, notes, and a discussion workshop package. The toolkit is designed to provide guidance on the core requirements of EBS but should be amended according to country specific needs before dissemination (Macdonald 2011).

An extensive systematic literature review was conducted by the Norwegian Institute of Public Health prior to developing the toolkit to find information on obstacles and incentives for event reporting at local and regional levels. Ovid was used to search Medline and Embase for publications ranging 1990 to 2009. Key words such as "early identification," "event monitor," and "population surveillance" were used in the literature search (MacDonald, 2011). In addition to the systematic review, expert consultations with European public health professionals were conducted to gather information on the expectations and feasibility of event reporting. Data obtained from the open-ended interviews were analyzed Richie and Spencer's Framework analysis technique. Results from the systematic review and expert consultations lead to the creation of the toolkit.

Sierra Leone

During the Ebola outbreak in 2014, EBS was implemented in 9 of the 14 districts in Sierra Leone to strengthen the country's Ebola surveillance and response capabilities. International Rescue Committee (IRC), the Sierra Leone-Bo District Health Management Team (DHMT), and CDC came together to develop the Community Events-Based Surveillance system (CEBS) (MMWR, 2015). The purpose of CEBS was to supplement case finding and contact tracing (MMWR, 2015). Community health monitors (volunteers from the community)

comprised of teachers, farmers, and other knowledgeable community members were trained to detect and report on six trigger events: two or more household members become sick or die within a short period of time, anyone becomes sick or dies within three weeks of taking part in an unsafe burial or washing/touching a corpse, any healthcare worker or traditional healer becomes sick or dies of an unknown cause, any traveler becomes sick or dies, anyone who was a contact of a suspect Ebola virus disease (EVD) becomes sick or dies, and any unsafe burial or washing of a dead body that took place in the village or surrounding community (this trigger would alert the surveillance team that there might be cases in the near future) (Stone, 2016).

Community health monitors, who were not given any incentives or compensation for their work, immediately reported any of the trigger events to the Community Surveillance Supervisor through use of mobile phones given to them by the CEBS management team. (Jia, 2015). Age, sex, name and location of the suspect or deceased case were recorded in a logbook (Stone, 2016). The Community Surveillance Supervisor along with a clinically trained MoH staff conducted a preliminary screening of the alert and determined whether District Ebola Response Center was needed to conduct a formal investigation (MMWR, 2015).

Assessment of CEBS found that it effectively generated alerts and detected nearly one third of all known EVD cases in the districts where CEBS was implemented (Ratnayake, 2016). Additionally, three measles outbreaks were detected through CEBS. One disadvantage seen by CEBS was that the triggers favored deaths over live alerts. Community health monitors, on average, recalled three out of the six triggers and the most commonly remembered triggers were ones involving a death. More than half of the events reported by community health monitors were deaths, most of which were not linked to EVD (Stone, 2016). The lack of sensitivity to capture EVD may be due to trigger events not being specific enough for EVD cases.

Overall, CEBS has shown that community volunteers are capable of detecting and reporting important health events (Stone, 2016). Trigger definitions should be simple and extensive training of community health monitors is needed to ensure adequate reporting of events (Ratnayake, 2016).

Vietnam

Vietnam is a popular tourist destination making it at risk for introduction of infectious diseases that may spread throughout the country. CDC is working in Vietnam to implement EBS so that community members are able to recognize and report unusual disease events (CDC, 2016). Community members will be trained to report events to local public health officials through a telephone hotline. Public health professionals investigate the events and determine if further action is needed from the MoH (CDC, 2016). CDC and MoH will work together to train people at the national, provincial, district, and commune level on how to identify potential outbreaks, report on events, and how to respond in a timely manner (CDC, 2016). EBS guidelines will be developed and integrated into routine disease surveillance activities.

Ethiopia

An EBS pilot study was implemented at the health center level in the Amhara Region of north-western Ethiopia. Due to the existing IBS infrastructure, EBS was easily implemented at minimal cost. Rumor logbooks were printed and distributed to 175 health centers (Toyama, 2015). Focal surveillance persons at each health center were given trainings on how to use the rumor logbooks. Community Health Extension Workers (CHEWs) recorded communicable disease outbreaks, unusual health events, and events with multiple deaths from unknown causes. Data recorded in the logbooks include data of event first started, date event was reported, source of rumor, date the health center notified a higher level, date intervention began, and date health

center received response from higher level (Toyama, 2015). Surveillance officers at the district level assisted the health centers with rumor verification. From October 2013 to November 2014, a total of 126 rumors on outbreaks were reported and 64% of those rumors were verified to be true public health events, 13% were ruled out, and 23% did not have records on the results of investigations (Toyama, 2015). Majority of the rumors reported came directly from community members or from health care workers. The EBS pilot study captured eight verified rumors on rabies/dog bites while only one of the cases was captured through routine surveillance (Toyama, 2015). Five cases of anthrax were captured and verified through EBS but only two of these were reported through routine surveillance (Toyama, 2015). The capacity to respond to rumors was seen as a limitation and should be improved in order for EBS to be successful.

Cambodia

In Cambodia from 2000 to 2002 community based EBS was developed and implemented in seven rural communities (Oum, 2005). Community members were trained to be Village Health Volunteers (VHV) to report on suspected outbreaks and important health events occurring in their villages. Standard case definitions for malaria, measles, acute diarrhea, hemorrhagic fever, and chronic cough were used throughout the study to collect information at the village level (Oum, 2005). VHVs immediately reported on clusters of cases but also reported every month the total number of cases each event included through a monthly reporting form. Prior to becoming a VHV, community members went through an initial 3 day training course followed by monthly refresher training courses (Oum, 2005). From August 2000 to September 2002 two outbreaks of malaria, seven outbreaks of acute diarrhea, ten outbreaks of measles, and two clusters of hemorrhagic fevers were captured through EBS (Oum, 2005). All but one of the measles outbreaks were confirmed (based on clinical manifestations) during outbreak

investigations. Information collected from the EBS system enabled health to respond quickly and investigate the outbreaks. The success of EBS in the rural communities can be linked to the relatively easy case definitions for VHVs to remember and the organized two-way flow of information from the community to level up to the central level (Oum, 2005). Some constraints of community EBS included difficulties in collecting data from people living in hard to reach areas and the less than optimal response time to events due to the lack of funding for health services.

Papua New Guinea

In 2009 the Papua New Guinea National Department of Health (NDOH) established an EBS system during the time of the H1N1 influenza pandemic in which several other countries such Mexico were also conducting event-based biosurveillence (Dagina, 2013; Nelson, 2010). One surveillance officer and one administrative officer were responsible for receiving reports from community members, health workers, and the media on potential health events (Dagina, 2013). The reported health events were recorded in a Microsoft Excel spreadsheet and were maintained by an EBS coordinator at NDOH (Dagina, 2013). In addition, the EBS coordinator helped with verification on the reported health events and all findings from the investigations were reported back to the stakeholders. From 2009-2010, there were 61 events reported in the EBS system (Dagina, 2013). Acute watery diarrhea and bloody diarrhea were the most common events reported followed by influenza-like illness and gastrointestinal syndromes (Dagina, 2013). Majority of events were reported from provincial health offices or clinical health workers. The median delay between event onset and date of reporting was ten days (range 0-109 days); there were ten events that took more than thirty days to report. Fifty-one events were verified to be true events, three were discarded to be false reports, and six could not be verified as no clear

pattern to the time of event reporting was available (Dagina, 2013). Papua New Guinea's EBS system meets all the requirements of IHR in terms of EBS but there is still room for improvement. Greater community outreach is needed to increase community participation in event reporting and EBS training should be incorporated into all surveillance training and resource materials.

Haiti

In response to the cholera epidemic in earthquake-devastated Haiti, the Pan American Health Organization (PAHO) of WHO designed an alert and response system for the purpose of saving lives through early detection and treatment of cases and controlling the spread through early intervention (Santa-Olalla, 2013). The case definition used for the alert system was defined as any person with three or more liquid stools with or without vomiting in the last 24 hours (Santa-Olalla, 2013). Alerts of cholera were received by the national alert team through field teams, NGO partners, e-mails, or phone. After the information was received, verification was done as soon as possible and the appropriate response implemented. From November 2010 to November 2011, a total of 863 alerts were received on public health events (Santa-Olalla, 2013). The peak in number of alerts matched the increase in number of new cholera cases based on epidemiological data from the health ministry. Majority of the alerts were related to cholera but some were non-cholera alerts such rabies, acute flaccid paralysis, diphtheria, and varicella. From the total alerts received, over 95% had a documented response and the remainder had no response because the information could not be verified or response was not needed.(Santa-Olalla, 2013). A lack of resources and limited technical capacity presented a challenge to the alert and response system but outbreaks in hard to reach communities were still able to be detected by the alert system.

Mass Gatherings

In addition to low resource countries, mass gatherings are another great environment for EBS. The London 2012 Olympic Games and EXPO Milan 2015 implemented EBS to provide additional epidemic intelligence for monitoring potential health events (Riccardo, 2016; Severi, 2014). In London, EBS was established by building on existing systems that included weekly surveillance reports. An event was defined as "any event in England related to an infectious agent affecting an individual or group of individual that (i) could have put the health of those participating, visiting or working at the Games at significant risk; or (ii) was likely to be/had been the subject of media scrutiny that would harm the perception of the Games; or (iii) may have resulted in wide-spread public concern that needed to be addressed" (Severi, 2014). During the Olympics, 343 events were reported with majority being related to food-borne diseases or vaccine preventable diseases (Severi, 2014). The EBS team assessed all reported events and identified 61 events as significant. (Severi, 2014).

Similarly, Italy implemented EBS for the first during the Milan EXPO which was expected to draw a crowd of 21 million participants (Riccardo, 2016). The same list of diseases and events used for the London Olympics EBS was used for the Milan EXPO EBS (Riccardo, 2016). EBS priority events were defined as any event involving two or more human cases of infectious disease that present an epidemiologic link. A team of infectious diseases specialists, statisticians, and biologists were in charge of the design and management of the surveillance system. The MoH were contacted immediately by email when reported events suggested a possible intentional release of a biological agent. A total of 268 signals were identified as events and 135 of those events were validated, 129 were confirmed, and 6 were false events. (Riccardo,

2016). The most severe event reported was a meningitis outbreak and the most reported events were cases of foodborne illnesses (Riccardo, 2016).

Conclusions

EBS is beneficial for early detection and rapid response to health events in hard to reach communities. Training community members on what events to detect is an important aspect of EBS. A system for verifying and responding to events is necessary in order for EBS to be successful. Despite the benefits of EBS, delay in response time to events and lack of technical capacity may present challenges to EBS.

Chapter Three: Methods

Qualitative methods were used to assess the EBS capacity in Siaya County, Kenya. The purpose of the site visit was to understand the flow of reporting surveillance data from the community level up to the national level. CHVs, one CHEW, and the county surveillance officer were asked questions regarding respiratory event reporting and response.

Community Health Volunteer Questionnaire

A 28 question questionnaire developed by a team from CDC was administered to 44 CHVs at Siaya County Referral Hospital. The questionnaire consisted of multiple choice, yes/no, and free text questions such as:

- How often do you visit your assigned community?
- How are you informed when there is death in the community?
- Where do you record information on community deaths and illness?

CHVs were asked about their role in the community as a CHV. Questions were focused on finding out how health events are detected and reported in the community but personal information such age, gender, and education level were also assed in the questionnaire.

The questionnaire was written in simple English and administered on paper. All 44 CHVs completed the questionnaire on the same day, place and time. A contact person from the hospital notified the CHVs about the questionnaire and arranged for them to come to the hospital. While the CHVs were taking the questionnaire, a staff member from the hospital was on hand to translate questions into the local language for any CHV who had trouble understanding the questions in English since they were all not fluent in English. CHVs were given an unlimited amount of time to complete the questionnaire. They were compensated with free transportation to and from the hospital and a free meal from the hospital canteen.

Semi-structured Interviews with CHEW and County Surveillance Officer

Two separate questionnaires were developed by a team from CDC for interviewing the CHEW and County Surveillance Officer and both were used as interview guides. Interviews with each person lasted for one hour and responses were recorded on the interview guide itself. Not every question on the interview guide was addressed however, additional topics were discussed that were not on the questionnaire.

The interview with the CHEW took place at the Mulaha Dispensary in Siaya County. The CHEW was asked to describe her supervisory role over the CHVs and on the reporting structure of how health events are reported from the CHVs to the next level in the health system. The interview with the County Surveillance Officer focused on the county's capacity on responding to health events and their role on reporting events to the MoH.

Data Analysis

A form was created using Epi Info (version 7.2) and data from the CHV questionnaire was entered into it. SAS (version 9.4) was used to calculate frequencies for multiple-choice questions. Means and medians were calculated for questions with numerical responses. Responses from the CHEW and County Surveillance Officer interviews were recorded in to a Word document. Responses were assessed for themes related to EBS such detecting events, reporting events, response to events. Information on frequency of reporting (weekly, monthly, etc.) and the method of reporting (electronic or manual) were extracted from the interview Reponses.

Limitations

Language barrier was a limitation of the CHV questionnaire. The CHVs limited knowledge of English made it difficult for them to comprehend some of the questions on the

questionnaire which may have possibly led to inaccurate or incomplete responses. Information bias was also a limitation of the CHV questionnaire and interviews with the CHEW and the County Surveillance Officer. Responses given during the interviews may not reflect the truth completely. Interviewees might have felt pressured by the interviewer to give the "right" answers instead of the answers that reflected the truth.

Chapter 4: Results

Community Health Volunteer Questionnaire

Out of the 44 CHVs who took the questionnaire, 75% were females and 25% were males. The mean age of participants was 46.5 years with the oldest 65 years and the youngest 32 years old. The highest level of education for majority (61%) of the CHVs was primary level while 36% of the CHVs highest level of education was secondary school (high school). Thirty-eight (%) CHVs had six or more years of experience working as a CHV while only five CHVS had five years or less experience working as a CHV. Thirty-five CHVs said being a CHV was their only job, eight CHVs had another job, and one did not respond.

The villages where the CHVs worked in had an average of 117 households (range 75-206). 30% of the CHVs reported that they visit their community once a week while 40 percent said they visited their community twice a week. During their household visits, 71 percent said they "always" visit each household compared to twenty-percent who said they "sometimes" visit all the households in the community. The activities the CHVs did the most included: educating the communities on how to improve health and prevent illness, refer cases to the nearest health facility or regional hospital, and maintain and keep records for all community related health events. The least common activities were treating patients using IMCI guidelines and participating and organizing monthly community meetings and activities. The most common way CHVs heard about a sick or dead person in the community was by visiting each household followed by second most common way of community members contacting them directly. After a sick or deceased person is identified in the community, 75% of the CHVs said they visit the patient's house to gather more information and 48% of the CHVs said they contact the CHEW. Almost all the CHVs (98%) said they follow up on sick community members once they find out

someone is sick. They revisit the home of the sick person to see if they have been to the health facility or not and to see if their health is progressing.

One section of the questionnaire included a list of notable respiratory events (Table 1) and CHVs were asked to indicate either "yes I report" or "no I do not report" for each event. Overall, majority of the CHVs indicated that they did report the events listed in Table 1; the least (52%) reported event was multiple poultry or animal deaths in the same village during the same week (Table 1). When asked about where and how often they record and report information on community deaths and illness, 91% of the CHVs said they record information in logbooks and 95% of them said they give monthly reports to their designated CHEW. CHVs said they contact the CHEW through mobile phones (83%) or by visiting the CHEW at the health facility where they work (14%). Eighty-nine percent of the CHVs were provided with smartphones; however, 88% of the CHVs reported that they are not compensated for airtime.

Table 1. Notable Respiratory Events

Scenario	**Reported Yes** n (%) N= 44
Unexplained death of a community health worker or healthcare worker	**35 (79.5%)**
Unexplained death among a group of people (e.g., family or community members, students, participants of an event)	**39 (88.6%)**
two or more people become ill after attending the funeral	**39 (88.6%)**
death or illness of a person less than a week after his arrival from a trip out of the country	**30 (68.2%)**
The death of several poultry or other animals in the same village and in the same week	**23 (52.3%)**
One or more deaths caused by respiratory infection in people who have contact with animals.	**34 (77.3%)**

Two people or more with severe coughing and fever in the same school, same family or the same environment in the same week	**39 (88.6%)**
Two people or more with the same signs or symptoms requiring bedrest or hospitalization in the same environment (family, school...)	**35 (79.5%)**
Any health event creating a concern or anxiety in the community	**33 (75%)**

Community Health Extension Worker

The one facility CHEW interviewed at Mulaha Dispensary had six years of experience working as a CHEW and has formal training in community strategy. The primary role of the CHEW is to supervise and provide support for the CHVs. They assist in CHV selection and training and also go into the field and work directly with the community members. The CHEW receives monthly reports from the CHVs. CHEWs typically aggregate the data into one report and submit it to the Sub-county health officials. In addition, the CHEW uses a chalkboard located at the dispensary to keep track of and display all the on-going cases.

The same list of unusual respiratory events (Table 1) given to the CHVs was also given to the CHEW. According to her, all listed scenarios are reportable; however, the CHEW indicated that several deaths in poultry and animals is not a reportable event because that falls under veterinary public health. In addition, the CHEW mentioned that while UNICEF provided smartphones for the CHVs and herself, none of the workers are compensated for work-related airtime.

Country Surveillance Officer

The interview with the county surveillance officer was similar to the interview with the CHEW. The country surveillance officer receives weekly electronic reports from the Sub-county. The County health department submits weekly electronic reports to the MoH. At the national level there are two hotline numbers for any member of the public to call to report public health events. Originally, one of the hotline numbers was established by WHO for the guinea worm eradication program but that program is over and the telephone number remains open for people to reports events of potential public health importance. The hotline numbers were advertised through posters placed around the community and health facilities. CHVs also shared the telephone numbers during their house visits. However, the county surveillance officer stated that many people do not call the hotline numbers and majority of the calls that do come in are for rabies cases or road accidents.

The county health department uses a Whatsapp group to communicate with all the surveillance officers, coordinators, and emergency responders within the county. A second Whatsapp group links different counties in Kenya to the national Emergency Operations Center (EOC) in Nairobi. During outbreaks and emergencies, sub-county and country health officials respond to the situation but if more help is needed then MoH gets involved and handles the situation.

The surveillance officer said EBS has not been implemented yet in Siaya County. They are currently working on software that will help keep track of reported events. However, the county would like some guidance from MoH on what the expectations are in terms of implementing EBS at the county level.

Chapter 5: Training Manual

Event Based Surveillance: Detecting Unusual Respiratory Events

Training Manual for Community Health Volunteers

Table of Contents

Purpose of Guide

The purpose of this manual is to educate Community Health Volunteers on event-based surveillance for detecting unusual respiratory events.

Course Objectives

- Understand the general concept of public health surveillance
- Understand what event-based surveillance is and how it works
- Define what an unusual event is
- Learn how to report an event to the Emergency Operations Center

Introduction to Public Health Surveillance

Definition: Public health surveillance is the continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice

Reason for conducting surveillance:

- Serves as an early warning system for potential public health emergencies
- Documents and tracks the progress of a public health intervention
- Monitor epidemiology of health problems
- Inform public health practices and policies

A good surveillance system is one that is:

- *Timeliness*: how quickly is data being reported?
- *Representative*: how well does the system represent the population under surveillance?
- *Sensitive*: How well does it capture cases?
- *Specific*: How well does it exclude non-cases?

Surveillance Process:

Surveillance can be either **passive** or **active**

Passive Surveillance is:

- A system that relies on health care providers to report on cases on reportable diseases
- It is simple and inexpensive
- Limited by variability of quality and incompleteness in reporting

List of Priority Diseases in Kenya

Epidemic prone diseases	Diseases marked for eradication/elimination	Diseases of Public Health Importance
Anthrax Brucellosis Diarrhea with blood Dengue fever Measles Meningococcal meningitis Plague Severe acute respiratory infections (SARI) Typhoid Viral hemorrhagic fever syndrome Yellow fever	Acute flaccid paralysis (Poliomyelitis) Guinea worm disease (Dracunculiasis) Leprosy Leishmaniasis Neonatal tetanus	Acute jaundice Adverse events following immunization (AEFI) Cancer Diabetes mellitus Diarrhea with dehydration in children under 5 years of age Maternal deaths Neonatal Deaths Rabies Road traffic injuries and fatalities Schistosomiasis Severe pneumonia in children less than 5 years of age Sexually transmitted infections Trachoma Tuberculosis

Active Surveillance is:

- A system that relies on health agencies contacting health providers to seek case information on specific diseases and conditions
- Most of the time active surveillance is used for short periods of time for discrete purpose

Event-based Surveillance

Event-based surveillance (EBS) is the organized and rapid capture of information about events that are a potential risk to public health.

Information can come from various sources:

- Established routine reporting systems
- Media (tv, news, etc.)
- Rumors
- Health care workers

Events can be related to diseases in humans:

- Cluster of cases
- Unusual disease patterns
- Unexpected deaths

Events can also be related to potential harmful exposure to humans:

- Deaths in animals
- Contaminated foods or water
- Environmental hazards

EBS works well when **Indicator-based surveillance (IBS) i**s already in place. IBS is a routine reporting system in which cases are normally reported through.

Indicator-based surveillance	Event-based surveillance
• Systematic notification of notifiable diseases	• Rapid detection of public health events
• Data is reported weekly or monthly	• Data is reported immediately
• Reports are structured and clearly defined	• Reports are unstructured and the format is flexible
• Reporting is limited to only health facilities	• Reporting is open to the public

How does Event-based Surveillance Work?

The Four Basic Steps

1. Report the event
2. Generate health event report with basic initial information
3. Confirm the event
4. Assess the event

Step 1: Reporting the Event

When an event is first detected, immediately (within 24 hours) call the national Emergency Operations Center (EOC) on either of the two hotline numbers:

- 0729-471414
- 0732-353535

Everyone from the community has access to the EOC hotlines and can report an event anytime of the day or night.

Step 2: Report Necessary Information

When reporting on an event, you must include the following information:

- Date event occurred
- Event description
  - What happened?
  - How many have been affected?
  - Has anyone died?
- Location of event
- Date event is reported
- Contact information of the person reporting the event

Step 3: Confirming the Event

Once the event has been reported to the EOC, country surveillance officers will be notified immediately to investigate the event for more details. Additional information may be obtained by visiting hospitals, laboratories, schools, etc.

Step 4: Assessing the Event

After assessing the event, county surveillance officers will determine what response is needed. Sometimes further investigation will need to be done before control measures are implemented immediately. Events that turn out to be false will not require any further action.

Roles and Responsibilities in EBS

Community	Community health volunteers detect unusual events and report them to the EOC national hotline number. Community health volunteers also inform community members of the EOC hotline number and to report any unusual event they may come across. Community members report any unusual event they come across or hear about to the EOC hotline number
Sub-county/County	Sub-county and county health officials respond to the event. The conduct an assessment of the event and coordinate a response plan. They communicate with EOC and update them on the event.
MoH/EOC	EOC receives the initial call and notifies appropriate county health officials of the vent. They help with response if needed.

What is an Event?

An event is one that is considered to have serious public health impact where there is a significant risk of international spread, unusual or unexpected events, or events where there is significant risk of international travel or trade restrictions (World Health Organization)

Important Events to Remember

- Unexplained death of a community health worker or healthcare worker
- Unexplained death among a group of people (e.g., family or community members, students, participants of an event)
- two or more people become ill after attending the funeral
- death or illness of a person less than a week after his arrival from a trip out of the country
- The death of several poultry or other animals in the same village and in the same week
- One or more deaths caused by respiratory infection in people who have contact with animals
- Two people or more with severe coughing and fever in the same school, same family or the same environment in the same week
- Two people or more with the same signs or symptoms requiring bedrest or hospitalization in the same environment (family, school...)
- Any health event creating a concern or anxiety in the community

Example Case 1

Scenario: A community health volunteer receives a phone call from a local school teacher saying four of her students from the same class are sick with respiratory symptoms and did not show up to class.

Is this an event?	Yes
Why is this unusual event?	Cluster of cases with similar symptoms in the same class
What is the next step?	The community health volunteer should immediately call the national EOC hotline number and report the event. The community health volunteer should gather details on where the event occurred, when, how many people are affected, and any other relevant information regarding the event. Be sure to give your personal contact information in case responding authority need additional information.

Example Case 2

Scenario: You hear that a fellow community health volunteer has suddenly died. They day before he had said he was not feeling well but otherwise had been in good health.

Is this an event?	Yes
Why is this unusual event?	Unexpected death of a community health volunteer with no clear cause
What is the next step?	Immediately report the death to the national EOC hotline number. Inform them when the death occurred, when he first began to fall ill, where the death occurred, and any other relevant information. Be sure to give your personal contact information in case responding authority need additional information

Example Case 3

Scenario: You find out that several chickens belonging to one owner have all died on the same day. The next day other people's chickens also die.

Is this an event?	Yes
Why is this unusual event?	Unexpected death of poultry, cluster of cases
What is the next step?	Immediately report the death to the national EOC hotline number. Inform them when the death occurred, when he first began to fall ill, where the death occurred, and any other relevant information. Be sure to give your personal contact information in case responding authority need additional information

Emergency Operations Center (EOC)

To report an event remember to call **0729-471414** or **0732-353535**

Chapter 6: Conclusion

The overall goal of this study was to understand the extent at which respiratory events are reported by CHVs and assess the EBS capacity in Siaya County, Kenya. As a result, appropriate training materials would be developed for this special study project in order to increase reporting of unusual respiratory events through EBS. Interviews with the CHEW, county health officials, and questionnaires completed by CHVs provided information on the current reporting structure of community-based surveillance in Siaya, Kenya.

Although EBS has not been implemented yet in Siaya County, there is an existing infrastructure which will make the implementation of EBS easier. CHVs visit each household in their community on a weekly basis and report a wide variety of events such as the notifiable diseases they are trained to detect or other community related issues. This is advantageous for EBS because community involvement is essential for EBS to be successful in detecting potential public health threats. At the county level, surveillance officers are aware of the EOC hotline numbers and are a part of a Whatsapp group with the EOC. This is beneficial because an established communication link between the county and EOC is required before EBS can be implemented.

Seeing that Siaya County has the capacity to begin EBS, it is necessary to train CHVs on what their role and responsibilities are in the EBS system. Multiple levels of Kenya's healthy system would be involved in the overall EBS process however, this training manual is a tool aimed at educating CHVs on EBS and on the different types of unusual events they should be looking out for in their communities. As the MoH pilot county, Siaya County CHVs will be the first ones trained on EBS. Once the effectiveness of the training manual has been tested and any necessary changes made, then it can be used nationwide for all the CHVs.

In conclusion, early and rapid detection of events that are a potential risk to public health can help with detecting outbreaks and improving outbreak response. In a place like Kenya where there are constant threats of emergence of novel respiratory pathogens like MERS or influenza virus, it is practical to have a system in place that detects events of public health importance early on. With joint efforts from Kenyan MoH and CDC DaRRE program, CHVs will be trained to detect unusual events using the training manual developed from this special studies project.

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Appendices

Appendix I:

Community Health Extension Worker/Health Facility Assessment

Location: Facility name: Occupation:

Name: Age: Sex: Female Male

Background information of CHEW

1. How long have you been working here? _____months/years_____
2. How long have you worked as CHEW? _____months/years_____

3. Have you received training to be a CHEW? Yes / No

    If Yes, when was the initial training? _____

    Have you had subsequent training? Yes/No

        i. If Yes, what are the topics that have been covered?
        _____
        _____

4. Describe your role as the CHEW

Role	Yes/No	If yes, frequency (times/month or week?)
Support and supervise CHWs	Yes/No	
Assist in the selection of CHWs		
Organizing and facilitating the training of CHWs		
Monitoring the use of simple drugs and preventive materials used by CHWs		
Providing supervision to CHWs in the course of their activities		
Supporting CHWs in recognition of health problems, classification, and action		
Healthcare delivery and disease detection	**Mark all that apply**	
Immunization	Home visits health facility both neither	
Family planning	Home visits/health facility/both/neither	

Antenatal care	Home visits/health facility/both/neither	
Disease surveillance	Home visits/health facility/both/neither	
Treatment of common conditions (diarrhea, resp illness, others?)	Home visits/health facility/both/neither	
Prevention and control of HIV/AIDS, STI, TB and school health	Home visits/health facility/both/neither	
Prevention and control of STI	Home visits/health facility/both/neither	
Prevention and control of TB	Home visits/health facility/both/neither	
School health	Yes /No	
Community activities	Yes /No	
Initiating community mobilization and awareness session for identified priorities in the community		
Leading CHW teams in household registration and mapping		
Communication with the community through advocacy, social community mobilization and interactive communication		
Data management	Yes /No	
Collating health data records from CHWs and forward to county health department		
Establishing and managing community based information system (including data collation, storage, analysis, interpretation and utilization)		
Keeping records of daily activities of services delivered and produce and submitting reports		

Describe in general lines the responsibilities of The CHEW:_____=_____

_____

_Describe how data are gathered and kept (electronic, paper, etc)

_____----------____

Routine reporting

5. Describe reports that you routinely receive from the CHWs

Type of report	Frequency of receiving the report	How you receive the report (e.g., paper, email, electronic database)	How you report (mark all that apply)

IDSR	Every_____ weeks Every ___months	1. Paper 2. Email 3. Electronic database 4. Phone call 5. Others_____	1. Submit paper report 2. Email notification 3. Electronic reporting 4. Phone call 5. Others_____
Vaccinations	Every_____ _weeks/months	1. Paper 2. Email 3. Electronic database 4. Phone call 5. Others_____	1. Submit paper report 2. Email notification 3. Electronic reporting 4. Phone call 5. Others_____
Maternal/child health	Every_____ _weeks/months	1. Paper 2. Email 3. Electronic database 4. Phone call 5. Others_____	1. Submit paper report 2. Email notification 3. Electronic reporting 4. Phone call 5. Others_____
Infectious disease event?	Every_____ _ weeks/months	1. Paper 2. Email 3. Electronic database 4. Phone call 5. Others_____	1. Submit paper report 2. Email notification 3. Electronic reporting 4. Phone call 5. Others_____
Respiratory event	Every_____ ____weeks/months	1. Paper 2. Email 3. Electronic database 4. Phone call 5. Others_____	1. Submit paper report 2. Email notification 3. Electronic reporting 4. Phone call 5. Others_____

What do you mean by respiratory events?

6. For the reports above that you report, to whom do you submit the report to? (check all that apply_)
   - ☐ Subcounty
   - ☐ County
   - ☐ MoH (specify: _____)
   - ☐ Other_____

Outbreak reporting

7. Have you ever received a report on disease outbreaks?
   - ☐ Yes
     i. If yes, on average, how often do you receive a report of an outbreak?

_____every week/month/year

- ☐ No (skip to 8.)

8. How do you hear about outbreaks (mark all that apply)?
   - ☐ From the community directly
   - ☐ From the community leaders
   - ☐ From teachers?
   - ☐ From CHWs
   - ☐ From a health facility(clinicians, nurses, faculty directors)
   - ☐ Others (describe)_____

9. Do you actively reach out to the sources listed above to learn about outbreaks?
   - ☐ Yes
     i. If yes, circle how: by phone call/by visiting/ask during meetings/others_____
     ii. If yes, how often do you reach out to the sources? _____every week/month
   - ☐ No

10. When you receive (or if you received) a report on an outbreak, to whom do you report (*mark all that apply*)?
    - ☐ County surveillance officer
    - ☐ Supervisor at the hospital (specify:_____)
    - ☐ MoH (specify_____)
    - ☐ Others_____
    - ☐ You do not report

11. When you receive a report of an outbreak, how quickly do you report it to the person indicated above? (like.g., within an hour, by the end of the day, within 24 hours, other? Depends on the nature of the outbreak?)

12. If you answered that you report outbreaks in the above question, how do you report the outbreak (mark all that apply)?
    - ☐ Phone call
    - ☐ Standardized paper form (a paper form you send)
    - ☐ Email
    - ☐ Electronic database
    - ☐ Others_____

13. Other than reporting, do you take any action to respond to the outbreak?
    - ☐ Yes
        i. If yes, how do you respond (mark all that apply)?
            1. Contact the community to collect more information
            2. Go to the community yourself
            3. Send a team to go to the community
            4. Others_____
    - ☐ No
    - ☐ If No, who responds to the outbreak? _____

Event reporting

14. Are you familiar with event-based reporting?
    - ☐ Yes
    - ☐ No

15. If the following events happen in the community, do you receive a report?

Scenario	**Reported Yes / NO**	**If No, should it be reported?**
Unexplained death of a community health worker or healthcare worker		
Unexplained death among a group of people (e.g., family or community members, students, participants of an event)		
Two or more people become ill after attending the funeral		
Death or illness of a person less than a week after his arrival from a trip out of the country		
The death of several poultry or other animals in the same village and in the same week		
One or more deaths caused by respiratory infection in people who have contact with animals.		
Two people or more with severe coughing and fever in the same school, same family or sharing a common activity/club in the same week		
Two people or more with the same signs or symptoms requiring bedrest or hospitalization in the same environment (family, school...)		

Any health event creating a concern or anxiety in the community		

Are there other events you think should be reported? If yes, give examples:

If Yes to any of the events above, how would you hear about the report (mark all that apply)?

- ☐ From residents in the community
- ☐ CHW
- ☐ community leaders
- ☐ leaders of religious groups
- ☐ schools
- ☐ media reports
- ☐ rumors
- ☐ hotline
- ☐ others_____

16. To whom do you report the event (*mark all that apply*)?
    - ☐ I do not report the event
    - ☐ Disease Response Surveillance Unit at MoH
    - ☐ County surveillance officer
    - ☐ To the national EOC
    - ☐ Others _____

17. How do you report the event?
    - ☐ Phone call
    - ☐ Standardized paper form
    - ☐ Email
    - ☐ Electronic database
    - ☐ Others_____

18. Do you record the event? YES / NO

19. Where do you record it?
    - ☐ Register
    - ☐ Standardized paper form
    - ☐ Electronic database

- Others_____

20. What information do you record?
    _____

21. Are you provided with a mobile phone or do you use your own phone? _____

22. Do you use a smart phone? Yes/No

23. Are you compensated for airtime? YES / NO

Appendix II:

Community Healthcare Worker Assessment for DaRRE Implementation

1. Name:
2. Age:
3. Sex:
4. Community you live in :

Please answer the questions below:

5. What is your education level?
    a. Primary
    b. Secondary
    c. College
6. How long have you worked as a community healthcare worker?
    a. <1 year
    b. 1-2 years
    c. 3-5 years
    d. 6-10 years
    e. More than 10 years
7. Do you have another job besides being a community healthcare worker?
    a. Yes
    b. No
8. How often do you receive training related to your work in the community?
    a. Weekly
    b. Monthly
    c. Yearly
    d. Every other year
    e. Never
    f. I only received training after my hiring
9. How many communities/villages are you responsible for?_____
10. Do you work on your own community?
    a. Yes
    b. No

11. Number of households in the communities/villages you work: _____

12. How often do you visit your assigned community?
    a. Once a week
    b. Twice a week
    c. Monthly
    d. other (please specify)_____

13. Do you visit each household individually when you are in the community?
    a. Always
    b. Sometimes
    c. Never
    d. Other, specify_____

14. What activities do you do for the community? *(Check all that applies*)
    a. Educate the community on how to improve health and prevent illness
    b. Treat patients using IMCI guidelines?
    c. Refer cases to be treated at nearest health facility or regional hospital?
    d. Participate and organize in monthly community meetings and activities
    e. Maintain and keep records for all community health related events
    f. Being always available to the community to respond to questions and provide advice
    g. Treat common ailments such as first aid
    h. Other (please specify) _____

15. How do you hear about a sick or dead person in the community you work: (*Check all that applies*)
    a. By visiting each household
    b. Speak with the community leaders
    c. The healthy facility alerts you
    d. Community members contact you directly
    e. other (please specify) _____

16. What do you do when there is a sick person in your community? (*Check all that applies*)

    a. Speak to the community chief
    b. Visit the sick member's household to gather more information on the deceased
    c. Contact the Community Health Extension worker
    d. Contact the county health department
    e. Other (please specify) _____

17. How are you informed when there is death in the community*(Check all that applies*)
    a. Community chief contacts you

b. Health facility notifies you
c. Community members contact you directly
d. During house visits
e. Other (please specify) _____

18. What do you do when a community member unexpectedly dies? (*Check all that applies*)

a. Notify the community leader
b. Notify the community health extension worker
c. Visit the family and gather more information
d. Other (please specify) _____

19. After a community member has fallen sick and you are notified, do you check back on them?
a. Yes
b. No
c. Sometimes

20. What events do you record/collect on visiting the community? (*Check all that applies*)

a. Outbreak cases
b. Deaths from known illnesses
c. Unexpected deaths
d. Community members falling sick without any known cause
e. Severe respiratory illness in more than one family member
f. Other (please specify) _____

21. What events do you report to your community health extension worker? *(Check all that applies*)

a. Outbreak cases
b. Deaths from known illnesses
c. Unexpected deaths
d. Community members falling sick without any known cause
e. Other (please specify) _____

22. Are the following events reported

Scenario	**Reported Yes / NO**	**If No, should it be reported?**
Unexplained death of a community health worker or healthcare worker		
Unexplained death among a group of people (e.g., family or community members, students, participants of an event)		
two or more people become ill after attending the funeral		
death or illness of a person less than a week after his arrival from a trip out of the country		
The death of several poultry or other animals in the same village and in the same week		
One or more deaths caused by respiratory infection in people who have contact with animals.		
Two people or more with severe coughing and fever in the same school, same family or the same environment in the same week		
Two people or more with the same signs or symptoms requiring bedrest or hospitalization in the same environment (family, school...)		
Any health event creating a concern or anxiety in the community		

23. Where do you record information on community deaths and illness?(*Check more than one if applicable)*

a. Log books
b. Electronic database
c. Other (please specify) _____

24. How often are you required to report to your community health extension worker?
    a. Daily
    b. Weekly
    c. Monthly
    d. Other (please specify)_____

25. How do you contact the community health extension worker?
    a. Mobile phone
    b. visit to health facility where health extension worker works
    c. other (please specify) _____

26. Are you provided with a mobile phone?
    a. Yes
    b. No, I use my own

27. Is your mobile phone a smartphone?
    a. Yes
    b. No

28. Are you compensated for airtime?
    a. Yes
    b. No

Appendix III:

County Director

Location: County Name:

Name:

Routine reporting

24. Please describe the health related reports that you receive routinely from the healthcare facilities in your jurisdiction

Type of report	Who sends the report	How the report is sent to you	How frequently the report is received

25. Are you required to notify the MoH on any of these reports that you receive?
    - ☐ Yes
    - ☐ No

26. If Yes, which reports do you need to send to to MoH?

Type of report	To whom in MoH do you send the report?	How the report is sent to the recipient	How frequently the report is sent

27. How quickly do you forward a report to the MoH?
    What types of reports do you forward immediately? Within 24 hours?

28. Is there a hotline for notifications of outbreaks or health events established in your county?
    - ☐ Yes
        i. If Yes, who has access to the hotline? _____
        ii. If Yes, who responds to the call?_____
    - ☐ No

Outbreak reporting

29. How do you hear about outbreaks (*mark all that apply*)?
    - ☐ From the community directly (including residents, community leaders, CHWs)
    - ☐ From a health facility
    - ☐ From county surveillance officers
    - ☐ Others (describe)_____

30. When you receive (or, if you received) a report on an outbreak, are you required to report to someone (*mark all that apply*)?
    - ☐ Yes
    - ☐ No
    - ☐ Only in special circumstances (specify: _____)

31. If yes (including for some), to whom do you report?
    - ☐ DRSU at MoH
    - ☐ EOC at MoH
    - ☐ Director of Medical Services
    - ☐ Other _____

32. Do you have/ever have an Emergency Operations Center (EOC) locally?
    - ☐ Yes
    - ☐ No

33. Do you ever contact the national EOC directly?
    - ☐ Yes
    - ☐ No

34. If yes, in what circumstances do you contact the national EOC?

_____

Outbreak Response

35. Who responds to outbreaks in your county?

36. When you or someone else responds to a disease event, what do you/they do? (e.g., investigate further, Develop a line list, Collect specimens for diagnostics (if yes, describe specimens collected and diagnostics performed, Attempt to control the outbreak; communicate with public and other colleagues…..)

37. What types of outbreaks are investigated?

38. What level of resolution to the investigation can be offered locally? (e.g., do you have lab capacity to support the investigation? Do you have enough HCW to do contact tracing?)

39. Under what circumstances do you reach out to MoH for further assistance?

Event reporting

40. The World Health Organization has encouraged countries to implement event-based surveillance that would allow organized and rapid capture of information about events that are a potential risk to public health. Has your county implemented event-based surveillance?
    - ☐ Yes
    - ☐ No

41. Do you have a list of events which should be reported? If yes, what are they?

_____

_____

_____

42. If Yes, have you been reporting the events based on WHO guidelines?
    - ☐ Yes
    - ☐ No

43. If Yes in #15, how do you hear about the events (mark all that apply)?
    - ☐ From the community (including CHW, community leaders, schools)
    - ☐ From health facilities

- County surveillance officers
- From county directors
- media reports
- rumors
- others_____