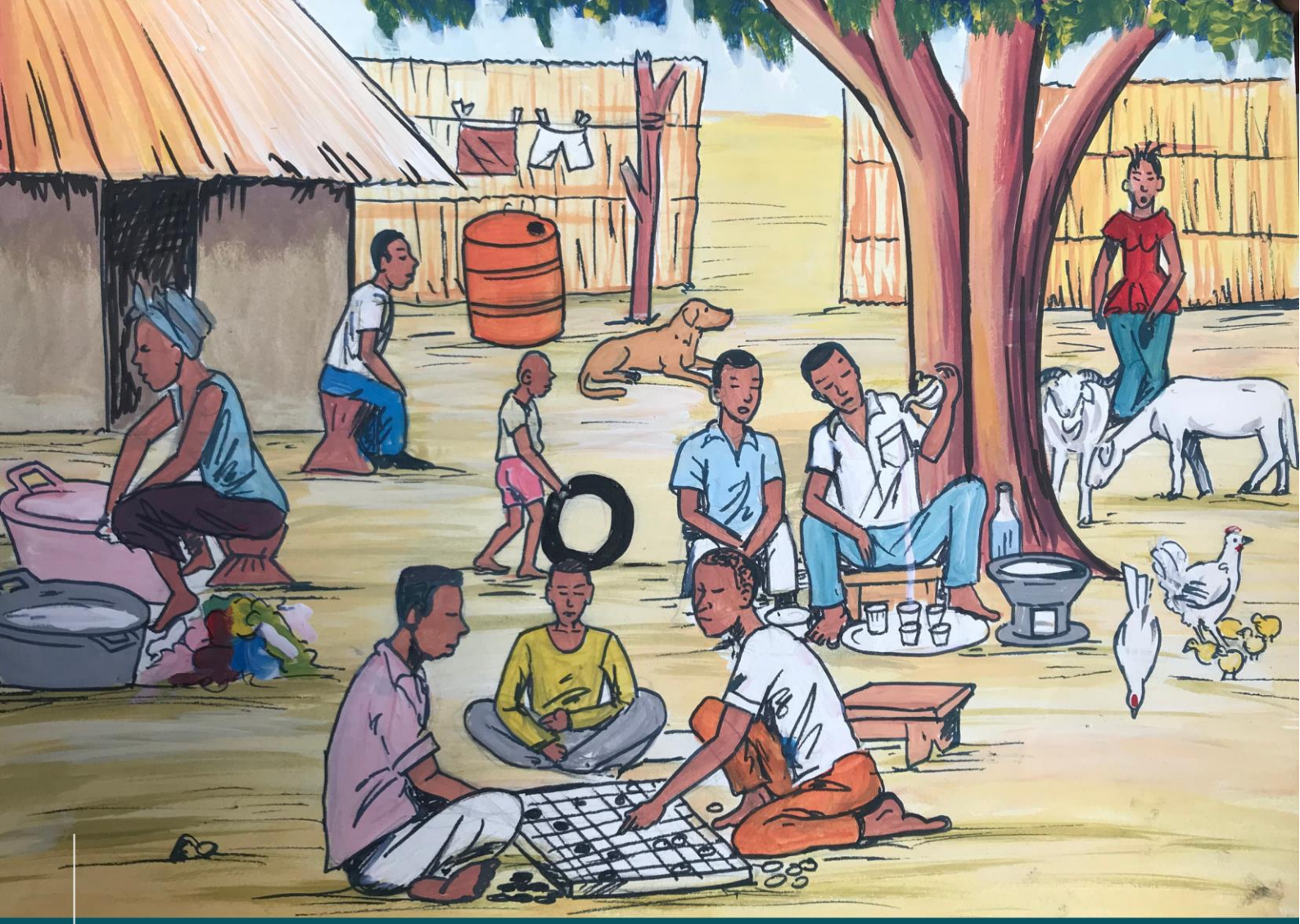

Community Event-Based Surveillance of Priority Human and Zoonotic Diseases in Senegal

Suggestions for a Model One Health Project

September 2019

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MEASURE Evaluation

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CONTENTS

FIGURES

TABLES

ABBREVIATIONS

CEBS	community event-based surveillance
COUS	Department of Health Emergencies Operations
CPV	livestock agent in veterinary post
CSC	Centre for Community Health
CVAC	community health volunteer
DHIS2	District Health Information Software, version 2
DP	disease prevention department
DS	district health office
DSV	Division of veterinary services
GHSA	Global Health Security Agenda
ICP	head nurse in health post
MSAS	Ministry of Health
RM	regional health office
SDEL	Departmental Service for Livestock
SREL	Regional Service for Livestock
USAID	United States Agency for International Development

BACKGROUND

A United States Agency for International Development (USAID)–supported Global Health Security Agenda (GHSA) activity for community event-based surveillance (CEBS) of zoonotic diseases with a One Health approach was launched in Senegal and implemented from September 2017 through June 2019. The activity was part of the USAID-supported MEASURE Evaluation Phase IV project under the GHSA Action 2 package. The activity focused on CEBS of eight prioritized infectious human and six zoonotic diseases in Senegal. This activity is a follow-on implementation of CEBS in four pilot districts (Tambacounda, Koumpentoum, Podor, and Pété) in two regions of Senegal.

The establishment of the pilot CEBS was accomplished by training community health volunteers to detect these diseases as soon as they occurred in their respective communities and to send text messages to the nearest health or veterinary post. The objective of the activity was early detection and response to limit the possibility of any large-scale outbreak of the disease.

The experience gained during this pilot forms the basis for recommendations for a model CEBS with a One Health approach for Senegal and perhaps other countries.

The priority human and zoonotic diseases are listed in Table 1.

Table 1. Priority human and zoonotic diseases

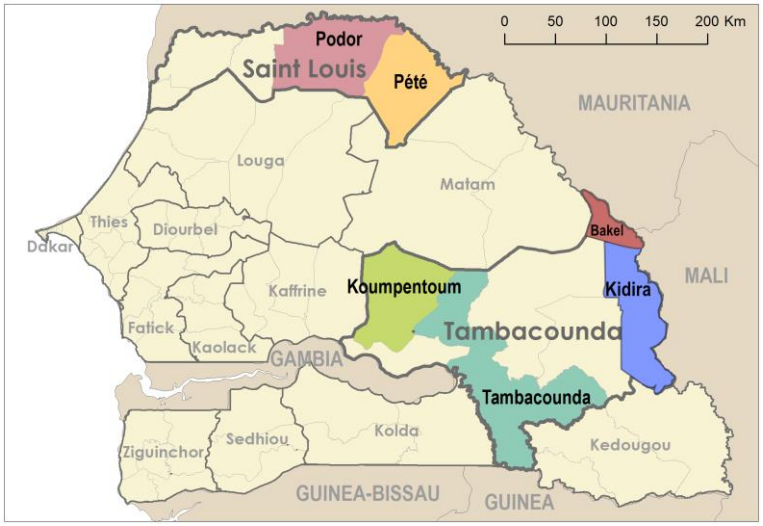
Human	
Cholera	Bloody diarrhea
Meningitis	Neonatal tetanus
Yellow fever	Measles
Hemorrhagic fever	Poliomyelitis (AFP)
Zoonotic	
Rabies	Zoonotic influenza
Bovine tuberculosis	Hemorrhagic fevers (Ebola and Marburg)
Anthrax	Rift Valley fever

PREPARING FOR CEBS

Selection of Pilot Districts

CEBS was implemented in six districts: Tambacounda, Koumpentoum, Bakel, and Kidira in the Tambacounda region, and Pété and Podor in the Saint Louis region. Several factors were considered in selecting the regions, including location (those on border areas have been prioritized), reported outbreaks of zoonotic diseases, the presence of organized community health volunteers, access to and utilization of the mobile platform mInfoSanté, and the presence of other implementing partners in the region.

Figure 1: Pilot Districts



Development of Community Case Definitions

The first step toward the development of CEBS was to create community case definitions for the eight human and six zoonotic diseases. These definitions were simplified versions of standard case definitions, adapted to suit the needs of community members and community health volunteers. They are essentially the basis for developing the data flow in the mobile platform that enables the community to send messages about disease outbreaks. These definitions were developed during the first of a series of multisectoral consultation meetings organized to plan and prepare the implementation of CEBS.

Expansion of the Mobile Platform mInfoSanté

Once the definitions had been developed, the next step was to modify the existing RapidPro-based mobile platform mInfoSanté to include the six prioritized zoonotic diseases. (The eight human diseases had been programmed into the software platform under an earlier MEASURE Evaluation activity.) Data flows were developed from the time of reporting by a community health volunteer to the nurse/livestock officer at the nearest health/veterinary post. Several stakeholder workshops were organized to discuss and validate the data flow, and the software was then programmed and tested.

Organization of Community Health Volunteers

Groups of community health volunteers (CVACs) have been established throughout Senegal by the Centre for Community Health (CSC) under the Ministry of Health (MSAS) for maternal and child health services. CEBS of the eight priority human diseases was implemented through these groups. As recommended during the first multisectoral consultation meeting, community livestock assistants from the livestock sector and ecogardes from the environment sector were identified and included in the CVAC groups.

Training and Training Materials

With the mobile platform programmed, the next step was to develop training tools. A cascade training was organized, with a national team for training nurses and livestock officers at the peripheral health and veterinary posts. Those nurses and livestock officers were in turn responsible for training the CVAC groups. Accordingly, two training guides were developed. The guide for nurses and livestock officers provided technical details of the priority diseases, their tasks and responsibilities, and the information required to train CVAC groups, including community case definitions, communication during home visits, and how to send messages using the mobile platform. A portable flip chart with pictorial descriptions of the diseases and job aids were developed and translated into two local dialects (Mandengue and Pulaar), as was the training guide for community health volunteers. The flip chart, job aids, and training guide were tested on one CVAC group in each of the four original pilot districts. A key consideration during the testing was validating the translation of job aids.

Once the mInfoSanté platform, the training materials, and the job aids had been developed, training was organized. The districts were mapped against the personnel to be trained in the health, livestock, and environment sectors as well as the CVACs. Logistics included the training materials, mobile phones to be distributed to the CVACs, and a detailed training calendar. Arrangements were made with the IT manager of mInfoSanté to register the cell phone numbers of CVACs and key functionaries of the livestock/health/environment sectors so that they could receive CEBS notifications through the mobile platform. The training was organized in three stages: for trainers at the national level; for nurses and livestock and environment officers in the local districts, and for CVACs at the health posts. Nurses and livestock officers were trained over a period of three days, and CVACs over two days.

IMPLEMENTING CEBS

Once the CVACs had been trained to identify the signals of the priority human and zoonotic diseases, their mobile numbers were registered in mInfoSanté. This enabled them to send signals via SMS to the toll-free number 21345. They then returned to their respective communities, and implementation of the CEBS program commenced from that point.

The Schema for CEBS

The processes involved in CEBS are illustrated in Figure 2. As is shown in the diagram, CEBS originates with the CVACs and is focused on the local health and veterinary posts.

- CVACs passively or actively seek to identify priority-disease signals in their respective communities, make a preliminary enquiry to confirm the symptoms by applying the community case definition, and send a message (signal) to the nearest nurse (ICP) if it is a human disease or the livestock officer (CPV) if it is an animal disease.

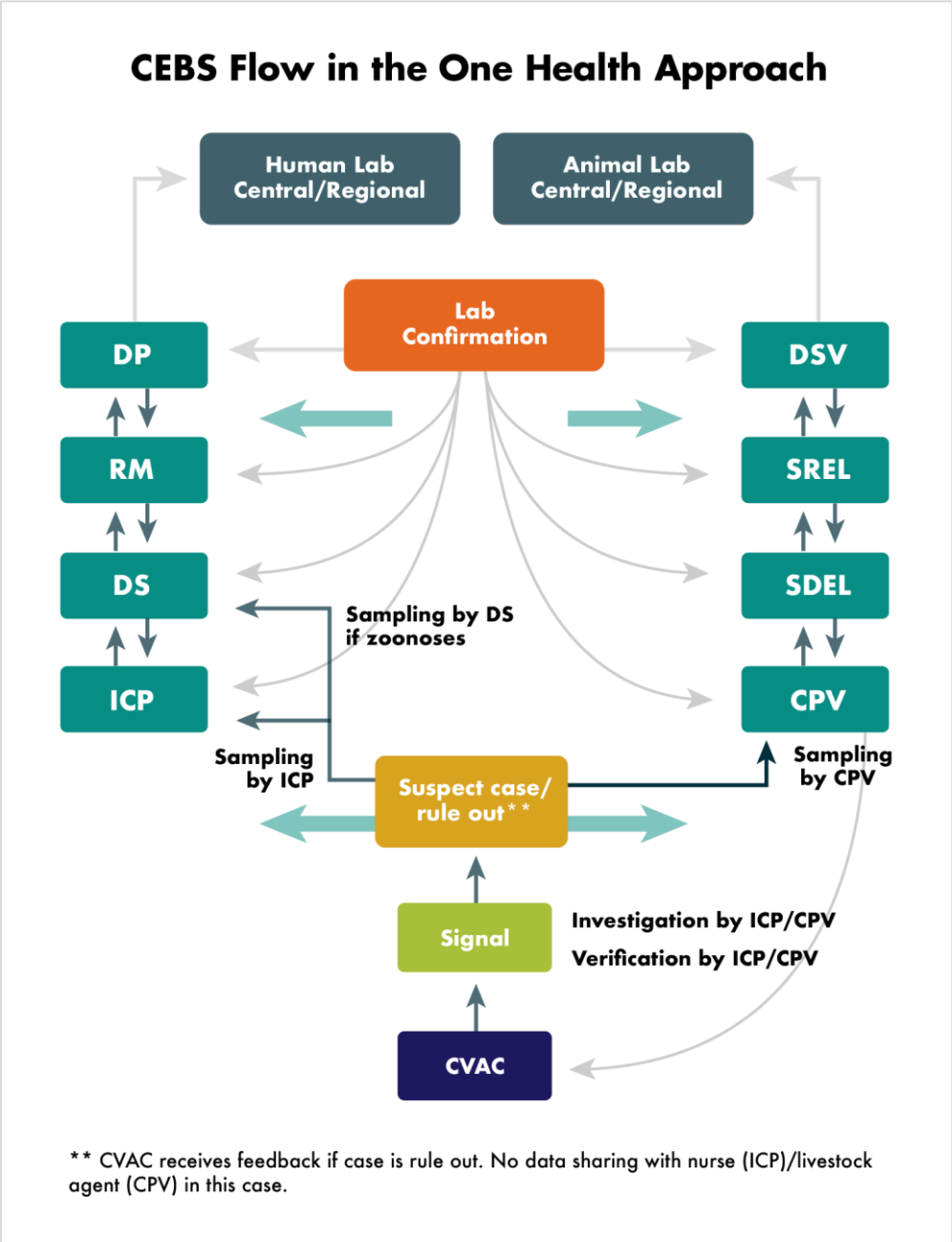
- The nurse/livestock officer is required to visit the community within 48 hours of receiving the community signal, verify the information received, classify it as a suspected/rejected case by applying the clinical/standard case definition, and report it in the mobile platform as well as the routine surveillance information systems of health and livestock sectors on a weekly and monthly basis.

- If it is a suspected case of zoonotic disease, the district health office (DS) or the Departmental Service for Livestock (SDEL) is notified, and a joint case investigation is conducted involving the stakeholder sectors. Biological samples are collected for laboratory confirmation of the disease if necessary.

- The information is reported to the regional and national surveillance departments through the respective routine surveillance systems.

- If the case is confirmed by a laboratory, that information is shared with the other sectors and with local administrative authorities. At the moment, no protocol exists for sharing information between health and livestock sectors for confirmed cases.

Figure 2. Schema for the CEBS in Senegal



Data Review Meetings

Community surveillance activities are monitored through monthly data review meetings organized at the district level by the chief medical doctor (MCD) and the departmental livestock specialist (SDELPA). The progress of community surveillance is assessed against indicators developed for the purpose and direct reports from nurses/livestock officers as well as CVACs. Monitoring has been recommended as part of the routine surveillance review.

CHALLENGES AND RECOMMENDATION TO CONTINUE AND TO IMPROVE CEBS

With the pilot stage of CEBS completed in the six districts, bottlenecks or challenges in the community surveillance program are explained here, with suggestions on how to deal with them.

Community Health Volunteers

Community health volunteers are the central actors of CEBS, and the success of the system depends on their level of involvement. Although they were originally entrusted with maternal and child health extension work, community surveillance was later added to their voluntary responsibilities. The majority of the CVACs in Senegal are women. They undertake this role knowing that it may take some time from regular work for their livelihood and thus entail some monetary loss. It is of the utmost importance that they be motivated to continue their contribution as CVACs.

MEASURE Evaluation conducted a qualitative study by organizing focus-group discussions in the four pilot districts where community surveillance had already been implemented. An important problem highlighted by most of the participants was that they were not getting public recognition for their services. It was also observed that the induction of CVAC group members was not following Ministry of Health guidelines. The following measures are recommended to keep CVACs motivated:

1. Induct CVACs in a public ceremony, as instructed in the guidelines of the Ministry of Health, to give them better visibility and recognition. This should be done in coordination with the health department. In the case of livestock assistants, coordination should be with the livestock sector; for ecogardes, it should be with the environment sector.

2. Provide CVACs with a government-recognized badge; this might help them in reaching out to communities and to government offices in the course of fulfilling their responsibilities.

3. Establish an annual public program to show appreciation for their commendable work. Criteria could be developed for evaluating the performance of CVAC groups, and the members could be recognized during a Community Health Volunteers Day.

4. Hold monthly meetings at the health/livestock posts where CVACs could share their experiences and challenges in the field and suggest solutions. Constant monitoring of their field activities and feedback could prove to be very effective at keeping them on track.

CVACs are generally trained at the commencement of a project. Their participation in this one was at a commendable rate of 97 percent, but for the complete success of the CEBS program, all the CVACs should be trained sooner. Also, new volunteers may be added every year. *It is therefore suggested that CVACs be provided with annual training refreshers and that focus be given to any new members.*

Sending and Receiving Messages

Community surveillance is being implemented through the mobile platform mInfoSanté. It becomes real-time surveillance if network connectivity exists. But experience shows that connectivity is most often poor, especially in remote villages. The same is true for reception at the health/veterinary posts.

To sustain communication through SMS messages among the various stakeholders, a mechanism for meeting the costs of mobile service providers is needed. It is therefore recommended that the Government of Senegal negotiate with the various providers in the country to provide cost-free service as part of their corporate social responsibility and to improve network connectivity throughout Senegal.

Verification of Signals

The first response by a local veterinary or health post to a community signal is to visit the community and verify whether the suspected case meets the clinical case definition. Ideally, this is done within 48 hours to achieve the expected outcome. A few challenges are being experienced on this front.

1. The most common problem in this regard concerns travel logistics. When villages are far away and public transport is rare, responders have difficulty getting to and from the villages.

2. Nurses are usually overwhelmed with their routine work at the health posts and find it challenging to do verification within the expected time frame.

3. Livestock officers have a wider area of jurisdiction than health districts do, making verification on top of their routine activities more tedious.

In this context it is recommended that:

- Community surveillance be made part of the mandatory work for nurses and livestock officers and funds be earmarked for it in the annual budgets of the health, livestock, and environment sectors

- Deputies be posted at the veterinary and health posts wherever warranted, to take care of the additional responsibilities

- Community surveillance activities be coordinated with the local governance department and motorcycle/fuel reimbursements be made for field visits to verify community signals

Joint Investigation

Following verification of a community signal by a nurse/livestock officer and classification of it as a suspect case, a multisectoral team visits the community to make a detailed investigation, including sample collection. It has been reported that this phase faces the same logistical problems as does verification.

As suggested earlier, it is recommended that the local governance office or the mayor's office arrange for a jeep or other conveyance to be made available for going to the field, conducting the necessary investigations, and collecting samples.

Laboratory Confirmation

Samples collected during a joint investigation are sent to a laboratory in the health/livestock sector for confirmation. The country has a national laboratory in each of those sectors to confirm zoonotic diseases. Any sample collected at the health or veterinary post of any region of the country must be dispatched to the national laboratory through the parcel service of a private ground-transport provider and may take three to seven days to arrive, depending on the route and the reporting mechanism used, whether through the district, the regional, or the national surveillance unit of the livestock/health sector. The possible resulting delay in confirming diagnosis could result in a wider disease outbreak.

The health sector has functional regional laboratories, but they lack the diagnostic facilities for zoonotic diseases. Thus, it is highly recommended that their capacities in that regard be enhanced.

The livestock sector has six designated regional laboratories, but they are not yet functional. The UN Food and Agriculture Organization (FAO) has been supporting the Ministry of Livestock to establish the regional laboratories. *These regional laboratories need to be equipped to diagnose zoonotic diseases as well. Field diagnostic kits are used to diagnose livestock diseases and have been found to be very effective in similar settings. For example, the tuberculin skin test is an effective and cheap way to screen for bovine tuberculosis.*

Community Surveillance as Part of Routine Surveillance

MEASURE Evaluation implemented community surveillance of the eight human and six zoonotic diseases prioritized in the six districts. Catholic Relief Services, with the support of the United States Centers for Disease Control and Prevention, implemented a CEBS of the priority diseases in the Diourbel region. Given the encouraging results from these pilot districts, the government has already proposed and planned for upscaling CBS of the eight priority human diseases in all the remaining regions of Senegal. It is expected that CEBS of the zoonotic diseases will also be scaled up in the near future. The data review from the mobile platform organized at the district health centers has proved how effective these mechanisms are in capturing the outbreak of these diseases. The following observations are pertinent:

- Monthly district data review meetings are the platform to visualize the mInfoSanté dashboard, critically examine the CEBS activities after data review and feedback from the nurses/livestock officers and the CVAC. A monthly review with the team is critical to the success of the program and for making any necessary changes.

- Because CEBS is in the pilot phase, and despite all the measures taken to make this activity sustainable, there is a possibility that it will get sidelined in the surge of regular surveillance activity and that less activity will be reported for zoonotic diseases.

- The surveillance information systems are vital for data collection, forecasting, and response measures. The health sector has developed DHIS2 for the reporting of human diseases, although zoonotic diseases are not included in the system.

- The livestock sector has not so far established a proper surveillance information system for reporting animal diseases. An attempt was made using the animal health information system VGTropics, but that has been recalled owing to implementation issues and is being replaced by KoBo Toolbox.

- With the pilot phase of CEBS of zoonotic diseases on the ground, communication between the sectors is a priority for the implementation of a One Health approach. Apart from the National One Health Task Force, information sharing needs to happen at all levels. Information regarding the outbreak of zoonotic diseases should be shared with the other sectors, and the health information systems could be the main platform for this. Unfortunately, this is not happening in Senegal now.

- To encourage regular participation in and implementation of the community surveillance program, a dedicated national and regional surveillance team is required. A national officer with responsibility for overseeing the community surveillance activities supported by regional One Health technical working committees could take the program a long way forward.

- Immediate measures should be taken to include the zoonotic diseases in DHIS2 so that the health information system is ready to pick up cases after community surveillance activities have been developed and regional laboratory capacities are strengthened. The livestock sector needs to establish and use a reliable surveillance information system that can be made interoperable with DHIS2 and share information relating to zoonotic diseases between the relevant sectors.

mInfoSanté Platform

The mobile platform mInfoSanté is a RapidPro-based program requiring ongoing technical support for application and maintenance of the server. mInfoSanté has two components: the application RapidPro, hosted in the cloud, and a data server hosted by the Senegal Department of Health Emergencies Operations (COUS). UNICEF currently provides technical and financial assistance for RapidPro, and

COUS provides technical assistance for the data server. mInfoSanté is a critical component of community surveillance activity. To sustain the system, especially in light of scaling up, it is suggested that:

- The government seek a permanent mechanism for maintaining the data server and addressing associated problems, the best possible option being incorporating it in the IT department of either of the sectors along with the main server. For instance, a local instance of RapidPro could be installed in-country to achieve sustainability.
- The management of the server be accompanied by continuous maintenance and updating of the program by competent IT personnel—a pool of in-country experts who could maintain the server as well as the program.

THE ONE HEALTH APPROACH

Even though the One Health approach for the CEBS of zoonotic diseases is only in the pilot stage, Senegal is ahead of other countries in the region. But more must be done to effectively implement One Health, with activities trickling down to all administrative levels. Zoonotic diseases are generally underdiagnosed and underreported, and they are often not considered in routine surveillance. Also, little information exists on the prevalence or surveillance of zoonotic diseases in Senegal. Thus, it is recommended that the following activities be supported:

1. Establishment of regional and district-level One Health technical working groups that meet regularly to discuss and share zoonotic disease surveillance and related activities

2. Establishment of regular communication among the sectors at the district level through the technical working groups and other channels, whether or not an outbreak of zoonosis is reported

3. Continuing education for all the health, veterinary, and environment professionals in zoonotic diseases through programs such as the Field Epidemiology Training Program of the Centers for Disease Control

4. Research in zoonotic diseases, particularly with reference to their prevalence and incidence in Senegal

Structural Evolution in CEBS over the Long Term

As noted above, CVACs have been trained to send signals to the nearest health post when they encounter what they believe is a reportable case of one of the priority zoonotic or human diseases according to the case definitions developed by the pilot project. However, making a preliminary diagnosis of a suspected disease can be challenging for a nonmedical community volunteer. Many diseases have similar symptoms, and if CEBS is expanded to include other diseases, the challenge will be even greater. Since the nurse or the veterinary agent will ultimately determine what if any case is valid, one approach would be to codify the symptoms in human and animal subjects that warrant sending a signal, and the nurse of veterinary agent would investigate. This change in protocol would not fundamentally change CEBS.

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