Updates from the Field

STORIES OF SUSTAINABILITY

Fall 2019 | Issue 29

Division of Global Health Protection

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Message from the Director

As I reflect on the complexities of our ever-changing interconnected world, I am moved by the tremendous progress we have made to build sustainable health systems and create a healthier and safer world for us all.

While many examples show our work's impact, the growth and development of the Nigeria Field Epidemiology Laboratory Program (NFELTP) stands out for me personally. I was part of the CDC team that worked with the Nigeria Ministry of Health and the African Field Epidemiology Network (AFENET) to create this program in 2007; from 2008-2010, I was the CDC Country Director and closely watched NFELTP's enthusiasm, efforts, and progress. When I returned for the Ebola outbreak response in 2014, I was moved by the ongoing work and dedication of the CDC-trained disease detectives. Many individuals I knew as trainees now were leading critical parts of the response; their efforts quickly stamped out Ebola in Nigeria and prevented cross-border spread.

CDC's investments in FETPs and other programs are making a difference. Every day, our epidemiologists, veterinarians, statisticians, communicators, and other subject matter experts work tirelessly, providing technical expertise to dozens of countries. Whether fighting the ongoing Ebola outbreak in the Democratic Republic of the Congo, tackling Zika virus in Brazil, or responding to cholera outbreaks in the aftermath of cyclones in Mozambique, DGHP staff support CDC-trained FETP residents and graduates who are on the frontlines of outbreak response working to keep health threats at bay.

This issue of *Updates from the Field* focuses on how we build sustainable health systems side by side with partners, which rely on support from many sources, including communities, decision makers, healthcare workers, and laws.

From training world leaders in disease detection and response through the Field Epidemiology Training Program to establishing and strengthening National Public Health Institutes; from integrating public health progress into law to setting up long-lasting disease surveillance systems around the world, our investments to protect the health of Americans and those around the globe are creating self-sustaining advances in global health security.

As you read, I encourage you to notice how sustainability is not just a feature of our work; it is the cornerstone. As pathogens change and adapt, new diseases emerge. As the world becomes increasingly connected, diseases travel faster and farther than ever before. Outbreaks are an ongoing threat that require proactive public health solutions. Sustainable health systems are key to that solution. CDC helps countries today to stop tomorrow's outbreaks.

Diseases won't wait and neither will we.

CAPT Nancy Knight, MD
Director, Division of Global Health Protection
Center for Global Health

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Preparedness Pays Off in Mozambique's Cyclone Responses

Aerial view of destruction and flooding in Sofala Province, Mozambique, from Cyclone Idai. Photo: Daniel Singer

In early 2019, Mozambique's coastline was hit by not one, but two, tropical cyclones. This was the first time in recorded history that two strong tropical cyclones hit the country in the same season.

Cholera outbreak investigation and alert monitoring training in Cabo Delgado Province. Photo: Erika Rosetto

The extent of the destruction and impact took days and even months to fully understand. Strong public health institutions and longstanding partnerships helped to reduce the negative health impacts across the affected areas.

On March 14 and 15, Cyclone Idai struck central Mozambique, leaving a trail of destruction and flooding. Mozambique's National Institute of Health (INS) was tapped by the Ministry of Health (MOH) to coordinate all surveillance and outbreak response activities. Within 48 hours, a rapid response team arrived on scene to assess the situation and prepare for disease outbreaks. INS promptly established an emergency surveillance system, including laboratory diagnosis. This provided critical information to guide the response and control a massive cholera outbreak in four districts. Early detection of the cholera outbreak and previous experience with cholera immunization were critical for INS to start a rapid response and vaccinate close to a million people within three weeks of the cyclone landing.

Only six weeks later on April 25, Cyclone Kenneth, the strongest cyclone to ever hit the African continent, struck northern Mozambique. Already stretched thin from the ongoing Cyclone Idai response, Mozambique began another emergency response. INS professionals arrived within days to establish a similar emergency surveillance system. A few days later, INS confirmed a cholera outbreak in three affected districts and began a rapid response.

"Managing two concurrent responses was an extremely challenging task, and INS's leadership is a key reason why the health impacts were not more severe. Working with the MOH, INS leveraged its own experts and support from partners to mount a coordinated response," said CDC Mozambique country director Dr. Alfredo Vergara.

INVESTING BEFORE DISASTER STRIKES

The country's effective response was the outcome of years of investments by the Mozambican government and its partners towards strengthening INS, the country's National Public Health Institute (NPHI). Efforts included developing the health workforce, establishing critical surveillance, and enhancing laboratory capabilities.

The value of NPHIs often becomes clear in emergencies, when coordination between national and international partners is necessary. Since 2015, CDC has supported Mozambique's INS to build upon its strength as an NPHI leader and develop more core public health capabilities. This includes recent One Health program development efforts, which helped build coordinated response and surveillance activities across human, animal, and environmental health sectors."The capacities developed at the INS in partnership with CDC, particularly the strengthened surveillance system, were key in the back-to-back emergency responses this year. Without this support, the rapid detection and response to the cholera outbreak would have not been possible," said INS Director General Dr. Ilesh Jani.

Since 2009, Mozambique has invested in its public health workforce through the Field Epidemiology and Laboratory Training Program (FELTP). This program, managed by INS, has trained more than 45 disease detectives over the past decade.

FELTP graduates around the world are among the first on the scene to investigate, respond, and provide further support for health emergencies. In Mozambique, FELTP training helped the team of responders quickly adapt to the challenges of the emergency response.

CDC SUPPORT FOR RAPID RESPONSE

The strength of Mozambique's response reflects key involvement from partners like CDC. Across CDC, support came from a variety of groups, including experts in surveillance, response, data management, infectious diseases, and water, sanitation, and hygiene (WASH).

Notably, CDC's WASH experts aided Mozambican and international partners by providing necessary guidance to help end the cholera outbreaks. This included water quality monitoring, supporting WASH rapid response teams, and conducting rapid assessment among displaced people.

Additionally, CDC helped implement the Early Warning, Alert, and Response System (EWARS), a World Health Organization (WHO) platform to improve outbreak detection in emergencies. INS plans to transition this into a national electronic rapid reporting system, which will sustain the investment and improve the country's preparedness.

Mozambique's response to the cyclones demonstrates the value of investing in health systems before disaster strikes. These systems, developed in partnership with strong national public health institutions, are the cornerstones for rapid and effective public health response.

MARCH 14-15

Cyclone Idai struck central Mozambique leaving a trail of destruction and flooding.

MARCH 16-17

A rapid response team arrived on scene within 48 hours to assess disease threats. Cholera outbreak detected in 4 districts and Mozambique's INS began vaccination campaign.

APRIL 25

Only six weeks later, Cyclone Kenneth hit northern Mozambique.

APRIL 27

A few days later, Mozambique's INS confirmed a cholera outbreak in 3 districts and began a rapid response.

Photo right: *Mozambique's INS, Ministry of Health, and other partners vaccinated close to a million people in four districts where a cholera outbreak emerged after Cyclone Idai. Photo: Adilson Taju, U.S. State Department*

Creating a Lasting Home for Public Health

On July 1, 1946, the Communicable Disease Center opened its doors, occupying only a single floor of a small building in Atlanta. Its primary mission was simple yet highly challenging: prevent malaria from spreading across the nation.

Over 70 years, this small agency grew into the Centers for Disease Control and Prevention (CDC), the preeminent public health institution for the United States. CDC is widely recognized as the world's premiere health promotion, prevention, and preparedness agency. It has also become a model for countries around the world looking to develop a sustainable National Public Health Institute (NPHI).

Since 2011, CDC has worked with ministries of health and other partners to help over 25 countries develop and strengthen their own NPHIs.

Around the world, NPHIs have varying names and differ in size and scope, but their purpose remains the same—improving public health around the world by being an institutional home for scientific excellence and partnership.

A HOME FOR PUBLIC HEALTH

NPHIs play a pivotal role in a country's ability to prevent, detect, and respond to potential health threats. They serve as the "home" for a country's public health activities. Creating a public health institute helps countries more effectively collect and use data, as well as implement and monitor science-based programs. Ultimately, NPHI coordination and leadership can save money and protect lives.

In 2018, the President of Nigeria signed legislation to officially name the Nigeria Centre for Disease Control (NCDC) as the country's NPHI—an act Dr. Chikwe Ihekweazu, the Director General of the NCDC, acknowledges as critical to its role in global health security. He said, "the individual components of an outbreak response, whether an emergency operation center, laboratory, surveillance system, or risk communication—none of these components would lead to greater preparedness if they did not operate within an institution with a mandate to act."

Ministry of Health **without** an **National Public Health Institute (NPHI)**

Ministry of Health **with** an **National Public Health Institute (NPHI)**

A disease-specific initiative from Pakistan's Institute of Public Health allows Dr. Eisha Mansoor to trace contacts of HIV positive individuals in Bakra Mandi, Rawalpindi Pakistan, in August 2018. Photo: Eisha Mansoor, FELTP Pakistan

NPHIs can also promote lasting impact. Training the public health workforce, establishing new laboratory diagnostic capabilities, or modernizing information systems represent a substantial resource investment by countries as well as partner organizations. NPHIs can sustain these investments, both those developed within an NPHI as well as those for a specific program like HIV or malaria. Through its role in planning and managing resources across the public health sector, an NPHI may support the continuation or expansion of disease-specific initiatives (for example, broadening the scope of a functional HIV surveillance system).

THE FAR-REACHING IMPACT OF STRONG NATIONAL SYSTEMS

Strong NPHIs can also serve as a foundation to address international public health priorities. NCDC has contributed its national experiences to develop important global NPHI resources, including the Staged Development Tool, establishment and legislative frameworks from the Africa Centers for Disease Control and Prevention (Africa CDC), and a best practices series collected by the International Association of National Public Health Institutes (IANPHI). The National Institute of Health (INS), Colombia's NPHI, is widely recognized as a national and regional leader in Latin America. In this critical role, INS has led trainings and discussions with neighboring countries about public health concerns related to the migrant crisis that began in Venezuela.

In addition to network organizations such as IANPHI, NPHIs support each other in a range of topics, from establishment to specific public health technical areas. The Zambia National Public Health Institute (ZNPHI) has hosted several countries (including Botswana, Malawi, and Zimbabwe) to share development process experiences and actively support NPHI initiatives in Southern Africa. NCDC and Pakistan's Institute of Public Health have shared lessons learned about improving Field Epidemiology Training Programs, which provide skilled workforce to support NPHI goals.

NPHIS — PROTECTING THE WORLD

Since 1946, CDC has evolved from its malaria-fighting roots into a leading public health institution supporting countries' efforts to develop their own NPHIs. When countries can address their own public health priorities through an NPHI, they build on results achieved with current U.S. financial and technical support, while minimizing current and future reliance on external assistance. By investing in NPHIs at this critical juncture, CDC can ensure that global health security and disease-specific program progress are sustained around the world.

Dr. Chikwe Ihekweazu, NCDC's Director General, and CDC's Dr. Zahid Samad standing with public health managers after training at NCDC. Photo: Jeremiah Agenyi

A Beat Ahead in Latin America and the Caribbean

Seniors dance during a weekly class for hypertensive adults at the Peru-Corea-Bellavista clinic in Callao, Peru. Photo: PAHO

"I'm so full of life again!" enthused formerly hypertensive patient Clara, moments after completing a traditional dance at the Peru-Corea-Bellavista clinic in Callao, Peru.

Clara's performance was part of the launch of Peru's HEARTS program, a national initiative to reduce premature deaths and disabilities from heart disease and strokes.

Rapid urbanization, aging populations, and the globalization of unhealthy lifestyles have fueled a global crisis of noncommunicable diseases (NCDs). In the Americas, NCDs such as heart disease, stroke, and diabetes cause nearly four out of every five deaths. Cardiovascular diseases alone account for nearly one-third of all regional deaths. Tragically, many of these deaths occur prematurely—before the age of 70. In addition to health consequences, NCDs also have devastating impacts on economies. High health care costs and productivity losses from NCDs undermine social and economic development.

Hypertension (high blood pressure), like Clara's condition, is a leading risk factor for heart disease and stroke. While treatment is simple, effective, and affordable, many health systems are not set up to prevent, diagnose, and manage the condition. Peru, however, has joined a growing number of countries in a global effort to improve heart health and strengthen health systems using the HEARTS initiative.

A nurse checks the blood pressure of a woman at a clinic in Sangre Grande, Trinidad. Photo: PAHO

HEARTS IN THE AMERICAS

CDC teamed up with the World Health Organization, the Pan American Health Organization (PAHO), and other partners to develop a strategic approach to improving cardiovascular health through primary care. Launched in 2016, HEARTS includes six practical, evidence-based interventions that use standardized treatment, lifestyle coaching, essential medicines, team-based health care, and monitoring systems to reduce heart attacks and strokes. HEARTS is being implemented in 21 countries, including 12 countries in Latin America and the Caribbean.

AN INITIATIVE OF THE COUNTRIES

CDC works with PAHO to ensure that countries own and manage HEARTS. With support from CDC, PAHO uses a coordinated approach that focuses on ministry of health commitment, local stakeholder engagement, capacity development, and a systematic plan for expansion. CDC provides technical expertise to improve data quality in addition to monitoring and evaluating programs. CDC also supports international and regional experts participating in planning and technical meetings on how to implement these programs in country.

"HEARTS in the Americas is an initiative of the countries," explained Dr. Pedro Ordunez, PAHO's technical officer for the initiative. **"HEARTS should be built on what already exists, using available resources, continuously improving performance and results, taking advantage of leadership and technical capabilities, and learning from successful programs.** HEARTS is not an isolated project, parallel to the existing health care systems...its sustainability depends on effective integration of the model into the health system."

The sustainability-focused approach also promotes country-to-country exchange, ensuring that countries learn from each other and follow best practices as they implement HEARTS. This also aids the development of national and regional expertise.

GLOBAL IMPACT

Country-led HEARTS programs in the Americas have already reached over two million adults at 131 health centers. By effectively addressing NCDs, countries are enhancing quality of life, preventing premature deaths and disabilities, improving productivity, reducing strains on health care systems, and promoting stronger economies. Clara is just one of many people whose lives have been enhanced, and perhaps extended, by this global commitment to confronting the NCD epidemic.

Protecting People through Public Health Law

Around the world, laws that support resilient public health systems and strengthen global health security protect countless lives every day.

From the cleanliness of the water we drink, to seatbelt laws that keep us safe, to diseases that many people no longer think about because of vaccines, public health laws impact nearly every part of our lives.

PUBLIC HEALTH LAW PROVIDES A ROADMAP

Public health laws act like any other law, authorizing activities, clearing operational authorities, and building systems to ensure accountability. These laws guide governments and ministries of health in developing processes that build program structure and establish functional roadmaps. In turn, these roadmaps guide public health officials on tackling a variety of health challenges.

CDC EXPERTS: MORE THAN JUST SCIENTISTS

CDC plays a prominent role in bridging public health law and sustainability. With decades of experience leading health programs and developing strong partnerships around the world, CDC experts provide guidance on how public health law can be used to build stronger, more sustainable health programs.

CDC's public health law experts improve health by advancing the understanding and use of law as a tool. As part of a multi-year project, CDC mapped health security-related laws in effect across 25 countries. CDC uses this data to help governments and ministries identify areas of opportunity for continued progress.

For many countries, this process of developing structured and formalized public health systems can take years; however, CDC recognizes the importance of this investment. "Legal and policy change is not something that happens overnight, even if laws are enacted in one day," said Emily Rosenfeld, a policy analyst in CDC's Center for Global Health.

Public health laws can help to create sustainable health structures, leading to lasting systemic changes. CDC's support helps strengthen global health security and public health capabilities around the world, improving and protecting the health of people worldwide.

PHEOC simulation exercise at the Côte d'Ivoire NPHI led by CDC's Chuck Menchion and Mamadou Diarrassouba. Photo: Jocelyn Nebre

Public health laws give countries the power to **PREVENT, DETECT,** and **RESPOND** to health crises.

LIBERIA

Strengthening Systems after Ebola

CDC experts helped Liberian officials compile and analyze existing public health laws, making it easier to identify potential gaps in the legal structure. Using this information, Liberia fully revised public health laws, adding sections to strengthen emergency operations, biosafety and biosecurity, reporting, and disease tracking abilities. In 2017, using the revised laws, Liberia fast-tracked the establishment of the National Public Health Institute of Liberia.

CÔTE D'IVOIRE & TOGO

Getting in at the Ground Floor

CDC aided Côte d'Ivoire and Togo in building processes for legal authorities that set clear protocols for emergency operations and defined staff roles in national public health emergency operations centers (PHEOCs). Both Côte d'Ivoire and Togo have now passed laws making their PHEOCs fully operational.

PAKISTAN

Supporting Development of a National Public Health Act

Pakistan is currently revising and strengthening its public health law framework through revision of their National Public Health Act. CDC continues to provide technical and legal assistance to senior government officials, addressing areas for opportunity in the current Public Health Act. With CDC support, Pakistan identified best public health law practices and developed a health strategy to fit the country's specific needs.

CAMBODIA

Biosafety and Biosecurity

CDC partnered with the Cambodian Ministry of Health to train health officials on using laws as tools to improve the handling and storage of toxins and pathogens. Government officials are working on a ministerial decree that will strengthen laboratory biosafety and biosecurity; once approved, it will be Cambodia's first ministerial decree on lab biosafety and biosecurity.

Raising Visibility for Global Health Security

Almost two-thirds of countries lack effective health security: the ability to prevent, detect, and respond to infectious disease outbreaks. In an increasingly interconnected world, threats to global health security pose a serious risk to lives at home and abroad.

During frightening emergencies like the 2014-2016 West Africa Ebola epidemic, partners and donors are often eager to help other countries in need. Unfortunately, when the emergency ends, attention to health security and resources decrease and countries are challenged with sustaining improvements. As a result, progress made is often lost.

> ***Prioritizing a sustained, focused commitment to health security is a prerequisite for the development of our nation. It's vital to saving lives, spending wisely, and protecting our economy.***
>
> HON. PRIME MINISTER RUHAKANA RUGUNDA, UGANDA

Partner support is critical to help countries transition from emergency response to routine public health activities that build and sustain health systems. CDC actively works with countries, strengthening their capabilities to identify, track, and stop outbreaks and public health emergencies as quickly as possible.

ASSESSING CRITICAL GAPS IN HEALTH SECURITY

One new resource that countries can use to leverage partner support and sustain health security investment is the World Health Organization's (WHO) International Health Regulations Monitoring and Evaluation Framework (IHR MEF). This toolkit enables countries to assess preparedness strengths and weaknesses, identify gaps and prioritize areas for improvement.

The IHR MEF is unique—it helps a ministry of health maintain high-level government attention on health security, attracting additional resources and targeting existing resources toward priority needs. CDC has been pivotal to the success of the IHR MEF by working with WHO to create and improve this toolkit, in addition they have deployed experts to help countries use the tools.

Photo above: *Ebola simulation exercise in Uganda prepared responders to quickly identify the first cross-border Ebola case in June 2019. Photo: Irene Nabusoba*

AN ALL-OF-GOVERNMENT PRIORITY

One tool within the IHR MEF, the Joint External Evaluation (JEE), assesses a country's health security capabilities. This voluntary process brings together representatives from across a country's government, including leaders and technical experts from animal and human health, agriculture, defense, and finance. In this way, the JEE encourages coordinated solutions to health security problems.

Through the JEE, Nigeria and Uganda made health security an all-of-government priority, rather than just a health sector responsibility. In Nigeria, the JEE brought national-level attention to the Nigeria Centre for Disease Control (NCDC), paving the way for a presidential act empowering the NCDC to direct state and federal level public health actions. Uganda leveraged extra attention from its JEE and follow-up plans to integrate health security into its National Development Plan III, cementing it as a long-term priority for the government.

THE BLUEPRINT FOR A SAFER WORLD

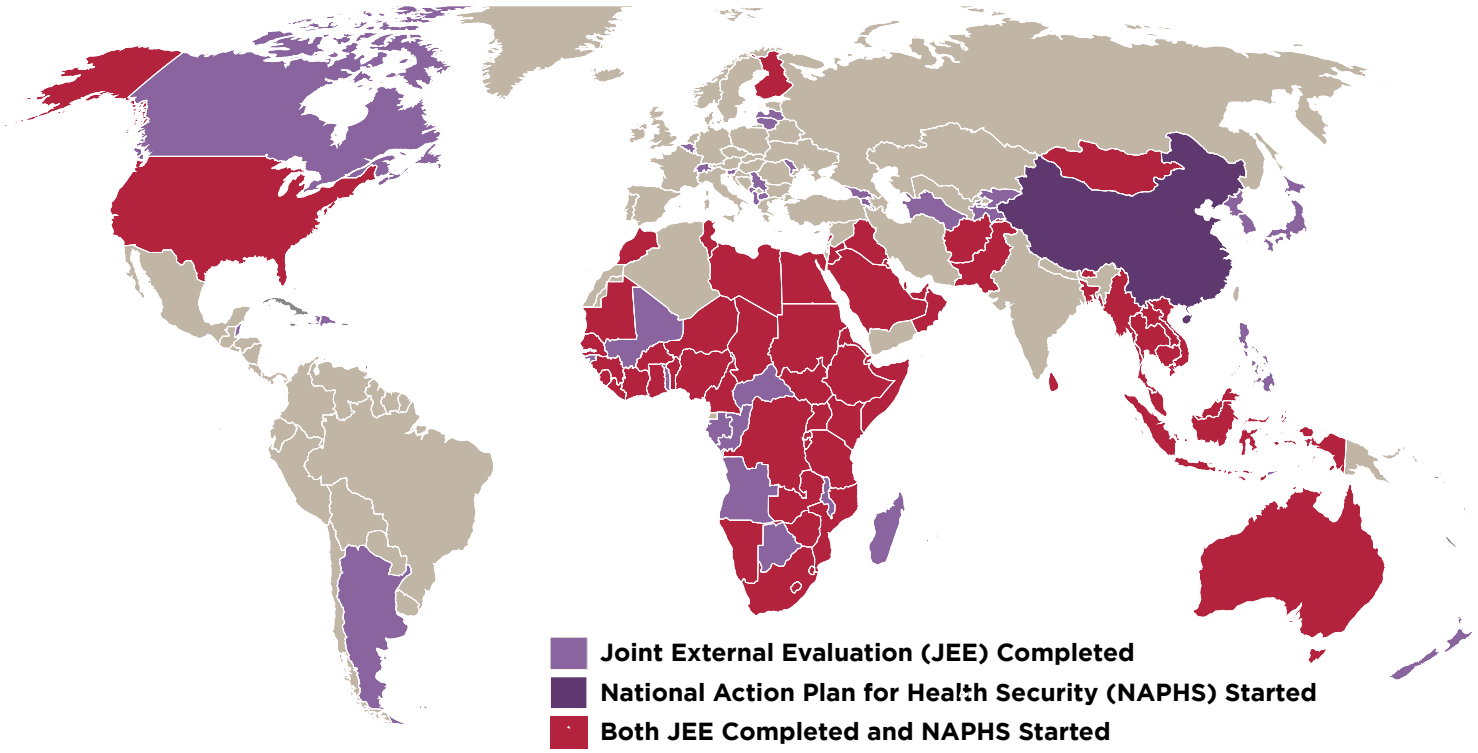
Following a JEE, many countries develop National Action Plans for Health Security (NAPHS), incorporating activities to more effectively address health emergencies. Countries also use these plans to direct potential partners to the most critical activities needing additional resources.

For example, Uganda secured $1.4 million U.S. dollars from the private and non-profit sectors to build the country's public health workforce capacity. Some of these funds were used to train Ugandan disease detectives, helping them track outbreaks at the source and stop diseases from further spreading. This training recently helped prevent Ebola from spreading along Uganda's border with the Democratic Republic of Congo, the epicenter of the current Ebola epidemic.

Sierra Leone worked with external partners to develop an annual NAPHS and JEE assessment update. This level of engagement helped funders more clearly understand the country's resource needs and provide guidance for external funds to address these gaps. By shifting focus to Sierra Leone's priorities for health security, it is more likely that the government will maintain this momentum, aligning domestic resources to continue to build and sustain capacity.

CDC is committed to supporting the IHR MEF because it brings health security into the spotlight, taking it from a ministry of health responsibility to an all-of-government priority. With IHR MEF, countries obtain international investments and increase their own budgeted resources to address health security gaps for years to come, making each country—and the world—safer.

Country Progress with the JEE and NAPHS



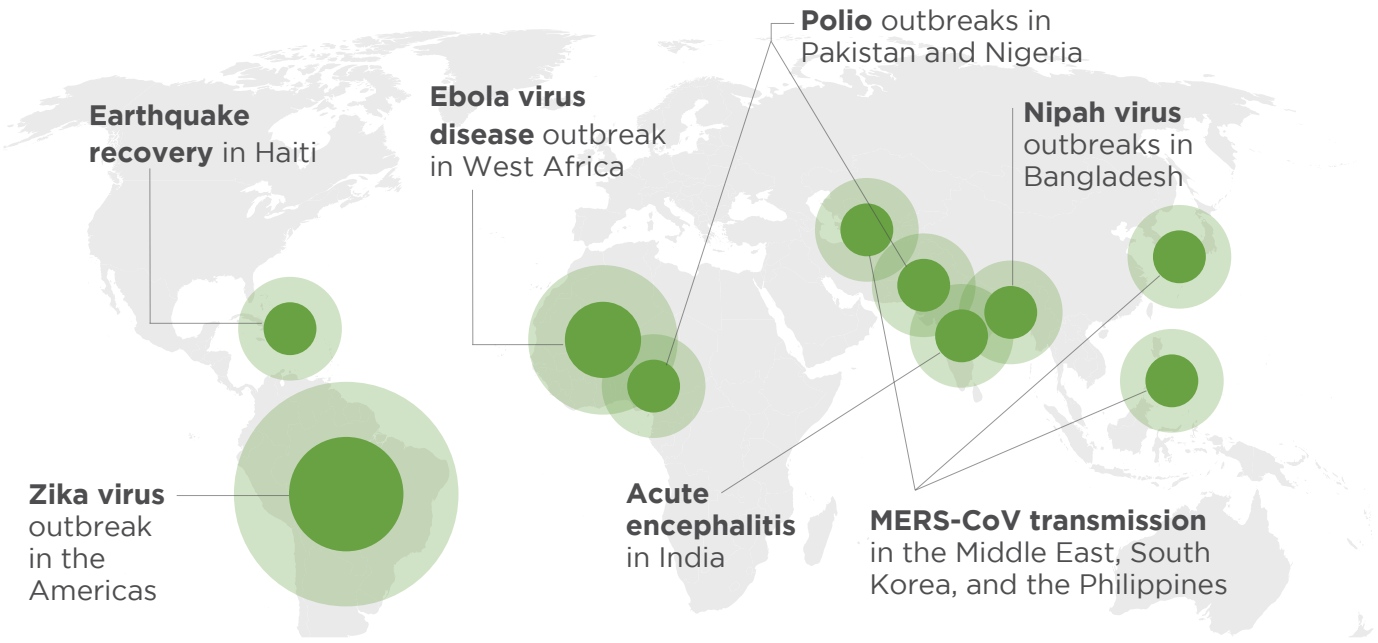
*Source: https://extranet.who.int/sph *As of November 22, 2019*

Developing Disease Detective Leaders Across the Globe

Every country needs an effective public health workforce to improve its ability to protect its citizens and rapidly detect and effectively respond to health threats and disease outbreaks.

Since 1980, CDC has helped train more than 16,000 disease detectives in over 70 countries through its flagship global Field Epidemiology Training Program (FETP). FETPs expand CDC's reach by training public health professionals to investigate and respond to disease outbreaks and other health threats. Through these programs, countries help fulfill the International Health Regulations (IHR) requirements for disease surveillance and response, and strengthen their capacity: conducting surveillance, analyzing data, and making sound evidence-based decisions. FETPs also work to address the increasingly important burden of noncommunicable diseases.

FETP graduates are CDC's "boots on the ground" and play a critical role in ensuring global health security. They do this by strengthening the public health workforce and expanding regional and global disease detection networks available during crises. For example, **FETP graduates have played key roles in responding to major health threats, including:**



For nearly 40 years, CDC has supported the development of FETPs and professional disease surveillance and response networks such as the Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET) and the African Field Epidemiology Network (AFENET). In addition to building the public health workforce, these programs and networks have helped FETP graduates stay connected while they guide and mentor the next generation of public health leaders. The FETP initiative continues to evolve and has become a sustainable part of global health security and IHR compliance.

A few FETP graduates, now in public health leadership positions, have shared their own thoughts about the program and their personal experiences.

Ma Huilai
China FETP Class of 2003
Director of China FETP

Building Critical Skills in Decision Making and Management

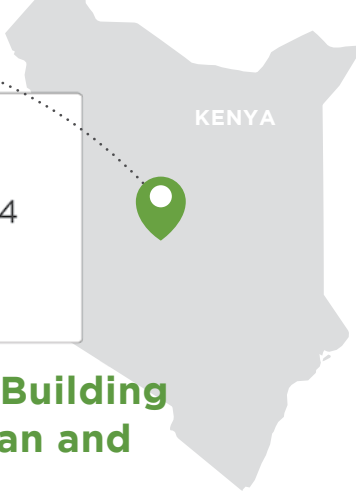
From local clinics, to provincial health departments, to China CDC, the fingerprints of FETP graduates can be found on the scene, and their impact can be felt throughout the Chinese public health system.

> ***My FETP training was key in my development of critical thinking and communication skills.***

These skills have been used in emergencies, when I had to rely on effective communication with team members, leadership, and partner organizations to effectively manage and deescalate focus upon challenges. The ability to critically assess a situation and deliver a plan of response is highly valuable, and it is a skill I try to include in training China's future FETPs. I now routinely give lectures and provide guidance to our current FETPs, with the hope of passing knowledge onto the next generation of public health leaders.

One of my greatest experiences as an FETP graduate was responding to a large drug contamination outbreak. My disease detective skills were put to the test, and knowledge I gained throughout FETP was critical in helping control the outbreak.

Mathew Muturi
Kenya, FELTP, Class of 2014
Co-director,
Zoonotic Disease Unit



Breaking Barriers and Building Relationships for Human and Animal Health

The Field Epidemiology Laboratory Training Program played a primary role in breaking down professional barriers and building relationships between human health and animal health colleagues. It is a driving force behind the success of the Kenya One Health Collaboration.

In Kenya, due to the previous cohort and graduate performance in the public sector, FELTP graduates are considered very competent and highly valuable. After my graduation from the program, I was tracked for a leadership position and took on a lead role in the Kenya One Health Office.

FELTP has reached a level where every government agency across Kenya appreciates the input and level of professionalism FELTP graduates bring to the table.

Ashenafi Ayalew
Ethiopia, FETP Class of 2015
Public Health Emergency
Management Directorate

Improving Surveillance Systems and Revolutionizing Communication

One of my most rewarding experience was being part of the team of FETP graduates who helped establish one of the strongest public health emergency management systems in Ethiopia. I am currently working in Amhara Regional State, which is the second most populous region in Ethiopia.

FETP graduates are making a difference in whatever location they are assigned to work. They have become a catalyst for change: enhancing communication protocols, producing key public health documents, providing pivotal feedback to leadership, and using skills developed in the program to improve disease surveillance systems.

Photo right: *Current Ethiopia FETP fellows guiding the community in malaria control activities in May 2019. Photo: Abreham Berneh*

David Rodriguez
El Salvador, Central America
FETP, Class of 2013
Coordinator of Training, COMISCA

Training the Next Generation of Disease Detectives

FETP has been the most important building block in my public health career; I am in my current position because of the program. I believe in FETP because I know what it can do for people like me. I have seen the surveillance system strengthened as a result of improved work performance training. I would like to see the program continue for many years so that it is sustainable in our region.

My FETP mentors have done a lot for my colleagues and me, and I hope to do the same for the individuals I'm training now; we always keep our mentors in our minds and our hearts. We are a family in FETP!

FETP has been the most important building block in my public health career...

Lessons Learned from Ebola Improve CDC's Global Response

CDC EIS Officer LCDR Kerton Victory is screened for fever symptoms by a healthcare worker before entering a building in Guinea during the West Africa Ebola epidemic.

The 2014-2016 West Africa Ebola epidemic tested the limits of the international community's ability to respond to public health threats.

Before the epidemic, CDC lacked a formal and sustainable pool of trained responders who could immediately deploy in the event of an emergency and remain in the field for extended periods of time. Previously, CDC's response system depended upon short-term deployments and lacked engagement of communities, partner organizations, and country governments. The epidemic emphasized an imminent need for coordinated responses, effective partnerships, and dedicated, skilled staff in emergencies. The question was not *if* CDC would see another emergency or outbreak of this scale, but *when*.

A RAPID RESPONSE TEAM IS BORN

In 2015, CDC launched the Global Rapid Response Team (GRRT) to address challenges recognized during the Ebola response. GRRT provided technical assistance and strengthened preparedness efforts to assist countries in responding to public health threats. As a result, the new team of multidisciplinary experts responded more quickly and efficiently to emergencies, wherever and whenever.

Dante Bugli, an emergency public health epidemiologist, reflected on his role as a part of GRRT for the past three years. "CDC has a reputation as a research institution, and I've found that a lot of CDC staff chose public health because of an inherent humanitarian calling. I feel lucky to be a part of a team that deploys and assists communities in need of an extra helping hand."

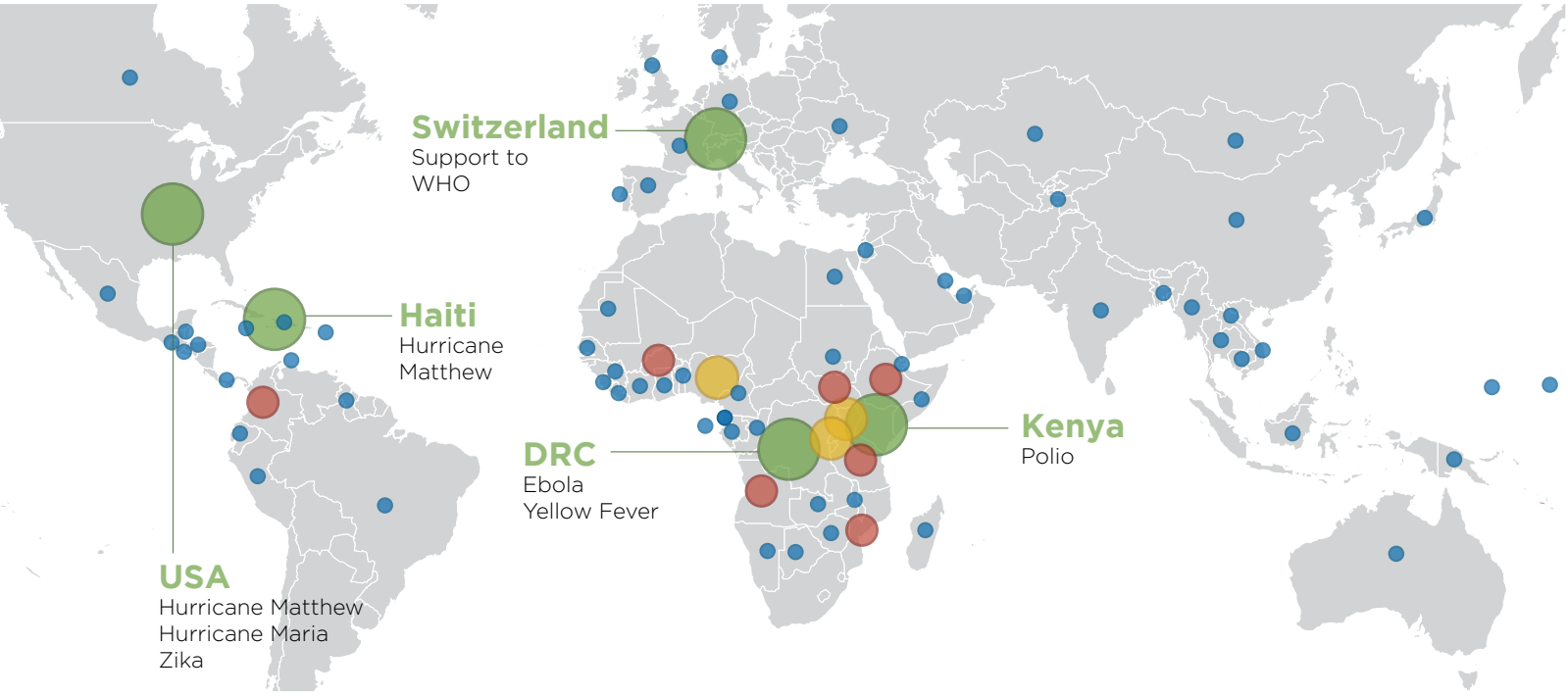
CDC created GRRT to provide the agency with a sustainable solution to emergency response—a team of over 500 specially trained surge responders. Responders are subject matter experts in fields such as surveillance, reproductive health, infection prevention and control, nutrition, and emergency management, with widely varying language and leadership skills. The team is made up of core staff who work full-time with GRRT and surge staff who are on call twice a year for emergency mobilizations. In the event of a large response effort, many GRRT core and surge members deploy multiple times a year.

THE ZIKA TEST

Shortly after GRRT's inception, the international community called upon the team to respond to an emerging threat: Zika virus. In May 2015, Brazil first reported an outbreak of Zika virus and its potential to cause severe birth defects during pregnancy. By 2016, the virus had spread to 14 countries in Latin America and the Caribbean. Within 24 hours of the country-initiated request for assistance, GRRT was on the scene, working around the clock to understand, track, and prevent further spread of Zika. By the end of the outbreak, GRRT sent 117 responders to nine countries and territories for a total of 151 deployments. The Zika virus response solidified GRRT as a key CDC asset and showcased its ability to quickly help countries stop an outbreak and avoid widespread negative health outcomes.

Global Rapid Response Team Deployments

October 2015-September 2019



TRUE GRIT: SUSTAINING HEALTH SECURITY THROUGH GRRT

As GRRT moves toward its fifth round of recruitment, GRRT staff have been actively engaged in responding to outbreaks, natural disasters, and sustainable health security strengthening efforts around the world. From polio in Mozambique and yellow fever in Angola, to coordinating the Hurricane Matthew response in Haiti and Ebola preparedness trainings in Uganda, GRRT proves that a capable, sustainable emergency workforce is an essential part of maintaining global health security. GRRT even deployed some members domestically to support West Virginia and Kentucky during the Hepatitis A outbreak response in 2018-2019.

August 2018 marked a new challenge for GRRT—another Ebola outbreak, this time in a conflict-affected area of the Democratic Republic of the Congo (DRC). Always learning, GRRT found that it needed a larger pool of French-speaking deployers for emergency responses in Francophone Africa.

Although the ongoing Ebola response has its challenges, GRRT's impact is evident. GRRT experts have filled essential vaccine, infection prevention, laboratory, epidemiology, and risk communications positions. Preparedness and border health security efforts have, so far, prevented the spread of the virus in large numbers to surrounding countries such as South Sudan, Rwanda, and Uganda.

In DRC, GRRT has applied lessons learned from the 2014-2016 Ebola epidemic to prevent previous mistakes. Even with a small number of staff, GRRT has transformed limited resources into maximum impact. GRRT sustains global health security investments by providing a workforce ready to deploy anytime, anywhere. Rapid action saves lives, and GRRT is ready when emergencies strike.

CDC's Peter Thomas and a member of the Programme National pour l'Hygiene des Frontieres (PNHF) work to raise the sides of an Ebola screening tent in Kisangani City, DRC during a supervisory visit. Photo: Dante Bugli

Zika Virus Research Pays It Forward

When you hear the word Zika, what thoughts come to mind? For many pregnant women, just thinking about the disease can be scary.

During the 2015-2016 outbreak in the Americas, scientists connected Zika infection during pregnancy with fetal brain abnormalities including microcephaly, or smaller than expected head size, or eye defects.

Scientists have also recognized that Zika infection during pregnancy could affect a baby's development. **Though not all pregnant women infected with Zika virus (ZIKV) will give birth to a baby with these problems, more research is needed to better understand the disease and the long-term impacts on mothers and children.**

Juvenile woolly monkeys drinking from a fountain at a rescue facility in Iquitos, Peru. Photo: Stephanie Salyer

Because ZIKV is a zoonotic disease, spreading from animals to humans, understanding its source and transmission patterns is the first step in disease tracking and prevention. CDC, along with local partners in Brazil, Colombia, and Peru, wanted to determine which animals and mosquitoes can carry and spread ZIKV over a long period of time. Armed with this information, it will be easier to address health threats associated with ZIKV, along with future emerging zoonotic and infectious diseases.

RESPONDING TO THE ZIKA EPIDEMIC THROUGH A ONE HEALTH SOLUTION

The world needs a One Health solution to protect the health of humans, animals, and their environments. By collaborating across multiple disciplines and health sectors, we can more effectively prevent, detect, and respond to health threats.

The Division of Global Health Protection (DGHP) worked across CDC and globally with partners, including universities, ministries of health and agriculture, U.S. government agencies, and other research partners to describe where ZIKV is found, how it spreads, and other effects of the virus. ZIKV is transmitted by mosquitoes to humans. The virus also has been detected in various animal species around the world, including primates in South America.

OBTAINING ANIMAL SAMPLES IN THE JUNGLE IS NOT AN EASY TASK

In Colombia, CDC partnered with Universidad de los Andes to collect animal samples for ZIKV testing from remote field sites. This partnership led CDC to work with Proyecto Primates Colombia—a small non-governmental organization that works to protect and save primates in Colombia.

Camila Gonzalez and field assistants from Fundación Proyecto Primates -Universidad de los Andes travel by boat to the forest where sampling was conducted. Photo: Giovanni Randazzo

Bocas del Carare is a small village of approximately 400 people, located on the shore of the Magdalena River, near an abundance of diverse wildlife species. Ongoing deforestation in Columbia has forced primates to migrate closer to villages, putting humans in closer contact with animals and increasing the likelihood of zoonotic disease transmission.

CDC epidemiologists and laboratorians went out to the field with local researchers to explain and demonstrate the experiment protocol, or written procedure method, and show how to take samples and collect data. “Having access to those kinds of trainings and protocols [from CDC] increases the quality of research we can do,” said Camila González Rosas, associate professor of biological sciences at Universidad de los Andes.

To get to the village, field workers must drive seven hours from the country’s capital, then continue an hour and a half upriver by motorized canoe. After five 15-day field trips over 14 months, 609 blood samples were collected from animals in the area. Of the samples collected, nine samples were positive for ZIKV antibodies. Even though no active cases of Zika were found, this means there was evidence of previous ZIKV infection and potential spillover from the affected human population into vertebrate species like bats, dogs and other domestic animals.

CASHING IN ON A NEW DATA BANK

Being able to gather new data and share information efficiently better prepares countries for emerging or re-emerging disease threats that affect the economy and livelihoods of the people living in these areas, as well as their health and wellbeing.

CDC is staying in touch with the ZIKV study partners to allow for a quicker response in case of a future outbreak. Lab data collected from previous outbreaks can help public health officials focus their efforts on specific regions and species that may be prone to spreading or contracting ZIKV, helping them to control outbreaks faster.

Further research is needed to understand ZIKV and its effects on pregnant women and fetuses. Also important is learning how ZIKV affects specific animal species and which of these can pass on the virus. This new information can help scientists better understand ZIKV’s health threats and long-term effects over time.

Using Smart Tools in Vietnam to Improve Outbreak Response

Dengue is a draining, mosquito-borne viral disease that infects an estimated 390 million people each year. Common in Vietnam, dengue poses a health risk to Vietnamese people and over 15 million travelers from around the world.

From March to April 2019, surveillance staff at the Tay Nguyen Institute of Hygiene and Epidemiology (TIHE) in Vietnam's Central Highlands noted increased dengue cases in Gia Lai province. One district alone had seven times the number of cases during the first quarter of 2019 as the same period in 2018.

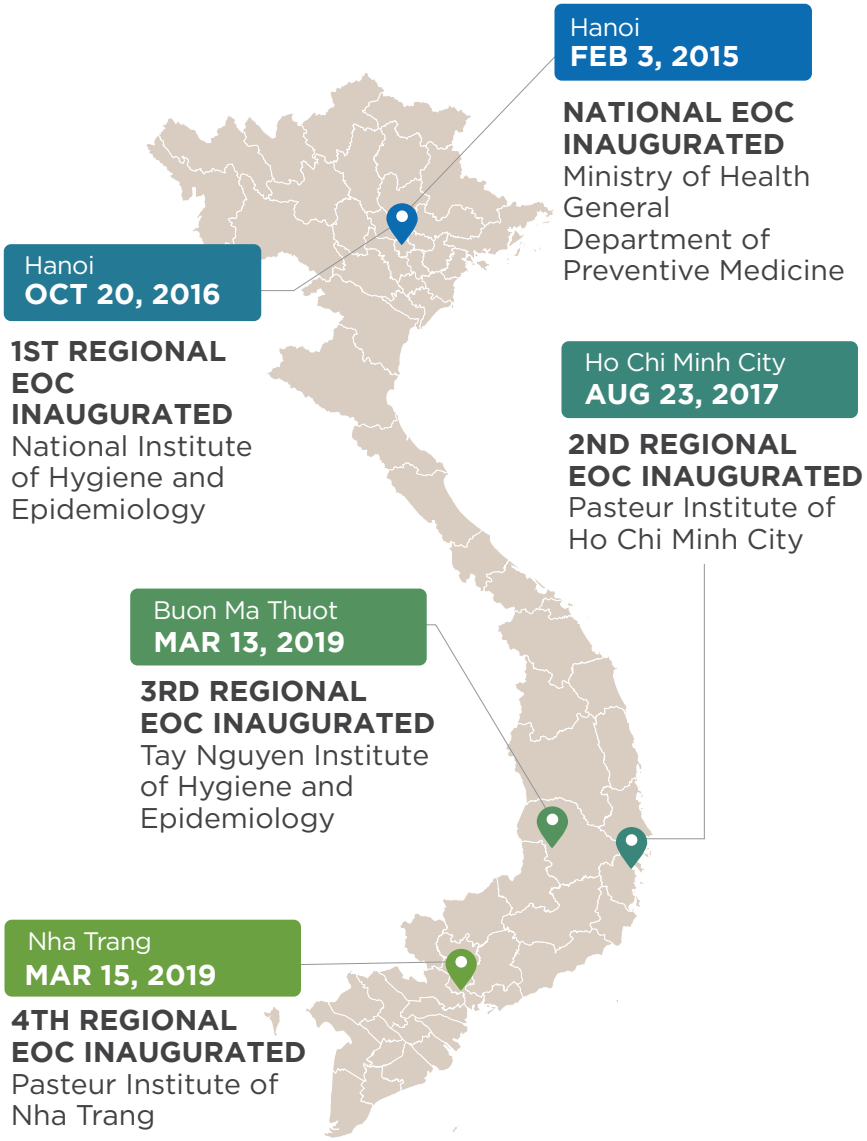
FETP Fellow Trang Tran and virology technician Quan Le from the Tay Nguyen Institute of Hygiene and Epidemiology, with Thai Mai from the Thang Hung Health commune station, check for mosquitoes during an investigation of a dengue outbreak in Vietnam's Central Highlands. Photo: Lý Thi Thùy Trang

HANDS-ON TRAINING DEVELOPS DISEASE DETECTIVES

Ms. Trang Tran (now a member of TIHE's surveillance team) was a fellow in Vietnam's updated Field Epidemiology Training Program (FETP). In collaboration with CDC, Vietnam's Ministry of Health revised the FETP course to improve the epidemiologic knowledge and skills of FETP fellows, or disease detectives, who detect, track, and stop diseases before outbreaks become epidemics. During this 12-week course, fellows participate in hands-on training, work closely with FETP mentors, and complete reports on outbreak investigations. This field work uses the learning-by-doing approach that has made FETP so successful around the world. As mentors support trainees, the mentors improve their own skills, thereby sustaining public health capacity.

As part of her required field work, Trang joined the Gia Lai provincial rapid response team to investigate the dengue outbreak. By applying what she learned as an FETP fellow, Trang was able to collect essential data and conduct data analysis that guided the province's response to the outbreak. "Through the FETP workshops, hands-on practice, and mentoring, I improved my ability to interpret and analyze data, identify

Building a National Network of Emergency Operations Centers (EOCs)



problems, and develop more useful reports," said Trang. "FETP helped me understand the nature, scale, and cause of the outbreak and how to control it."

SMARTER TOOLS, BETTER DECISIONS

CDC and the U.S. Defense Threat Reduction Agency (DTRA) helped Vietnam establish a national network of Emergency Operations Centers (EOCs), which was completed in March 2019. The network, which includes one national and four regional EOCs, is crucial for surveillance and response to communicable diseases throughout the country. Trang was able to use newly available tools to compile, analyze, and interpret the data while working within TIHE's EOC. "Trang's investigation was a great opportunity for our Ministry of Health partners to leverage the investments provided by the U.S. government. Creating a synergistic result, an approach that can be applied to future outbreaks," said Dr. Trang Do, Team Lead for Surveillance and Response, CDC Vietnam.

CDC and DTRA also supported the development of a data warehouse, a storage system that integrates national and regional data sources from laboratories, hospitals, and clinics. CDC helped TIHE develop an online portal for Trang to enter dengue data into the warehouse. Because the data warehouse is connected to TIHE's EOC, Trang was able to immediately analyze, display, and share the data with decision makers. The EOC's data warehouse provides Vietnam with the most advanced tools available for using data for public health decision-making.

PRACTICE MAKES PROGRESS

By revising the FETP course, establishing the national EOC network, and developing a data warehouse, CDC provided smarter tools for Vietnam to make better public health decisions.

Trang's dengue investigation serves as a valuable reminder for surveillance staff to routinely use the EOC network and the data warehouse to effectively manage, analyze, and visualize data to control an outbreak. CDC continues to support Vietnam to use these tools in solving larger, more complex problems, such as newly emerging and imported diseases. "When our partners apply these tools to their unique context and in diverse situations, they become more comfortable and see them as a means to solving public health problems faster and better. That is the key to sustainability," said Dr. Matthew Moore, Global Health Security Program Director, CDC Vietnam.

Burkina Faso's Disease Detection System in Action

As Ebola spread across West Africa from 2014-2016, so did the fear and recognition that everyone was at risk. The outbreak showed that safeguarding public health meant that nations needed to rethink their surveillance strategies and apply sustainable and effective outbreak warning systems.

While completing community assessments in Burkina Faso, local health workers come across a donkey pulling children in a cart. Photo: Evelyn Hockstein, CDC Foundation

Located in the heart of West Africa, Burkina Faso took the threat of a disease outbreak seriously. The country decided to pilot a bold and innovative disease surveillance approach by engaging communities in early detection of potential infectious disease threats.

SOUNDING THE ALARM ON EMERGING HEALTH THREATS

In 2017, Burkina Faso's Ministry of Health (MOH), with strong technical support from the CDC, implemented a community event-based surveillance (EBS) pilot system. Community members and local health workers were trained to identify and report unusual health events to quickly detect potential human or animal outbreaks. Local health workers acted as frontline disease detectives who could sound the outbreak alarm and bring attention to emerging health problems. The pilot EBS system provided tools, operating procedures, and neccessary training and mentoring for community health workers. It equipped frontline healthcare staff with the knowledge and skills needed to successfully identify emerging public health threats.

It was not long before the pilot EBS system would face a significant test.

EVENT-BASED SURVEILLANCE IN ACTION

In December 2018, a community health worker in the Kongoussi health district reported strange symptoms among local donkeys. Many of the animals suffered severe respiratory distress, coughing and struggling to breathe. The unexplained illness resulted in the sudden deaths of several donkeys. By January 10, 2019, the mysterious illness had spread to other areas, and the Ministry of Animal and Fisheries Resources (MRAH) reported approximately 140 donkey deaths. Ten out of 38 communes in Kongoussi

also reported animals with similar symptoms, and other regions reported the outbreak through the EBS pilot program.

The government had to act quickly. A team of health and animal resource workers joined forces to investigate the cause of the outbreak. Laboratory results identified the illness as strangles, a contagious, infectious disease of the upper respiratory tract of donkeys, horses, and mules, caused by the bacterium *Streptococcus equi*.

The MOH and MRAH called for regular meetings with key partners including CDC, U.S. Agency for International Development (USAID), World Health Organization (WHO), and Food and Agriculture Organization (FAO) of the United Nations.

During these meetings, investigators discovered that there were other cases of sick donkeys in Bagare (in Northern Burkina Faso), where the animals tested negative for strangles but positive for anthrax. Through effective field investigations, the team confirmed the presence of anthrax in the donkey population. In 19 villages in Bagare, over 75 donkeys died, but a rapid response introduced control measures and ultimately prevented the disease from spreading to humans.

Early identification of animal disease outbreaks helps reduce the risk of serious losses of livestock as well as disease spread to people.

PROVIDING A MODEL FOR THE FUTURE

Since the launch of the CDC-supported EBS in 2017, three district health teams, 210 assistant nurses and chief nurses, and 935 community health workers have received EBS tool training. The EBS curriculum also now includes the One Health approach, which considers the connection between human, animal, and environmental factors in the spread of infectious diseases. Early identification of animal disease outbreaks helps reduce the risk of serious losses of livestock as well as disease spread to people.

Burkina Faso's success with the EBS program is a model for other countries seeking to improve community-level surveillance. The EBS program has become a key part of Burkina Faso's health system. This sustainable intervention can better protect public health by strongly improving disease surveillance throughout the country.

3 **District health teams,**

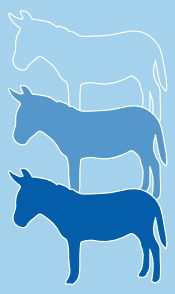
210 **assistant nurses and chief nurses,**

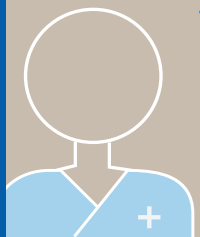
935 **community health workers**

were trained on the EBS tools with a **One Health approach**

A trained local health worker reported suspicious illnesses among donkeys through EBS, **triggering an investigation**

In 19 villages in **Bagare**, 75 **donkeys died from anthrax**





0 **People were infected with anthrax** as a result of the EBS program

Local health worker demonstrating eIDSR to CDC's Fanny Koroma (in blue) during a field site visit. Photo: Julia Chen

Ebola Outbreak Sparks Disease Surveillance Transformation in Sierra Leone

In 2014, tragedy struck a remote area in Sierra Leone, after an Ebola outbreak crossed over from neighboring Guinea. Due to gaps in the disease surveillance systems, the Ebola virus continued to spread throughout Sierra Leone and into neighboring West African countries.

Two years later, when the epidemic was finally stopped, Ebola had claimed nearly 4,000 lives in Sierra Leone and prompted the country to make substantial, sustainable improvements to its disease surveillance system.

Today, Sierra Leone is the first country in the World Health Organization (WHO) African region to fully transform its national disease surveillance system from paper-based to a health facility-level, web-based electronic platform. This change significantly improved disease reporting and tracking throughout the country.

UPGRADING SIERRA LEONE SURVEILLANCE SYSTEMS

Before the Ebola epidemic, Sierra Leone relied on the Integrated Disease Surveillance and Response (IDSR) system, a paper-based surveillance system used to track local health conditions and report to the district health facility. Unfortunately, IDSR was not available in all health facilities, and reporting was low in the facilities that used it. Weekly counts of disease conditions required verbal transmission to the district health facility. An electronic spreadsheet was used by the national staff to manually enter each district's data. This manual system was affected by human error and

144

TRAINING SESSIONS included in the roll-out coverage of the new eIDSR system

2,300

HEALTH PROFESSIONALS instructed during the roll-out of the new eIDSR system

The roll-out trained health professionals from over

1,300

HEALTH FACILITIES

did not meet data reporting expectations.

In 2015, Sierra Leone's Ministry of Health, with support from the CDC, WHO, and other partners, updated the paper-based IDSR system. They added organized system tools, refined the country-specific disease notification list, and developed standard processes to improve tracking and reporting. In 2016, Sierra Leone and CDC moved away from paper-based surveillance to a web-based electronic IDSR (eIDSR) system that allows district-level officials to enter health facility-level data. This new web-based platform transmits data to the national District Health Information System (DHIS2) database in real-time.

DEVELOPING A MOBILE APP TO OBTAIN DATA

After the successful use of district-level eIDSR, a mobile application (app) was then developed based on DHIS2's technology. With the app, local health facilities transmitted data directly into the national database, bypassing the need for district-level data entry. Once the app was downloaded onto a tablet at each health facility, it allowed data to be automatically submitted over a mobile network or via text message to the national system without additional entry.

When an internet connection was unavailable, the app automatically converted the data into a simpler format, transmitted it to the national system, and converted back to its original format for analysis. The guidelines built into the app help ensure accurate data entry by requiring additional verification if the system "senses" information might be entered incorrectly.

One of the challenges facing the app's usability was health workers' limited experience using a smart device. To reduce issues, the developers simplified the design. Workers in local health facilities were already familiar with the paper-based system, so the designers set up the app to mirror the paper form layout. Designers also ensured that system messages used familiar terms.

The mobile app was tested at six health locations before widespread implementation. **National rollout of the app included 144 training sessions of more than 2,300 health personnel from over 1,300 health facilities. The updated eIDSR and use of the app improved weekly reporting from less than 40% in 2015 to 99% as of May 2019.** The app made it possible to more effectively track 28 priority diseases in every government health facility across the country.

Disease outbreaks pose a serious threat to health security worldwide. Much of a country's public health relies on its ability to prevent, detect, and respond to rising threats. Sierra Leone has made great improvements by implementing a sustainable and effective surveillance system. This transformation has positioned the country to better protect citizens' health and well-being and prevent diseases from spreading beyond its borders.

National surveillance staff training community health workers on the eIDSR system. Photo: Michelle Sloan

Cover and back photos: RTI International