

Updates from the Field

STORIES OF REGIONAL COLLABORATION

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

DIVISION OF
**GLOBAL HEALTH
PROTECTION**
DGHP



Photo: Sara Holcombe

Message from the Director

The global flow of information, goods, and people means that we live in an increasingly interconnected world. But just as people can move across countries, so too can diseases; within 36 hours a pathogen could conceivably travel from a rural village to cities on every continent.

Shared risk means shared responsibility. Today's global health challenges require collaboration among countries, particularly neighboring countries, which often have familial, cultural, linguistic, social, and economic ties. In this era, no country can protect itself alone. We must build regional networks, relationships, and shared assets to help nations minimize their public health risk and maximize their capacity to quickly contain threats.

Regional collaborations are a cornerstone of global health security and are instrumental in addressing the public health threats of our time. They allow us to strengthen communication, consolidate functions, create efficiencies, and accelerate progress. Through the work of the Division of Global Health Protection (DGHP), CDC will continue to invest in robust and resilient regional public health systems so that countries can leverage each other's expertise and benefit from the knowledge gained by their neighbors to fight emerging and re-emerging pathogens.

Every day, members of the DGHP team provide technical expertise to dozens of countries around

the world. They bring countries together to strategize on the best ways to develop strong disease surveillance systems, laboratory networks, cadres of public health professionals, and emergency response structures. Working side by side with partners from multiple governments, faith-based groups, nongovernmental organizations, academic institutions, and more, DGHP staff bring their world-class knowledge and skills to bear on the most pressing global health security issues faced by each region of the world.

In this issue of *Updates from the Field*, you will read about how DGHP and other CDC groups have connected people and systems within different regions—Africa, the Americas, the Middle East/Europe, and Asia—and around the globe. For example, in Africa, we connected disease detectives from Nigeria and Benin to respond to a Lassa fever outbreak. In the Americas, we addressed a deadly fungus and fought the spread of measles. In the Middle East/Europe, we helped improve vaccination coverage for polio in Syria and in Asia we worked to bring safe water to Rohingya refugee camps in Bangladesh. These are a few of the many shining examples of the difference that CDC's efforts make and how a regional approach can safeguard and improve global health security.

I hope you enjoy reading about our impact and that you will consider how you too can be part of the work to create a safer, healthier world.

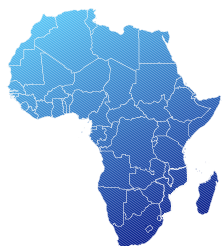
CAPT Nancy Knight, MD

Director, Division of Global Health Protection
Center for Global Health

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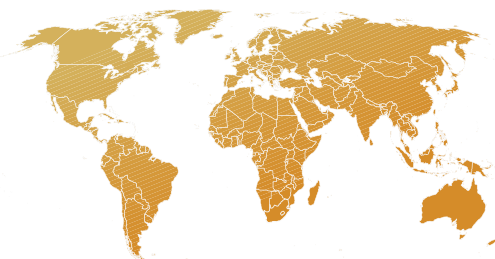
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International Community Renews Commitment to the Global Health Security Agenda

West Africa Comes Together to Confront Monkeypox

On September 22, 2017, the Nigeria Center for Disease Control (NCDC) sprang into action when a suspected case of monkeypox was reported in the southern part of Nigeria, almost 40 years after the rare virus was last detected in the country.

The outbreak spread rapidly. Within two weeks, 33 suspected cases were identified. As cases were confirmed in the early stages of the outbreak and evidence of possible human-to-human transmission emerged, the fear that the outbreak could spread rapidly throughout the country and across borders grew. Given the scope of the outbreak, the response required a collaborative approach with regional partners and international organizations to accurately detect, track, and stop the virus.

When NCDC noticed the sudden appearance of monkeypox symptoms in one community, it immediately activated its multi-agency and multi-partner emergency operations center (EOC) for coordination of the outbreak response. The response took a One Health approach, recognizing that human health is closely connected to the health of animals and the environment. Experts from Nigeria's health, agriculture, and environmental sectors,

10 

healthcare professionals
trained under the One
Health approach

7 

laboratory staff trained
to use PCR testing

120 

animal samples of
monkeypox virus banked



Clint Morgan and Jeffrey Doty of U.S. CDC guide the One Health team in laboratory techniques at Afi Mountain.
Photo: Muhammad Saleh

in collaboration with international partners including the U.S. Centers for Disease Control and Prevention (CDC), the World Health Organization, Africa Centres for Disease Control and Prevention (Africa CDC), and the African Field Epidemiology Training Network, set to work to identify and address diagnostic and surveillance gaps for both

human and animal infections. CDC contributed its expertise to the response by training 10 healthcare professionals on the EOC team using the One Health approach. This training helped the EOC team analyze the latest disease surveillance data, improve Nigeria's laboratory capacity to diagnose new cases, and develop national

guidelines for NCDC. In neighboring Cameroon, Equatorial Guinea, Togo, and Central African Republic, border health authorities were also on alert and ready to investigate if people presented with fever, headache, muscle aches, swollen lymph nodes, exhaustion, and rash—the usual signs and symptoms of monkeypox.

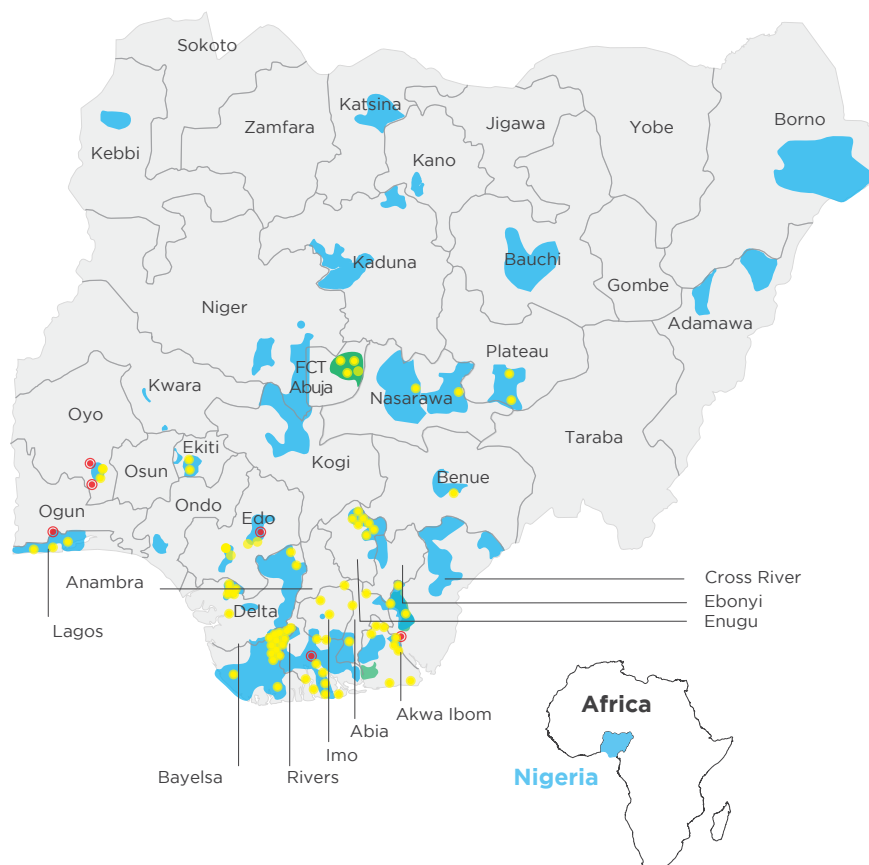
IMPROVING LAB CAPACITY

“Regional and global collaboration were essential to contain this monkeypox outbreak,” explained Muhammad Saleh, a senior public health specialist for emergency management at CDC’s office in Nigeria. “Within a few days of the EOC’s activation, Africa CDC deployed an expert to provide technical assistance in the coordination of the EOC’s daily operations and how to follow the International Health Regulations (2005), which aim to strengthen reporting and communication among neighboring nations in potential cross-border outbreaks.”

At the time of the outbreak, Nigeria did not have the laboratory capacity to test for monkeypox. As a result, NCDC had to dispatch initial specimens to laboratories in neighboring Senegal and to CDC in Atlanta for quick and accurate diagnosis. To strengthen Nigeria’s local capacity to confirm suspected animal and human monkeypox cases, CDC trained seven frontline laboratory staff to test samples in-country using polymerase chain reaction (PCR) testing. CDC deployed poxvirus experts to work closely with staff at NCDC, providing technical assistance in outbreak coordination, surveillance, and laboratory diagnosis. CDC also provided reagents, equipment, and other essential laboratory supplies needed to identify specimens accurately.

Collaboration with U.S. CDC, Africa CDC, and other partners helped improve NCDC’s laboratory surveillance and testing methods to quickly and accurately test for monkeypox and other diseases like Lassa fever. CDC poxvirus ecologists trained local staff in how to trap small animals that may carry monkeypox virus. Almost 120 animal samples are banked for PCR and genetic testing at the National Veterinary Research Laboratory, a local collaborating institution for outbreak response in Nigeria. These samples, when tested and analyzed, may provide information about the source of the outbreak and any additional monkeypox disease reservoirs, critical details needed to

NIGERIA: Distribution of Monkeypox Cases by Local Government Areas (LGA) September 2017-January 2019



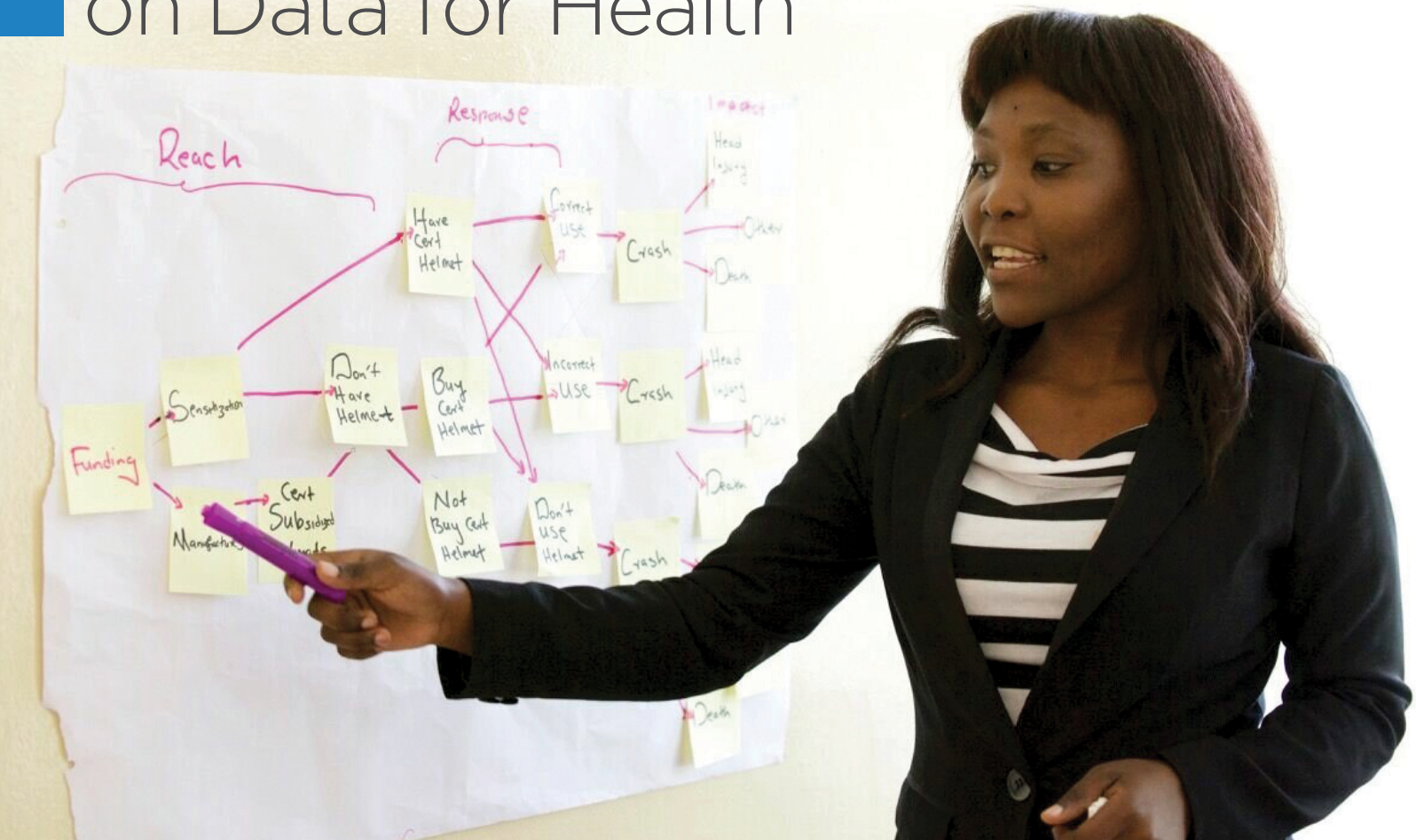
- LGAs with 1-4 Reported Cases of Monkeypox
- LGAs with 5-10 Reported Cases of Monkeypox
- Monkeypox Confirmed, Sept 2017-Jan 2019
- Monkeypox Deaths, Sept 2017-Jan 2019

Source: <https://ncdc.gov.ng/diseases/sitreps/?cat=8&name=An%20update%20of%20Monkeypox%20Outbreak%20in%20Nigeria>

improve the country’s ability to detect and prevent future outbreaks.

Regional and international collaborations strengthened NCDC’s outbreak response capabilities, building the foundation for faster in-country disease diagnosis and a One Health approach that can be applied to future outbreaks. The outbreak included more than 300 cases (132 of them confirmed) and seven deaths by the end of January 2019. However, the coordinated response stopped the monkeypox outbreak before it spread more widely, demonstrating that collaboration and a regional approach to global health security can save lives.

Zambia at the Forefront on Data for Health



Chama Mulubwa explains the decision tree for a policy brief. Photo: Michael Washington

Nearly 60% of low- and middle-income countries currently do not report basic health data, limiting the ability of policymakers to make informed decisions to improve the public's health.

To better equip governments with the tools and systems to collect and use data, Bloomberg Philanthropies, CDC, and global partners launched Data for Health (D4H) initiative in 20 countries. Among these, Zambia has been at the forefront, providing a model of effective and country-driven implementation, demonstrating best practices, and sharing lessons learned.

USING MOBILE PHONES TO COLLECT DATA

With mobile phones increasingly common worldwide, D4H is exploring the potential for mobile phones to provide timely and accurate data. D4H teamed up with CDC to assess the feasibility of using mobile phone technology to track noncommunicable diseases (NCDs) and their related risk factors by gathering nationally representative information on topics like tobacco use, alcohol use, diet, hypertension, and diabetes.

As the first country to conduct the NCD Mobile Phone Survey, Zambia led the way in successfully engaging national stakeholders, establishing technical infrastructure, building local capacity, adapting and administering the survey, and analyzing results. The Zambian government is now

preparing to share the survey findings publicly and use the data to enhance NCD prevention and response strategies. Following Zambia's lead, the Philippines and Morocco also completed the survey. Meanwhile Malawi, Sri Lanka, and several other low- and middle-income countries are currently implementing the survey, applying insights from Zambia's pioneering efforts.

TURNING DATA INTO ACTION

Without analysis and good communication, data are only numbers. Through trainings and mentorship, the Data Impact Program, another arm of D4H, is building the skills of Ministry of Health staff to translate data into policy briefs, communications products, and public health bulletins to inform policy and program development.

Zambia has begun to apply the recommendations stemming from analysis of national data. So far, results include policy changes on cervical cancer screenings and pilot programs for tuberculosis testing among health care workers and in maximum security prisons. These recommendations, and results from other D4H activities in Zambia, are shared in *The Health Press*, Zambia's public health bulletin, which was also developed with support from the D4H initiative.

Zambia is sharing these successful strategies regionally; in 2018, Zambia sent two trainers to Tanzania to facilitate a Data to Policy session for the Southern Africa region. This facilitation across countries is a promising way for the Data to Policy training program to build regional capacity.

A NEW WAY FORWARD

The D4H initiative is empowering Zambia and other countries to strengthen health surveillance and improve data use. From the initial data collection at the community level to decision-making at the Ministry of Health, CDC's partnership with D4H is equipping countries with the technical capacity to collect, analyze, and translate data for meaningful health policy change.

"Very few projects address the real issues," explained Jabbin Mulwanda, Permanent Secretary for the Zambia Ministry of Health, "Lessons are learned, but the reports end up on the shelf and don't change policy. I am excited about this initiative because available evidence will be used to inform decision makers and make meaningful change."



With mobile phone use common globally, mobile phone surveys offer a rapid, cost-effective tool to collect health data.
Photo: Zambia Ministry of Health

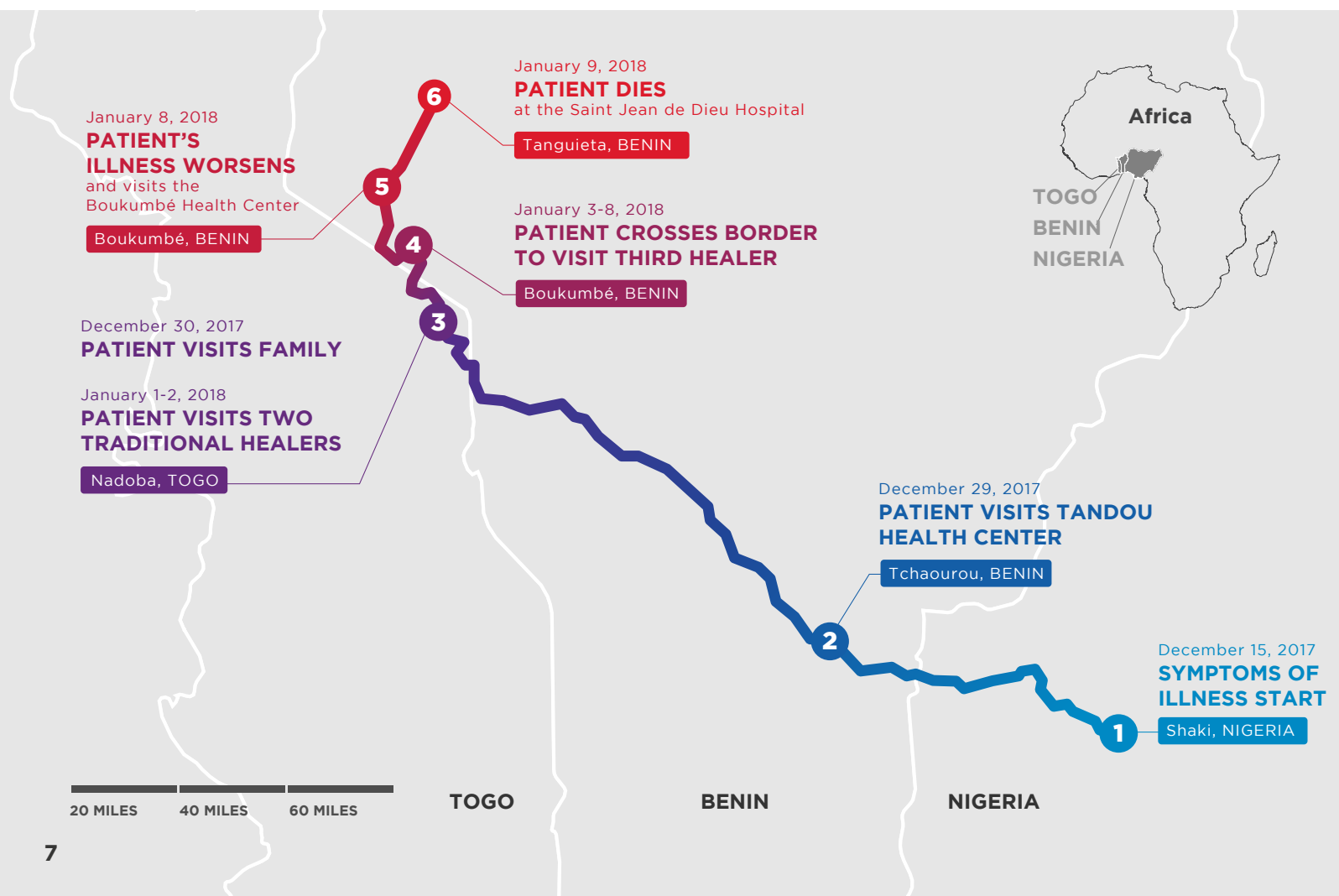
Tracking Lassa Fever Across Three Countries

When a Beninese migrant worker fell ill in Nigeria in December 2017, he decided to return to his parents' home in Togo for care. His condition deteriorated during his trip through Benin.

On his trip he stopped at Tandou Health Center in Tchaourou, Benin, was attended to by two health care workers, and continued his trip. He arrived home in Nadoba, Togo but his condition worsened and he went to several traditional healers near his home in Togo, as well as another health center in Boukumbé, Benin, which referred him to the nearest hospital, Saint Jean de Dieu Zone Hospital in Tanguieta, Benin. Here the attending doctor immediately suspected a hemorrhagic fever.

The patient was placed in isolation and a blood sample was sent to the national laboratory of Cotonou for diagnostic testing. He died the following day and laboratory tests confirmed he had Lassa fever. Public health workers in Benin immediately notified their colleagues across the border in Togo, and worked together to identify and follow fifty-five contacts, 23 in Togo and 32 in Benin.

This tragic story of a very sick man traveling across three countries caught the attention of Lesley Chace, CDC's support lead for Francophone West Africa Field Epidemiology Training Programs (FETP). She wondered if the man had infected others on his journey and if Nigeria and Benin were communicating with each other about this epidemic-prone viral hemorrhagic fever. Nigeria had an ongoing Lassa fever outbreak that had peaked in October 2017. About 10 days after the man died, Benin declared a Lassa fever outbreak with 21 cases, including four deaths.





Team members review records as part of a health evaluation in Nigeria. Photo: Tamuno-Wari Numbere

Lassa fever is endemic in many West African countries and shares some characteristics with Ebola. The last Lassa fever outbreak in Benin occurred in February 2017 and involved someone traveling from Nigeria. The frequent movement of people across the Benin-Nigeria and Benin-Togo borders makes it imperative for the countries to foster both formal and informal communication and information sharing.

CONNECTING ACROSS BORDERS

When the outbreak started, both Benin and Nigeria had established successful FETPs that, with support from CDC, allowed information sharing and collaboration, an opportunity Chace wanted to capitalize on. For nearly 40 years, CDC has worked with ministries of health worldwide to develop country- and region-specific FETPs, building a cadre of more than 14,000 skilled disease detectives in over 70 countries. These FETPs, modeled after the CDC Epidemic Intelligence Service program, provide “boots on the ground” to respond to natural disasters and disease outbreaks, as well as to conduct hundreds of investigations, including surveillance evaluations and planned studies.

“With FETPs, we are building professional networks of similarly trained epidemiologists who can learn from each other and call on each

other for epidemiology support,” said Chace. “This situation where a person with Lassa fever traveled across borders presented an excellent opportunity to strengthen communication and collaboration in the face of a possible outbreak affecting several countries.”

CDC FETP Africa Region team lead Ken Johnson moved swiftly to link the leadership of Benin FETP to Nigeria FETP to share information. “Collaborations like these are made easier when there are FETPs in each country. A disease recognizes no borders, but joint efforts between two or more FETPs can facilitate a stronger response and save lives,” said Johnson. CDC’s efforts helped the two country programs to share information and situational updates that informed each country’s outbreak response and prevention efforts.

In West Africa, all three tiers of FETPs—Frontline, Intermediate, and Advanced—continue to lay the foundation for cross-country and regional collaborations to respond to disease threats and outbreaks. By sharing knowledge, skills, and experiences, FETPs and their trainees can potentially accomplish more than if they worked alone. Working collaboratively creates opportunities for countries to share best practices and lessons learned from epidemiology work. Through these exchanges, they gain a more harmonized approach and increased capacities to improve the health security of the population.

Southern Africa Leads the Regional Approach to Public Health



Administering the oral polio vaccine to a child as part of the National Immunization Plus Days in April 2018 in Nigeria.
Photo: Tamuno-Wari Numbere

When Ebola ravaged West Africa during 2014-2016, the need for a continent-wide public health agency—an idea conceived years prior—became an urgent priority for the African Union (AU).

“AU member states tasked the AU Commission to accelerate the establishment and operationalization of the Africa Centres for Disease Control and Prevention (Africa CDC), and the concept of an Africa-owned technical arm, now known as Africa CDC, to ensure health security on the continent, was born,” said John Nkengasong, director of the Africa CDC.

Africa CDC was launched in January 2017 and operates in partnership with AU member states and through five regional collaborating centers (RCCs), which coordinate regional public health initiatives. CDC, working directly and through partners, collaborates with Africa CDC to support its overall operationalization, as well as development of specific public health capacities. Africa CDC supports the establishment and strengthening of national public health institutes

(NPHIs) in member states. NPHIs serve as pillars for coordinating national public health efforts, including surveillance, preparedness, and emergency response. Regionally, this idea is bearing fruit in the Southern African RCC.

TAKEN OFF LIKE A BULLET

In just two years, the Zambia-based Southern African RCC (SA-RCC) has made significant progress towards integrating and harnessing public health assets in the 10 countries in that region: Angola, Botswana, eSwatini, Lesotho, Malawi, Mozambique, Namibia, South Africa, Zambia, and Zimbabwe. The SA-RCC, hosted by the Zambia National Public Health Institute (ZNPHI), is paving the way by building a regional network for coordinated outbreak response, information sharing, and other cross-border public health priorities in the region.

ZNPHI is a new NPHI, launched in 2015, and according to Nkengasong, “has taken off like a bullet.” He attributes ZNPHI’s success to the leadership of the interim SA-RCC coordinator and Zambia NPHI director, Victor Mukonka, along with the efforts of Zambia’s Ministry of Health.

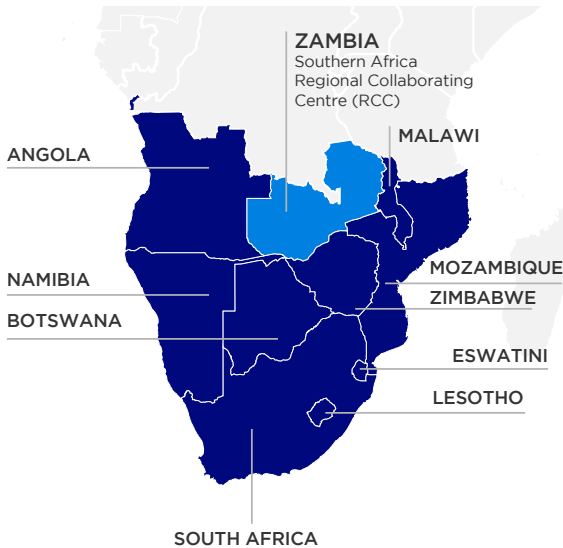
“Zambia has embraced its role in the RCC and is fortunate to have strong support from our country’s leaders in our regional role to help ensure global health security for the continent’s citizens,” said Mukonka.

The SA-RCC has fostered understanding of the public health landscape, engaged public health leaders in the region, supported mapping of regional public health assets, and strengthened the network’s use of those assets. SA-RCC has hosted meetings to identify regional public health priorities and develop strategies on cholera elimination and antimicrobial resistance.

REAPING REWARDS

In 2017, Africa CDC established the Extension for Community Healthcare Outcomes (ECHO) platform in Southern Africa to improve data- and information-sharing in real time, which has facilitated timely regional preparedness and response. SA-RCC uses the platform for regular discussions about outbreak preparedness and to leverage expertise in the region to support response efforts. The ECHO platform facilitated

Southern Africa Regional Collaborating Center (RCC) Member States

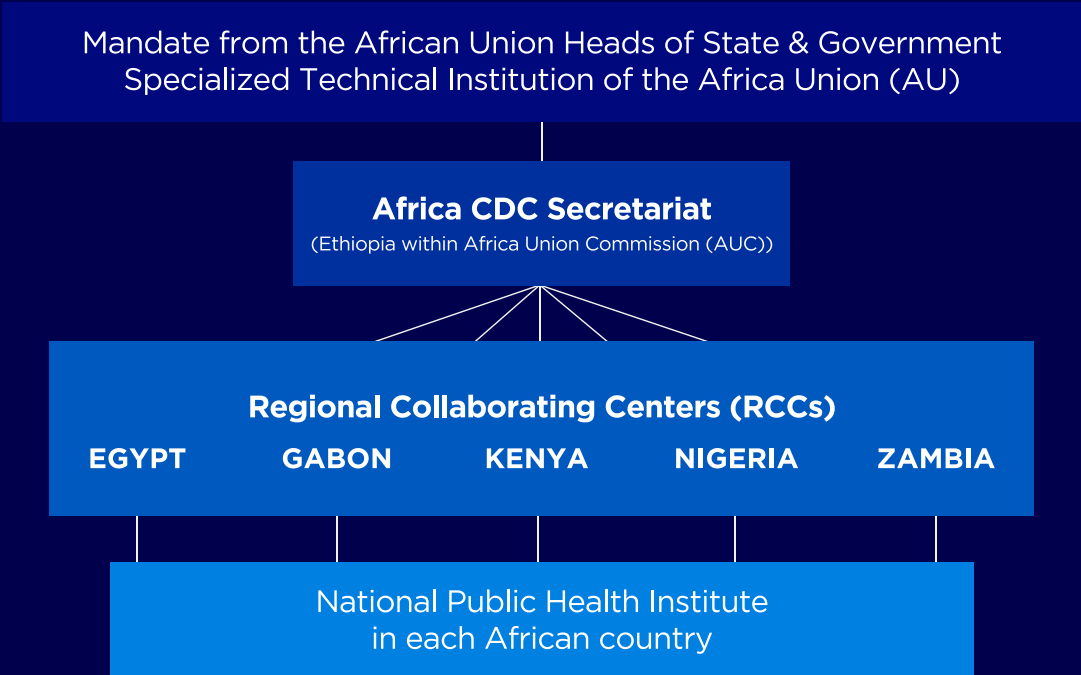


regional communication during the 2017-2018 listeriosis outbreak in South Africa.

Improved information sharing has resulted in increased requests to SA-RCC and Africa CDC for technical assistance from countries in the region. In 2018, during outbreaks of cholera in Zambia, Zimbabwe, and Malawi, SA-RCC facilitated regional surge capacity. For the Malawi outbreak, the SA-RCC coordinated needs assessments, trainings on laboratory and data management, and laboratory reagent procurement. SA-RCC also mobilized experts in the

region to support response to Ebola outbreaks in the Democratic Republic of the Congo in 2018-2019.

Outbreaks of Ebola and other infectious diseases underscore the importance of coordinated responses and the value of RCCs to global health security. CDC will continue to collaborate with Africa CDC to strengthen the continent’s response to disease threats at national, regional, and continental levels—all of which contribute to improved health security globally.



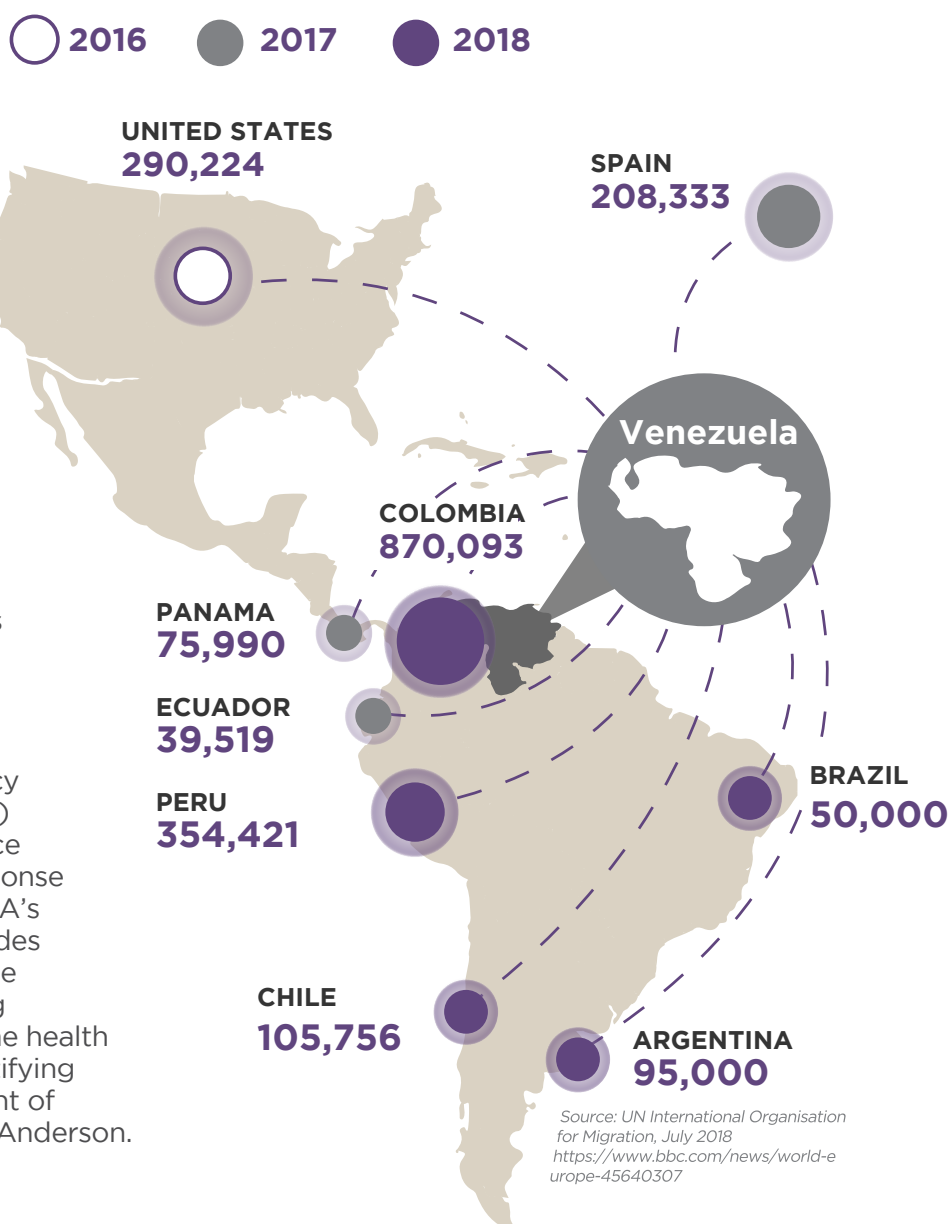
Venezuela Crisis Presents Complex Global Health Security Challenges

Aerial view of the entry of Venezuelan citizens to Peru. Photo: Maria Edith Solis Castro

In South America, the Venezuelan people are experiencing a desperate humanitarian crisis. With the collapse of the country's economy and healthcare systems, more than three million people (~10% of the population) have migrated out of the country since 2015. The United Nations projects that a total of 5.3 million Venezuelans will leave their homes by the end of 2019. The massive influx of refugees into Brazil, Colombia, Ecuador, Peru, Panama, and beyond has elevated global health security risks and has led to the surge of preventable diseases in the region.

Experts from CDC are on the ground in Colombia and other countries, finding ways to help migrants and other vulnerable populations being served by overwhelmed healthcare and social systems. For example, CDC is providing public health and medical technical advice to United States Agency for International Development's (USAID) Office of U.S. Foreign Disaster Assistance (OFDA) Venezuela Regional Crisis Response Team. "Our technical assistance to OFDA's disaster assistance response team includes assessing current health trends along the Colombia-Venezuela border, supporting colleagues in the region to determine the health needs of those affected, as well as identifying opportunities to support the government of Colombia's response," said CDC's Mark Anderson.

Main Destinations for Venezuelan Migrants Over Time



ERODING PREVIOUS GAINS

A resurgence of measles in South America began in July 2017, when a new case was reported in Venezuela. This was a huge setback, as the previous year the WHO Americas Region had celebrated its elimination of measles as an endemic disease. “This success was the result of more than 20 years of heroic effort at the local, national, and regional levels,” said CDC’s Robert Linkins. Since the reemergence of measles, Venezuela has recorded over 6,200 cases in 2018. Because the epidemic in Venezuela has lasted more than a year, measles is once again considered endemic in the country.

Linkins said that, among those 6,200 confirmed cases, at least 76 people have died. “This outbreak is now spreading throughout the Americas. Measles outbreaks have been reported in Brazil, Colombia, Ecuador, and Peru.” In 2018, Brazil recorded 10,000 cases and 12 deaths.

At the same time South America was contending with a measles outbreak, a major outbreak of diphtheria was also occurring on the continent. After nine years without any cases of diphtheria, a new outbreak began in Venezuela in 2016 and remains ongoing. The Pan American Health Organization (PAHO) has recorded more than 2,000 confirmed diphtheria cases and more than 200 deaths. In response to these outbreaks, CDC, in collaboration with USAID, PAHO, and other partners, funded the purchase and distribution of measles, rubella, and diphtheria vaccines for the region. From April 2018 to February 2019, more than 8.3 million children between six months and 15 years were vaccinated.

Venezuelan family looking for opportunities in Peru.
Photo: Maria Edith Solis Castro

BUILDING A CULTURE OF COLLABORATION

Additionally, CDC staff are supporting the International Organization on Migration’s (IOM) disease surveillance activities in migrant populations in Colombia and Panama. These activities complement the national surveillance systems and prepare countries for potential outbreaks before they occur. CDC, in collaboration with the Colombia National Public Health Institute, facilitated a public health emergency response and cross-border surveillance training in October 2018. The training was part of CDC’s ongoing support to enhance Colombia’s capacity to respond to public health crises, including the current influx of Venezuelan refugees. A major benefit of the training was that it brought together a variety of Colombian ministries and NGOs who had never worked together previously.

As conditions deteriorate in Venezuela, CDC experts are also supporting PAHO and neighboring ministries of health with their responses. CDC has tested clinical specimens for a wide range of pathogens, including measles, rubella, polio, Zika, chikungunya, and dengue, in its role as World Health Organization/PAHO Collaborating Centre’s regional/global reference laboratory. CDC continues to work in the region to strengthen laboratory capacity for measles, diphtheria, and other vaccine-preventable diseases. Through PAHO, CDC also supports the Venezuela Polio Laboratory when needed.

The crisis in Venezuela is accelerating the re-emergence of diseases, severely undermining regional disease elimination efforts of the past 20 years and placing millions of individuals at risk. Regional and global efforts, including from CDC, are required to address these worsening conditions inside Venezuela and meet the needs of this vulnerable population.



Taming a Triple Threat Fungus

***Candida auris* (*C. auris*) is an emerging fungus that presents three serious concerns as a growing public health threat in the United States and around the globe. The fungus is not only difficult to identify with standard laboratory methods, but also challenging to treat because it is resistant to multiple antifungal medicines commonly used to treat *Candida* infections.**

Additionally, *C. auris* spreads rapidly in hospitals and nursing homes, making it important to quickly identify the fungus in patients and take immediate special precautions to stop its proliferation.

Between July and September 2016, a mystery bloodstream infection began to spread and posed a grave threat to seriously ill patients in the intensive care unit at one of the largest hospitals in Panama. The invasive infection spread



Joint investigation team processing environmental and patient samples for the detection of *Candida auris*, Panama City, Panama. Photo: Diego H. Ceres

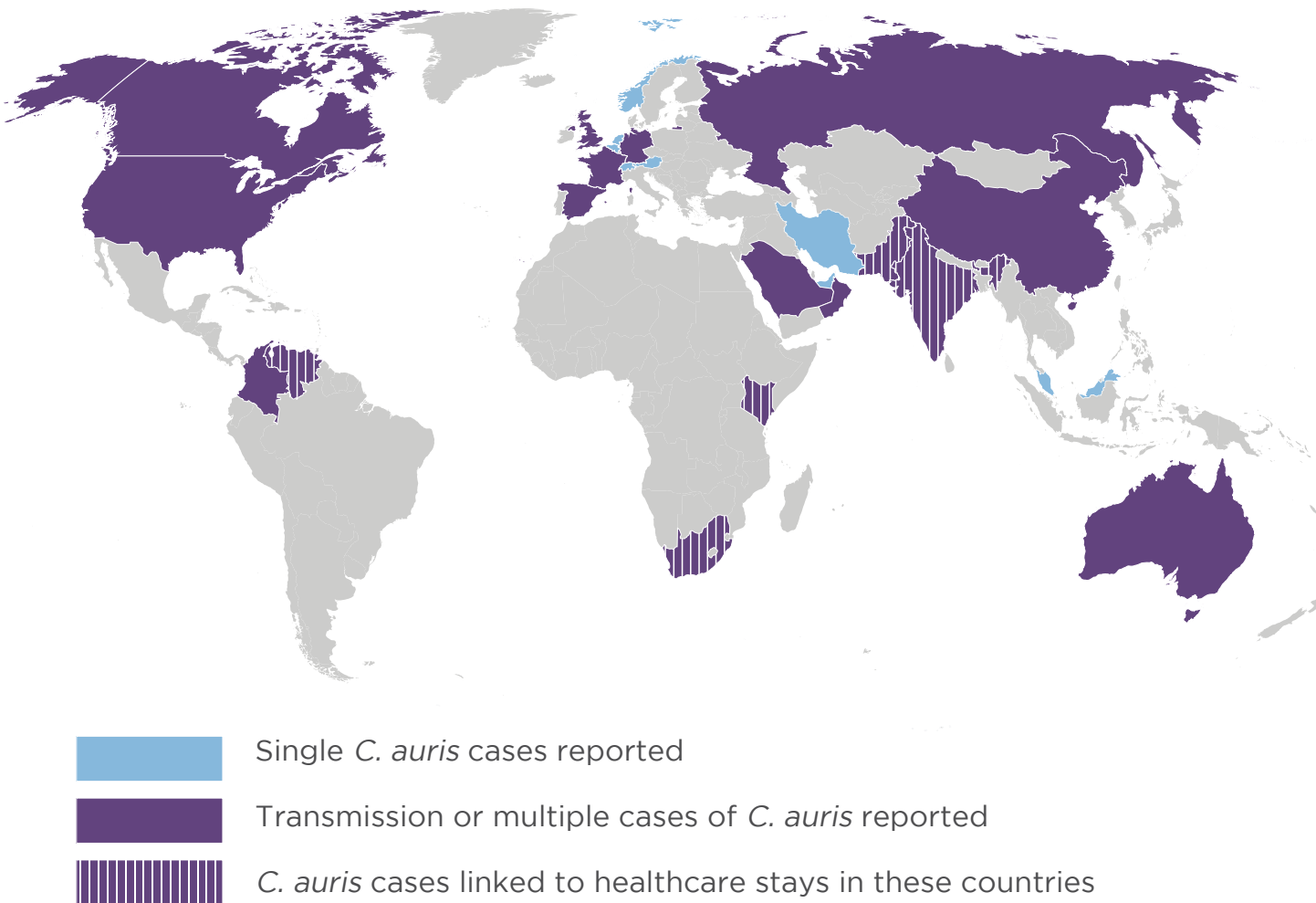
to nine patients, posing a health security concern to the hospital and requiring immediate public health interventions.

Initial laboratory testing in Panama identified the disease-causing agent as *Candida haemulonii*, another kind of *Candida* species. The Panamanian Ministry of Health requested assistance to respond to the outbreak from CDC's Central America Regional Office.



Strain of *Candida auris* cultured in a petri dish at the Centers for Disease Control and Prevention (CDC). Photo: Shawn Lockhart

Countries where *Candida auris* Cases Have Been Reported (As of February 28, 2019)



Source: <https://www.cdc.gov/fungal/candida-auris/tracking-c-auris.html>

Using specialized laboratory techniques that were not available in most Central American countries at the time of the outbreak, CDC confirmed, for the first time, the presence of *C. auris* in Panama. Around the same time, *C. auris* cases were identified in South America, including in neighboring Colombia. CDC also reported that most of the *C. auris* samples were resistant to at least one of three most commonly used antifungal treatments. Panama's public health and clinical authorities, with CDC technical assistance, implemented infection control practices to contain the outbreak. The number of infections caused by *C. auris* at the hospital decreased in the following months.

TAKING A REGIONAL APPROACH

Given the complexities of identifying and treating dangerous pathogens like *C. auris*, CDC has coordinated efforts with ministries of health, the Council of Ministries of Health of Central America

and Dominican Republic, and the Pan American Health Organization to implement regional programmatic activities to strengthen Central America's capabilities to prevent, detect, and respond to outbreaks and emerging pathogens. In a world where rates of antifungal resistance are increasing, improving surveillance and response at the national level to prevent the spread of such drug-resistant pathogens from crossing borders is vital. CDC is steadfast in its mission to provide technical support so Panama and other countries stand better prepared to respond effectively to future outbreaks at home and in the region.

C. auris infections in the United States have been closely related to strains found in Central America. Assisting international partners is key to reducing the spread of *C. auris* in hospitals and long-term care facilities both at home and abroad.

Colombia's NPHI Keeps the Public Healthy

What do mosquito-borne diseases, papal visits, and migrants all have in common?

In Colombia, they have all highlighted the value of a prepared public health system and the strength of the country's national public health institute (NPHI), the Instituto Nacional de Salud (INS).

INS is a well-established, highly functional NPHI that has been operational for more than 100 years. Investments from Colombia and CDC in strengthening INS's surveillance and emergency functions, along with a strong collaborative relationship with the Ministry of Health, have helped INS become the go-to public health institution in Colombia and the region.

CDC and INS have collaborated since 1992 when Colombia's Field Epidemiology Training Program (FETP) was established to develop a cadre of disease detectives. For more than 25 years, CDC's support has focused on

DID YOU KNOW?

NPHIs are CDC-like organizations, either governmental or non-governmental, closely aligned with the Ministry of Health, providing science-based leadership and coordinating a country's core public health functions. Strong NPHIs enable countries to effectively and efficiently collect and use public health data, implement and monitor evidence-based public health programs, and ultimately, save money and protect lives. NPHIs are critical when coordinating response to outbreaks and other public health threats.



Bogota border surveillance training workshop. Photo: Rebecca Merrill

119 graduates

from the **Advanced tier**

350 graduates

from the **Intermediate tier**

~1400 graduates

from the **Frontline tier**

NPHI strengthening, emergency preparedness and response, laboratory capacity building, workforce development, and improving use of data for public health action. These focus areas complement INS's own investments in public health capacities. When the Zika epidemic arrived in Colombia in 2015, INS was better prepared and able to respond by safely and efficiently handling the increased volume of laboratory specimens, conducting disease surveillance, and coordinating research to learn more about this emerging infectious disease.

FIRST REGIONAL EMERGENCY OPERATIONS CENTER

In January 2017, with support from CDC and the International Association of National Public Health (IANPHI), the INS ushered in a new era for disease surveillance collaboration, inaugurating the first fully functional public health emergency operations center (PHEOC) in South America. The PHEOC first activated for Pope Francis's visit in September 2017. It was imperative to monitor the health and safety of 1.5 million people, locals and visitors, who gathered for the visit in Bogota.

The PHEOC has also been vital to handling the arrival of large numbers of refugees from neighboring Venezuela. According to UNHCR (the United Nations' refugee agency) and the International Organization for Migration, approximately 440,000 Venezuelan migrants – 27 percent of them children – entered Colombia between April and June 2018. An influx of this magnitude strains public health and clinical services and easily overwhelms most public health infrastructures.

The PHEOC has helped Colombia monitor the health status of migrants during the crisis, and

INS's culture of preparedness has solidified its leadership in the control of communicable diseases and epidemics, measles immunization, and public health surveillance related to the migrant population.

CONTAINING MEASLES IN A MIGRANT POPULATION

When measles cases occurred in migrant populations, INS and its field epidemiologists led the response using the framework of the PHEOC. This effective response structure contributed to minimal transmission, with only 250 cases in 12 months, a notable success that has been recognized both locally and internationally.

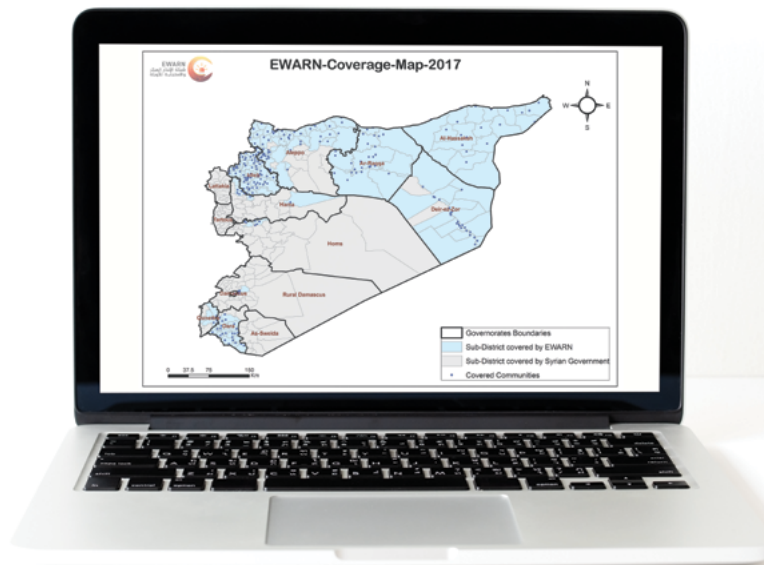
A CDC-facilitated border surveillance training, hosted in August 2018, helped INS develop the capacity to account for migration in surveillance efforts, as well as strengthen collaboration with numerous other groups working in migrant health.

“The Venezuelan migrant crisis provides another example of the role INS has in public health surveillance and response, as well as the value of continuously strengthening these capabilities and related resources,” said INS Director Martha Ospina. “Being prepared and having a plan for every risk has helped us be more responsive to this and other public health emergencies that arise within and beyond our borders.”



CDC Director Robert Redfield signing a Memorandum of Agreement with Colombia INS Director Martha Ospina, February 2019. Photo: Lauren Bishop

Ensuring Data Quality in the Midst of Insecurity and Uncertainty



Screenshot of EWARN map from 2017 campaign

Sitting in Atlanta, approximately 6,500 miles away, CDC Epidemic Intelligence Service (EIS) officer Velma Lopez and epidemiologist Colleen Hardy can monitor disease outbreaks among internally displaced populations in northern Syria.

Working in partnership with the World Health Organization (WHO), Lopez and Hardy use remote data evaluation methods to ensure that the Early Warning Alert and Response Network (EWARN), a disease surveillance system for epidemic-prone diseases, is operating effectively.

A LONG-STANDING SURVEILLANCE PARTNERSHIP

EWARN is often the only source for health data during a humanitarian emergency. It fills the gaps in existing public health surveillance

systems that may have limited or no capacity during a crisis. Covering a population of approximately 12 million, the northern Syrian EWARN was created to supplement the Syrian Ministry of Health's Early Warning and Response System that covers the southern region of the country. EWARN draws epidemiological data on 13 communicable diseases from more than 480 health facility sentinel sites. EWARN is primarily implemented and coordinated by the Assistance Coordination Unit (ACU), a Syrian nongovernmental organization based in Turkey. In collaboration with ACU, teams from WHO and CDC continuously evaluate and improve the system to best serve impacted communities. In particular, Lopez and Hardy focus on how the circumstances in the conflict-affected areas of Syria impacted the collection and management of EWARN's data in 2018.

The EWARN system plays a vital role in early detection of potential epidemics, making rapid response across humanitarian emergencies possible. After detection of a disease threat, health organizations determine the needed response, as well as help build capacity in the affected community to prevent future outbreaks. For example, in Syria, the system helped detect



Community-based health team surveys health and nutrition in camps in rural northern Idlib, Syria.
Photo: Mu'sab Ahmad A'raby/Red Crescent

a wild poliovirus (type 1) outbreak in 2013, more than a decade after the disease was eliminated in the country, as well as an outbreak of circulating vaccine-derived poliovirus (type 2) in 2017. ACU set up the Syrian Immunization Group and the Syria Immunization Task Force to build a vaccination program in response to these polio outbreaks. In 2015, the task force led a campaign to vaccinate about 1,280,000 Syrian children, covering 99.27% of children in all seven targeted governorates and continues immunization campaigns in various districts to this day.

MEETING REMOTE EVALUATION CHALLENGES

The system evaluations conducted by Lopez and Hardy are deliberately designed to be broad which helps establish the multi-faceted causes and effects of an outbreak. “Our focus is on data

quality and how people interact with the data they collect,” Lopez said. In addition to virtual interviews with database managers, Hardy and Lopez assess the attributes of EWARN’s database, including the timeliness, sensitivity, simplicity, and quality of data.

“Any gaps in data are not for lack of trying,” said Lopez. While remote evaluation of EWARN can be difficult, those who are working on the ground encounter their own set of challenges when collecting and managing EWARN’s data. Lopez describes the health workers gathering data as a “very dedicated and hardworking staff with innovative methods.” For instance, when health workers identified challenges to reach communities during outbreaks, they adopted the popular *WhatsApp* mobile messaging application as their method of communication, allowing workers to reach otherwise inaccessible populations with a simple message. In a health security emergency, every bit of speed and accuracy counts when it comes to prevention, response, and recovery.

Whether in Syria or any other country, special attention must be paid to conflict-affected regions that deal with unique health security challenges, including decreased access to health services and a reduced ability to move securely. With CDC’s support to improve EWARN, the system will be even more effective in detecting outbreaks early and promptly guiding response to save the lives of the most vulnerable in the face of instability.

12
MILLION



The EWARN system covers a population of **12 million**

13
DISEASES



EWARN draws data on **13 communicable diseases** from more than **480 health facilities**

Georgia: A Neutral Hub Brings Disease Detectives Together

Tucked away in the Caucasus Mountains, the country of Georgia has a rich history of trials and triumphs.

Georgia, together with neighbors Armenia and Azerbaijan, make up the South Caucasus (SC) region. Despite the challenges of rebuilding after the fall of the Soviet Union and an ongoing conflict between Armenia and Azerbaijan, Georgia has persevered and has become a model country for public health and global health security.



A KEY HEALTH DIPLOMACY TOOL

CDC's work in the SC demonstrates the true power of regional and international collaboration, commitment to science, and shared motivation to help others. These have always been core principles for the SC CDC regional office in Georgia, founded in 2009 to bring the Field Epidemiology and Laboratory Training Program (FELTP) to the area. Following the end of the Soviet Union, FELTP was the first program to bring together public health specialists and clinicians from Georgia, Armenia, Azerbaijan, and Ukraine.

The aim of the two-year FELTP was to strengthen capacity in human and animal disease surveillance, laboratory, outbreak response, and program evaluation through on-the-ground fieldwork, supplemented by in-class training. CDC's SC FELTP has served as a key health diplomacy tool, strengthening the network of public health professionals across the region as they train together for two years and work cooperatively to enhance health security.

Since 2009, the program has produced 127 graduates from the region; importantly, more than half (53%) of all graduates are from outside of Georgia.

FLAGSHIP OF HEALTH DIPLOMACY IN THE REGION

Through SC FELTP, Georgian graduates are working in various sectors in the country, including the Georgian National Center for Disease Control and Public Health (NCDC), the Richard G. Lugar Center for Public Health Research (national reference laboratory), the Ministry of Agriculture, private hospitals, and more. What has been a consistent theme in their experiences is how often the work they do is interdisciplinary, international, and most importantly, collaborative. All graduates are quick to relay not only how important CDC and SC FELTP was to their public health career, but also how important their training has been as a tool for health diplomacy in the region.



Orthopox field team processing small mammal samples in Akhmeta municipality, Georgia. Photo: Giorgi Maghlakelidze



Georgia FELTP aims to strengthen capacity in human and animal disease surveillance in the South Caucasus region. Photo: Tea Shvelidze

With the recent discovery of a novel orthopox virus in Georgia in 2013 and regional outbreaks of measles, rabies, Crimean-Congo hemorrhagic fever (CCHF), and *Shigella*, working across borders is more important than ever. The Lugar Center and the Azerbaijan Ministry of Health have developed a rewarding partnership, including the first genotypic analysis of human anthrax strains which detected that Georgian and Azeri strains share a similar heritage. This collaboration is a clear example of SC FELTP, with support of CDC Atlanta experts and SC public health agencies, developing sustainable public health capacity on a regional level and forging regional cooperation on common public health issues. This unique program demonstrates the value of regional collaboration in consistently building public health capacity, especially in times of rising global health threats.

Do You Speak *Data*?



Trainings in QGIS software brings together specialists from both the human and animal health sectors to share expertise.

CDC Central Asia Regional Office (CDC-CAR) database analyst and information technology advisor Dilafkor Mirdjalilov speaks four languages fluently. One of those languages, he said, is “*data*.”

According to Mirdjalilov, “*Data* is the language of public health that guides interventions, informs policymakers, and helps track disease outbreaks. *Data* is at the core of public health.”

In Central Asia, CDC uses the Field Epidemiology Training Program (FETP) to improve local capacity in data collection and analysis, all necessary skills to understand, anticipate, and prepare for outbreaks. Since 2016, the Central Asia FETP has collaborated with Amber Dimer, a CDC health scientist in Atlanta, Georgia. Dimer leads trainings in Central Asia on geographic information systems (GIS) using the free Quantum GIS software (QGIS), allowing trainees to spatially present and analyze national public health surveillance datasets. Rooted in the science of geography, GIS helps users analyze, store, manipulate, and visualize geographic information. It helps answer questions about how location impacts diseases and guides decisions about activities to prevent, detect, and respond to disease threats.

Dimer said GIS can be widely applied in public health. “It’s used to determine where outbreaks start, identify disease patterns or clusters, and target public health surveillance efforts. GIS is invaluable.”

TRAINING OF TRAINERS

Since 2016, Dismer has trained more than 90 FETP residents and graduates from Kazakhstan and Kyrgyzstan, and 20 epidemiologists from the Kazakhstan Ministry of Health (MOH) in GIS. In Tajikistan, with Dismer's support, Mirdjalilov trained an additional 17 FETP residents from Tajikistan and Afghanistan in 2017. In turn, FETP residents co-facilitated a basic-level GIS course in 2018 and will lead similar trainings in Kazakhstan.

In these trainings, participants gain technical skills to present spatial data in QGIS software, learn data visualization methods, and create their own disease maps. Participants also learn various cartographic techniques that help increase collaboration and data sharing between local, national, and international partners.

The trainings bring specialists from both the human and animal health sectors together to share expertise. In 2018, Dismer and Mirdjalilov developed a One Health GIS training course in Uzbekistan and trained 10 MOH and 10 Ministry of Agriculture specialists to use datasets on priority diseases, including anthrax, brucellosis, and Crimean-Congo hemorrhagic fever.

In Kazakhstan, Dismer worked with FETP staff and residents on spatial analysis to identify hotspots of the 2018 meningitis outbreak and clusters of

tuberculosis transmission in Almaty City. They informed policymakers on priority areas for targeted prevention activities, including active case finding and population screening.

"Thanks to the trainings provided by CDC, QGIS mapping has also become an integral part of how the Ministry of Health describes the epidemiology of HIV in the country," said Vladimir Kazakov, FETP graduate and monitoring and assessment specialist at Kazakhstan's Republican Center on Prevention and Control of AIDS. In 2017, CDC's Central Asia office provided technical support for the Republican AIDS Center to investigate an HIV outbreak in northern Kazakhstan, and, for the first time, used spatial analysis to locate hotspots of HIV transmission. Kazakov said, "The [identification of] HIV hotspots helped [us] to develop new recommendations for policymakers so they could direct resources and prevention activities where they are needed most."

The FETP residents and graduates trained by Dismer have now joined an international community of QGIS users. With their new skills, these disease detectives help improve the region's ability to collect accurate spatial data from disease investigations and conduct more rigorous data analysis. FETP graduates in the region are now qualified to conduct GIS trainings for others, teaching a new generation how to speak the language of *data*.



SINCE 2016



90

FETP residents and graduates from **Kazakhstan** and **Kyrgyzstan** trained in GIS



20

epidemiologists from **Kazakhstan's** Ministry of Health were trained in GIS

IN 2017



17

FETP residents from **Tajikistan** and **Afghanistan** were trained in GIS

IN 2018



10

Uzbekistan Ministry of Health and Ministry of Agriculture specialists were trained in a One Health GIS course

Disease Detectives Working Toward Polio Eradication

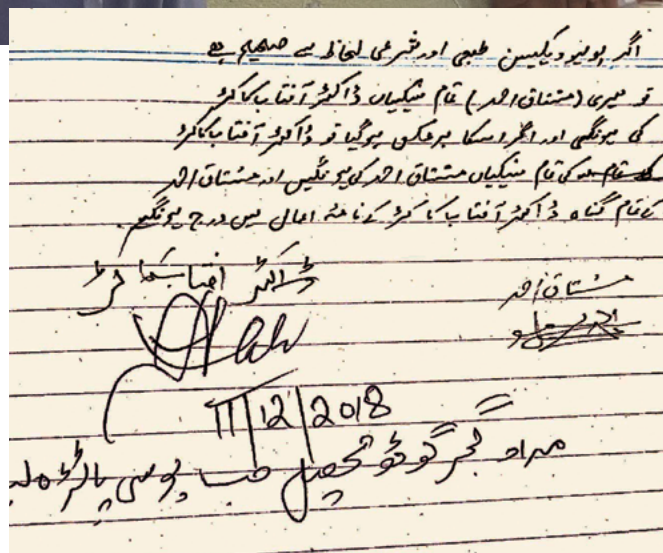


Infant receiving polio vaccine during local vaccination campaign.

When Aftab Kakar and his National Stop Transmission of Polio (NSTOP) team arrived in Lasbella in southern Pakistan to support a polio vaccination campaign, they learned some troubling news: at least 33 children, all under 5, had not received the polio vaccine.

As the NSTOP team lead for Balochistan Province, Kakar knew that a single child not vaccinated against polio could pose a public health threat.

Wild poliovirus recently returned to Pakistan and Afghanistan, and along with Nigeria, they are the three remaining countries with wild poliovirus. The continual movements of populations such as refugees, internally displaced people, nomadic/pastoral groups, people who migrate seasonally, and international business travelers in Pakistan and Afghanistan underscore the importance of eradicating polio from the region.



A note absolving an imam in Pakistan from any negative vaccine consequences.

Also troubling for Kakar and his team was that district health authorities had taken the extraordinary step of calling law enforcement agencies to forcibly vaccinate the children in the village. The potential for forced vaccinations created an atmosphere of fear and resentment, negatively affecting polio eradication efforts. Parents worried that they would be jailed for not complying with vaccination mandates or that vaccines would cause polio or sterility in their children. The NSTOP team, made up of the top graduates of Pakistan's Field Epidemiology and Laboratory Training Program (FELTP), was charged with addressing these challenges.

ADDRESSING VACCINE CHALLENGES WITH COMMUNITY LEADERS

The FELTP graduates on Kakar's NSTOP team immediately stopped health care workers from using police to force families to vaccinate their children. To convince parents to participate in the vaccination effort, the NSTOP officers knew they had to win the support of the influential imam (prayer leader) of the local mosque, whose opposition to the program heavily influenced parents. The NSTOP officers met with the imam and senior members of the community and discussed the benefits of the vaccine and



Child receiving polio examination from medical professional.

the potentially devastating consequences of this crippling disease that attacks the brain and spinal cord and can cause paralysis in unvaccinated children. The NSTOP team also discussed the safety and efficacy of the vaccine. The officers addressed the imam's concerns and successfully persuaded him to encourage vaccinations to proceed. As a result, with parental consent, all 33 children in the village were vaccinated. This approach has been successfully used in other Pakistani villages to get parental consent to vaccinate children.

DID YOU KNOW?

FELTP is a comprehensive two-year workforce development program in which government medical officers receive public health experience through hands-on training in outbreak response and disease surveillance. NSTOP officers are recruited through a rigorous and highly competitive selection process among FELTP graduates and receive intensive polio eradication training provided by CDC subject matter experts. Officers chosen to be part of the elite NSTOP program are involved in all aspects of Pakistan's polio eradication activities—case and environmental response, surveillance, vaccination campaign planning and implementation, and data analysis leading to programmatic decisions—to name a few.

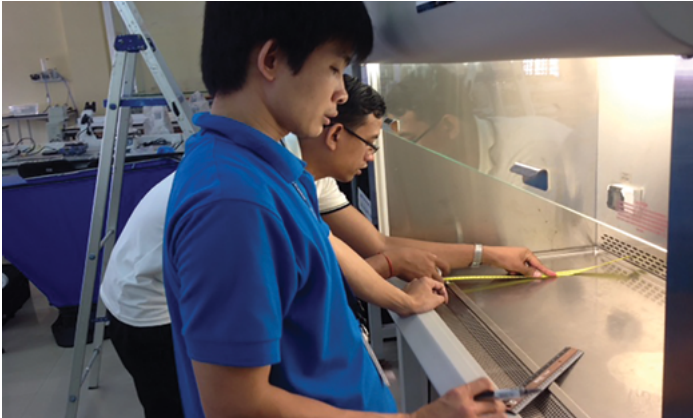
Kakar explained the challenges of this work. “Though NSTOP officers face challenges of uncertainty, insecurity, and targeted killings, they effectively support the Polio Eradication Initiative Program through strong coordination with partners at all levels through good analytical and communication skills,” he said. “They are monitoring the supplementary immunization activities in the most challenging areas with dedication and without fear.”

BUILDING A REGIONAL WORKFORCE TO TACKLE POLIO

In neighboring Afghanistan, CDC is working with the government to create an intermediate level Field Epidemiology Training Program (FETP) to boost the country's capacity for disease surveillance and outbreak investigations. The current FETP cohort is focused on involving fellow public health professionals in polio eradication and other vaccine-preventable disease activities. FETP's cross-cutting health systems approach strengthens public health workforce, surveillance, and response capacity in a region with critical need for a skilled and supported workforce to eradicate polio.

CDC has provided unwavering support to Pakistan and Afghanistan in their fight against polio. Eradicating polio and supporting a strong public health infrastructure in the two countries will help the region eventually maintain a polio-free status and control other vaccine-preventable diseases.

Keeping Safe around Highly Dangerous Pathogens and Toxins

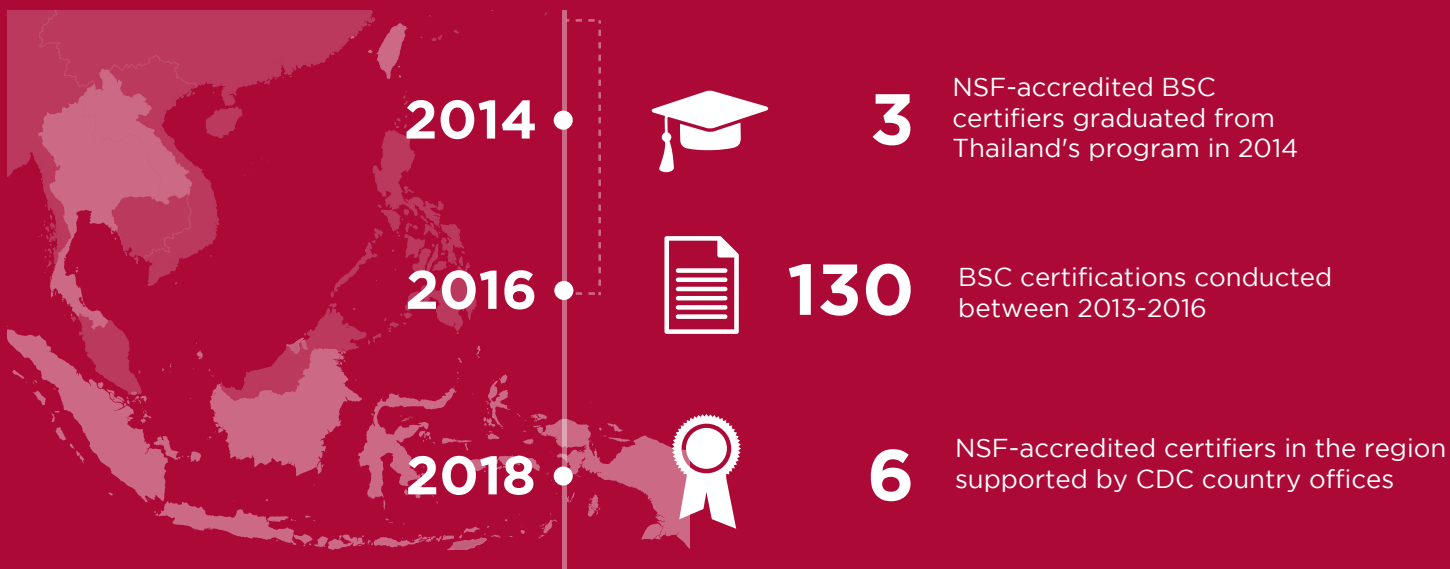


NAMRU-2 staff learning how to measure the airflow of biological safety cabinets. Photo: Anek Kaewpan

Southeast Asia faces numerous health security challenges, including novel disease threats, growing antimicrobial resistance, and increasing numbers of laboratories working with dangerous bacteria and viruses.

To enhance laboratory safety and biosecurity, nations in the region are focusing on the certification of biological safety cabinets (BSCs), passing legislation to improve biosafety, and promoting partnerships among public health institutions to strengthen their collective ability to respond to disease threats.

Certification of BSCs—enclosed, ventilated laboratory workspaces—protects laboratorians from infection, laboratory specimens and materials from contamination, and the public from the consequences of unintentionally released dangerous pathogens. In 2012, the CDC office in Thailand (CDC Thailand) established a BSC-certification training program with the Thai National Institute of Health and National Institute of Animal Health. The program was certified by NSF International (NSF), an organization that develops public health standards and certifies programs. In 2013, this program was expanded to Cambodia, with the US Department of Defense's Naval Medical Research Unit No. 2 (NAMRU-2) and the Cambodian Ministry of Health (MOH) as key partners. CDC's Cambodia office has since assumed responsibility for BSC work in the country.



Combined, these individuals performed more than **500 BSC certifications** in **65 laboratories** throughout **5 countries** & trained **more than 600 laboratory staff & students** on BSC certification & maintenance.



Testing for leaks on a high efficiency air filter of a biological safety cabinet. Photo: Anek Kaewpan

Three NSF-accredited BSC certifiers graduated from Thailand's program in 2014, one of whom qualified as a mentor to future trainees. The CDC Thailand-based mentor then trained two staff from NAMRU-2 in Cambodia, and together they performed 130 BSC certifications between 2013 and 2016. In 2016, some NAMRU-2 staff became registered BSC certifiers through NSF, and one qualified as a mentor. Since then, one more NAMRU-2 staff was NSF-accredited as a certifier. By the end of 2018, CDC country offices supported six NSF-accredited certifiers in the region; combined, these individuals have performed more than 500 BSC certifications in 65 laboratories throughout five countries and trained about 600 laboratory staff and students on BSC certification and maintenance.

LAWS IN LABS

Cambodia complemented their work in BSC certification with support for improved national legislation. Laboratory biosafety and biosecurity regulations are essential to government oversight and laboratory accountability. In November 2017, laboratory leaders from the Cambodian MOH partnered with technical experts from across CDC to hold a workshop on strengthening biosafety and biosecurity practices within the country's national laboratory network.

The workshop focused on the role of law as a public health tool and outlined a *prakas*, or ministerial proclamation, for the management of highly dangerous pathogens and toxins by laboratories. This *prakas*, when passed, will be the first regulation within the Cambodian MOH created to improve laboratory safety; the *prakas* will cover the possession, use, storage, and transfer of dangerous biological pathogens within public health laboratories.

The partnerships that CDC offices built with countries across the Southeast Asia region—Cambodia, Laos, Burma (Myanmar), Thailand, and Vietnam—are critical for building the regional capacity to manage and maintain safe and secure laboratories upon which global health security depends.

Responding to Rohingya Refugee Crisis

Fleeing political repression and violence in Burma (Myanmar), more than 900,000 Rohingya refugees have crossed the border into Bangladesh since August 2017.

Arriving on foot to ill-equipped settlements, the Rohingya refugees face numerous health risks including malnutrition, unsafe drinking water, poor sanitation and hygiene, lack of health care, and overcrowding. These conditions leave them especially vulnerable and exposed to epidemic-prone diseases. CDC is collaborating with the

In Cox's Bazar, where most of the refugees are located, WASH experts have determined that centralized chlorinated piped systems with community tapstands are the best long-term water provision strategy for the camps. In the short- to medium-term, humanitarian partners are distributing point-of-use household water treatment products and implementing bucket chlorination at tube wells to reduce the risk of cholera and other waterborne disease outbreaks. At these sites, an attendant puts chlorine directly into water collection vessels to ensure households are using chlorinated water. According to a WASH household survey completed in April 2018, only 13% of the households interviewed reported using



5 CDC team members collaborated with partners on the following activities to strengthen bucket chlorination activities in the camps:



Implemented a bucket chlorination monitoring system using **mobile phone surveys**

2



Conducted free residual chlorine rapid assessments in one camp with ongoing bucket chlorination activities

1

3

Created guidance for implementing partners to scale-up and improve bucket chlorination methods



4

Piloted the use of community consultation guidelines to identify priority drinking water tube wells for bucket chlorination.



government of Bangladesh and international partners to respond to this humanitarian emergency.

Within the refugee settlements, water, sanitation, and hygiene (WASH) issues are of immediate concern, especially because cholera is endemic to the area. While there are major efforts to expand access to safe drinking water and to provide access to adequate latrines for the Rohingya refugees, gaps in access still remain more than 18 months after the initial influx.

household water treatment methods. Because of these results, WASH experts scaled-up bucket chlorination activities to improve chlorination during the 2018 monsoon season.

ROBUST RESPONSE TO A COMPLEX CRISIS

To support this work, five CDC headquarters staff collaborated with partners on the ground, including the CDC Bangladesh team, to strengthen bucket chlorination activities in the



900,000+

Rohingya refugees have crossed the border into Bangladesh since August 2017



13%

of households reported to treat water with household water treatment methods, among those interviewed by a 2018 WASH survey



Water, sanitation, and hygiene issues pose health threats in the camp. Photo: Anu Rajasingham

camps. They conducted free residual chlorine rapid assessments to provide a snapshot of current chlorination coverage and implemented a bucket chlorination monitoring system using mobile phone surveys to ensure presence of chlorinators, correct dosing of containers, and presence of chlorine in stored water.

The public health threats facing the Rohingya refugees are significant and require a multi-dimensional and multi-sectoral response. In addition to WASH activities, CDC support has played a critical role in addressing multiple health-related challenges in the community. Michael Friedman, CDC Bangladesh country director said, “In the face of a complex crisis with multiple opportunities for outbreaks, CDC’s robust response provided critical, on-the-ground epidemiological support through our technical experts to the organizations on the forefront of the response.” Working closely with international partners and local government,

CDC’s epidemiologists have supported high-quality assessments and planning related to nutrition, immunization, and health information systems. Perhaps most notably, when a suspected diphtheria outbreak swept through the camps, CDC quickly sent laboratory supplies and laboratory experts to establish testing capacity in Bangladesh that confirmed *c. diphtheriae* as the source of the outbreak.

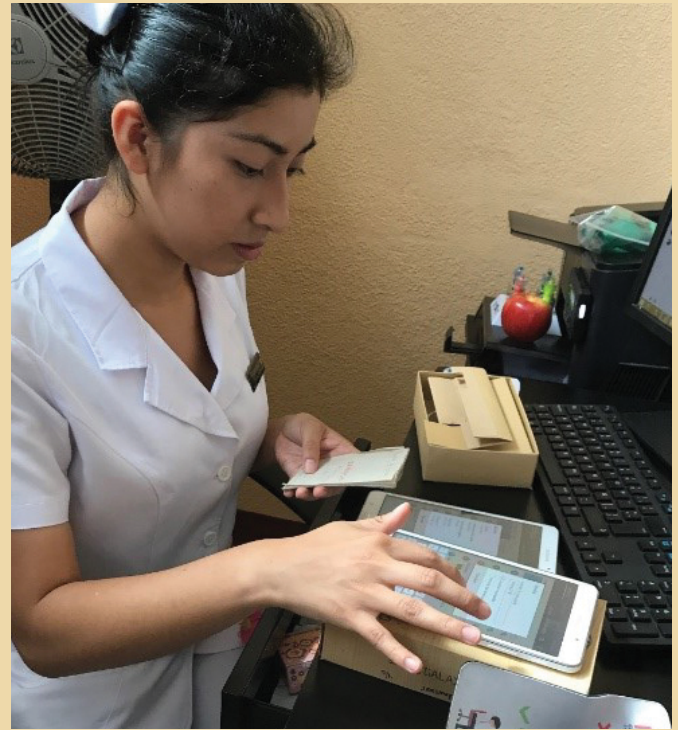
As the Rohingya crisis persists and the refugees continue to face numerous health threats, CDC efforts remain relevant to mitigate the risk of outbreaks and improve quality of life until a solution is found. As Friedman said, “The Rohingya crisis response teaches us that an emergency of such magnitude and complexity requires multi-pronged and multi-level collaborations, locally and regionally. When we address the needs of refugee communities, everyone benefits—including the host country and beyond.”

Connecting Networks to Solve the Mystery of Zika

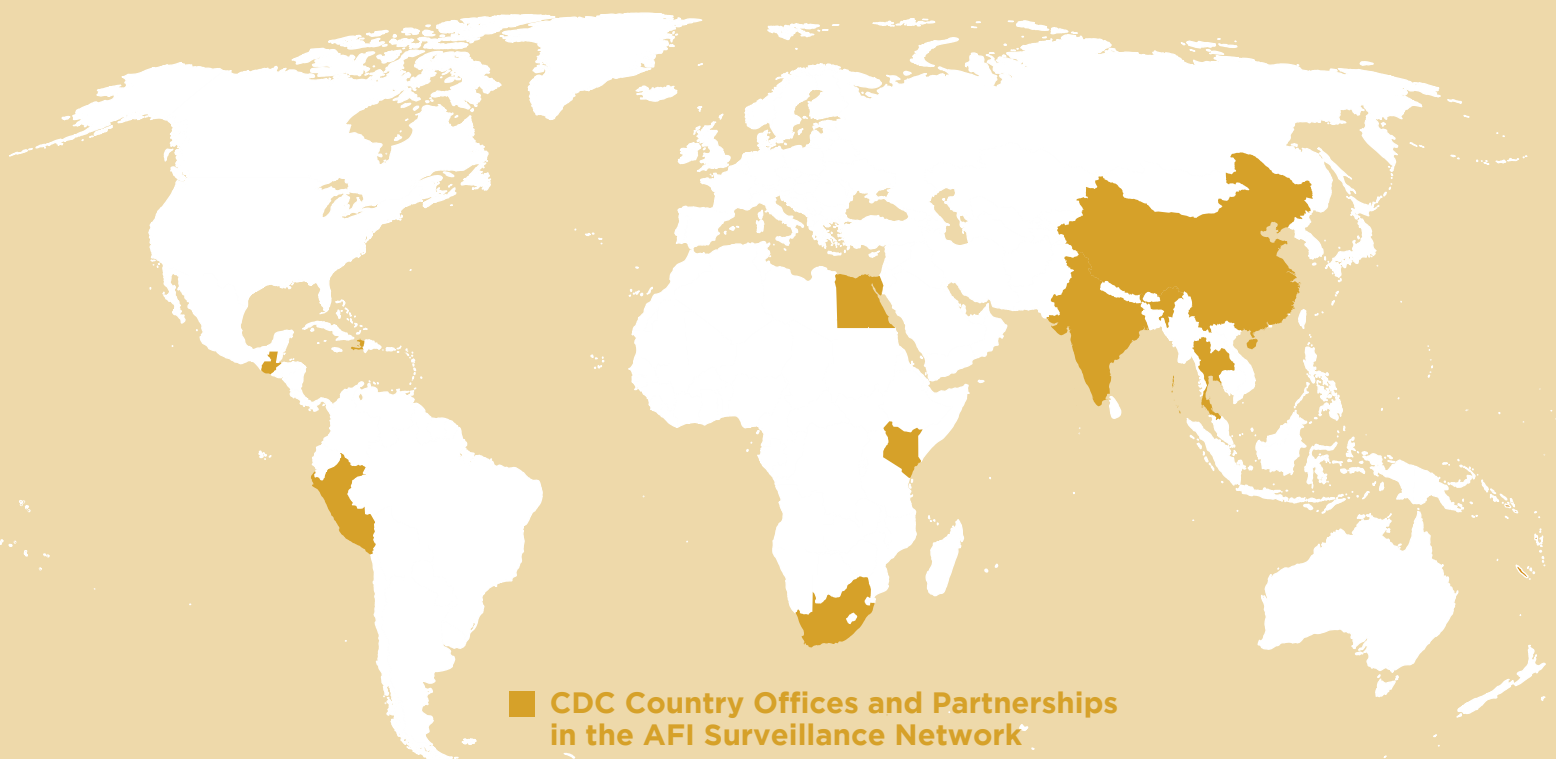
In 2014, when the Zika virus (ZIKV) emerged as a global public health threat, nine countries were particularly well poised to respond.

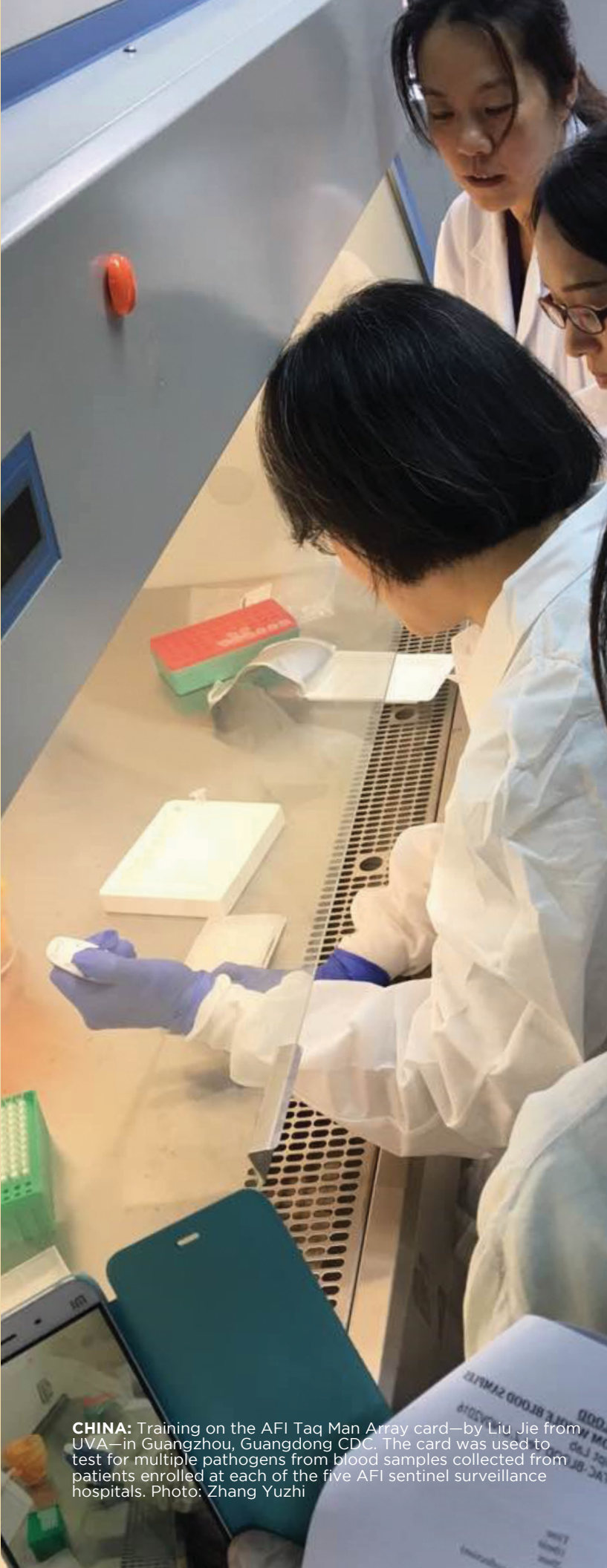
CDC country offices in China, Egypt, Guatemala, Haiti, India, Kenya, South Africa, and Thailand, were working on or setting up activities to conduct surveillance on acute febrile illness (AFI). These country offices, as well as Peru, which has a partnership with the U.S. Navy, analyzed and interpreted the AFI data and used it to develop and implement strategies to protect people's health and improve their well-being.

These AFI surveillance activities used data from local health centers and hospitals to identify and characterize sources of fever, one of the major symptoms of ZIKV infection. Using existing or new AFI surveillance systems and working with local officers, CDC was able to rapidly form a worldwide surveillance network across four continents to examine the global distribution of ZIKV.



GUATEMALA: Nurse Karen Orozco loading new tablets for capturing data on febrile illness patients as part of a community surveillance study. Photo: Joe P. Bryan





In addition to not having to create a new global ZIKV surveillance system, CDC and its partners also leveraged existing activities in the nine countries to conduct research to evaluate two new laboratory tests for ZIKV.

LEVERAGING EXISTING PLATFORMS

The work conducted allowed for the quick identification and characterization of some of the first ZIKV cases in Guatemala and India. In countries like Thailand, where ZIKV had been circulating for years, monitoring for adverse health effects and trends of the virus helped develop recommendations for public health activities and interventions. In countries where mosquito- or tick-borne virus (including ZIKV, dengue, and yellow fever) circulation is common, the public health research activities offered the opportunity for rapid evaluation of new ZIKV laboratory tests. Thanks to this worldwide network, experts quickly gained a better understanding of who got infected and why, health risks to local populations and travelers, and possible regional differences in disease outcomes. They also discovered causes of unknown fevers across the world and were able to use this new information to adapt and strengthen surveillance and laboratory systems, further advancing global health security.

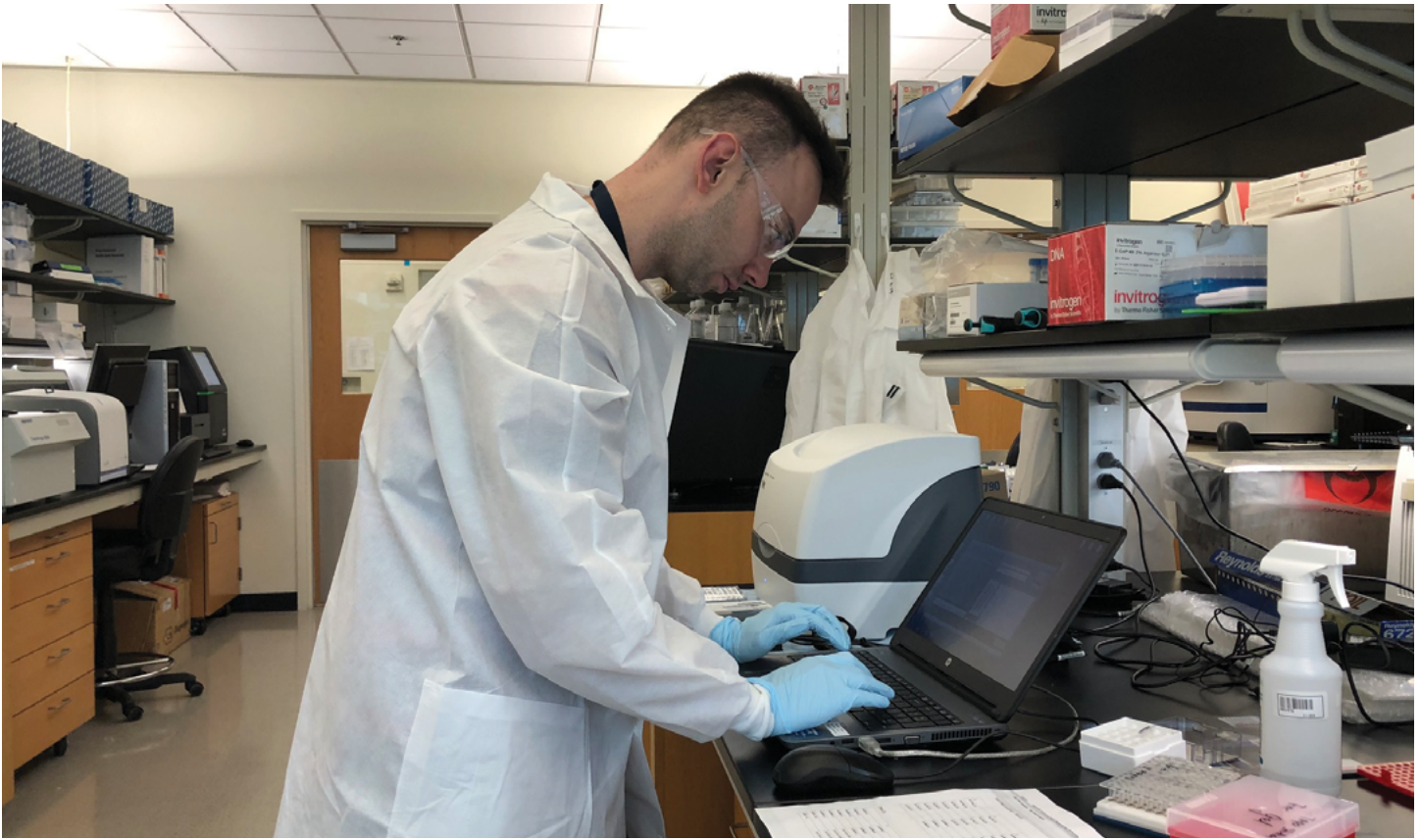
The success of harnessing the AFI surveillance activities to study ZIKV underscores the benefits of regional coordination of surveillance and research, and highlights the value of using existing globally connected surveillance systems as a platform to study and respond to emerging disease threats faster and smarter than ever before. In a world where a disease can circle in the globe in a matter of hours, it is vital to have global networks of scientists who can unravel the mysteries of new diseases and develop solutions to them just as quickly.



KENYA: Rapid diagnostic tests were set up for AFI laboratory testing (bottom right, next to the white box). Photo: Naila Smith

CHINA: Training on the AFI Taq Man Array card—by Liu Jie from UVA—in Guangzhou, Guangdong CDC. The card was used to test for multiple pathogens from blood samples collected from patients enrolled at each of the five AFI sentinel surveillance hospitals. Photo: Zhang Yuzhi

Closing Critical Gaps in Laboratory Leadership



John Saindon in action during CDC Hepatitis A response. Photo: CDC EOC

Leadership and laboratories are seldom spoken of in the same breath or considered to complement each other. Yet public health laboratories, which conduct their work in disease surveillance and biosecurity behind the scenes, owe much of their success to effective leaders and collaborative systems.

Without an effective laboratory system in place, experts working in the field could wait weeks for the results of crucial tests, delaying outbreak response and risking lives. The 2014-2016 Ebola outbreak in West Africa was the wakeup call that finally connected the dots about how crucial it is to merge scientific expertise with strong leadership skills.

Often, laboratory directors and senior laboratory managers lack training in leadership and management, skills needed to develop and lead effective laboratory systems for disease surveillance and response. To fill this critical gap, CDC, the World Health Organization (WHO), and the Association of Public Health Laboratories (APHL) worked together to

Without an effective laboratory system in place, experts working in the field could wait weeks for the results of crucial tests, delaying outbreak response and risking lives.

describe what constitutes successful laboratory leadership. In 2017, the collaboration was expanded to include the European Centre for Disease Prevention and Control (ECDC), the Food and Agriculture Organization of the United Nations (FAO), and the World Organization for Animal Health (OIE). Together these leading international organizations partnered to develop the Global Laboratory Leadership Programme (GLLP). Each of the partners has extensive experience in laboratory strengthening within their respective mandates, and together they provide a unique, multi-sectoral perspective on improving laboratory systems. While still young, this collaboration is strong in its commitment to strengthening laboratory systems by addressing gaps in laboratory leadership across all sectors.

“The promise and power of the GLLP is because of this partnership. The expertise and experience provided by each of these organizations is complementary and fosters the use of best practices—a true win-win situation for developing laboratory leaders to meet global needs,” said CDC’s Leonard Peruski.

DEVELOPING EFFECTIVE LAB LEADERS

GLLP is based on the Laboratory Leadership Competency Framework and uses a standard curriculum, built to be flexible and adaptable to country needs. GLLP consists of an implementation framework designed



Global Laboratory Leadership Programme Partners meeting, January, 2019. Photo: Alex Ginzberg

to transform laboratory directors and senior managers into effective leaders who can manage laboratories under any circumstances, determine appropriate laboratory diagnostics, and build strong collaborative networks with relevant sectors at every level of the health system. Program participants will be mentored in a variety of skills related to leadership, management, communication, quality system management, and biosecurity, addressing the entire national health laboratory system. GLLP emphasizes a One Health approach, acknowledging the connection between human, animal, and environmental health. This multi-sectoral strategy helps laboratories respond to public health challenges across sectors in a more comprehensive way.

A condensed GLLP will begin in Pakistan in August 2019, running for four to six weeks. Liberia is in the process of establishing a full two-year program for launch later in 2019. “We are excited about the two pilot programs because we are always sharing experiences and adapting real-world practices to the ever evolving needs of countries, helping public health laboratories meet the mission to improve global public health,” said CDC’s Mark Rayfield.

Addressing critical gaps in laboratory leadership and management is key to achieving the goals of the Global Health Security Agenda. With empowered leadership and robust, coordinated national laboratory systems, the world will have even greater capacity to safely and sustainably respond to ever-evolving health security threats.



CDC’s Matt Mikoleit collecting chicken samples at a shop in Kenya. Photo: Justin Williams

International Community Renews Commitment to the Global Health Security Agenda

On November 6, 2018, just one week after a deadly earthquake and tsunami struck central Indonesia, CDC's Mitch Wolfe, Sara Clements, and Maureen Bartee traveled to Denpasar, in the southern part of Indonesia, for the 5th Global Health Security Agenda (GHSa) Ministerial Meeting.

Together with ministers of health, agriculture, and defense, as well as nongovernmental sector partners from around the world, they discussed strategies to confront the world's vulnerability to public health emergencies and other disasters.

This Ministerial Meeting was particularly significant, as it launched the second five years of the GHSa initiative, titled *GHSa 2024*, which will guide national and global efforts in evaluation, planning, resource mobilization, and program implementation to build health security capacity across an interconnected global network.



Representatives from WHO, OIE, FAO, and World Bank discuss global partnerships for health security, Indonesia, 2018. Photo: Maureen Bartee

WHAT IS *GHSa 2024*?

GHSa 2024 builds upon the successes and lessons learned in the first phase of the GHSa, launched in 2014 by a partnership of nations, international organizations, and nongovernmental sector partners. These partners agreed to support efforts to build countries' capacity to prevent, detect, and respond to infectious disease threats and to elevate global health security as a national and international priority.

In Indonesia, the delegates were particularly focused on advancing global partnerships. *GHSa*



Over 60 countries
pledged their
commitment to
GHSa 2024

2024 is designed to take a multi-sectoral approach to strengthening health systems, promoting international initiatives, and supporting regional efforts. The new strategy engages the broader global health security community through tangible commitments, measures progress in new and meaningful ways, and ensures accountability for reaching goals.

"Our mission is to make global health security transparent, measureable, sustainable, and proactive," said Bartee about the updated approach. "With *GHSa 2024*, we're improving health outcomes today to protect the health of tomorrow."

“With *GHSA 2024*, we’re improving health outcomes today to protect the health of tomorrow.”

MAUREEN BARTEE, CDC

IMPACTS OF CROSS-BORDER COLLABORATION

Wolfe, Bartee, Clements, and the rest of the U.S. delegation kept a packed schedule, observing progress in local clinics and laboratories in Denpasar and talking with ministerial representatives about how to better prepare for the next outbreak. From antimicrobial resistance in Senegal to community-based surveillance in Vietnam, the CDC team shared its expertise on strengthening efforts in developing countries to fight disease.

“We emphasized the importance of capacity building and private sector engagement in health security and emergency response. Governments can’t do it alone,” said Clements.

By the end of the week, more than 60 countries had pledged their commitment to *GHSA 2024*, joining hands with international organizations, nongovernmental groups, and the private sector to envision a world safe and secure from global health threats. The momentum that started in Indonesia continues to grow as new partners join, working together to build a more protected, healthier world.

U.S. Health and Human Services Deputy Secretary Eric Hagan, on behalf of the United States, pledged \$150 million to support the goals of *GHSA 2024* in high-risk countries. U.S. institutions and their GHSA partners have made significant strides in building a world more resilient to infectious disease threats. CDC works with GHSA partners across a range of critical programs in this initiative, most notably disease surveillance, laboratory systems, workforce development, and emergency management. However, for these projects to be most successful, they must be well coordinated with those of other partners. Gatherings such as the one in Indonesia are an important way of building and maintaining the international consensus for global health security as a priority and accelerating the efforts of each partner in this important work.



GHSA ministerial delegates visited Sanglah Hospital microbiology laboratory, which routinely tests for evidence of antimicrobial resistance to MRSA, MDR-TB, among other pathogens. Photo: Beth Ervin



Cover and back photos:
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