CDC stories from the field:

building sustainable public health capacity

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
Coordinating Office for Global Health
Division of Global Public Health Capacity Development

Inside this Report

About the Division of Global Public Health Capacity Development

Promoting Global Public Health

The Division of Global Public Health Capacity Development (DGPHCD) is part of the Coordinating Office for Global Health at the Centers for Disease Control and Prevention (CDC). Headquartered in Atlanta, Georgia, CDC is recognized for conducting public health investigations and applied research.

Since 1980, DGPHCD and its partners have built numerous long-term applied public health training programs on six continents.

Working with Ministries of Health

We help Ministries of Health (MOHs) create strong, effective, sustainable programs to improve public health systems on local, regional, and national levels. These programs allow MOHs to strengthen their disease surveillance, outbreak response, leadership and management, and program evaluation.

Offering Support

Our teams of physicians, epidemiologists, public health advisors, management trainers, instructional designers, health communication specialists, and support staff provide scientific expertise, in-country and remote technical assistance, and other programmatic support and advice to enable MOHs to enhance their health protection and health promotion programs.

Establishing Partnerships

Developing partnerships is an important element of establishing, supporting, and sustaining our programs. We regularly collaborate with national and international organizations such as the World Health Organization, the U.S. Agency for International Development, the Department of Defense, the Department of State, the Ellison Medical Foundation, the Carter Center, and the World Bank.

Our partnerships strengthen the global public health workforce, support public health systems, and build sustainability and capacity through key strategies that emphasize applying public health science and practice and demonstrating measurable public health impact.

OUR VISION

Our vision is that countries throughout the world have effective and equitable public health systems to protect communities and enable people to live healthy and productive lives.

OUR MISSION

Working with Ministries of Health and public health partners, we are committed to strengthening public health systems and developing the workforce using solid science, innovative programs, and a commitment to building sustainable capacity that meets our partners' national priorities.

Improving Global Health Through Health Promo

With the help of its many national and international partners, DGPHCD strives to protect, promote, and improve the health of people around the globe. Through our active, direct, and daily involvement with national and international partners, we play a key role in addressing CDC's global health goal of Healthy People in a Healthy World through health promotion, health protection, and health diplomacy.

Global Health Promotion

We promote global health by providing consultations, advice, training, and follow-up support to foreign governments, thus helping promote health and prevent diseases and disease outbreaks around the world.

With the help of our international partners, we develop and disseminate health training and establish health programs that are tailored to a country's specific individual needs, thus helping to ensure the successful implementation of a country's health promotion goals.

Global Health Protection

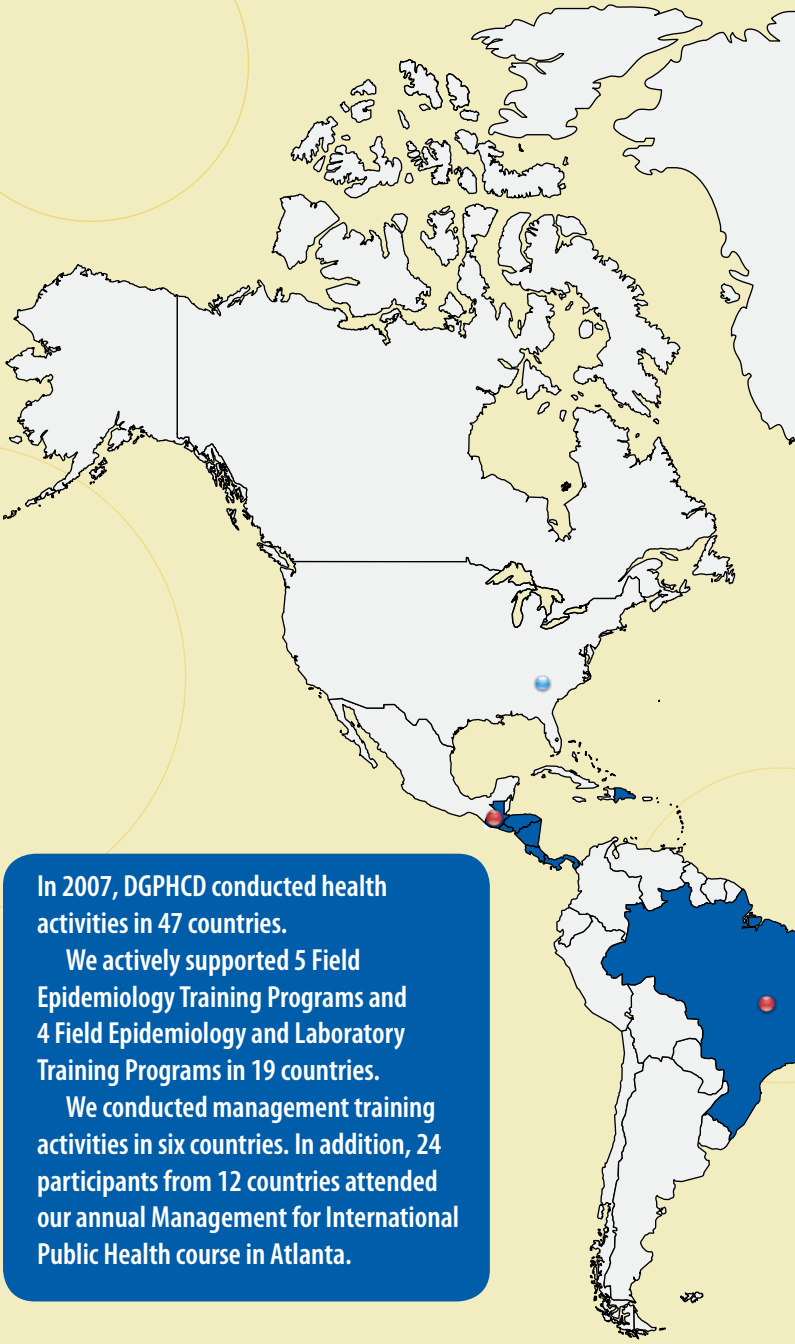
We protect the health of people around the world by collaborating with international partners to help them develop their capacity to detect, diagnose, monitor, control, and contain existing, new, and emerging health threats.

To ensure that health threats can be dealt with in a timely and effective manner, we help countries develop and set up epidemiology surveillance, outbreak response, and tracking programs, thus preventing diseases from spreading around the globe.

Global Health Diplomacy

We advance global health diplomacy by fostering close partnerships with Ministries of Health in the developing and the developed world, U.S. diplomatic facilities abroad, and international agencies.

Our staff work directly with these foreign entities to provide hands-on support and training to help people around the world lead healthier, safer lives.



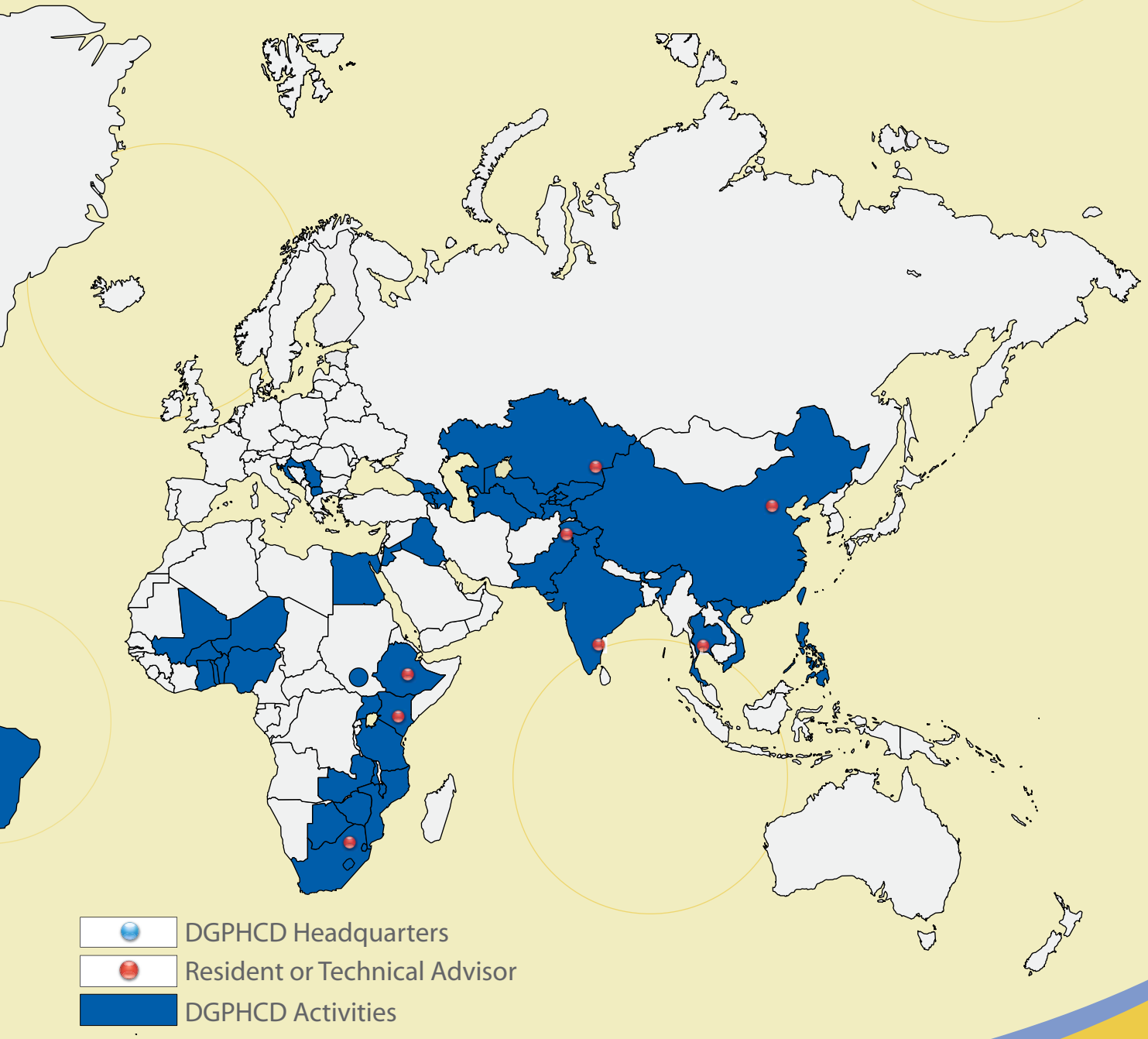
In 2007, DGPHCD conducted health activities in 47 countries.

We actively supported 5 Field Epidemiology Training Programs and 4 Field Epidemiology and Laboratory Training Programs in 19 countries.

We conducted management training activities in six countries. In addition, 24 participants from 12 countries attended our annual Management for International Public Health course in Atlanta.

otion, Health Protection, and Health Diplomacy

DGPHCD Global Activities (2008)



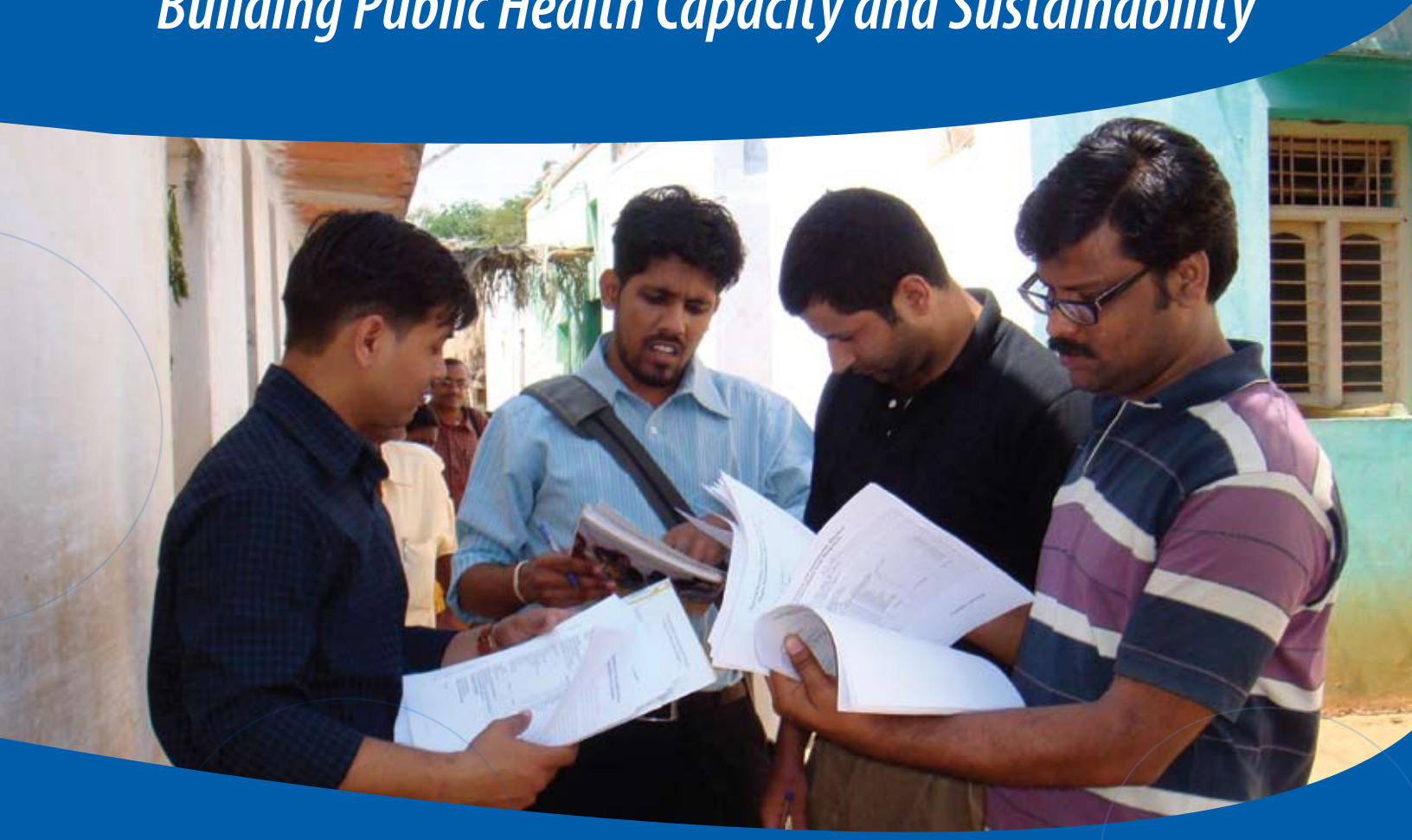
DGPHCD-At-A-Glance

DGPHCD Programs and Strategy

DGPHCD works with partners to strengthen the global public health workforce, support public health systems, and strive for program sustainability through key strategies that emphasize applying public health science and practice, and demonstrating measurable public health results. We strive to achieve these goals through the following:

- **Applied Epidemiology.** We work with Ministries of Health (MOHs) and other public health institutions to strengthen their countries' epidemiology workforce through residency-based programs in applied epidemiology: the Field Epidemiology Training Program (FETP) and the Field Epidemiology and Laboratory Training Program (FELTP). A combination of classroom-based instruction and mentored practical work allows trainees to receive hands-on multi-disciplinary training in public health surveillance, outbreak investigation, laboratory management, program evaluation, and other aspects of epidemiology research and methods.
- **Public Health Surveillance and Response Systems.** We work with partner MOHs to strengthen their public health surveillance and response systems for priority disease conditions. FETP and FELTP trainees learn detection, confirmation, reporting, analysis and feedback of disease data, and implementation of effective public health responses in a participatory approach. As graduates, they apply these skills in their work for the MOH to operate and further strengthen the surveillance and response systems and to use the information for more effective disease detection, control, and prevention.
- **Public Health Leadership and Management.** We help countries develop sustainable public health capacity to deliver effective leadership and management development programs through the Sustainable Management Development Program (SMDP). Through strategic partnerships with public health training institutions, faculty development in SMDP's Management for International Public Health course, and technical program assistance, we develop leadership and management programs for public health professionals. SMDP combines experiential training and supervised applied management improvement projects to help public health professionals acquire the knowledge and skills needed to improve organizational performance, shape the public health agenda, and strengthen public health practice in their countries.

Building Public Health Capacity and Sustainability



Health Infrastructure Components

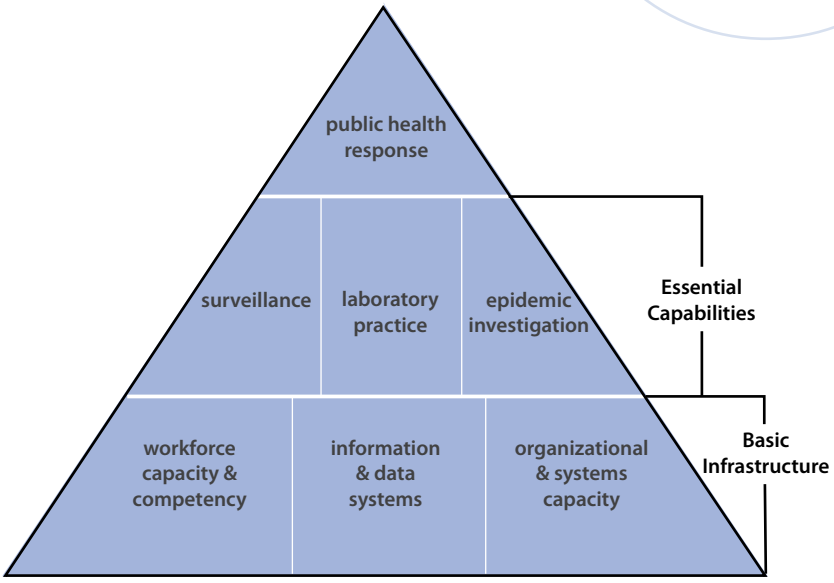
The three components of public health infrastructure are workforce capacity, information systems, and organizational capacity.

Because these components are interrelated, the goal of strengthening public health capacity is to achieve improvements in all three areas.

Built on that foundation are the essential capabilities of surveillance, laboratory practice, and investigation of epidemics or other priority health conditions.

We work with MOHs to strengthen the basic public health infrastructure (bottom of the pyramid) and build the capacity to carry out the essential capabilities (middle of the pyramid) to enable appropriate public health response (top of the pyramid).

Pyramid of Public Health System Preparedness



Source: *Public Health's Infrastructure: A Status Report*, CDC 2001

Central America FETP

Creating a Regional Network

The Central America Field Epidemiology Training Program (CAFETP) is a regional program of five national FETPs representing Costa Rica, the Dominican Republic, El Salvador, Guatemala, and Honduras. The program also includes individual trainees from Nicaragua and Panama. Created in 2000, the program is led jointly by three Resident Advisors based in Guatemala City, Guatemala.

Implementing a Tiered Approach

The CAFETP has designed and implemented a pyramidal, three-tiered FETP in Guatemala which has been cited as a successful model for FETPs in the global network. This model aims to build an effective career track and surveillance network for epidemiologists. The three tiers are

1. **Basic Level:** Training in Applied Epidemiology Locally (known as CEAL) for local health staff.
2. **Intermediate Level:** Specialization in Applied Epidemiology (known as EEA in some countries) for mid-level district epidemiologists.
3. **Advanced Level:** The FETP with a national focus for advanced epidemiologists.

This tiered approach lets trainees establish a foundation of epidemiology skills that can be built upon as they graduate through higher levels of the training model.

This model also creates a mentorship "cascade" with FETP trainees serving as mentors to EEA trainees who in turn mentor CEAL trainees. For example, Guatemala has 130 graduates from the intermediate level and 774 graduates from the basic level programs.

The "multiplier effect" of this model has significantly improved surveillance in remote areas of the country as seen during Hurricane Stan where much higher quality post-hurricane surveillance data were obtained from those health areas employing graduates of the program.

Celebrating Graduate Successes

Graduates have had a significant positive impact on the public health in the region, and most are still involved with the program, helping conduct investigations or serving as tutors for the new cohorts.

Five graduates work in international institutions dedicated to high-level epidemiologic work. Another 32 graduates work in positions with high-level responsibility in their countries, including National Directors of Epidemiology. One graduate received the national medical award in their country and another received the CDC team award for Equity in Health in 2008. The success of the program was also highlighted through CDC's Excellence in Innovation Award, received by CDC's lead regional consultant.

Implementing a Regional Approach

Methanol Intoxication Outbreak, Nicaragua

On September 2, 2006, several suspected cases of methanol intoxication were reported in Poneloya, a coastal community in the Province of Leon, Nicaragua.

An FETP trainee was sent to lead the investigation. After reviewing police records and other traceback activities to identify the implicated liquor, the trainee identified the sequence of events that lead to this outbreak.

On August 19, 2006, a large container of methanol had been imported into Nicaragua. During the next week a significant volume of methanol had been stolen from this container and sold to intermediaries who then diluted it with consumable alcohol and sold it as liquor beginning on September 1. The first death of fatal methanol poisoning occurred the following day. Cases began increasing during the second week of September.

On September 8, due in large part to preliminary results of the investigation, a law went into effect banning the sale of unbottled liquor. In addition, all suspect unbottled liquor was confiscated and substituted for bottled liquor. The substitution method was important because it provided the incentive for vendors and the public to turn in suspect liquor.

The peak of the outbreak occurred on September 10. The highest mortality rate was seen in the first four days of the outbreak and declined gradually. The last case of fatal methanol poisoning occurred on September 12.

The outbreak resulted in 823 cases of methanol intoxication, including 51 deaths, making this the largest reported outbreak in the region.

As a result of the recommendations made by the trainee, the community was alerted and all the suspect adulterated liquor was confiscated. Health personnel were also trained in the proper protocol for the treatment of methanol poisoning. In addition, regulatory laws were passed and the persons who committed this crime were captured, convicted, and sentenced to lengthy prison terms.

From 2000 to 2007, trainees

- Investigated 222 outbreaks
- Conducted 181 analyses and/or surveillance system evaluations
- Implemented 167 planned studies
- Disseminated knowledge and lessons learned through 138 journals/bulletins articles and 204 conference presentations

Central Asia FETP

The Central Asia Field Epidemiology Training Program was started in 2003 as a regional program. It consists of five countries: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. The program is led by a Resident Advisor and is headquartered in Almaty, Kazakhstan. The number of participants in the annual cohort ranges from 7 to 10.

Creating a Strong Workforce

To date, the program has 34 graduates, 85% of whom are still working in their government health system. Several have been appointed to high-level positions in the MOH where they can influence the way public health is practiced in their country. For example, in Kazakhstan, one graduate is Head of the National Surveillance Department and another is the National TB Coordinator. In Tajikistan, the Deputy Minister of Health is an FETP alumnus and another is Deputy Director of the Republican Sanitary Epidemiologic System (analogous to the CDC).

Effecting Policy Changes

After trainees helped conduct the investigation of an HIV outbreak among children (see story on next page), additional CDC experts helped the Kazakhstan MOH develop guidelines concerning the use of disposable medical instruments and blood safety practices. The ongoing work is bringing attention to HIV risks associated with in-patient procedures, medical practices, and blood banks throughout the region.

Conducting Investigations

The program conducts an average of 15–20 outbreak investigations per year. One recent investigation involved Hantavirus Hemorrhagic Fever with renal syndrome in western Kazakhstan. This outbreak occurred in January 2008 and affected four patients who were exposed to contaminated animal feed.

Trainees recommended environmental measures to eliminate rats in nearby areas. Trainees also led educational seminars for epidemiologists, clinicians, and laboratorians. In addition, they delivered health education messages to the public to help them reduce their exposure to rats and the diseases they carry.

In August 2007, an anthrax outbreak in Uzgen, Kyrgyzstan, affected 13 people. The investigation by FETP trainees revealed that the source of the outbreak were sick cows that had been slaughtered. Recommendations were made to the local health and veterinary department, including continued surveillance for human anthrax, distribution of health messages on slaughtering animals and handling raw meat, and improved delivery of veterinary services.

Between 2003 and 2008, the program has graduated 34 trainees and 15 are currently enrolled. The program has conducted almost 80 outbreak investigations and 22 surveillance evaluations; more than 20 planned research studies also have been completed.

Strengthening Regional Public Health Capacity

HIV Outbreak Among Children in Southern Kazakhstan

From January to May 2006, six HIV-infected children, all under two years of age, were identified in Shymkent City, in southern Kazakhstan. The Republican AIDS Center in Kazakhstan consulted the FETP on how to investigate this serious and unusual disease occurrence.

The children were identified as HIV-infected while hospitalized. To define the magnitude of the problem, the trainees recommended that children born after a certain date and hospitalized in Shymkent City during 2006 be tested for HIV. They also advised that an analytical epidemiologic investigation be carried out to identify the source and modes of transmission.

The MOH conducted a serosurvey which identified more than 150 children as HIV positive. The trainees used the serosurvey as the source for a case-control study. The objectives of the study were to describe the exposure history of the infected children, characterize the virus, and identify the source and modes of HIV transmission.

After the study was completed, the trainees determined that multiple factors might have contributed to this outbreak. In particular, improper medical practices, including the re-use of medical instruments, were associated with HIV infection. Trainees identified violations of blood safety practices, including fractional transfusion of blood that was taken from the same container and administered to different children. Trainees also found evidence that transfusions could have been made without implementing the regular blood screening practices. In addition, blood sample analyses revealed that the infection might have been imported from a neighboring country where some of the children from Shymkent City had received medical care.

Trainees made the following recommendations, which were implemented by the MOH:

- Continue active case finding by testing all children below five years of age who received medical care in 2006,
- Identify and test all children who were hospitalized at the same time as known HIV-infected children,
- Ensure the safety of the administration of transfusion material and proper sterilization of reusable medical equipment, and
- Reorganize blood-collection stations, standardize blood-collecting behaviors, and strengthen response against blood selling and collection.

This investigation became a model for HIV outbreak investigations in neighboring countries. Trainees investigated an HIV outbreak among children in Kyrgyzstan and epidemiologists in neighboring countries used the methodology to investigate similar disease occurrences. Results of the 2006 investigation have been widely publicized and highlighted the effectiveness of the MOH and FETP partnership, as well as the capabilities of FETP trainees to conduct outbreak investigations.

Kenya FELTP

Strengthening Laboratory Capacity

The Kenya Field Epidemiology and Laboratory Training Program (FELTP) was started in 2004. The program has two Resident Advisors based in Nairobi.

This was the first program of its kind to include a laboratory component. Since then, all the programs that have been created have included a laboratory component. It was also the first program in Africa to host trainees from other parts of the continent.

Advancing Public Health

The program has brought numerous positive changes on all levels of public health. Outbreaks are detected early, acted upon diligently, and documented properly. An evidence-based decision-making culture has been practiced as MOH staff consult and use the available data. In addition, Kenya now has an electronic system to manage disease surveillance data.

Building Local and Regional Capacity

Between 2004 and 2008, the program has raised the number of epidemiologists in the Kenya MOH from one to eight. Graduates from the first and second cohort are holding prominent positions in the MOH on the national level and those from the third cohort have been hired to work at the provincial level, thus enhancing the public health workforce at all levels of the Kenya health system.

Some of the positions held by graduates include Head of the Health Management Information Systems and Deputy of the Expanded Program on Immunization. Another graduate is responsible for outbreak management in the Disease Outbreak Management Unit.

The program also has helped build capacity in other parts of Africa as trainees from Ghana, South Sudan, Tanzania, and Uganda have taken their experience back to their own countries. For example, three graduates from Tanzania have been chosen to lead the FELTP in Tanzania (scheduled to start in late 2008).

As graduates return to their own countries and demonstrate the value of their new competencies to their MOHs they are garnering support for improved epidemiology practice in their countries.

Working Towards Sustainability

The program is collaborating closely with the MOH to promote sustainability. Several steps have been taken. On a managerial level, a senior MOH official is the Director of the program. On a logistic level, the FELTP courses now are taught on the MOH premises and trainees working in field locations are allocated MOH housing. On a financial level, the MOH has a budget line for the program and is funding the salaries of the Kenyan trainees.

Strengthening Outbreak Response

Rift Valley Fever Outbreak In Northeast Kenya

An outbreak of Rift Valley Fever (RVF) occurred in November 2006 in northeast Kenya. RVF is an acute, febrile zoonotic disease that can be transmitted to humans through mosquito bites or direct exposure to infected animals.

Teams of investigators that included Kenya FELTP trainees conducted patient interviews, reviewed medical records, and collected blood samples from patients with suspected RVF. The teams consisted of FELTP residents from the epidemiology and laboratory management tracks and were led by graduates of the program.

Investigators concluded that the most likely risk factor was being exposed to an infected animal. They also surmised that the outbreak was associated with heavy rains that produced flooding, resulting in the hatching of mosquitoes that carry and transmit RVF.

Measures were taken to contain the outbreak, including vaccinating livestock, disseminating public health messages to the affected communities, banning the slaughter of livestock, and closing livestock markets.

The outbreak officially ended in January 2007; it resulted in 404 cases and 118 deaths.

Brazil FETP

Improving Brazil's Surveillance Capacity

Created in 2000, the Brazil Field Epidemiology Training Program (called EPISUS) had 58 graduates as of 2008, with another 23 trainees enrolled. One of the program's significant contributions has been improving Brazil's surveillance system evaluation efforts. In the past, surveillance data were not analyzed because the public health workforce lacked appropriate skills.

With knowledge gained in the FETP, graduates enhance the ability of the Brazilian MOH to evaluate systems that track diseases, deaths, and injuries. These skills have allowed the MOH to prioritize public health activities and track progress towards disease prevention in order to implement effective public health policies.

Strengthening the Public Health Workforce

Two-thirds of FETP graduates stay within the Secretariat of Health Surveillance whose function in the MOH roughly corresponds to that of CDC. Many also stay at the federal MOH level where they have supervisory roles such as staff supervisors and senior epidemiologists. Their largest contribution is introducing modern assessment techniques and complex analyses to Brazil's public health efforts. Graduates now routinely use data, which was not the norm before the creation of the program.

Achieving Sustainability

The Brazil MOH is highly committed to the FETP and has funded the program since its inception. FETP trainees are MOH fellows, and the MOH pays for their travel and other expenses. The MOH also pays salaries of directors and supervisors, and part of the cost of the CDC Technical Advisor.
In 2008, the FETP became an official program within the MOH.

Effecting Policy Changes

Some of the work performed by FETP trainees has led to policy changes in the public health arena. For example, a Beri Beri outbreak was thought to stem from eating polished rice. Through their investigations, FETP trainees concluded that a combination of microtoxins and polished rice likely caused the outbreak. This led to a unique intervention involving government alternative food supplies and long-term federal agricultural oversight.

In another instance, an outbreak of non-TB mycobacterial infection following laparoscopic surgeries led to nationwide efforts to promote sanitation in surgical settings.

Promoting Sustainability

Sixty percent of Brazil's population of 200 million live in the Amazon rainforest, a hotspot for emerging infectious diseases. This results in an unmet need and an opportunity for further research. The FETP provides a valuable foundation for beginning this research.

Responding to Health Threats

Trainees respond to an average of 20–22 outbreaks a year. Some of their recent investigations include

- Brazilian Purpuric Fever: The disease has a 60–80% mortality rate in children. Little is known about the disease and only about 100 cases have ever been diagnosed. Trainees and supervisors conducted the investigation in a remote region of Brazil. They diagnosed the cases correctly and established an ongoing surveillance system. Since then, no new cases have occurred.
- Continuous outbreak of non-TB mycobacterial infections following laparoscopic surgeries: Since 2005, several thousand cases have occurred, suggesting an absence of infection control measures following surgeries and a need to raise awareness about best practices for sterile surgeries. Trainees traced and characterized the infection and identified risk factors. Because of their efforts, the government has raised awareness about the importance of sterile surgeries, leading to a drop in the number of reported cases of infections.
- Oral transmission of Chagas disease: This tropical disease is usually transmitted by bites of blood-sucking insects or by blood transfusions. However, FETP trainees identified a novel mode of transmission in this outbreak, which was linked to consumption of the açai fruit that had been contaminated by insects. An FETP graduate is in charge of control efforts and has established a new surveillance and response network.

Thailand FETP

Expanding on a Regional Level

The Thailand Field Epidemiology Training Program was the first FETP established outside of North America in 1980.

Over the years, DGPHCD has provided two Resident Advisors to work with the program. In 1998, the program expanded to include trainees from neighboring countries, namely Cambodia, Laos, Malaysia (which now has its own FETP, started by graduates), Myanmar, and Vietnam. Two CDC Technical Advisors (one full-time and one part-time) have been assigned to the program to help with regional expansion plans.

Achieving a Lasting Impact

Since its inception, the program has helped create and set up numerous public health surveillance systems in Thailand, including one for legionellosis.

In addition, the program has made a lasting impact in the area of HIV/AIDS surveillance. In 1988, FETP trainees conducted a survey whose results suggested that HIV may be a problem in Thailand. These efforts eventually informed the country's now famous 100% condom campaign and helped prevent between 4.7 and 5 million infections. Thailand now has an HIV infection surveillance system in a third of its provinces.

Investing in Future Public Health Leaders

FETP alumni occupy prominent positions at the MOH and at other health organizations. Most graduates (87%) still work for the MOH while others work at the World Health Organization, the Global Fund, and UNAIDS.

Informing Public Health Policy

The program conducts an average of 30–35 investigations a year. Some of the more notable investigations include the avian influenza outbreak and the response to the Asian tsunami, both in 2004.

Many of the outbreaks led to public health policy changes:

- Two botulism outbreaks led to the creation of a national and regional emergency response center and the creation of an antitoxin stockpile.
- Investigations of severe Hand Foot and Mouth disease led to the establishment of a new surveillance system and isolation of the Enterovirus 71 strain previously unknown in Thailand.
- Investigations of endemic *Streptococcus suis* cases led to enhanced surveillance, early detection of a new outbreak, and laboratory training.
- A legionellosis outbreak led to a change in water treatment in Phuket and early detection of a second outbreak in Pattaya.

Adapting to Meet Needs

To stay abreast of the changing nature of global disease detection, the program is expanding in several directions. To strengthen laboratory-based surveillance and diagnosis, the program is adding a laboratory component and will become an FELTP.

In addition, the program is including veterinarians as trainees and enhancing its curriculum in the area of veterinary medicine.

The program is also starting the world's first junior fellowship program to enable managers to learn how to supervise others during outbreaks, develop curricula, and deliver lectures.

Achieving Long-Term Sustainability

Botulism Outbreaks In Northern Thailand

In 2006, two botulism outbreaks occurred in Thailand.

The first one occurred in March, in the Nan Province of northern Thailand. FETP trainees were sent to investigate and found that 163 people had contracted botulism after eating home-canned bamboo shoots.

The second botulism outbreak occurred in December, in the same region. In this outbreak, 192 people were exposed to raw deer meat.

In both cases, FETP trainees helped administer a standard questionnaire to assess food consumed and possible illness, which led to fast response rates and an urgent public health response during these outbreaks. The work of trainees helped alert the clinical staff and mobilize the community. In the case of the first outbreak, it also helped ensure that stores promptly removed the contaminated canned goods.

Because trainees acted quickly, the outbreaks were detected early. Typically, the mortality rate associated with botulism is between 8% and 17%. However, because of the trainees' quick response time and experience, there were no fatalities. The rapid response to both these outbreaks saved between 15 and 30 lives.

These botulism outbreaks led to the creation of a national and regional emergency response center for Southeast Asia and the development of a new antitoxin stockpile program.

Between 1980 and 2006, the Thailand FETP has successfully trained 27 cohorts and graduated 154 field epidemiologists (130 from Thailand and 24 from neighboring countries). The program has expanded from 5 trainees in its first class to 12 in its latest class.

SMDP Country Program: Vietnam

Increasing Management Capacity for HIV/AIDS Prevention and Care Activities

In the past decade, rates of HIV/AIDS in Vietnam have increased rapidly. The most recent data show that 132,628 individuals are infected with HIV, 26,828 have AIDS, and 15,007 have died due to AIDS.

To combat this epidemic, DGPHCD's Sustainable Management Development Program (SMDP) and the President's Emergency Plan for AIDS Relief (PEPFAR) in Vietnam are collaborating with the Hanoi School of Public Health (HSPH) and the Vietnam Administration of HIV/AIDS Control (VAAC).

These partnerships led to the creation of a program aimed at improving the delivery and effectiveness of HIV/AIDS services at the provincial and district levels in Vietnam by strengthening the management capacity of Centers of AIDS Control.

To achieve this goal, the program was expanded to two regional training center partners, the Center for Preventive Medicine in Danang and the Institute for Hygiene and Public Health in Ho Chi Minh City.

The VAAC seeks to develop a collaboration with HSPH to apply the existing management training model officially for the whole HIV/AIDS control system in Vietnam.
Dr. Duong Quoc Trong, Former VAAC Director

Conducting Training-of-Trainers

Vietnamese faculty from the three regional training centers attended SMDP's Management for International Public Health course in Atlanta. After graduation, they championed the program, drawing in trainers from other organizational partners in their regions.

A core group of 28 trainers from the regional centers in Vietnam participated in several intensive training-of-trainers (TOT) courses developed and delivered by HSPH and SMDP. The trainers agreed to conduct regional training and provide follow-up supervision to HIV/AIDS health workers. Since 2005, they have trained over 200 HIV/AIDS health workers across Vietnam.

Achieving Program Sustainability

The program has successfully built institutional capacity at the three regional centers to deliver high-quality management training to the public health workforce at the provincial and district levels throughout Vietnam.

Improving Public Health Impact

Improving Public Health Impact

In-country workshop participants commit to completing a management improvement project over a 4–6 month period, thereby ensuring that they apply in their actual work settings the management skills they have learned.

Teams at 69 provincial HIV/AIDS organizations have implemented projects in key strategic technical areas including voluntary counseling and testing (VCT) clinics; out-patient clinics; management, caring and counseling for persons living with HIV/AIDS in communities; outreach activities by HIV peer educators; harm reduction; and HIV/AIDS information, education, and communication. Examples of public health impacts include

- Increasing the percentage of clients returning to VCT clinics for HIV test results. Using the evidence-based management skills learned in TOT, a small team working in the Nam Dinh province in Vietnam successfully increased the percentage of clients returning for HIV test results and post-test counseling from 60% in 2006 to 92% in 2007.
- Improving patient adherence to opportunistic-infection prevention treatment. The percentage of patients infected with HIV/AIDS adhering to opportunistic-infections preventive treatment at an outpatient clinic of Viet-Tiep Hai Phong hospital increased from 60% in October 2005 to 92% in March 2006 as a result of that intervention.
- Increasing condom use among female sex workers in Hue City. Female sex workers in Hue City increased their self-reported use of condoms from 69% in 2006 to 90% in 2007 as a result of a peer-education program.

SMDP Country Program: Nigeria

Addressing Neglected Tropical Diseases: Minor Recognition, Devastating Impact

In developed nations, diseases like elephantiasis and schistosomiasis are frequently referred to as neglected or forgotten tropical diseases.

Generally affecting the impoverished and disadvantaged, these diseases are termed 'neglected' due to a lack of visibility and recognition in the developed world. They do not attract media attention or affect wealthy nations and thus are often ignored in global health agendas. Yet they have a devastating impact on more than one billion people worldwide.

Integrating Programs to Fight Neglected Tropical Diseases

Most control and treatment programs for neglected tropical diseases focus on a single disease, but people in tropical regions usually face more than one serious disease threat at a time.

Current intervention strategies for the different diseases are often similar. The goal of the Nigerian program is to determine the feasibility, effectiveness, and cost benefit of integrating Nigerian disease control programs on a large scale. These control programs include elephantiasis, malaria, onchocerciasis (river blindness), schistosomiasis, trachoma, and vitamin A deficiency.

The integration of disease control programs can increase effectiveness and reduce cost, thereby easing the strain on public health systems in African countries and ultimately reducing high rates of disease morbidity and mortality.

In Nigeria, six diseases are ongoing causes of death and suffering:

Elephantiasis: 80 to 100 million Nigerians need drug treatment (#1 in the world).

Malaria: An estimated 300,000 Nigerian children under five years of age die annually.

Onchocerciasis: 27 million Nigerians need drug treatment (#1 in the world).

Schistosomiasis: 30 million Nigerians are infected and need drug treatment (#1 in the world).

Trachoma: 11 million Nigerians are infected and need surgery, drugs, health education, and latrines.

Vitamin A deficiency: 20 million Nigerian children under five years of age are at risk and can benefit from Vitamin A supplementation.

Focusing on Integration

Promoting Prevention Through Partnerships

In 1996, a partnership between the Carter Center Nigeria and SMDP, in collaboration with Emory University, led to the opening of the Sustainable Management Training Center (SMTC) in Jos, Nigeria. Since its opening, the center has trained more than 300 public health managers.

A few years ago, integration of single disease control programs started to take hold in the international public health community. Recognizing a need to obtain evidence surrounding the feasibility and effectiveness of integration, the Bill and Melinda Gates Foundation granted funding to five programs working on integrated disease programs.

Of the five, the Carter Center/SMDP program was the only one with a management capacity building component.

A key challenge in successfully integrating programs is dealing with substantial organizational change. Historically, single disease programs have worked independently. The customized curriculum used at the SMTC includes change management on all levels of the health system. By building managerial skills, this project better equips organizational leaders to successfully combine program efforts.

Working Towards Sustainability

This program seeks to demonstrate that integration is more efficient and effective than focusing on a single disease.

Additionally, the program seeks evidence that providing management capacity building for the workforce involved supports more effective delivery of integrated interventions.

If successful, the model used in this project will be implemented for integrating disease control programs on a national scale through Nigeria's MOH.

SMDP Country Program: Malawi

Improving Management Capacity

As a resource-constrained country with numerous health problems (for example, the national HIV prevalence rate among adults ages 15 to 49 years of age was 14% in 2005), Malawi is searching for ways to make best use of limited health-related resources.

Two approaches Malawi has been using are

- Helping hospital and program managers to improve HIV/AIDS and tuberculosis (TB)-related work processes in hospitals and HIV/AIDS counseling and testing centers, and
- Helping District Health Management Teams (DHMTs) to improve health planning and management at the district level to most effectively address local needs.

Designing Successful Projects

Through 2006, graduates of SMDP's Management for International Public Health (MIPH) course facilitated quality improvement training for 135 public health program managers.

These participants and the team members they recruited from their worksites completed approximately 30 applied management improvement projects which have

- Increased the percentage of TB patients at Ntchisi District Hospital who received health talks on TB from 0% to 80%,
- Increased the percentage of smear-positive TB patients who began treatment within seven days from 50% to 90%, and
- Increased the percentage of HIV-positive patients at Kasungu branch referred to support groups from 47% to 98%.

The MOH has publicized results of successful projects at its national meetings so that teams at other sites can adopt improved procedures to more effectively address public health process problems.

Applying Evidence-Based Strategies

Developing Tools to Address Local Health Problems

In 2007, MIPH graduates facilitated two program planning and budgeting workshops for 58 participants from DHMTs in 22 district hospitals. The DHMTs are using the workshop tools to analyze health problems and develop logical, evidence-based strategies in their District Implementation Plans (DIPs) to address local health problems such as malaria, maternal mortality, and HIV/AIDS.

Promoting Sustainability Efforts

The MOH has begun incorporating tools from the program planning and management workshop into its regular DIP process and will convene a meeting of all workshop graduates in 2009 to consider incorporating all the workshop tools into the annual DIP.

MIPH graduates are currently advocating for funds to continue process improvement training for hospital program managers in Malawi. Finally, program partners plan to establish an institutional home for the management capacity building program in the near future. This arrangement will provide access to management expertise, advocacy, an established academic infrastructure, and program coordination.

African Field Epidemiology Network

Reaching Across the Continent

Established in 2005 as a non-profit organization, the African Field Epidemiology Network (AFENET) helps African nations enhance or develop their own applied epidemiology capacity. AFENET supports existing FETPs and FELTPs and helps build new programs across sub-Saharan Africa.

AFENET receives its funding primarily from CDC and the U.S. Agency for International Development (USAID). The organization is headquartered in Kampala, Uganda.

AFENET's current members include Ghana, Kenya, South Africa, Uganda, and Zimbabwe. Associate members include the MOHs of Nigeria, South Sudan, and Tanzania, as well as the Multi-Disease Surveillance Center in Burkina Faso. Potential future members include Burkina Faso, Ethiopia, Mali, Mozambique, Niger, Nigeria, Rwanda, and Togo.

Strengthening Programs

Since its inception, AFENET has worked on numerous projects, including

- Providing technical assistance to various African countries and regions such as Nigeria, Tanzania, and Francophone West Africa (Burkina Faso, Mali, Niger, and Togo) to develop their own FELTPs. In 2008, Nigeria and Tanzania are expected to begin their programs.
- Supporting trainee projects to improve childhood immunization coverage in Africa. Through this project, AFENET provided small grants on a competitive basis to trainees in its member programs to undertake demonstration projects.
- Providing technical assistance to MOH surveillance units through Resident AFENET Fellows. These medical epidemiologists in Ghana, Tanzania, and Uganda help MOHs strengthen their public health surveillance systems, investigation and response to acute health events, and provide supervision for FETP and FELTP trainees.
- Strengthening laboratory capacities through the development and distribution of Outbreak Laboratory Kits to four countries.
- Developing a curriculum and training materials for an in-service laboratory course to enhance the laboratory management and disease surveillance skills of public health laboratorians in Africa. As of 2008, AFENET has trained 22 laboratorians in Tanzania, 20 in Uganda, and 18 in Zimbabwe.
- Renovating and equipping the National Bacteriology Reference Laboratory for the Kenya MOH.
- Supporting the production of weekly Integrated Disease Surveillance and Response (IDSR) bulletins in Ghana, Tanzania, Uganda, and Zimbabwe.
- Helping conduct outbreak investigations of plague, Marburg Hemorrhagic Fever, and Ebola Hemorrhagic Fever in Uganda; aflatoxin in Kenya; Rift Valley Fever in Kenya and Tanzania; meningitis in Ghana, Sudan, and Uganda; cholera in Zimbabwe; and H5N1 in Ghana.

AFENET

a healthier Africa

To find out more, go to www.afenet.net

Serving as a Regional Resource

Discovering a New Strain of Ebola Virus in Uganda

In September 2007, when the call came out for volunteers to assist the World Health Organization with an Ebola Hemorrhagic Fever outbreak in the Congo, AFENET responded quickly with a team of highly qualified epidemiologists and laboratorians representing a cross section of the FELTPs in Africa.

These epidemiologists could not have known that this exercise at mobilization for such a deadly infectious disease would serve as the ideal exercise for another such outbreak that occurred in October 2007 in a mining community in the Ruwenzori Mountains, a remote rural area in the Bundibugyo District of western Uganda.

Because a Marburg Hemorrhagic Fever outbreak had been confirmed in early August 2007 in another mining community in western Uganda, this new outbreak was first thought to be caused by the same deadly pathogen. However, in November 2007 laboratory tests in Entebbe and at CDC in Atlanta confirmed that this was a new strain of the Ebola virus, probably transmitted by infected bats that were living in the mines.

Initially confounding public health workers, it was eventually the investigation by graduates of the Uganda FETP that characterized the outbreak which led to the appropriate control measures.

The AFENET Secretariat and its member countries organized response teams of epidemiologists and laboratorians from Kenya, Tanzania, and Uganda, while USAID provided personal protective equipment. As of January 2008, a total of 149 cases of Ebola Hemorrhagic Fever cases were confirmed and 37 people died from the disease, including a medical officer from the Uganda MOH. However, without proper training in field epidemiology and the partnerships developed and maintained by AFENET, the extent of this outbreak may have been much more severe.

DGPHCD Workforce

Since its creation in 1980, DGPHCD has been involved in global public health activities. Over the years, the expanding scope of DGPHCD's activities around the globe has led to an expanded workforce, both at home and abroad.

Today, the division has 55 full-time CDC permanent employees or contractors. Of these, 40 staff members are located at the CDC headquarters in Atlanta, Georgia, and 13 Resident Advisors are stationed abroad.

Resident Advisors, who supervise FETP and FELTP trainees in-country, are stationed in Beijing, China; Addis Ababa, Ethiopia; Guatemala City, Guatemala; Chennai, India; Almaty, Kazakhstan; Nairobi, Kenya; Islamabad, Pakistan; and Johannesburg, South Africa. In addition, we provide support for three Technical Advisors, one in Brasilia, Brazil; and two (one full-time and one part-time) in Bangkok, Thailand.

Our staff members come from various academic background; many have advanced degrees such as an MA, MS, MPH, PhD, or MD, and 15 are graduates of the Epidemic Intelligence Service.

Staff members originally hail from many parts of the world, including the Bahamas, Bangladesh, Burma, Columbia, France, Georgia, Germany, Ghana, Jordan, Kenya, Panama, Peru, Tanzania, Thailand, Uganda, the United Kingdom, and the United States.

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