



Global Disease Detection Program

2010 Monitoring and Evaluation Report

Center for Global Health
Division of Global Disease Detection and Emergency Response



“Meeting emerging threats requires long-range collaborative investments: building preparedness among partner countries to prevent, detect, and respond to the full range of health hazards, including infectious diseases...”

“Report of the CSIS Commission on Smart Global Health Policy: A Healthier, Safer, and More Prosperous World.” 2010, Center for Strategic & International Studies





Table of Contents

Foreword

Letter from the Division Director.....	4
Letter from the Global Disease Detection Branch Chief.....	5

Overview

Global Disease Detection (GDD) Program.....	6
GDD Broadens Coverage.....	8
Monitoring and Evaluation.....	10

GDD Activities

Outbreak Response.....	13
Pathogen Discovery.....	17
Training.....	21
Surveillance.....	25
Networking.....	29

Appendix

Core Capacities of GDD Regional Centers.....	32
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Dear Colleagues:

The Global Disease Detection (GDD) program was established in 2004 to promote global health security by building capacity to rapidly detect and contain emerging health threats. The program began as a series of individual projects aimed at improving global disease detection and response capacity for emerging health threats, later followed by an official strategy that built on the establishment of GDD Regional Centers with host countries. The sixth year of the program, 2010, marked an important milestone with the establishment of the GDD Branch in the Division of Global Disease Detection and Emergency Response, within the Centers for Disease Control and Prevention's (CDC's) Center for Global Health. This new structure presents opportunities for enhanced collaboration with the other Branches and Offices in the division, including the Global Disease Detection Operations Center, the International Emergency and Refugee Health Branch, the Global Health Security Branch, the Health Systems Reconstruction Office, and the Office of Policy, Evaluation, and Communication.

In addition, GDD has strong collaborations with other programs (see page 10) throughout CDC and critical partnerships within the interagency community. I am especially appreciative of our long-standing collaborations with colleagues in the Field Epidemiology Training Program (FETP) and influenza program at CDC, and of the support from the Cooperative Threat Reduction programs at both the Department of Defense and the Department of State. These partnerships and collaborations have helped us to maximize our public health impact.

In conjunction with the World Health Organization (WHO), host countries, a broad network of global partners, and our eight GDD Regional Centers, we have achieved important progress towards building global public health capacity in support of the International Health Regulations (IHR), as highlighted in this Monitoring and Evaluation report.

Thank you for your continued interest in GDD. I look forward to the coming year as CDC continues to work with global health partners to ensure global health security for our citizens by strengthening global capacity for emerging health threats.

Scott F. Dowell, MD, MPH
Director, Division of Global Disease Detection and Emergency Response
Center for Global Health
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Dear Colleagues:

I am pleased at the progress that has been made to date towards global public health capacity for emerging health threats, as well as reminded of the challenges and work that remain ahead.

In 2010, the GDD program helped coordinate a CDC response to several high-profile and important outbreaks including cholera in Haiti (see page 13), Nodding Syndrome in Uganda (see page 17), and lead poisoning in Nigeria. These outbreaks showed us that emerging health threats remain a complicated reality, yet they also highlight the value of our robust network of partners, which is essential for rapidly responding to outbreaks. Several examples of the contributions and partnerships of the GDD program are highlighted throughout this report.

Recognizing the ongoing vulnerability to new disease threats from regions with limited detection and response capacity, Congress appropriated funding for an additional GDD Regional Center in 2010. South Africa was selected as the eighth GDD Regional Center after a competitive selection process (see page 8). The selection of this additional Regional Center represents an important step forward in achieving the long-term goal of improving global public health security through the establishment of 18 GDD Regional Centers. It also reduces geographic vulnerabilities and further strengthens global public health capacity-building activities, particularly on the continent of Africa. CDC is working with its counterparts in South Africa to establish the Regional Center and to begin initial activities as part of this collaboration.

As a WHO Collaborating Center for Implementation of the IHR, and through ongoing work with our network of partners, CDC is contributing to the development of priorities and goals for IHR implementation. In addition, in coordination with WHO, U.S. government partners, and others, GDD is strategically placing scientific expertise and resources in each of the WHO regions to build and strengthen national core capacities for surveillance and response in host countries and throughout the region.

This GDD 2010 Monitoring and Evaluation Report highlights the collective achievements of the GDD Regional Centers, other CDC programs, and partners in building global public health capacity for emerging health threats. We hope you will enjoy reading and learning about these activities and accomplishments.

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Global Disease Detection Program

Global Disease Detection Program

GDD is CDC's principal and most visible program for strengthening global health security and developing public health capacity to rapidly identify and contain disease threats around the world. The program is comprised of field-based and CDC headquarters-based components.

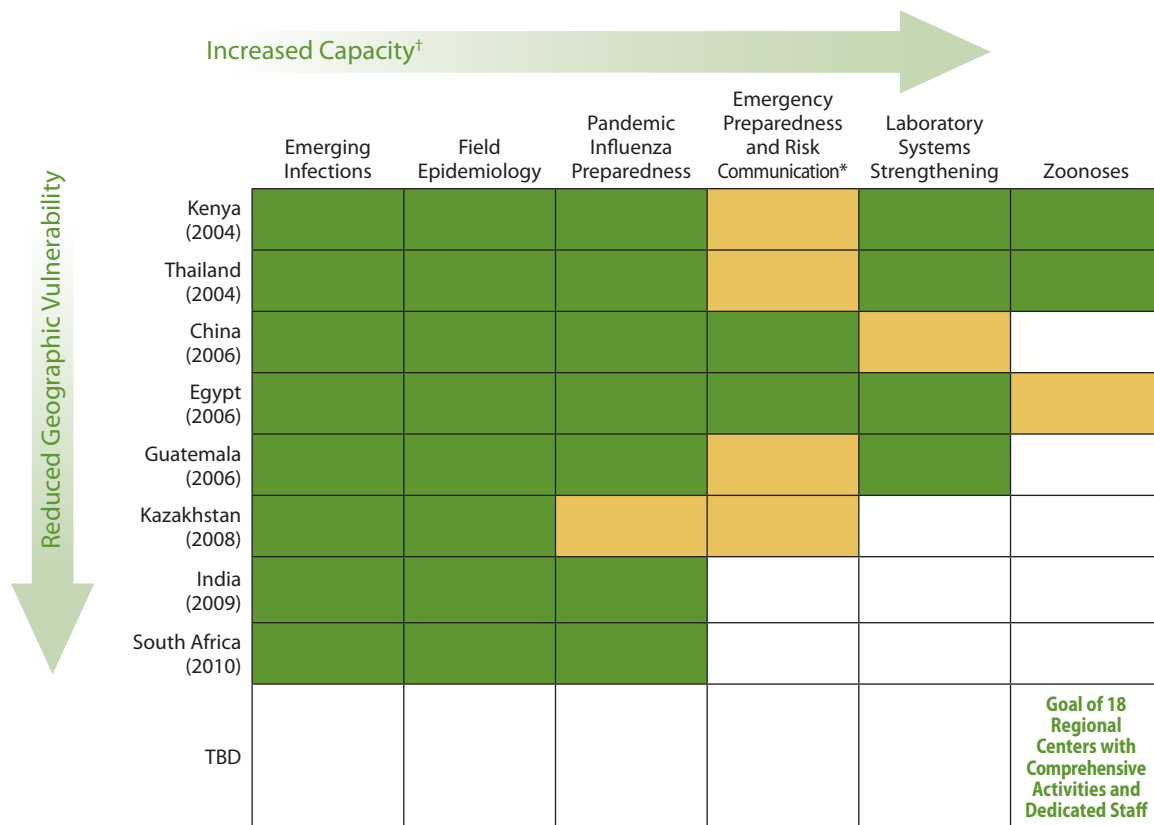
GDD Regional Centers

A central focus of GDD is establishing and expanding GDD Regional Centers that build broad-based public health capacity in support of the IHR. CDC currently operates eight GDD Regional Centers (see map on page 7) at varying levels of capacity (see table below). GDD Regional Centers work with the host country and within the region to develop the following six core capacities (see the appendix for detailed descriptions):

- Emerging infectious disease detection and response
- Training in field epidemiology and laboratory methods
- Pandemic influenza preparedness and response
- Zoonotic disease detection and response at the animal-human interface
- Emergency preparedness and risk communication
- Laboratory systems strengthening

GDD Regional Center Capacity and Growth Matrix

GDD strengthens global health security by building capacity to detect and respond to emerging health threats and closing existing geographic vulnerabilities through the establishment of strategically placed GDD Regional Centers that build public health capacity in six core areas (see table below).



Green Comprehensive activities with dedicated staff (existing or expected within 12 months)

Yellow Initial activities underway

† Capacities are added based on host country priority

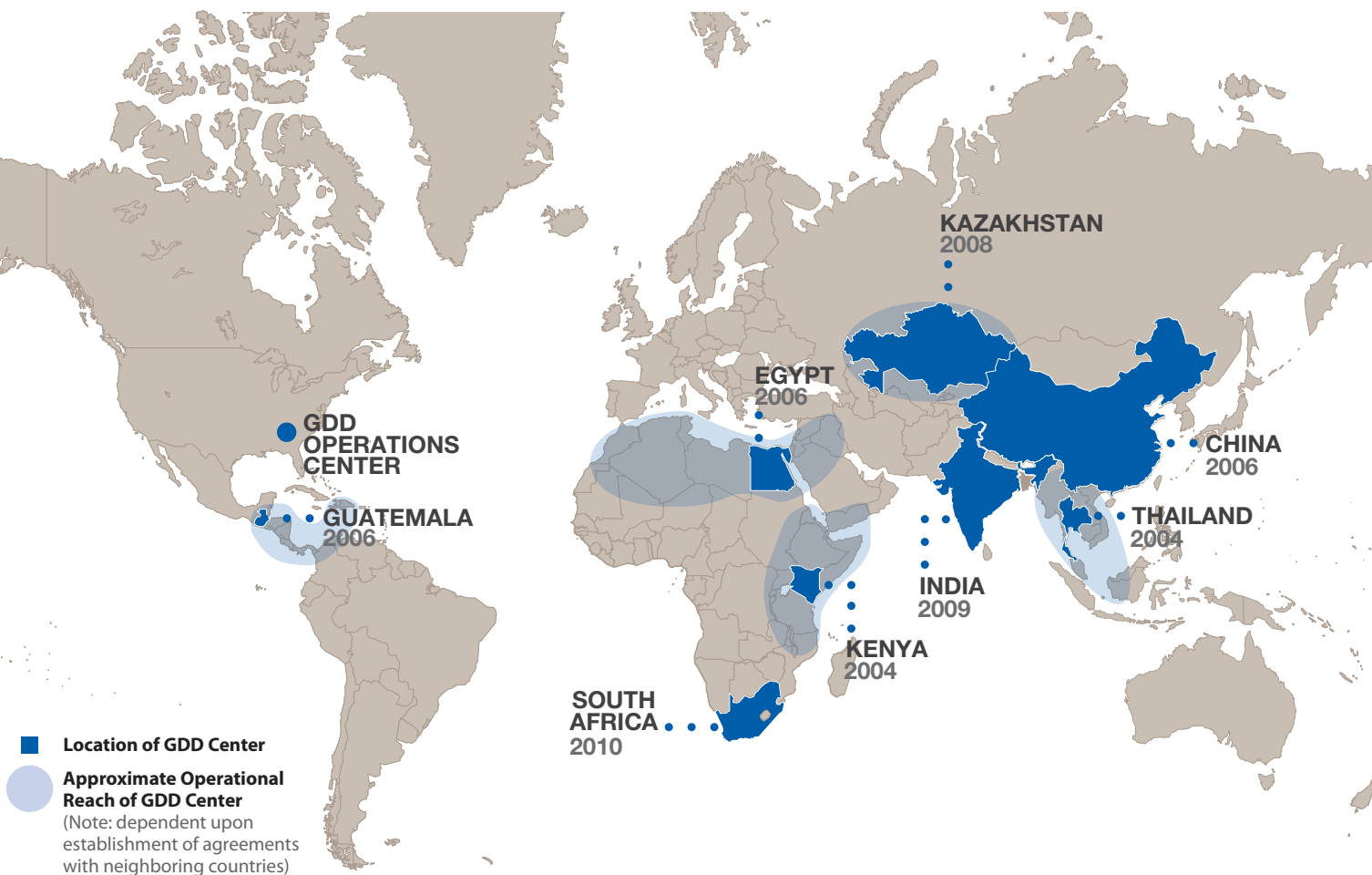
*Formerly the Health Communication and Information Technology core capacity

Technical Support Corps

CDC is one of the world's leading public health agencies and the only U.S. government agency that can rapidly access the in-depth scientific expertise required to respond to complex disease outbreaks. GDD provides technical support through its Technical Support Corps (TSC), a cadre of scientists based at CDC headquarters who are available to provide 24 hours a day, seven days a week direct support to GDD Regional Centers and to facilitate aid to the field in prolonged or complex emergencies. In 2010, four TSC members were added for a total of 18 TSC members who have a range of expertise in each of the GDD core capacities.

GDD Operations Center

The GDD Operations Center is an innovative epidemic intelligence and response operations unit located at CDC headquarters. It uses non-traditional surveillance methods to provide early warning about international disease threats so that CDC can rapidly respond to protect public health in the United States and the global community. The GDD Operations Center includes experts in infectious diseases, veterinary medicine, medical microbiology, epidemiology, and information technology. In response to requests for outbreak assistance by a country or WHO, the GDD Operations Center coordinates expertise from across CDC and manages an outbreak contingency fund to facilitate rapid deployment of teams to the field.



Selection of South Africa as the Newest GDD Regional Center

In February, 2010, GDD began the process of identifying a country to host a new GDD Regional Center. CDC experts used selection criteria including public health significance, country commitment, established CDC presence, regional reach, and international partner presence to identify and assess eight countries that had previously shown interest in hosting a GDD Regional Center. In June, after reviewing input from CDC, U.S. Embassies, Ministers of Health, and other relevant government health agencies operating in these countries, and after site visits to top candidate countries, South Africa was selected as the eighth GDD Regional Center.

Activities at the GDD Regional Center in South Africa are well underway.

- Funding has been allocated for the Field Epidemiology and Laboratory Training Program (FELTP), infectious disease surveillance, and emergency preparedness;
- South African counterparts at the Ministry of Health and the National Institute for Communicable Diseases have identified office and laboratory space and experienced leaders to collaboratively develop the programs;
- An acting GDD Regional Center U.S. co-director has been appointed; and,
- Recruitment has begun for permanent U.S. and South African co-directors for the Regional Center as well as for other staff positions.



Launching GDD India

2010 marked the first full year of operation for the newly established GDD Regional Center in India. The formal launch of the Regional Center occurred in November as part of President Obama's state visit to India when the memorandum of understanding was signed by both the Indian and U.S. governments. Many activities are already underway.

India Epidemic Intelligence Service

The GDD Regional Center in India is providing funding and technical support to the Indian National Center for Disease Control (NCDC) to establish an India Epidemic Intelligence Service (India EIS) program. This intensive two-year, mentored, competency and service-based training is modeled after the FELTP. Early training included a scientist exchange, sending technical subject matter experts from the United States to India to provide instruction to India EIS residents, and bringing residents to state health departments in the United States to learn about how state and national surveillance systems work together to provide a cohesive national surveillance system.

Laboratory Methods Training

In March 2010, the Regional Center supported two scientists from NCDC and the National Institute of Virology to travel to the United States to participate in a two-week Arbovirus Diagnostics and Surveillance Training Program conducted by CDC's National Center for Emerging and Zoonotic Infectious Diseases. Topics included serology (ELISA, Luminex microsphere, PRNT) and molecular diagnostics (PCR-based), mosquito testing (specimen processing, RNA detection, virus isolation, data management), and ArboNET and arbovirus surveillance data management/analysis.

Zoonotic Disease Reservoirs

In June 2010, the Regional Center provided funding and technical support for a three-week training session at the National Institute of Virology by a four-member team from CDC's Viral Special Pathogens Branch in the National Center for Emerging and Zoonotic Infectious Diseases with experience in bat collection, handling, and specimen testing. The training focused on trapping and sample collection from two species of bats that required cave and forest collection techniques. Laboratory training was also conducted to demonstrate methods of pathogen detection by ELISA (serology) and PCR (nucleic acid detection). Assays included detection of known zoonotic viruses such as Marburg, Ebola (Reston), and Nipah viruses.

The Regional Center is supporting several integrated approaches to surveillance for influenza and other severe viral diseases such as hemorrhagic fevers and viral encephalitis to correctly identify viruses associated with these infections. Objectives of this surveillance include detection and identification of viruses associated with hemorrhagic fever and encephalitis syndromes, surveillance for Hantavirus, surveillance of slaughterhouses for zoonotic viruses, and investigation of bats as a potential source of emerging viral diseases. These systems will provide information about the ecology of these viruses and their potential to infect people and lead to emerging diseases.



Monitoring and Evaluation

GDD Monitoring and Evaluation

GDD developed a comprehensive monitoring and evaluation (M&E) program in 2006 which has been used to measure progress towards building capacity to rapidly detect and contain emerging disease threats. This program monitors and evaluates capabilities and progress on a quarterly basis using a framework that includes quantitative and qualitative information about five key activities as described below.

- **Outbreak Response:** Ensure outbreak investigations and responses are timely and comprehensive
- **Pathogen Discovery:** Advance public health knowledge through innovative research into the epidemiology and biology of emerging infections and identify novel threats before they spread
- **Training:** Build capacity and improve the quality of epidemiology and laboratory science through applied training
- **Surveillance:** Strengthen surveillance systems capable of detecting, assessing, and monitoring the occurrence and public health significance of infectious disease threats
- **Networking:** Enhance collaboration through shared resources and synergy

GDD collaborates closely with Centers and programs at CDC (see side bar) to accomplish its mission. This collaboration allows GDD to draw upon expertise from across the agency. GDD also works closely with a variety of in-country partners including Ministries of Health, academic institutions, other U.S. government programs, and international and non-government organizations. These partners contribute funding, expertise, and other resources towards GDD projects and goals. Therefore, the results of the M&E reflect the shared accomplishments of GDD and its partners.

Internal Partners

Center for Global Health

- Division of Global HIV/AIDS
- Division of Parasitic Diseases and Malaria
- Division of Public Health Systems and Workforce Development

National Center for Birth Defects and Developmental Disabilities

- The Division of Birth Defects and Developmental Disabilities

National Center for Environmental Health

- Division of Emergency and Environmental Health Services

National Center for Emerging and Zoonotic Infectious Diseases

- Division of Foodborne, Waterborne, and Environmental Diseases
- Division of Global Migration and Quarantine
- Division of Healthcare Quality Promotion
- Division of High-Consequence Pathogens and Pathology
- Division of Preparedness and Emerging Infections
- Division of Vector-borne Diseases

National Center for HIV/AIDS, Viral Hepatitis, STD & TB Prevention

- Division of TB Elimination
- Division of Viral Hepatitis

National Center for Immunization and Respiratory Diseases

- Division of Bacterial Diseases
- Division of Viral Diseases
- Influenza Division
- Global Immunization Division

Office of Public Health Preparedness and Response

- Division of Emergency Operations

Summary of GDD Accomplishments: 2010 and Cumulative

This table contains summary statistics for each of the GDD activities for 2010 as well as cumulative statistics covering 2006-2010. The shaded boxes reflect fields not applicable to the corresponding statistics.

	2010	2010 Percents	Cumulative Total 2006-2010	Cumulative Percents
Outbreak Response	Total number of outbreak responses	156	665	
	Number of outbreaks in which response time was within 24 hours [†]	110	390	75%
	Number of outbreaks in which epidemiological activities helped identify risk factors to control the outbreak [†]	116	266	51%
	Number of outbreak responses that achieved measurable health impact (saving lives, prevention of disease spread, or policy change)	86	257	50%
	Number of outbreak responses in which GDD lab support was provided	122	331	50%
	Number of outbreaks in which GDD lab support provided pathogen confirmation	104	283	85%
	Number of outbreaks in which communication support was provided [†]	102	219	42%
	Number of responses that included support to other countries*	39	151	23%
	Number of outbreaks that involved CDC headquarters support**	27	113	22%
Number of outbreaks that involved WHO or Global Outbreak Alert and Response Network (GOARN) partners**	13	65	13%	
Pathogen Discovery	Total number of new pathogens detected	5	54	
	Number of pathogens new to the region	3	46	85%
	Number of pathogens new to the world	2	6	11%
	Number of pathogen-specific tests available in-country	29	186	
Training	Total number of participants in short-term public health training	12,508	49,729	
	Number of Field Epidemiology (and Laboratory) Training Program (FE(L)TP) graduates	67	302	
	Number of FE(L)TP graduates in public health positions within country	415		
Surveillance	Total population of host countries receiving national surveillance technical support	2,960,400,000 [‡]		
	Total population under surveillance for pneumonia	5,538,000		
	Total population under surveillance for other diseases and syndromes	72,217,166		
	Total number of other diseases and syndromes under surveillance	12		

* Also contributes to "Networking" activity area

[†] Indicator was not collected for all years. The denominator for these percentages are based on the number of outbreaks conducted during the years that indicator was collected, and not the total number of outbreaks from 2006-2010.

[‡] 2010 World Population Data Sheet. Retrieved from Population Reference Bureau website, http://www.prb.org/pdf10/10wpds_eng.pdf



Outbreak Response

CDC Responds to Cholera in Haiti

On October 21, 2010 the Haitian Ministry of Public Health and Population (Haitian MSPP) confirmed an outbreak of cholera in Haiti. This was the first appearance of cholera in more than a decade in the Americas and in more than a century in Haiti.

CDC provided comprehensive support to the Haitian MSPP to respond to the outbreak.

These efforts resulted in:

Reduced Mortality CDC's efforts, as part of the broader international response, contributed to a significant decrease in the number of deaths from cholera. By the end of 2010, cholera mortality was reduced to the international standard of less than 1%.

Increased Access to Improved Water, Sanitation, and Hygiene Supplies CDC worked with partners to provide access to an adequate supply of clean drinking water, chlorine-based products for household drinking water treatment, latrines for proper waste disposal, and soap and hand washing facilities at key locations such as schools, hospitals, and clinics.

Messages in Support of Cholera Prevention and Control CDC helped develop train-the-trainer materials and community health worker materials (including translation into French, Creole, and Spanish), and distribute them to over 500 medical providers.

Robust Nationwide Surveillance CDC helped establish a national cholera monitoring system which allowed Haitian MSPP to identify cases in real-time, pre-position resources, track the evolution of the epidemic, and target interventions.

GDD played a significant role in the larger CDC response efforts, ensuring that the response was rapid, comprehensive, and effective.

As part of these efforts, GDD:

Enabled Rapid Response The GDD Operations Center outbreak response contingency fund (see pages 7 and 31) supported the initial deployment of 67 public health professionals to provide on-the-ground support in Haiti until supplemental funding became available.

Leveraged a Global Network Most clinicians in Haiti had never managed cholera before, and initial mortality was more than 6%. Drawing on its global network of partners, GDD requested assistance from the International Center for Diarrheal Disease Research in Bangladesh (ICDDR,B) where cholera is endemic. ICDDR,B assisted CDC and MSPP in conducting a train-the-trainer program in all regions in Haiti to instruct healthcare providers on the treatment and management of cholera. Now, the initial trainees have become the trainers and continue to share their knowledge.

Deployed Regional Resources Multidisciplinary rapid response teams trained by the GDD Regional Center in Guatemala and regional partners in the wake of pandemic influenza H1N1 2009 (H1N1) were rapidly mobilized to provide much needed surge capacity.

GDD conducts and supports outbreak investigations at the invitation of the Ministry of Health by providing technical assistance, human and zoonotic epidemiology expertise, laboratory support, and health communication support. In addition, GDD Regional Centers can request assistance from scientific experts at CDC headquarters when additional technical assistance such as specialized laboratory testing or field deployment is needed.

Accomplishments in 2010

GDD Regional Centers assisted in over 156 outbreak investigations and other public health emergencies, including typhoid fever and goatpox in China; influenza H5N1 and H5N2 in Egypt; respiratory syncytial virus and influenza H3N2 in Guatemala; Congo-Crimean hemorrhagic fever (see story on page 15) and anthrax in Kazakhstan; dengue and Rift Valley fever in Kenya and; typhoid fever and dengue in Thailand.

GDD helps build national and regional capacity. In 2010, outbreak responses

Were Timely

- 71% received a response within 24 hours of the request

Were Comprehensive

- 78% involved laboratory support, and of these, 85% led to a confirmed cause
- 65% included health communication support
- 25% included support to other countries

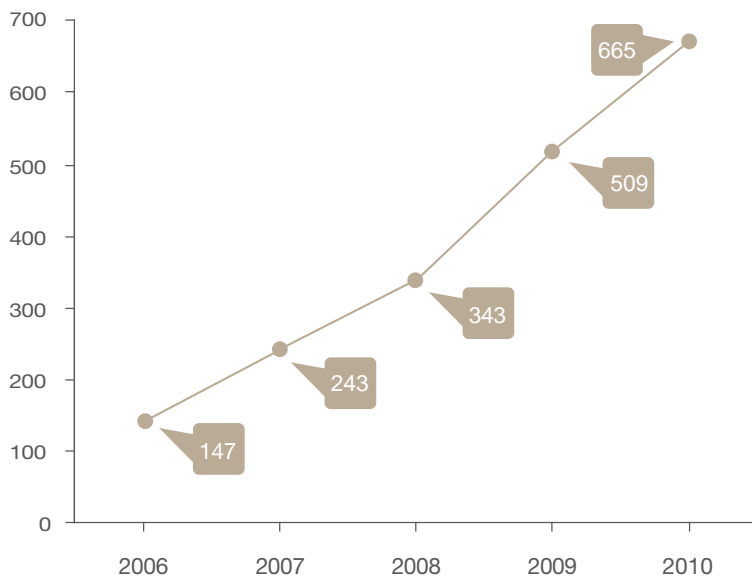
Achieved Public Health Impact

- 74% led to identification of risk factors
- 55% led to saving of lives, preventive action, or policy change

Disease Control in China put to the “Text”

The GDD Regional Center in China and the China Ministry of Health recently explored the use of mobile phone text messaging for sharing vital public health information. Based on the premise that outbreak control improves when prevention information spreads rapidly, the GDD Regional Center worked with the Chinese national public health hotline and the Ministry of Health to evaluate the use of SMS text-messages to rapidly disseminate health messages. Together, they sent text messages with health advice to thousands of mobile phone users. H1N1 messages were used for the first large-scale evaluation conducted in 2010 in Shanghai, China’s largest city. The evaluation showed that those people receiving H1N1 information via text message gained increased knowledge compared with those in a control group. The recipients of the SMS text messages also showed an increased change of attitude regarding influenza prevention and control measures such as hand hygiene and staying home when sick. Encouraged by the Shanghai results, the Ministry of Health has established a permanent health text messaging code available in all 31 provinces for emergency messaging as well as for routine public health education and promotion.

Cumulative Number of Outbreak Responses



Response to Congo-Crimean Hemorrhagic Fever in Kazakhstan

Congo-Crimean hemorrhagic fever (CCHF) causes death for 10% - 50% of the people who become infected. CCHF spreads to people through tick bites, or contact with infected animal blood. Usually, CCHF does not affect its animal hosts, but it can cause serious illness to humans. Symptoms range from headache, high fever, and joint pain to vomiting, large areas of severe bruising, severe nosebleeds, and other uncontrolled bleeding.

In recent years, three districts in southern Kazakhstan have reported as many as 20 cases per year, which resulted in the Ministry of Health of Kazakhstan requesting that the GDD Regional Center in Kazakhstan help build capacity to detect and contain the spread of this deadly disease. Together with support from the Department of Defense's Defense Threat Reduction Agency and technical experts from CDC, the GDD Regional Center is helping develop a comprehensive strategy focused on prevention to defeat the deadly virus.

Transmission of CCHF is most common to livestock workers who come in contact with infected ticks carried by cattle; some cases, however, have occurred in medical personnel exposed to the blood of hospitalized patients. Messages in Russian and the Kazakh languages were created to teach hospital workers, local public health agencies, and entire communities how to avoid and care for tick bites, and how to recognize signs of infection. The GDD Regional Center also conducted an intensive five-week course to improve local capability to detect the virus that causes CCHF and study the epidemiology of CCHF. The result of these combined efforts is improved testing to detect CCHF in the laboratory, suggested approaches for tick control in livestock, and enhanced prevention measures to protect livestock workers and others who come in contact with ticks.







Pathogen Discovery

Coordinated Campaign Against Nodding Syndrome in Uganda

Since the early 1960s, there have been reports of a mysterious disease affecting children in Africa, which causes uncontrolled head nodding (particularly in the presence of food), seizure-like activity, and in many cases, death. This illness is referred to as “Nodding Syndrome” after its most notable symptom. In late 2009, reports from Northern Uganda suggested that over 2,000 children were afflicted with this unusual illness.

In 2010, the GDD Operations Center alerted experts from programs across CDC, including infectious diseases, nutrition and physical activity, and birth defects and developmental disabilities, to study the outbreak. Through its outbreak response contingency fund, the GDD Operations Center supported two field deployments of multidisciplinary teams of scientists to the field to investigate. These teams consisted of experts in pediatric infectious disease, pediatric neurology, toxicology, laboratory, and geographic information systems.

The teams documented for the first time that Nodding Syndrome is a novel complex epilepsy syndrome, and that the head nodding was a direct manifestation of seizures that cause a brief lapse in muscle tone due to alterations in brain function. The cases in Northern Uganda are clustered in time and space, with rates of disease many times higher than expected background rates of complex epilepsy. Children living under the poorest conditions where there is not sufficient food, clean water, or adequate housing seem most susceptible to this condition. CDC is continuing to investigate the disease further to identify the underlying cause in the hope of improving management and eventually curing the illness through effective treatment.

GDD is working to identify pathogens that are new to the region or the world which represent unrecognized and potentially important risks. In addition, GDD helps countries to establish or significantly improve laboratory testing capacity to confirm emerging health threats and implement appropriate response interventions more quickly.

Accomplishments in 2010

GDD Regional Centers:

- Detected three pathogens that were new to their regions
- Discovered two new pathogens that are new to the world
- Built capacity for 29 diagnostic tests

Identifying Diseases in Disguise in Thailand

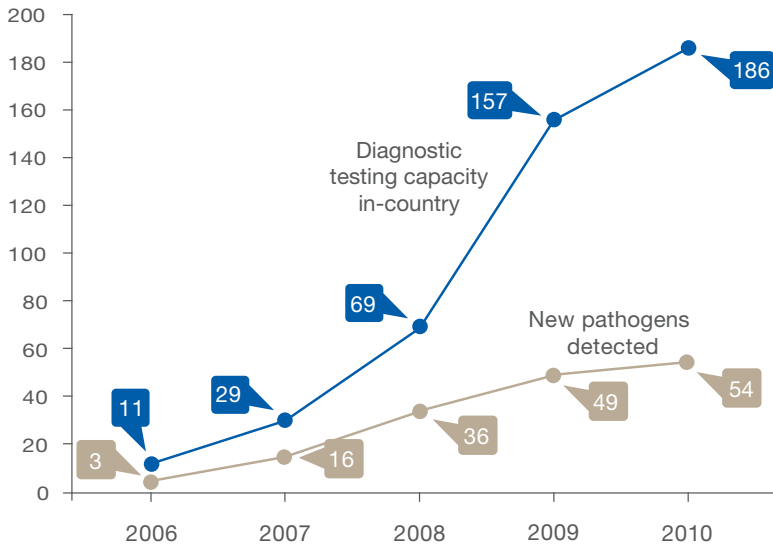
Emerging diseases may often look and behave like existing diseases by producing similar symptoms in infected patients. These diseases may continue to spread undetected and unconstrained if current treatment and prevention measures are not effective. The GDD Regional Center in Thailand is collaborating with Thailand's Ministry of Public Health and Ministry of Agriculture, the Thailand Red Cross, and U.S. CDC to identify new pathogens with clinical presentations similar to known diseases and syndromes (such as non-specific fever), and help answer questions about the causes and transmission routes of new and distinct infectious diseases. *Bartonella* and other emerging zoonotic pathogens are a specific focus.

Between 2007 and 2010, the Regional Center identified four *Bartonella* species linked to serious previously undiagnosed human diseases that are likely new to Thailand and possibly the world. These pathogens are in the process of being characterized using genomic methods. This work builds upon the 2007 discovery by the GDD Regional Center in Thailand and CDC-Fort Collins of a pathogen that was new to the world, *Bartonella tamiae*, and the first culture-confirmed *Bartonella* infection in Thailand. These ongoing efforts demonstrate the importance of pathogen discovery work to emerging and re-emerging disease threats.

Pathogens Detected, 2010

GDD Regional Center	Pathogen Name	New to
Egypt	Crimean Congo hemorrhagic fever variant	World
Kenya	<i>Bartonella</i> (novel species)	World
Thailand	<i>Coxiella burnetii</i>	Region
Thailand	<i>Bartonella henselae</i>	Region
Thailand	<i>Bartonella bovis</i>	Region

Cumulative Number of New Pathogens Detected and Testing Capacity



Pathogen Detection in an Egyptian Abattoir

In a pilot study at an Egyptian abattoir, epidemiologists from the GDD Regional Center in Egypt discovered a new version of an old infectious threat to human health: CCHF, (described on page 15) which is commonplace across Africa, the Balkans, the Middle East, and parts of Asia.

The viral variant that was identified indicated the presence of a disease with potentially significant human impact, and underscored the importance of expanding novel approaches to disease detection for public health investigators. This study was unusual, not just for its location, but also its scope, which included human, animal, and vector surveillance. Staff collected and tested specimens taken from slaughtered livestock including cattle, buffalo, camels, and sheep. The staff found the previously unknown variant of CCHF in ticks taken from the carcasses of three camels originating in Somalia and Sudan. Because of the success of this surveillance model, the Regional Center is expanding the pilot surveillance activities to a live animal market in the Cairo area. The discovery of a new variant of the CCHF virus helps scientists stay ahead of evolving pathogens by identifying them before they spread.







Training

A Public Health Network Rallies to Eradicate Polio in Central Asia

Vigilance comes with the territory in the global polio eradication effort. In 2002, the European Region (which includes Russia and the Central Asia Republics of Kazakhstan, Tajikistan, and Turkmenistan) was declared polio-free. But in April 2010, an enormous outbreak of polio was detected in Tajikistan, with subsequent exportation of cases to Russia, Turkmenistan, and Kazakhstan. By year's end this outbreak was responsible for more than 50% of all the world's polio cases in 2010. In Tajikistan, there were 457 laboratory-confirmed polio cases and 29 deaths in a country that had previously not had any cases since 1997.

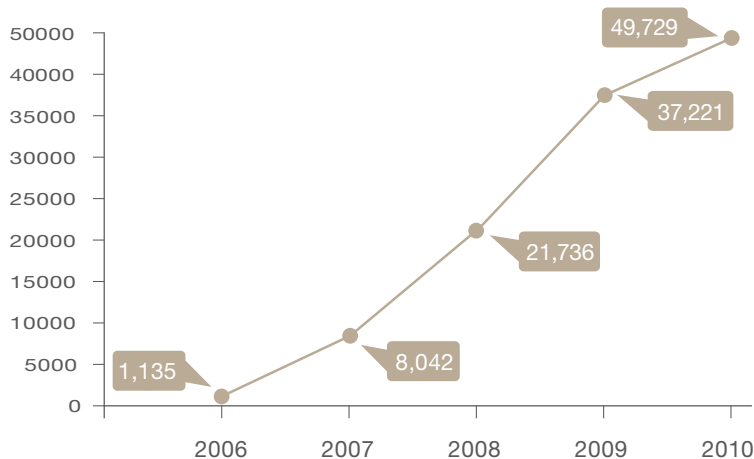
The outbreak was immediately addressed through national vaccination campaigns coordinated by WHO, with support from CDC's Global Immunization Division (GID). In resource-constrained areas of the world, mounting a rapid, large-scale vaccination campaign presents significant challenges. Fortunately, the FETP has been training public health professionals in the Central Asian Republics since 2003. The highly-trained graduates of this program have remained in the region and frequently hold leadership positions in their respective institutions and Ministries of Public Health. Scientists from the GDD Regional Center in Kazakhstan were able to work in collaboration with the network of FETP graduates to provide expertise and assistance. They monitored surveillance efforts in collaboration with GID and other partners, and provided quality assurance during the mass vaccination campaigns that dispensed over 15,000,000 doses of vaccine. CDC's prior investment in professional capacity building helped build strong public health alliances that contributed to controlling the polio outbreak.

GDD strengthens in-country and regional public health capacity for outbreak detection and response through short-term, classroom-based instruction, and more rigorous, in-depth instruction and training of senior epidemiologists through the FE(L)TP.

Accomplishments in 2010

- 67 epidemiologists and laboratorians graduated from FE(L)TP at GDD Regional Centers (see figure on page 23).
- 415 FE(L)TP graduates remained in public health positions in country or within the region after graduation.
- More than 12,000 people participated in short-term public health training (see figures below). Instruction included a combination of advanced training for core public health personnel and more basic training for clinicians and others whose work impacts the public health system.

Cumulative Number of Training Participants



Number of Participants Trained by Topic, 2010

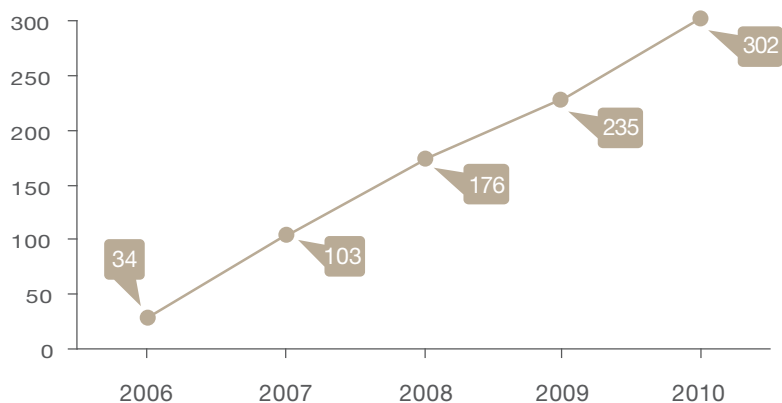


Building Laboratory Capacity in Central America

High quality laboratories are critically important in identifying pathogens that have the potential to cause pandemics. In 2010, the influenza program at the GDD Regional Center in Guatemala helped the National Influenza Centers in Guatemala and Nicaragua improve the quality and reliability of their testing, culminating in their formal accreditation as Central American National Reference Laboratories. The Regional Center helped identify and address the gaps necessary to meet the strict accreditation criteria required by PAHO. They provided equipment and training to perform powerful new laboratory tests, to analyze, interpret, and report the results, and to ship isolates to WHO.

This effort is an important milestone toward better influenza control around the world because accredited labs have trained personnel, equipment, and supplies to find and identify new influenza viruses, including those with the potential to cause pandemics. The two new accredited national laboratories in Guatemala and Nicaragua are now recognized as a part of Central America's network of six regional accredited National Influenza Centers.

Cumulative Number of Senior Epidemiologists (FE(L)TP)



A man in a white lab coat is standing in a clinical setting, looking towards the camera. He is wearing a white lab coat over a dark shirt. The background is a plain wall with a door frame visible on the left. The overall scene is brightly lit.

Surveillance

Building Surveillance Capacity in Eritrea

Rotavirus is the leading cause of severe diarrhea in infants and young children worldwide. Globally, it causes more than a half a million deaths each year in children younger than 5 years old. Pediatric bacterial meningitis is also a significant health problem in the developing world, particularly in Africa. Prior to 2010, Eritrea had no rotavirus surveillance and substandard pediatric bacterial meningitis surveillance, resulting in many cases going undetected and untreated, and leading to further spread of these diseases.

The GDD Regional Center in Kenya, through its FELTP, partnered with WHO to evaluate Eritrea's pediatric bacterial meningitis surveillance system and to help establish a rotavirus diarrheal surveillance system in 2010. With assistance from WHO's Africa Regional Office, Eritrea Ministry of Health, Orotta National Paediatric Referral Hospital, and National Reference Laboratory, staff from the GDD Regional Center supported laboratory training to establish testing capacity for rotavirus and bacterial meningitis. They helped develop laboratory systems to ensure consistent, safe, and high quality laboratory support. More than 50 doctors, nurses, data managers, epidemiologists, and surveillance officers were trained in their roles within the surveillance system.

Eritrea can now correctly estimate the burden of rotavirus, diarrheal diseases, and meningitis, which could be the first step for Eritrea to implement a vaccination program to proactively prevent these diseases. This institutional capacity will better enable Eritrea to detect and respond to outbreaks more rapidly.

GDD includes a network of Regional Centers capable of conducting surveillance for emerging infectious diseases. GDD Regional Centers use population-based surveillance, linked to powerful laboratory diagnostics, to accurately estimate burden of disease and direct control efforts where they can be most effective. Surveillance data are used to support evidence-based decision making in public health practice and policy.

Accomplishments in 2010

- 5.5 million persons are under population-based surveillance for pneumonia; and,
- 72 million persons are under population-based surveillance for other locally important diseases and syndromes.

Enhancing Surveillance in Thailand

A country's ability to detect diseases is only as good as the information being produced by its surveillance system. If there are limited or poor quality data coming into a surveillance system, the decisions being made using these data will not be very useful or effective. For years, Thailand's invasive bacterial infections surveillance was hampered by a lack of resources and inadequate reporting. In collaboration with CDC, the GDD Regional Center in Thailand partnered with the Thailand Ministry of Public Health to address these challenges.

This collaboration has revitalized the existing surveillance system by improving the quality of data collection and reporting, and by more actively looking for cases. This system was further enhanced by including two provincial population-based surveillance sites for bloodstream infections which are managed by scientists from the GDD Regional Center. Because the enhanced system integrates laboratory, clinical, and epidemiological data, it is now able to effectively monitor trends, detect emerging antimicrobial resistance, and assess the impact of prevention and control programs. The addition of the two population-based sites also gives the system the power to accurately estimate the extent to which a disease exists in the population, to identify high-risk groups, and to describe the characteristics of that disease, including what drugs are likely to be most effective for treatment. This information helps public health officials to efficiently and effectively direct resources and investigations. This system is also flexible and scalable so that surveillance for additional pathogens (including non-bacterial pathogens) can be conducted quickly, allowing the network to serve as a national resource in public health emergencies. The end result is the Thailand Invasive Bacterial Infections Surveillance-Plus, a network of more than 30 sites that are well positioned to respond to a wide array of emerging public health threats.

Fingerprinting Pathogens in China

The GDD Regional Center in China is tailoring proven approaches from the United States to help the Chinese Ministry of Health and other partners find the cause of food-borne disease outbreaks. Like fingerprints, disease-causing pathogens leave their own genetic marks. The GDD Regional Center in China is helping establish laboratory techniques that effectively “dust” for evidence that can prove whether two ill people, regardless of where they live, were sickened by the same pathogen. With this information, epidemiologists can narrow their search for the tainted products and protect people from further exposures.

Chinese microbiologists and epidemiologists in eight provinces are now equipped to receive specimens and identify common foodborne diseases as well as entirely new ones. Along with experts in medical epidemiology, microbiology, environmental health, and program management, scientists at the GDD Regional Center in China are finding more *Salmonella* cases than ever, and have recently discovered a new strain of *Salmonella Typhimurium* that has been causing illness among children. Through enhanced training and state-of-the-art laboratories, these public health experts can “fingerprint” the genetic markers for pathogens causing food-borne infections and identify their source. This essential step makes food safer – whether it’s consumed in China, exported to the United States, or shipped worldwide.

Diseases and Syndromes Under Population-Based Surveillance at GDD Regional Centers in 2010

- Bacterial blood stream infections
- Diarrheal disease
- Febrile illness of unknown origins
- Fungal blood stream infections
- Invasive bacterial infection
- Influenza-like illnesses
- Invasive neurological disease
- Jaundice
- Meningitis
- Pneumonia
- Respiratory disease
- Tuberculosis







Networking

Flattening the Learning Curve

Emergencies that are not handled well can quickly become public health crises. Stakeholders in emergency preparedness and response must work collaboratively to respond effectively. When multiple agencies are involved in the same response but are unaware of each other's activities, duplication of efforts, unrecognized gaps in the response, mismanagement of resources, and confusion among responders and the general population may occur.

GDD provided funding and support for an intensive week-long forum which was managed jointly by CDC's International Emergency and Refugee Health Branch and the WHO Regional Office for the Eastern Mediterranean, Center for Health Risk Reduction. This forum, facilitated by a group of experienced humanitarian and public health experts from CDC, WHO and the United Nations system, was designed to help individuals, organizations, countries, and regions working in public health emergencies to increase their capacity to prepare for and respond to complex emergencies and disasters.

This forum brought together the emergency coordinators from the GDD Regional Centers in Kenya, Guatemala, China, Thailand, and Kazakhstan, representatives from all six WHO Regional Offices, and representatives from other partner organizations that collaborate with CDC on emergency preparedness and response. It provided an opportunity for participants to share the most up-to-date knowledge, skills, and field experience, and to collaborate to increase preparedness locally.

This forum was an important networking opportunity for the GDD Regional Center in Kenya, which, as the newest emergency preparedness program of the group, needed to share its experiences and learn from other countries. In Kenya, emergency preparedness and response was previously fragmented, with many stakeholders working independently in their own sectors. Kenyan participants learned how to manage the multiple efforts of ministries and agencies working on emergency preparedness, and how to better coordinate plans and preparations for future events. This forum strengthened an established network of partners and helped the GDD Regional Center in Kenya improve its emergency preparedness program more rapidly.

Rapid detection and response to disease threats anywhere in the world requires a strong network with a global reach. GDD builds a global “network of networks” through strategically placed GDD Regional Centers linked to their host countries and regional partners. Components of GDD, headquartered in Atlanta, play a significant role in linking the Regional Centers with other U.S. government agencies, and international organizations such as WHO and the Global Outbreak Alert and Response Network (GOARN).

Improving Surveillance Systems in Oman

In the fall of 2007, the GDD Regional Center in Egypt invited Jordan, Oman, and Egypt to become part of a Severe Acute Respiratory Infection (SARI) surveillance network. These countries did not have the expertise or equipment to diagnose SARI accurately. So the GDD Regional Center provided funds and technical assistance to help them establish SARI sites in their countries. With assistance to the Ministries of Health in Jordan, Egypt, and Oman, and the Ministry of Higher Education in Egypt, the countries quickly gained competency to process samples to identify the causes of people hospitalized with respiratory infections.

In partnership with the Ministry of Health and Ministry of Higher Education, the GDD Regional Center in Egypt helped increase clinical and diagnostic capability to improve their early warning detection surveillance system for SARI-related epidemics, including for influenza. The success of the surveillance system during the 2009 H1N1 pandemic led the Oman Ministry of Health to adopt the SARI program and fund it as part of the national surveillance system in 2010. The success in Oman has made it possible for the Regional Center to serve as a regional public health resource to other countries in the region.

Bringing Laboratory Capacity to Refugees in Kenya

Before 2010, laboratory capacity in Dadaab refugee camp was extremely limited, involving primarily microscopy and rapid tests. Dadaab refugee camp has a capacity of 90,000, but it currently hosts over 300,000 refugees. In an overcrowded living situation, poor water and sanitation conditions make refugee camps susceptible to a wide range of infectious diseases. Due to lack of good diagnostic capabilities and efficient transportation systems, illnesses were detected late and lives were lost.

In 2010, the GDD Regional Center in Kenya, together with CDC’s Division of Global Migration and Quarantine, worked with several international organizations, including the United Nations Human Rights Council and the International Rescue Committee, to help renovate a laboratory in the Dadaab refugee camp complex. Renovations included adding the capacity to analyze blood and stool cultures, the diagnostic tool known as ELISA, and the necessary training for the laboratory staff. The expanded and improved laboratory benefits the refugees of the camp, the host community of Dadaab town, the entire North Eastern Province in Kenya, and could be utilized for Southern Somalia as well.

With this laboratory, when a mother brings her child to the hospital, the doctor will be able to determine the cause of the child’s illness, such as staphylococcus, streptococcus or other epidemic prone diseases such as cholera or shigella. With this diagnostic capacity, healthcare workers are able to treat patients more accurately, and, in the event of an outbreak, implement appropriate measures to control the situation.



The GDD Operations Center

Through its surveillance function, the GDD Operations Center in Atlanta is frequently the first to alert CDC staff (based in Atlanta and internationally) about a disease outbreak. The GDD Operations Center utilizes multiple sources of information about disease events, including internet-based media reports which scan for key words in more than 40 languages. To investigate and confirm the existence of these outbreaks, the GDD Operations Center relies on a global network, including CDC subject matter experts and their international networks, WHO headquarters and regional offices, and other international partners. The GDD Operations Center is also a member of the Biosurveillance Indications and Warning Analytic Community, a U.S. government interagency collaboration that allows 12 agencies to exchange unclassified information through a secure Web-based portal. The GDD Operations Center is also CDC's liaison with GOARN, receiving and responding to requests for international assistance to control disease outbreaks.

In 2010, the GDD Operations Center outbreak response contingency fund supported 17 outbreak investigations in 14 countries (see table below).

Outbreak Response	Country	CDC Support
Aflatoxin	Kenya	Deployed and funded CDC staff, provision of lab supplies
Anthrax	Scotland	Deployed and funded CDC staff, provision of anti-toxin
Botulism	Thailand	Provided funding for the provision of anti-toxin and associated shipping costs
Cholera	Haiti	Deployed and funded CDC staff, procurement and shipping
Cholera	Dominican Republic	Deployed and funded CDC staff
Cholera	Cameroon	Deployed and funded CDC staff, transportation, supplies/equipment, communications
Cholera	Kenya	Deployed and funded CDC staff, transportation, supplies/equipment, communications
Earthquake Response	Haiti	Deployed and funded CDC staff, provision of lab supplies
Fungal Investigation	Jamaica	Deployed and funded CDC staff, transportation, supplies/equipment, communications
Hepatitis E Virus	Uganda	Deployed and funded CDC staff, transportation, supplies/equipment, communications contractual services, rent
Lead Poisoning	Nigeria	Deployed and funded CDC staff
Legionella	Mexico	Deployed and funded CDC staff
Measles	Malawi	Deployed and funded CDC staff, transportation, supplies/equipment, communications contractual services, rent, utilities
Meningitis	Ghana	Deployed and funded CDC staff, transportation, supplies/equipment, contractual services
Nodding Disease	Uganda	Deployed and funded CDC staff, transportation, supplies/equipment, communications
Polio	Democratic Republic of Congo	Deployed and funded CDC staff
Q Fever	Netherlands	Deployed and funded CDC staff, provision of lab supplies



Core Capacities of Global Disease Detection Regional Centers

GDD Regional Centers are helping to strengthen public health systems and build essential infrastructure in host countries to uphold IHR 2005. The following core capacities were identified by internal and external GDD stakeholders as critical to the development of a country's ability to rapidly identify and control emerging infectious diseases at the source:

Emerging infectious disease detection and response: Develop integrated disease surveillance, prevention, and control activities to rapidly identify and respond to a wide range of emerging infections (including respiratory syndromes, diarrheal diseases, food-borne illnesses, zoonotic diseases, and others).

Training in field epidemiology and laboratory methods: Provide training for scientists and public health practitioners in epidemiology and laboratory methods to build and strengthen public health systems and increase their capacity to detect and control emerging infectious diseases.

Pandemic influenza preparedness and response: Develop laboratory and epidemiologic influenza surveillance capacity in host countries in order to improve and expand global surveillance networks, increase virus isolation and epidemiological data collection, and increase timely identification, reporting, and response to outbreaks.

Zoonotic disease detection and response at the animal-human interface: Build veterinary expertise within the public health work force and develop enhanced partnerships between the Ministry of Agriculture and the Ministry of Health within host countries to strengthen capacity to detect and respond to zoonotic diseases.

Emergency preparedness and risk communication: Improve host-country capacity to plan, exercise, and provide the necessary coordination, including delivery of timely and appropriate health messages, to achieve a state of readiness required to rapidly control and mitigate emerging infectious diseases and other public health emergencies.

Laboratory systems strengthening: Ensure appropriate containment facilities, equipment, policies/practices, security precautions, and occupational health programs to encourage working safely with highly pathogenic agents. Develop standardized test procedures, laboratory protocols, and management practices in order to strengthen laboratory operations.

“The threat of contagious disease transcends political boundaries, and the ability to prevent, quickly detect and contain outbreaks with pandemic potential has never been so important.”

— The White House:
“National Security Strategy.” 2010

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