

CDC Global Health E-Brief

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Haiti: One Year after the Earthquake

2011

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A young girl looks on as CDC staff meet with camp leaders in the Aviation camp in working in Port au Prince, Haiti, 5 weeks after the earthquake that killed more than 230,000 people in the city. The CDC worked to set up disease surveillance networks in the weeks after the earthquake to prevent outbreaks in the crowded and unsanitary camps.

WELCOME to the first quarter 2011 *Global Health E-Brief*, designed to inform readers about key global health activities at the Centers for Disease Control and Prevention (CDC). One year after a 7.0 magnitude earthquake struck the island nation of Haiti; upwards of 1.5 million people continue to live in displaced persons camps while the country faces the added burden of a cholera crisis. CDC and a wide range of partners are helping Haiti reorganize, reconstruct, and restore systems to meet these enormous challenges.

Haiti's Ministry of Health requested CDC assistance in responding to control disease outbreaks. CDC has sent more than 277 technical staff to support public health in Haiti since the earthquake. Additionally, CDC and partners continue to work toward restoring the entire public health system that enables disease monitoring and response.

Dr. Jordan Tappero, CDC medical epidemiologist and leader of the CDC cholera response team in Haiti states, "Our primary focus here is to save lives and control the spread of disease." This quarter's E-brief highlights the health impact of this work in Haiti.

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Center for Global Health
Office of the Director



One Year Later: Haiti Public Health System Rebounds with Help from US, Other Partners

On January 12, 2010, Haiti was hit by a magnitude-7.0 earthquake. More than half a million people died or were injured, and approximately 2 million people were displaced from their homes. Overcrowded and poor living conditions increased Haitians' risk for communicable diseases. The earthquake destroyed most government buildings, schools, homes, hospitals, and transportation and communication infrastructure in the Western part of the country, including the capital Port-au-Prince and much of the Southeastern part of the country.

Immediately after the earthquake, the Ministry of Public Health and Population (MSPP) turned to the Centers for Disease Control and Prevention's (CDC's) Haiti Office in Port-au-Prince for help in strengthening the country's public health workforce. Within 2 weeks, the ministry, the Pan-American Health Organization (PAHO), CDC, and other national and international agencies had launched the National Sentinel Site Surveillance (NSSS) System.

The NSSS has since enabled Haiti to monitor injury and disease trends and to detect outbreaks such as the cholera epidemic. It also has provided vital information about disaster-affected populations throughout Haiti so that relief efforts could be better targeted. The ministry is now maintaining the NSSS, with collaboration and support from CDC and other partners. The goal is for the system to be a long-term national surveillance system for Haiti, generating data that will help decision makers allocate resources and identify effective public health interventions.

"The NSSS could not have been launched so quickly if it weren't for the surveillance sites that had already been established by hospitals and clinics affiliated with PEPFAR, the US President's Emergency Plan for AIDS Relief," noted Daphne B. Moffett, PhD, Captain in the US Public Health Service and Deputy Director for CDC's Health Systems

Reconstruction Office. In the months immediately following the earthquake, 51 PEPFAR sites provided the ministry and its public health partners with daily information via e-mail and phone, so they could target disaster relief resources where they were most needed.

Over the past year, the ministry, PAHO, CDC, and partners have collaborated to establish two additional surveillance systems that complement the NSSS. The Internally Displaced Persons Surveillance System (IDPSS) allows non-governmental organizations to share and track illness data. Clinics voluntarily report diagnoses that pose the greatest public health risk to internally displaced persons who face overcrowded living conditions, poor hygiene and sanitation, malnutrition, exposure to mosquitoes, and incomplete vaccination coverage.

In addition, Haiti's nationwide cholera surveillance system allows hospitals and clinics to send daily cholera case counts to local ministry officials. Aggregate data are sent on to department-level officials and then to central government officials. The ministry posts daily and cumulative tallies of cholera reports on its [public website](#).

Strengthening Epidemiology and Laboratory Capacity

Over the past year, CDC also has worked closely with the ministry and other partners to expand the capacity of Haiti's National Public Health Laboratory. One of the goals is to improve the quality of diagnostic testing for TB, HIV/AIDS, malaria, and rabies, which are major public health problems in Haiti.

In addition, CDC is launching a Field Epidemiology and Laboratory Training Program (FELTP) in Haiti. Working with the country's Ministry of Health, FELTPs have a proven track record of strengthening a country's capacity to respond to public health priorities and emergencies through mentoring and training of epidemiologists. Developing partnerships is an important element of establishing, supporting, and sustaining FELTPs, and CDC regularly collaborates with national and international organizations and other federal agencies, including the US Agency for International Development (USAID).

Strong Capacity Means Fast Response

Because surveillance and laboratory system investments for outbreak-prone disease were established by the Haitian MSPP in collaboration with CDC last fall following the earthquake, health officials were able to rapidly identify cholera. Jordan W. Tappero, MD, MPH, recalls how quickly the events unfolded after an Epidemic Intelligence Service (EIS) officer called him one evening in October 2010 to give him a heads up about reports received by the MSPP of watery diarrhea among patients in the Artibonite Department of Haiti.

"Within 30 minutes, two EIS officers were in a car with laboratory media (collected from the National Public Health Laboratory) needed to identify cholera. The two EIS officers went immediately to the facility that had reported patients with rice water diarrhea," said Tappero, Director for CDC's Health Systems Reconstruction Office. Rapid tests of the first 11 specimens were positive for *Vibrio cholerae*. "They brought the specimens to Haiti's National Public Health Laboratory. Within 36 hours, colonies were growing in culture media, confirming cholera," he said.

Forty-eight hours after that phone call from the EIS officer, CDC's resident laboratory advisor Georges Dahourou, PharmD, MSc, working side by side with ministry laboratorians at Haiti's National Public Health Laboratory, was able to confirm the cholera outbreak for public health officials. CDC Director Tom Frieden advised the Haitian MSPP to report the findings to the World Health Organization. It was the first cholera outbreak in Haiti in at least a century.

"Having a public health infrastructure and partnerships in place was critical after the earthquake hit the Port-au-Prince area," said Brian Wheeler, MPH, Deputy Director for the CDC Haiti Office in Port-au-Prince.

Partnerships and infrastructure will be critical to Haiti's long-term reconstruction efforts and success in managing many longstanding health problems — such as HIV/AIDS, malaria, TB, and malnutrition — as well as new challenges such as cholera. For more information on CDC's role in strengthening health systems in Haiti, see <http://www.cdc.gov/globalhealth/hsr>.



Photo Credit: Nancy Strockbine, CDC

Georges Dabourou, PharmD, MS, Lab Advisor for CDC Haiti, carries the first 80 cholera isolates from Haiti's National Public Health Laboratory. Working side by side with ministry laboratorians at the national laboratory, he was able to confirm the cholera outbreak for public health officials. It was Haiti's first cholera outbreak in at least a century.

CDC Responds to Public Health Challenges in Haiti

HIV/AIDS Epidemic

Haiti has the highest HIV prevalence rate in the Western Hemisphere (2.2%), with an estimated 120,000 persons living with HIV/AIDS.

In 2002, the CDC Global AIDS Program (GAP) opened CDC's first office in Haiti to assist the country in addressing the HIV/AIDS epidemic.

In 2003, GAP resources were increased in Haiti under the President's Emergency Plan for AIDS Relief (PEPFAR).

Earthquake's Aftermath

In January 2010, Haiti was hit by a 7.0 earthquake. The Haitian government estimated that 230,000 people died and 300,000 were injured.

Less than 2 weeks after the quake hit, Haiti's public health officials had launched a national surveillance system with assistance from CDC, PAHO, and other partners.

Cholera

In October 2010, Haiti's first case of cholera was confirmed by Haiti's National Public Health Laboratory.

CDC experts deployed to Haiti to provide in-country assistance include medical officers, epidemiologists, laboratory scientists, environmental health specialists, communication specialists, public health advisors, planners, information technology specialists, and support staff.

Longstanding Public Health Challenges

Other public health challenges in Haiti include tuberculosis, opportunistic infections; malaria; dengue; rabies; lymphatic filariasis; water, sanitation, and hygiene practices; chronic malnutrition; reproductive health; child and maternal health; diabetes; and high blood pressure.

Basic Public Health Actions Rapidly Mobilized to Lessen Impact of Cholera in Earthquake-Devastated Haiti

When the January 2010 earthquake struck Haiti, the first priorities of Haitian public health officials and their partners, including CDC and USAID, were improving access to clean water and sanitation and promoting basic hygiene. They knew these basic public health actions could protect Haitians from threats they faced as a result of living in crowded, temporary camps.

Even before the January 2010 earthquake devastated much of Port-au-Prince, many Haitians lived without access to basic water and sanitation services. According to the WHO/UNICEF Joint Monitoring Program, only 71% of Haitians living in urban settings had access to an improved drinking water source—household connection, public standpipe, borehole, protected dug well, protected spring, or rainwater collection. Access for rural Haitians was even lower—only 55%. In addition, Haitians had limited access to resources that could turn any of these water sources into safe drinking water. Haitians' access to improved

sanitation—connection to a public sewer or septic system, pour-flush latrine, simple pit latrine or ventilated improved pit latrine—was even more limited. Only 24% of urban Haitians had access to improved sanitation. Of Haitians living in rural Haiti (53% of the total population), only 51% had any type of sanitation coverage; an estimated 49% of rural Haitians rely on open defecation.

Dr. Eric Mintz, CDC epidemiologist and cholera expert, remarked, "Poor water and sanitation conditions are the reasons why cholera is such a big problem in Haiti. "Fortunately, we are helping the government of Haiti take the steps needed to improve access to safe water and educate the public about basic hygiene that can prevent cholera and other diarrheal diseases."

Despite the challenging circumstances, the Haitian Ministry of Health and Population (MSP) and the National Directorate for Water and Sanitation (DINEPA) immediately set in place procedures to improve water quality through disinfection at the source and household level. CDC supported the Ministry's efforts to test drinking water supplies in the Port-au-Prince camps established for Haitians displaced by the earthquake and helped to establish a portable lab to identify the organisms that affect

water quality and cause disease, including cholera. CDC also trained people to monitor drinking water outside of Port-au-Prince.

When the first cases of cholera were confirmed by the Haitian National Public Health Laboratory in October 2010, the Government of Haiti, CDC, USAID, and other partners quickly developed educational materials for clinicians (http://www.cdc.gov/haiticholera/training/hcp_materials.htm). Within a month, more than 400 clinicians were trained and spread across the country to share their new skills with other health workers.

In addition, USAID rapidly mobilized to distribute soap, chlorine-based disinfectants, and other supplies to ensure Haitians could protect themselves through hand washing, cleaning, and purifying and safely storing water. Although some cholera cases have occurred in the camps that still serve as home for over 1 million persons displaced by the earthquake, major outbreaks in those camps have thus far been avoided and case fatality rates have been relatively low.

Mintz notes that much has been accomplished, but additional short- and long-term efforts are needed to address the cholera outbreak, which is expected to

continue for a period of years unless the poor water and sanitation conditions are resolved.

CDC and USAID are working together on hygiene promotion and cholera prevention campaigns. The short- and long-term cholera response in Haiti requires the Haitian government and the international community to expand the focus to water, sanitation, and hygiene efforts. USAID and CDC are currently assessing how to support the Haitian government and leverage efforts of other international partners to ensure the short-term effectiveness and continued sustainability of water, sanitation, and hygiene activities. Activities being considered include expanding household water treatment and safe water storage throughout Haiti, expanding the number of latrines and sanitation at health facilities, chlorination of piped water supplies, wider distribution of soap for hand washing, and promotion of safe food-handling practices. Other long-term efforts, in partnership with the Haitian government, could include construction of physical infrastructure, training the Haitian workforce to operate and maintain the infrastructure and ongoing health education to improve hygiene behaviors.



Photo Credit: GDDER, CDC

Many Haitians, especially those living in rural parts of the country, get their drinking water from unprotected sources, such as this well. A lack of basic water and sanitation services, compounded by inadequate hygiene behaviors, has greatly contributed to the current cholera crisis and will make it challenging to contain.

The Haitian government and its partners are well aware that the country has a long way to go to reduce the burden of cholera and improve water, sanitation, and hygiene.

However past responses to cholera outbreaks in Mexico and Chile show that improvements in water, sanitation, and hygiene are achievable. In Mexico, the government dramatically increased access to safe drinking water and sanitation,

reducing deaths from diarrhea by 18% with only rare cases of cholera. In Chile, a similar response led to a similar reduction in cholera and decreases of 87% in typhoid fever and 61% in hepatitis A.

“The good news is that we have seen other countries affected by cholera outbreaks successfully, over time, reduce deaths from cholera and eventually the impact of future outbreaks,” Mintz said.

Training Teaches Haitian Health Care Workers: “No one need die from diarrheal disease”

In late October 2010, the public health laboratory of Haiti’s Ministry of Public Health and Population (or MSPP) identified the presence of the bacteria that causes cholera in samples from people with acute watery diarrhea in the Artibonite Department. When a cholera outbreak occurs in resource-limited countries like Haiti, where sanitary conditions are poor and safe water systems do not exist, public health officials must act quickly to save lives.

One of MSPP’s first requests of CDC and partners was for help to educate health care workers to manage cholera clinically and to teach Haitians how to prevent the illness.

“Education is the key here,” says Dr. Robert Tauxe, a CDC expert in waterborne diseases. “Cholera is a fairly simple disease requiring a fairly simple response. But without an understanding of how to mount an effective response, cholera can be quite devastating. It is not only that the general population is unfamiliar with the disease but also that the health care system in Haiti—from staff to facilities—is unprepared to deal with an outbreak. And because cholera can spread fast and kill fast, fluids need to be replaced in the body quickly. If untreated, mortality can reach 20 percent or more. But with treatment, primarily oral or intravenous, mortality can be less than 1 percent.”

Three-Part Approach to Training

In November 2010, Tauxe was deployed to Haiti to lead a training campaign for Haitian health care workers. He was joined by Dr. Azharul Islam Khan, head of the Short Stay Unit, Clinical Sciences Division, Dhaka Hospital, Dhaka, Bangladesh,

and representative of the respected International Centre for Diarrhoeal Disease Research, Bangladesh, and WHO’s Global Outbreak Alert and Response Network. Khan was invited to participate because of his expertise in cholera treatment and management. He arrived at CDC one week prior to deployment to Haiti with Tauxe to assist in the development of the training materials. Bangladesh is well known for the development of oral rehydration solution (ORS), an intervention credited with saving the lives of more than 20 million children struck with diarrheal diseases. CDC also reached out to Haitian experts, including Dr. Yves Lambert, infectious disease specialist at Haiti’s State University Hospital.

CDC’s training complemented the Government of Haiti’s public awareness campaigns and messages emphasizing safe water, sanitation, hand-washing and proper food preparation. CDC coordinated message development and clinical

guidelines among experts in Atlanta, WHO/PAHO, MSPP, and many partners. Within days, Five Basic Prevention Messages were shared, immediately followed by Diagnosis and Testing guidelines, and Clinical Presentation & Management. Materials were translated into French, Haitian Creole, and Spanish.

The training, which emphasizes that “no one need die from diarrheal disease,” is being rolled out in three phases. First, CDC and partners trained 33 “master trainers” selected by MSPP. Topics include:

- The microbe and how it causes cholera
- Clinical presentation and treatment
- Transmission and prevention
- Laboratory diagnosis
- Surveillance
- Clinical management of a single case
- Operation of a Cholera Treatment Center

The master trainers then taught public health officials and clinical staff in Haiti’s ten departments.

The final phase involves the training of community health workers (CHW) across the country by department-level health officials. CHWs staff local health institutions that are either part of MSPP’s network, or sites funded by the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR) (see related story for more on how this network of sites across Haiti assisted with the cholera response). Because a large percentage of Haiti’s population speaks Haitian Creole rather than French, CHW training materials, including laminated cards, were translated into Haitian Creole. This final stage of training covers a range

of instructions, from hand-washing and proper water treatment to effective sanitation and preparation of a body for burial.

Training Expected to Lead to Fewer Deaths

As participants share knowledge gained from the trainings, awareness of how to prevent and treat cholera will increase throughout Haiti. Similarly, feedback provided by master trainers, department-level health officials, and CHWs is being evaluated by CDC to strengthen the training for the ongoing and future responses. Already, improved understanding of cholera and its treatment is believed to be a factor in the decreasing case fatality rate documented for cholera since the beginning of the outbreak.

According to a partner from the International Rescue Committee who

attended training in Port-au-Prince on November 22, “this training has been very useful; the presenters are great and very animated.” Of Khan, in particular, she said, “after listening to him, I feel like going out and saving the world.”

“Every person at every level has been so cooperative and supportive here,” Khan said of his experience at CDC’s headquarters and in Haiti. “Particularly useful were the daily calls between the team in Haiti and staff at headquarters.” “The two-way discussion has led to a valuable flow of information, which is the grounding for a successful intervention.”

“CDC’s unique combination of evidence-based approaches, surveillance, clinical training, and applied training in the field should serve as an example for the world.”



Dr. Azbarul Islam Khan, head of the Short Stay Unit, Clinical Sciences Division, Dhaka Hospital, Dhaka, Bangladesh. Khan co-led training of health care workers in Port-au-Prince-au-Prince.

Photo Credit: Araceli Rey, CDC

Earthquake Can’t Stop Progress to Eliminate Lymphatic Filariasis in Haiti

Not even an earthquake can stop an outstanding public health program. With strong support from local Haitian leaders and CDC and other U.S. partners, the program to eliminate lymphatic filariasis (LF) in Haiti has managed to stay on track, treating nearly three million persons since

the earthquake struck in January 2010.

LF is a mosquito-borne parasitic infection sometimes called elephantiasis. The disease causes hugely swollen limbs and fluid accumulation in the scrotal sac. It is disabling and stigmatizing. According to the World Health Organization (WHO), more than 8.6 million Haitians are at risk for LF, with a national prevalence of approximately 10%. Infection levels in some communities are among the highest in the world: 30% of children are infected by age 4. Haiti is

one of only four countries in the Americas where transmission of LF still occurs.

Stopping transmission of the disease is a first step toward elimination. Transmission can be interrupted by treating the entire population in endemic communities once a year for 5 to 8 years with a two drugs: DEC and albendazole. Albendazole has the added benefit of eliminating intestinal worms that cause anemia and malnutrition in children. The genesis of the LF program in Haiti was a research effort carried out



Photo Credit: Valerie Johnson, CDC

EIS Officer Beau de Rochars, a leader in the drive to eliminate LF in Haiti, working recently with the CDC cholera outbreak team.

by CDC scientists beginning in the 1980s. These studies contributed to understanding of the diagnosis and treatment of infection and informed the global strategy to eliminate LF.

From its beginning as a CDC-led research activity, the LF elimination program in Haiti gradually added partners and expanded to reach more communities. Key partners included the Haitian Ministry of Public

Health and Population (MSPH); University of Notre Dame (funded by the Bill & Melinda Gates Foundation); IMA World Health (funded by RTI/USAID); PAHO and CDC. Despite the unprecedented devastation of the earthquake, the partners redoubled their efforts, and with new donors, the program is now poised to reach all of Haiti for the first time, making elimination of LF an achievable goal.

Patrick Lammie, a CDC scientist involved with the program since its inception notes: "That the program in Haiti continues today is a testimony to the commitment and dedication of a small group of Haitian colleagues who continued to keep the focus on the program at considerable personal risk during periods of political instability." In particular, Dr. Lammie cites Dr. Beau de Rochars, a Haitian physician who was instrumental in the success of the Haitian program. (Now Dr. Beau de Rochars is a CDC Epidemic Intelligence Officer.)

Results from Haiti have documented a dramatic decline in levels of LF infection. In parallel, hookworm infection – a major cause of anemia in Haiti – has virtually disappeared. Infection with other intestinal worms has also declined.

Dr. Beau DeRochars says the LF program has given Haitians good results. "Patients with LF complications are treated with respect and dignity; prevention is emphasized, especially for children; and by protecting kids from intestinal parasites, the LF program is offering children a better future."

Despite overwhelming odds, the LF program is now poised to offer Haiti a future free of this disabling and stigmatizing disease.

With CDC Assistance, Haiti Successfully Tests and Adopts Rapid Diagnostic Tests for Malaria

Already a major public health problem in Haiti, malaria became a bigger challenge after much of Haiti's public health infrastructure was destroyed after the January 12, 2010 earthquake. With CDC's help, Haitian officials investigated whether rapid diagnostic tests (RDTs) could be used as one part of a national strategy to quickly and accurately diagnose and treat malaria.

Plasmodium falciparum malaria, the most lethal of malaria parasites, is endemic to Haiti and remains a major concern for residents, displaced persons, and emergency

responders one year after the January 12, 2010, earthquake.

Rapid, accurate diagnosis of malaria has historically been difficult. Until recently, the only way to diagnose the disease was for a skilled laboratory worker to use a microscope to look for malaria parasites in a blood sample. In addition, this was the only approved method for diagnosing malaria, according to Haiti's national policy for the diagnosis and management of malaria. Unfortunately, many facilities in Haiti have neither functioning microscopes nor staff with the skills to use this diagnostic method.

Recognizing that the millions of people displaced by the earthquake were at increased risk of malaria because they were sleeping in the open or in tents

that mosquitoes could easily enter, CDC helped Haiti's Ministry of Public Health and Population (MSPH) test RDTs to see if they could help meet the country's acute need for quick malaria diagnostics. Dr. Michelle Chang, MD, medical epidemiologist, coordinated the technical assistance CDC's Malaria Branch provided to Haiti's MSPH.

During 2 weeks in April, MSPH and CDC worked to gather in country, local data and experience that would lay the groundwork for a policy change. In Port-au-Prince and several towns affected by the earthquake, an assessment was conducted to compare expert microscopy with two brands of RDTs in four health facilities where local health workers were trained in RDT use. In two of the sites, one brand of RDTs showed acceptable sensitivity and specificity, indicating that it performed well. In a third



Photo Credit: Dr. Michelle Chang, CDC

Health workers learn to use rapid diagnostic tests for malaria at the National Public Health Laboratory in Port-au-Prince, Haiti.

site, the other brand of RDT showed poor sensitivity, and in the fourth site there were not enough data. The findings convinced the MSPP that at least some RDTs could perform adequately in Haiti's setting.

Given these results, which correlated with previously published, lab-based evaluations of RDTs, MSPP favored the use of RDTs as part of the national strategy at health centers

and clinics where microscopy is not available. Considering the in-country experience along with the known evaluations of RDTs and WHO recommendations, the MSPP approved three RDTs for diagnosis of *P. falciparum* malaria as part of their national policy.

"This policy change using in-country data and published reports greatly expands the opportunities for accurate malaria

diagnosis across the country. This means that Haiti's health system can more easily discern if a person with fever has malaria versus another disease, and can then treat that person accurately and appropriately. The ability to easily test people will also help the country maintain accurate surveillance on the burden of malaria in Haiti and mobilize resources accordingly," said Dr. Chang.

Review of Earthquake Injuries Data Informs Future Responses to Disasters

The 7.0 magnitude earthquake that struck Haiti on January 12, 2010, caused an estimated 222,570 deaths and 300,000 injuries. In impoverished countries like Haiti, analyzing the causes of deaths and injuries post-disaster can help countries better prepare for disasters in the future.

Analysis of the injuries and surgical procedures common after the earthquake in Haiti was possible thanks to establishment of the first field hospital by the University of Miami Global Institute/Project Medishare (UMGI/PM). The facility, which had 280 beds, three operating rooms,

and 220 volunteer, rotating staff from the United States and Canada, eventually handled many of the complex medical and surgical cases.

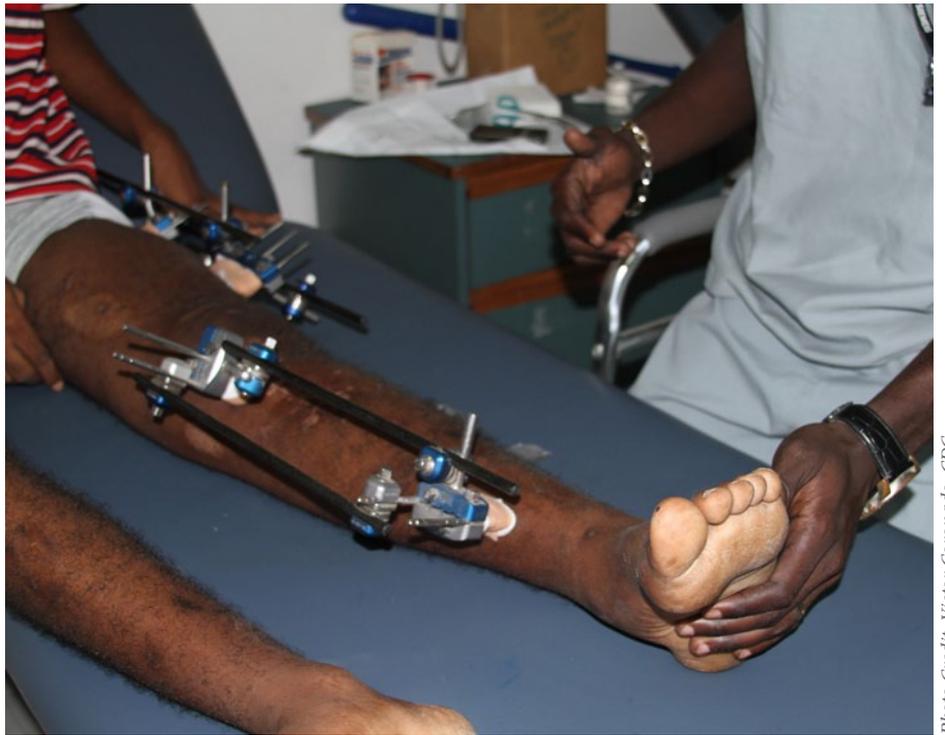
In June 2010, UMGI/PM approached CDC for assistance in conducting a retrospective review of available inpatient records between January 12 and May 28, 2010. Data collected from paper-based medical records were entered into an electronic database to characterize injuries and surgical procedures, and ultimately to guide future earthquake planning in resource-limited settings.

Of the 1,369 admissions, injury-related diagnoses were recorded for 581 (42.4%) patients, of which 346 (59.6%) required a surgical procedure. The most common injury-related diagnoses were fracture/

dislocation; post-traumatic wound infection; and head, face, and brain injuries. The most common injury-related surgical procedures were skin surgeries, orthopedic, and surgical amputation. The exact number of amputees resulting from the earthquake is unknown, but aid agencies say Haiti ranks among the highest-ever for the number of limbs lost in a single natural disaster.

Of the patient records that documented injuries, approximately 28% were earthquake related. Most patients with injuries related to the earthquake came to the hospital during the first four weeks of the response. In following weeks, other injuries (e.g., motor vehicle-related, violence-related) were seen. Of all injured patients, more than three-fourths were discharged to a residential setting. Nearly three percent died.

Some important lessons emerged from the data reported through UMG/PM. First, injuries following earthquakes (limb fractures and significant skin injuries) in resource-limited areas often require urgent orthopedic and plastic surgery performed by highly skilled medical staff. While a surge of injuries and surgical procedures were noted immediately after the earthquake in Haiti, an important lesson for disaster preparedness and response is that sustained numbers of injuries caused by the disaster and injuries from violence and damaged infrastructure can be expected for several months. In areas like Haiti, with high levels of poverty, poor social and economic infrastructure, and history of social upheaval and high levels of interpersonal violence, the need for medical response to injuries can be prolonged and substantial. Therefore, field hospitals preparing for a long-term response to resource-limited settings following an earthquake should be prepared to mobilize, deploy and utilize resources for many months following the disaster.



Earthquake survivor with left leg fractures is receiving physical therapy after surgery to aid in his rehabilitation.

Photo Credit: Victor Coronado, CDC

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Now on YouTube: *Malaria Eradication: Back to the Future*

Tune in to CDC's Public Health Grand Rounds to hear four current and former CDC malaria experts review the history of the malaria eradication campaign, discuss current control successes and challenges, and explore strategies to eliminate, and eventually eradicate, this deadly disease, which caused approximately 781,000 deaths in 2009.

CDC has been a leader in the fight against malaria for more than 60 years, ever since the agency's early days as a federal program that led the successful elimination of malaria from the U.S. CDC scientists provide technical expertise to develop evidence-based policies and programs, critical scientific innovations to help guide future global malaria efforts, and monitoring and evaluation of progress toward global malaria goals.

CDC is charged by U.S. Congress (through the Lantos-Hyde Act, 2008) to take a leading role in strategic information (monitoring and evaluation, surveillance, and operations research), including advising the U.S. Malaria Coordinator on priorities for these activities and being a key implementer of such activities.

To watch *Malaria Eradication: Back to the Future*, visit YouTube (<http://www.youtube.com/watch?v=SyISSp2DPy8>) or CDC's web site (<http://www.cdc.gov/about/grand-rounds/>).

For more on CDC's malaria program, visit www.cdc.gov/malaria.

New CDC Regional Global Disease Detection Center Established in India

CDC's Global Disease Detection (GDD) Regional Centers work with WHO and a network of international partners to build global public health capacity in alignment with the International Health Regulations (IHR).

On November 9, 2010, a Memorandum of Understanding (MOU) was signed between CDC, the Department of Health and Human Services and the Indian National Centre for Disease Control (NCDC), Ministry of Health & Family Welfare, during President Obama's visit to the country in November 2010. The MOU establishes the NCDC as the site for the new GDD Regional Center in New Delhi, India, which will expand geographic coverage of and strengthen the global network of existing GDD Regional Centers, currently located in Thailand, Kenya, Guatemala, China, Egypt, Kazakhstan, and South Africa.

For leading the US year-long effort to bring to completion the GDD Memorandum of Understanding, Dr. Kenneth Earhart, director of the Indian GDD Center, received the Department of State Meritorious Honor Award. His leadership created tremendous goodwill with colleagues in the Ministry of Health and Family Welfare, enabled the timely signing of the MOU, and prepared a foundation for developing this important international partnership.