

Eliminating Guinea Worm Disease: the Power is in the People

Massive global cooperation helps to conquer the 3,000-year-old disease

Imagine a 3-foot-long worm emerging from your skin, little by little, while you shudder helplessly in excruciating pain. This isn't a scene from a horror movie; it's the reality that thousands of people are facing as a result of *dracunculiasis* – better known as Guinea worm disease. Few people know about the disease, which dates back to biblical times and affects the poorest of the poor in Africa. Fortunately, Guinea worm disease is on its way to becoming eliminated, thanks to the Carter Center -- the organization created by former U.S. President Jimmy Carter to promote human welfare around the world.

The Trauma of Guinea Worm Disease

Guinea worm disease is contracted when a person drinks contaminated water containing infected water fleas. Once inside the body, the larvae begin to take the shape of thin worms, growing up to 3-feet-long. The incubation process lasts for about a year, throughout which patients remain asymptomatic. But once the worms start to emerge, they create painful, burning blisters on the body. Unaware of the consequences, many victims seek relief through the cooling effect of water -- immersing themselves in the same source that infected them. Hundreds of thousands of Guinea worm larvae are released in the process, continuing the life cycle of the disease.

Due to unsanitary conditions and inadequate healthcare, many people with Guinea worm disease develop secondary bacterial infections. These patients are incapacitated for weeks or months; as a result, entire communities suffer.

“Guinea worm always hits during the harvest or planting season,” explains Kelly Callahan, assistant director of program support for the Carter Center. “Taking someone out during their viable agricultural season puts a huge stressor on an already poor and impoverished community.” In just one year, a farming community in Nigeria lost \$20 million as a result of the disease.



THE UGLY FACE OF GUINEA WORM DISEASE:

A volunteer extracts a guinea worm from a patient's wound. Although many worms grow up to 3-feet-long, only a few centimeters can be removed each day.

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Unfortunately, the only treatment for Guinea worm disease lies in mechanical removal. This traditionally involves wrapping the worm around a small stick and manually extracting it from the patient's wound. Typically, only a few centimeters can be removed on any given day; it can take anywhere from a few days to several weeks for a Guinea worm to completely exit the body.

Because of its debilitating effect on victims, it is important that Guinea worm disease be stopped. Not only must at-risk communities be educated about sanitary removal techniques, but they must also be taught how to track and prevent the disease. But who would take the time and trouble to travel to thousands of remote African villages? Since 1986, the Carter Center has been doing just that.

Role of the Carter Center

The Carter Center has taken the global lead in efforts to eradicate Guinea worm disease, working closely with organizations like the World Health Organization (WHO), UNICEF and the ministries of health in each of the six endemic countries.

Volunteers often work long hours, sometimes traveling for days without proper rest or nutrition to reach Guinea worm-infested locations. In some war-ravaged areas, workers must even be accompanied by army convoys – particularly in Southern Sudan, where hostility continues after decades of civil war.

Once in the villages, volunteers work with local authorities to locate the carriers of the disease. This can be a daunting task, as many authorities may be wary of their intentions. Many believe that the disease is the result of a curse and refuse to acknowledge that it can be stopped. The key lies in education -- and the fruit of that education is in prevention.

Prevention

The concept behind Guinea worm disease prevention is rather simple: avoid drinking contaminated water. In reality, however, it's not that easy. Water supplies are often scarce, and the construction of wells or boreholes is not always economically feasible. With these obstacles in mind, the Carter Center has developed a basic but effective way to tackle the issue: portable water filters.

The center distributes two types of filters, both of which remove the microscopic water fleas that cause Guinea worm disease. One is a fine-mesh nylon cloth, typically tied around clay pots and other household water sources. The other takes the form of a portable straw with a stainless steel

mesh on one end. The latter can be worn around the neck and is especially suited for nomadic tribes, which are common in endemic countries. To date, workers have distributed more than 23 million of these filters in sub-Saharan Africa alone. Another technique that has proven to be effective is the use of ABATE – a larvicide manufactured by BASF Corporation. “ABATE is used in treating water sources to affect Cyclops, which is the intermediary host of the Guinea worm larvae,” Callahan explains. “We teach people how to treat water sources that are known to cause transmission of Guinea worm disease.” BASF has donated more than \$4 million of the chemical to aid eradication efforts.



CREATING PUBLIC AWARENESS: President Carter addresses infected children during a recent trip to Ghana. The involvement of public figures has helped to mobilize communities and spread awareness of Guinea worm disease. THE CARTER CENTER

directly with Guinea worm volunteers, who are recognized by their trademark Carter Center t-shirts.

Also contributing to the eradication effort are local entertainers like Sheriff Ghale, who incorporates disease prevention tactics in his performances. Miss Ghana has also been involved in the campaign, visiting dozens of villages and raising thousands of dollars to fight the disease.

Local village authorities have also played an important role in the disease’s eradication. “It’s very cultural,” explains Dr. Rani Bright, an assistant professor of microbiology and immunology at the Philadelphia College of Osteopathic Medicine. “These tribes listen to their leaders more than people coming from the outside.” Local authorities work

Perhaps the most famous advocate against Guinea worm disease is former U.S. President Jimmy Carter, who has been personally involved in education, delegation and funding efforts since 1986. The involvement of public figures, together with ongoing efforts by local communities and organizations like the Carter Center, has created a potent formula for eradicating the disease.

Challenges

Guinea worm disease is set to become the second disease in mankind to be eliminated, following smallpox. However, the challenges remain greater, according to Donald Hopkins, Vice President of Health Programs at the Carter Center. “In the case of Guinea worm disease, we have a one-year incubation period [compared to one week for smallpox]…We have no vaccine or treatment, and people who become infected do not become immune.”

In addition, since the disease is not fatal, public interest remains low. Therefore, many endemic societies focus efforts on other diseases like malaria, HIV and tuberculosis.

One of the biggest obstacles, according to Callahan, has been the lack of security in areas like Southern Sudan and northern Mali. Along with the displacement of populations, this has made it hard for workers to access infected areas. Still, Callahan and her team have made record progress in eliminating the disease.

Large-scale Success

Indigenous cases of Guinea worm disease have declined from an estimated 3.5 million in 1986 to fewer than 3,500 today, reports Callahan – a reduction of 99.9 percent. More than 85 percent of current cases are in Sudan, the most populous of the six endemic African nations. However, the country has cut the number of cases by 25 percent over the last year alone. Nigeria has

experienced similar large-scale success, says Callahan -- eliminating all 892,000 of its indigenous cases since 1996. Other endemic countries include Ghana, Mali, Ethiopia, and Niger. Like Nigeria, Niger is on its way to becoming certified as Guinea worm-free. Since 1993, the WHO has already issued this certification to nine countries, including India and Pakistan.

Much of the success in eliminating Guinea worm disease can be attributed to contributions from philanthropic organizations. Last December, the Bill and Melinda Gates Foundation contributed \$8 million toward eradication efforts and pledged to match \$32 million in additional funding dollars. Around the same time, the United Kingdom Department for International Development (DFID) pledged another £10 million (approximately US\$15 million). The Carter Center reports that to date, more than \$225 million has been dedicated toward eliminating the disease in Africa.

The Road Ahead

The relentless ongoing efforts of the Carter Center, combined with generous contributions from cooperating organizations, have paved the road for the elimination of Guinea worm disease.

International efforts are expected to continue in accordance with millennium development goals set at the United Nations Millennium Summit in 2000. In addition, accessibility and cooperation in Sudan is expected to improve as the country's Comprehensive Peace Agreement continues to be implemented. Additional hope comes through growing public support for democracy and the advocacy for safe drinking water in infected areas.

Kelly Callahan predicts that the disease could be eliminated as early as 2012. "I think it will be a great day when the first parasitic disease is eradicated from the world," states Callahan, "and the poorest of the poor have one less thing to worry about."