ERADICATION OF GUINEA WORM DISEASE
Case Statement
Since The Carter Center began leading global Guinea worm disease eradication efforts in 1986 together with endemic countries and the World Health Organization, as well as other trusted partners such as UNICEF, the campaign has reduced the number of cases 99.99 percent, from 3.5 million cases annually in Africa and Asia to 22 cases in 2015.

Guinea worm eradication is drawing ever closer to the finish line. The campaign demonstrates what remarkable change can occur with full engagement—from national ministries of health and each individual in affected villages—even though there is no drug to cure Guinea worm disease or a vaccine to prevent it.

Each country that triumphs over Guinea worm disease serves as a reminder to the world that the greatest challenges can be overcome with hard work, political commitment, and support of the international community. However, success in global eradication will require stronger commitment of the four endemic countries fighting the remaining cases, as well as of international partners in this public health initiative.

Everyone has a stake in these efforts. The entire world stands to gain from the eradication of Guinea worm disease, not only because an age-old affliction will have been wiped off the surface of the planet, but also as proof that eradication can be achieved with willpower, political involvement, local perseverance, and financial investment. It was done with smallpox, and we can do it again.

We urge development partners—governments, foundations, and corporations—to generously contribute financial support in a united demonstration that, together, we can ensure the eradication of Guinea worm disease by 2020.

With best wishes,

Jimmy Carter
Former U.S. President
Co-founder, The Carter Center

Margaret Chan
Director-General
World Health Organization

Boys with Guinea worm disease receive treatment at a case containment center in South Sudan.

On the cover: A South Sudanese boy examines a cloth filter. Filtration of drinking water prevents Guinea worm disease.
ABOUT GUINEA WORM DISEASE

Guinea worm disease is an affliction of poverty, debilitating residents of remote and marginalized communities in sub-Saharan Africa. A painful and incapacitating waterborne disease, it negatively affects health, agricultural productivity, school attendance, and overall quality of life in the communities where it is found.¹ Guinea worm disease is caused by the parasitic worm *Dracunculus medinensis*, which infects people who drink water from stagnant sources containing microscopic infective larvae harbored by tiny copepods ("water fleas"). During the yearlong incubation period, individuals do not know they are infected and become unwitting carriers of the parasite until the adult female worms, measuring up to one meter in length, emerge. An emerging worm causes a blister on the victim’s skin, accompanied by a severe burning sensation and pain, followed by an open lesion with a protruding Guinea worm. When a patient cools the wound in a stagnant water source, the worm releases hundreds of thousands of larvae, which are readily ingested by copepods, contaminating the water source and continuing the transmission cycle.

There is no drug to cure Guinea worm disease or vaccine to prevent it, humans do not develop immunity to the disease, and there is no known wild animal reservoir from which the disease can return to humans once transmission is interrupted. However, disease transmission can be prevented. The Carter Center— in partnership with the national Guinea worm eradication programs of the ministries of health of affected countries, the World Health Organization (WHO), and strategic partners such as the Centers for Disease Control and Prevention and UNICEF—have pioneered community-based responses to prevent transmission, and ultimately eradicate Guinea worm disease by 2020.

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¹ Guinea worm disease transmission was halted in 1986 in Djibouti, a small country in the Horn of Africa. It was entirely eradicated in 1994, and the last person who might have been infected was reported in 2015.
THE NEEDS
In 1986, an estimated 3.5 million cases of the disease could be found in 21 countries in Africa and Asia, where 120 million residents were at risk of the infection. Since then, cases have been reduced by more than 99.9 percent. At the end of 2015, there were only 22 cases in 20 villages in four countries: South Sudan, Ethiopia, Mali, and Chad. To date, the World Health Organization has certified 15 formerly endemic countries and 183 other countries and territories and areas as free of Guinea worm disease.

Guinea worm is poised to be the second human disease and the first parasitic disease ever eradicated. The Carter Center and its partners assist the national Guinea worm eradication programs to halt transmission of the disease through:

Education: Communities learn about the disease and how to prevent it. For example, people learn never to enter a source of drinking water if a Guinea worm is emerging, never to allow anyone else in the community with an emerging Guinea worm to do so, and to report anyone with Guinea worm.

Surveillance: A comprehensive community-based surveillance network aims to detect and report cases of Guinea worm disease promptly (before or within 24 hours of worm emergence).

Case containment: Individual cases are promptly managed (contained) to prevent infected people from contaminating sources of drinking water.

Water treatment: Contaminated, stagnant sources of drinking water are treated with Abate® (temephos), a safe chemical larvicide donated by BASF Corporation.

Water filtration: Community members are taught to filter all unsafe drinking water to sieve out copepods and prevent infection. Cloth filters and pipe filters are donated by Vestergaard.

As the lead agency over the last 30 years of the global Guinea worm eradication campaign, The Carter Center has raised $332.9 million in financial and in-kind contributions. Sources of support are illustrated in the chart below.

An estimated $214 million is needed between 2015 and 2020 to fully eradicate Guinea worm disease and to certify that the disease has been eradicated. As with any eradication campaign, the last cases will be the most expensive, but the ultimate reward is a world free of Guinea worm disease for future generations.
THE INTERVENTIONS

The campaign will be successful when all countries are certified as free of Guinea worm disease. The following phases outline the work remaining to reach that goal. Ministries of health, national Guinea worm eradication programs and governments of affected countries are key partners in these efforts.

Phase 1 Interruption of transmission in remaining endemic countries, led by endemic countries with support from The Carter Center: 2016

- Ensure 100 percent coverage of active surveillance in remaining endemic areas, including regular case searches, investigation, documentation and response (within 24 hours) of rumored cases of Guinea worm disease.
- Maintain surveillance and response capacity in areas of endemic countries where transmission has already been stopped.
- Continue health education and mobilization, including distribution of cloth and pipe water filters, application of Abate larvicide to treat contaminated sources of drinking water, provision of safe drinking water, and promotion of cash rewards for reporting cases.
- Conduct ongoing advocacy at national and international levels for continued support and funding to reach eradication.
- Maintain cross-border surveillance and response capacity to prevent importation of cases and ensure that eradication status is maintained in all countries that have already been certified as free of Guinea worm disease. (WHO)

Phase 2 Pre-certification, led by concerned countries with support from The Carter Center and WHO: 2016–2019

- Continue active surveillance in last group of endemic areas and immediate reporting and investigation of rumored cases. (The Carter Center)
- Conduct ongoing advocacy at national and international levels for continued support and funding to reach eradication. (The Carter Center and WHO)
- Facilitate external assessments to verify national claim that transmission has been interrupted. (WHO)
- Implement a global reward for Guinea worm disease cases. (WHO)
- Maintain cross-border surveillance and response capacity to prevent importation of cases and ensure that eradication status is maintained in all countries that have already been certified as free of Guinea worm disease.³ (WHO)

Phase 3 Certification, led by WHO: 2016–2020

- Continue dissemination of information about rewards for Guinea worm disease cases.
- Assist countries in preparing report for the International Commission for Certification of Dracunculiasis Eradication (ICCDE).
- Certify eight countries remaining, based on ICCDE assessment: Chad, Ethiopia, Mali, South Sudan, Kenya, Sudan, Angola, and Democratic Republic of the Congo.
SOCIAL AND ECONOMIC CASE FOR ERADICATION

The burden of Guinea worm disease on individuals, communities, and societies extends beyond physical suffering to significant economic and social consequences, hampering development and perpetuating a cycle of poverty and disease. The disease burden impacts adults and children alike, resulting in decreased agricultural and household productivity, as well as impinging on children's school attendance.

The economic burden on poor rural communities is particularly severe and aggravated by the seasonality of transmission, which coincides with peak agricultural activities. Agricultural laborers infected with Guinea worm disease are unable to harvest and farm crops (average duration of Guinea worm disability is eight weeks), affecting income and nutrition for families and the wider community. Additionally, children may be forced to take on work of their sick family members in the fields or in the home, causing absences at school. Children's malnourishment or their own emerging Guinea worms that disable them from walking to school can further exacerbate the impact of the disease.

The effort to eradicate Guinea worm disease is considered one of the most cost-effective health interventions available. Over 80 million cases have been averted since The Carter Center began working on the campaign in 1986, resulting in improved health status (including childcare and immunization coverage), agricultural productivity, and school attendance for millions of people in some of the most remote areas of the world at an estimated financial cost of $3.47 per case averted. Through community-based health education, filtration of drinking water, application of Abate, and prompt detection of cases, Guinea worm disease can be affordably and effectively prevented.

However, the costs per case of treatment and containment do increase toward the end of each national campaign and the end of the global campaign for the following reasons:

**Long incubation:** The one-year-long incubation period makes it impossible to pre-identify infected carriers of the disease and ascertain who will develop infection. An extensive and intensive surveillance system must be maintained for at least one year beyond the report of the last indigenous case. Thus, the surveillance footprint of Guinea worm eradication programs must not only be maintained but must encompass all places where infected persons may be when they develop the disease.

**Prompt detection and containment:** Interrupting transmission requires intensified operations during the last phase of each national eradication effort in order to detect all cases within 24 hours of worm emergence, to manage all patients promptly by case containment and to prevent transmission effectively, through treatment of contaminated sources of drinking water and ongoing community education about the need to consistently filter all drinking water.
In 2007, 11-year-old Hubeida Iddirisu faced long days of pain as three Guinea worms began to emerge from blisters on her body. Hubeida was the victim of a particularly severe Guinea worm disease outbreak in her town of Savelugu, Ghana.

“I probably caught the worms when accepting a drink from a neighbor during my rounds of charcoal selling,” she said.

Every day for two weeks, a volunteer came to Hubeida’s home to extract the worms. Often people suffer from more than one worm at a time, as Hubeida did, and the incapacitating wounds caused by the worms typically take up to two months to heal. While the worms were emerging, Hubeida was unable to attend school, handle her household tasks, or work at her after-school job.

During the outbreak, the Ghana Guinea Worm Eradication Program, assisted by The Carter Center and its partners, stepped up efforts to halt the disease in Savelugu by providing all households with cloth filters to strain out the Guinea worm larvae in drinking water. Community members with emerging worms were told not to enter sources of drinking water, such as the local dam, because doing so would allow the worms to release larvae into the water and continue the parasite’s life cycle. Stagnant ponds were also treated with a safe larvicide.

One year later, Hubeida was free of Guinea worm disease. She was able to carry out her daily chores as well as her job selling charcoal to help support her family and pay for school fees.

Today, Hubeida Iddirisu is a smiling young woman, and she has never had another Guinea worm. Ghana saw its last case of the disease in 2010 and was certified as free of Guinea worm disease in 2015.

**SUCCESS STORY: HUBEIDA IDDIRISU**

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**Isolation and marginalization of affected communities:** The dearth of public health infrastructure in Guinea worm endemic areas requires establishment and operation of case containment centers where patients with cases voluntarily admit themselves for health care and prevention of transmission. In addition, the last communities affected by Guinea worm disease are frequently the most marginalized by local society and distrustful of government programs and anyone of authority outside their communities. This often results in community reluctance to cooperate and likelihood to hide cases or withhold information about population movements or sources of drinking water, thus increasing the chances of missing cases. Community mobilization and trust are therefore essential.
CALL TO ACTION

Global eradication of Guinea worm disease requires unrelenting daily acts of courage by field workers in the four remaining endemic countries to break the transmission cycle. In spite of numerous challenges (including, but not limited to, insecurity and difficult access to endemic areas), the national Guinea worm eradication programs, assisted by The Carter Center and WHO, continue to deliver on their goals, steadily reducing cases, stopping transmission in endemic villages, and ensuring optimal surveillance and reporting. Continued perseverance and adequate funding will certainly ensure victory.

Once transmission has been stopped globally, no further interventions or monitoring will be needed beyond the three-year-long precertification of eradication stage required by WHO. The impact of success without a vaccine or curative drug will extend to validate the principle of disease eradication, the potential of community-based engagement and health education, and provide an example of a successful program for a neglected tropical disease. The legacy of the established health infrastructure and networks created to fight Guinea worm disease will include community-based surveillance and health education delivery systems ready to deliver other essential interventions. Eradication will accrue economic returns forever by benefiting the health, agricultural productivity, and school attendance among some of the world’s poorest people.

Join the global campaign. Your support is essential to maintaining momentum in the final push to eradicate Guinea worm disease.

3 See: http://apps.who.int/dracunculiasis/dradata/html/report_Countries_i1.html

For more details on how to support the Guinea worm eradication campaign, please contact:

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For the most up-to-date information, including a link to the current case count, go to www.cartercenter.org/guinea-worm.