

# WITHIN REACH

## GUINEA WORM ERADICATION IN GHANA





A painful and debilitating condition, Guinea worm disease has plagued Ghana since ancient times. In 1988, Ghana joined an international effort to eradicate the disease and has made remarkable progress over the past 20 years. Guinea worm has been found in the most forgotten communities, where there is little or no access to safe water. To protect themselves against this waterborne parasitic disease, these Ghanaians must filter all household water so that they do not unknowingly drink the water fleas that contain Guinea worm larvae.

After two decades of ongoing efforts to fight Guinea worm, Ghana is now on the brink of joining other countries around the world that no longer suffer from the disease. Ghana is finally within reach of its goal to rid itself of this scourge.

# WITHIN REACH

GUINEA WORM ERADICATION IN GHANA



THE  
CARTER CENTER



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During a 2007 Guinea worm disease outbreak, former U.S. President Jimmy Carter comforts 6-year-old Ruhama Issah at the Savelugu Hospital as a health worker dresses her painful Guinea worm wound.

It is heartbreaking to witness a child's future threatened by Guinea worm disease, a horrible affliction that is completely preventable. Thousands of Ghanaians have worked for many years to end the agony and economic hardship caused by this ancient disease, and it seems their efforts and dedication at last are being rewarded. The successes documented in this book are an inspiration to all of the partners working to eradicate the disease in the few African nations where it still exists. With intensified dedication in the field and continued political commitment, the goal of eliminating Guinea worm in Ghana is finally within reach in 2008.

Former U.S. President Jimmy Carter  
*Founder, The Carter Center*  
*2002 Nobel Peace Prize Laureate*

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## INTRODUCTION

For centuries Guinea worm disease has plagued people living in the region that is now modern Ghana. It was reported from the Elmina fortress as early as 1599 and among slave workers and British craftsmen building the fort at Anomabu in 1750.

Guinea worm is a parasitic disease caused by consuming water from ponds contaminated with infective larvae. The disease, known medically as dracunculiasis, is excruciatingly painful because of the blistering and slow exit of a parasitic worm through the skin. The worm, sometimes reaching 1 meter in length, leaves its victims temporarily crippled, often for months. Once widely prevalent in several countries in Africa and Asia, the disease was long neglected because it mostly affected poor people living in remote rural areas.

Ghana made a commitment to address the problem in 1988, when it joined the global campaign to eradicate Guinea worm disease,

hosting the Second African Regional Conference on Dracunculiasis in March of that year. The Ghana Guinea Worm Eradication Program officially was launched in June, and a number of international partners joined in to assist. Ghana's head of state toured endemic areas of the Northern Region, educating local leaders, health workers, and villagers about how to prevent the disease.

The following year, Ghana conducted a nationwide, village-by-village search for cases of Guinea worm disease—recording a total of 179,670 cases in 6,515 villages. The disease was found to occur in virtually every region and district of the country, but more than half of the cases were in the Northern Region.

At first, Ghana's eradication efforts progressed rapidly, reducing the number of cases reported by almost 90 percent between 1989 and 1993, and was an inspiring

model for other Guinea worm eradication campaigns in Africa.

Early in 1994, a market dispute over a Guinea fowl escalated into a major ethnic conflict in several districts of the highly endemic Northern Region at the peak of the Guinea worm season. The conflict, which lasted several weeks, disrupted program activities as villagers and health workers fled from their homes into towns. The conflict flared again briefly in 1995 and was succeeded by obstacles such as inadequate funding, administrative changes, and other difficulties that hampered operations and contributed to a decade of programmatic stagnation.

Most of Ghana's difficulties were shared to varying degrees by other African countries that were also waging war against Guinea worm. The longstanding neglect of northern Ghana (dating at least from colonial times), strong traditional beliefs about the ancient



Women and children from Savelugu town in the Northern Region collect water at the Dukanani Dam. All drinking water must be filtered to prevent Guinea worm disease, a painful and debilitating condition.

disease, and other factors added to inherent constraints imposed by local geology and ecology to frustrate further progress against the disease in Ghana. Over the years, Ghanaians witnessed numerous relaunchings of the Guinea Worm Eradication Program and eight successively unrealized target dates for achieving eradication as the country experienced a cumulative total of more than 500,000 cases of the disease.

With increased support provided through The Carter Center beginning in 2000, Ghana's program began to improve slowly, including mobilization of over 6,000 Ghana Red Cross Women's Club members to work with village volunteers to help detect and contain cases in endemic villages.

During a program review held at The Carter Center in August 2006, former U.S. President Carter encouraged officials from Ghana's Ministry of Health, UNICEF, and the World Health Organization to continue intensifying their efforts. A severe drought coupled with the deterioration of the municipal water supply in the Northern Region's capital of Tamale, and with it, breakdown in water supply to the nearby district capital of Savelugu, resulted in an unfortunate explosion of cases in early 2007. Unbeknown at the time, however, the tide already had begun to turn in Ghana's long struggle.

The Ghana Guinea Worm Eradication Program now appears to be fully back on track and gaining momentum toward eradication. In January 2008,

Ghana reported its 10th consecutive month of reduced cases, exceeding 80 percent reduction each month since October 2007 and suppressing the upsurge in cases normally expected at the beginning of the annual peak transmission season. In 2007, Ghana reported a provisional total of 3,358 cases—the fewest number of cases ever reported since the program began. To see Ghana's progress over the years, turn to the charts in the back of this book. With continued diligence, dedication, and political will, Ghana is finally within reach of its long-sought goal: zero cases of Guinea worm disease.

Dr. Donald Hopkins  
*Vice President, Health Programs*  
*The Carter Center*

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A girl cannot bear to watch as a health worker removes a Guinea worm from her foot. She unknowingly drank water contaminated with Guinea worm larvae a full year earlier. Once ingested, the Guinea worm parasite matured for a year inside her body before boring a painful hole through a blister in her skin.



Miss Ghana 2005, Lamisi Mbillah, spends time with Tampion schoolchildren. During and after her reign, Mbillah volunteered to assist the national eradication campaign and became an effective spokesperson, visiting officials, villages, schools, and donors on behalf of the program.

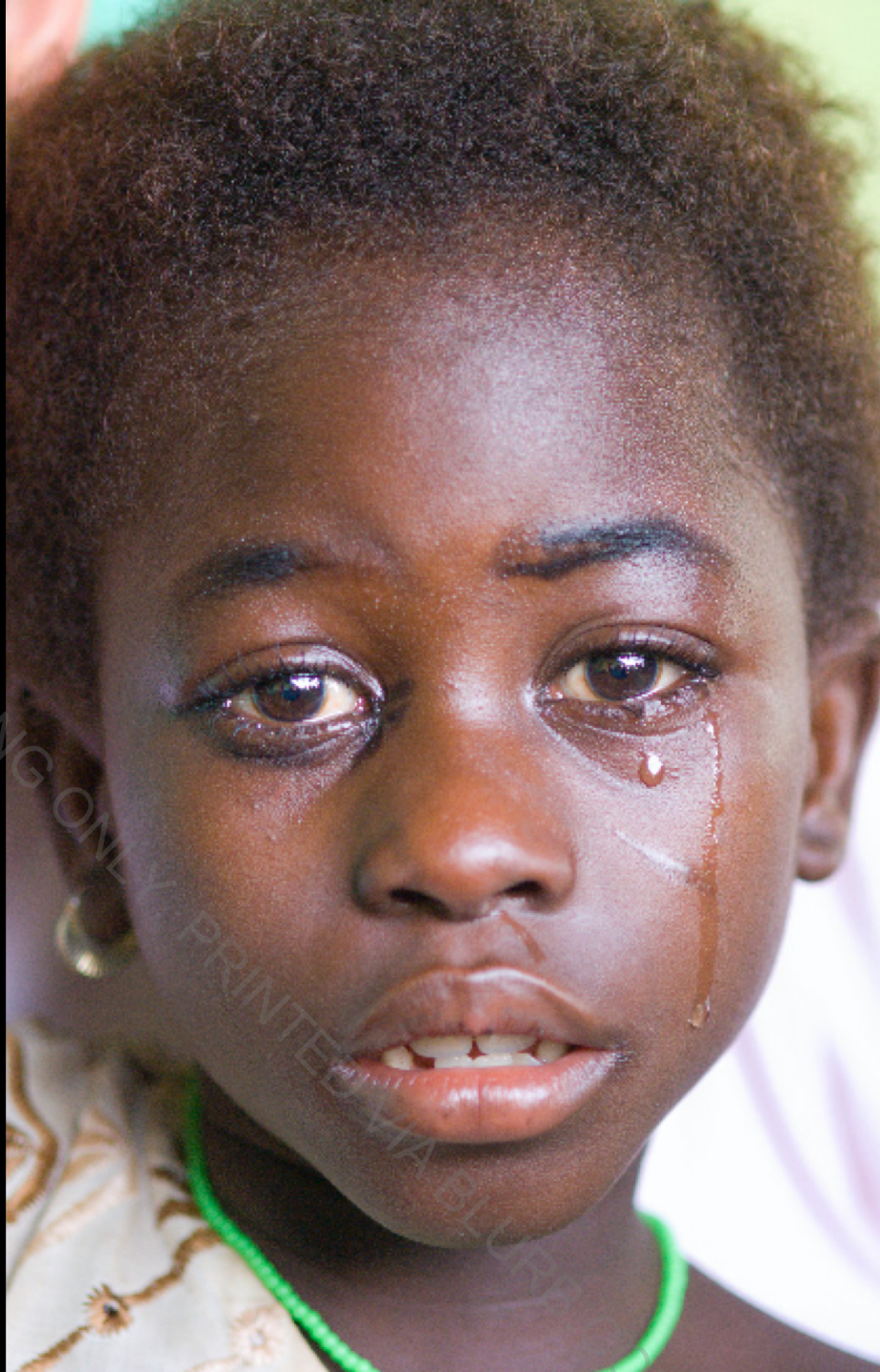
## FROM OUTBREAK TO HOPE

As Ghanaians toil to harvest the year's crops, the wind of the Harmattan blows from the Sahara, swallowing everything in a cloud of red dust that augurs the start of dry season in northern Ghana. With it comes the spread of Guinea worm disease from stagnant drinking water sources that dot the arid landscape. Guinea worm is a totally preventable affliction that has long wrought unnecessary human suffering and economic hardship, and for nearly 20 years, the Ghana Guinea Worm Eradication Program has worked to halt the parasite's yearlong life cycle.

A critical setback occurred in 2006, when a severe drought and a two-month breakdown in Savelugu town's water system caused more people to draw water from unsafe local sources. As a result, 2007 brought a horrific Guinea worm outbreak in Savelugu district, particularly Savelugu town, which incapacitated residents in the already impoverished Northern Region.

Ghana soon redoubled its efforts to eradicate the ancient scourge. Through the hard work and perseverance of government officials, health workers, and volunteers, 2008 has seen the largest reduction in cases ever documented, renewing prospects of eradication in Ghana in the near future. The following pages tell the story of this miraculous transformation from sorrow to hope.

Sadia Mesuna, 6, from northern Ghana, endured three worms emerging from her feet at the same time during the Guinea worm outbreak of 2007.



As small village ponds disappear during the dry season, women and children are forced to walk farther and farther to collect water. In the severe drought of 2006, people in Savelugu town gathered their daily water from Dukanani Dam. A single person who steps into the dam with an emerging worm can contaminate the water and put the whole area at risk for the disease.





In addition to drought conditions, a breakdown in the water supply system serving Savelugu town in 2006 forced more residents to collect unsafe water from dams such as Dukanani, leading to hundreds of cases a year later.



Because of the one-year incubation period between the ingestion of Guinea worm larvae and the emergence of mature worms, the full effect of the previous year's drought and water breakdown was not known until 930 cases of Guinea worm disease were reported in Savelugu town in early 2007, compared with 107 cases in 2006 during the same period.

Opposite: Following the Savelugu town outbreak, Ghana's Guinea Worm Eradication Program, in partnership with The Carter Center, set up case containment centers to identify, treat, and educate victims, most of whom were children, on how to prevent the spread of Guinea worm disease. National attention to the outbreak and lack of overall progress spurred the government to increase support to the national eradication program.

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In February 2007, more than 200 outpatients were treated at the Savelugu case containment center. The center, a place where patients can voluntarily come and receive free treatment, was home to more than 20 children who received inpatient care.



A child keeps a brave face as her Guinea worm is treated. Each day, a health worker will coax the worm from the victim's skin little by little. The process could take weeks before the worm, which can grow up to a meter long, is completely removed.



A plastic bottle, shown from the back, reveals the cause of the children's suffering—intact Guinea worms, painstakingly removed from patients' bodies.





Patients with Guinea worms soak their hanging worms or wounds prior to their daily morning treatment at the containment center to facilitate easier removal and control the release of Guinea worm larvae. The emerging Guinea worm is wound around a moist bandage to prevent it from breaking.



Opposite: One year later, efforts to prevent Guinea worm disease have intensified on every front, and Savelugu has nearly recovered. Many new interventions have been implemented to discourage people from stepping into the dam. As part of the eradication effort, Issifu Adam Ben (far left), a representative of the district assembly, monitors the pumps to ensure they are used properly.

In early February 2008, there were only nine Guinea worm patients at the containment center and, fortunately, no outpatients to treat, although program volunteers treated a few patients in their homes. Pictured here, Dante Vasquez, a technical assistant, treats Latifah, 9, who has two worms emerging from the back of her knee, as health worker Majeed Fuseini works with other patients.

Due to the program's immediate response to the outbreak, Savelugu town reported only 44 cases in January and February 2008, a 95 percent reduction compared to 2007.





Although the number of cases has reduced significantly in 2008, people are still suffering from this preventable disease. Robert Agoe (left), technical assistant, leads two patients who have developed medical complications due to Guinea worm to Dr. Kofi Issah (right), district director of health services, at Savelugu Hospital.



Dr. Issah and Mr. Agoe discuss how to best treat one of the young patients. Broken Guinea worms can calcify within a victim's body, sometimes wrapping around joints and ligaments, causing permanent disability. As Ghana strives to stop the transmission of Guinea worm disease, it is hoped that this girl will be one of the last cases.

## Rafia, Fatima, and Samata Fuseini



In February 2007, President and Mrs. Carter, assisted by Dr. Issah, examined the painful condition of Rafia Fuseini, who had a hanging worm in her left foot.



Rafia's sister Fatima, here seen soaking in water to encourage the Guinea worm in her foot to emerge, spent three long months at the containment center having her Guinea worms treated.





The girls' other sister Samata, here being comforted by former Miss Ghana, Lamisi Moillah, had a worm coming out of her abdomen and spent time at the containment center in early 2007.



One year later, the three girls are free of Guinea worm disease and all smiles at home.



Samata lends Rafia, smaller and weaker, a hand of encouragement as she struggles with her load after they and their sisters have collected water at the dam.



Aunt Salamatu, in charge of the family's water filtering, said, "We didn't know about filtering our water last year. Volunteers came to our home with filter cloths and taught us how to use them properly. Now we can get on with our normal lives. The kids can go to school. Last year we missed our kids. We spent much of our days visiting them at the containment center. Fatima was there for three months. Guinea worm really wasted our time!"



Ghana's Guinea Worm Program Manager Dr. Andrew Seidu Korkor (left) and technical assistant Michael Humes discuss Ghana's Guinea worm case loads at program headquarters in Tamale. The program's attention continues to be focused on detecting and containing every case.

Staff from several organizations working to eradicate Guinea worm disease—including Ghana Health Services, The Carter Center, Japan International Cooperation Agency, and Red Cross—meet weekly in Savelugu town to ensure that all Guinea worm case numbers are reported. Increased and focused teamwork has contributed to Ghana’s recent success in combating Guinea worm during the 2007–2008 transmission season.

Opposite: Traveling by motorcycle, Guinea worm “foot soldier” Eugene Yeng (left), a technical assistant, and Abdulhai Idirissu, a community surveillance volunteer, head out to areas in the Savelugu district armed with new household water filters for Guinea worm that they will give to families needing a replacement free of charge.







Yeng keeps an eye on villagers possibly infected with Guinea worm by going house to house, which is one important surveillance measure to prevent spread of the disease. He collaborates with a wide array of community members to monitor the disease and provide health education.

Opposite: One of the primary ways to protect against Guinea worm disease is by filtering household water through fine mesh cloths to trap the tiny water fleas carrying the infective larvae. Volunteers, such as this traditional birth attendant (left), are vigilant in educating people throughout the community about how to filter water at home.

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In addition to removing the tiny infected water fleas that eventually cause Guinea worm disease, water filters help keep debris out of drinking water, an added benefit of filtering.

Opposite: Guinea worm disease is a major impediment to a farmer's ability to work. Dressed in his farming clothes, Nuru Ziblim, a Guinea worm health volunteer, educates children on how to use pipe filters when they go to the fields with their families. Pipe filters, individual filtration devices worn around the neck, work similarly to a straw, allowing people to filter their water to avoid contracting Guinea worm disease while away from home.

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Moshei Ziblim, a Red Cross Women's Club volunteer for 12 years, teaches proper filter care by demonstrating how to back wash a household filter after straining the water.

"I don't need to be paid. We're doing this for our own sake. Love yourself, love others!" she said. "People really started listening this year simply because they saw what happened in 2007, and they don't want a repeat. It wasn't just the pain. Their income also went down."

Opposite: Women and young girls are responsible for nearly all household-related water activities, including gathering, cooking, washing, and bathing. Because women serve as the eyes and ears of a community, it is vital to include them in Guinea worm surveillance and health education.



## Awabu Alidu



Receiving outpatient care at the Savulgu containment center, Awabu Alidu, 47, endured four Guinea worms in 2007, including one in her right breast. The only previous time she had Guinea worm was as a teenager. During treatment, "they told me to avoid contaminated water by filtering it," she said.



Awabu cringes as a volunteer pulls on an emerging worm.



Today, shown at home with her husband, Awabu is free of Guinea worm disease. She still wonders, however, whether it is because of the cleaner water, or if she has just broken a curse.





Educators emphasize the primary ways that Guinea worm can be stopped: preventing people with emerging Guinea worms from entering sources of drinking water, filtering or boiling all drinking water, treating water with a safe larvicide called ABATE®, and constructing boreholes or deep wells.

Opposite: Nearly half of Ghana's Guinea worm cases last year were children younger than age 15. Educating schoolchildren is an important part of surveillance and case reduction. Suzie Asigri, a member of National Service Personnel, uses a flip chart to show schoolchildren how Guinea worm is contracted and what they must do to prevent it. Education and low-technology measures to promote behavioral change are especially important because there is no medicine or vaccine to prevent Guinea worm disease.



The program continues to organize competitive school quizzes about Guinea worm disease. According to Eric Djokotoe (not pictured), Savelugu's water engineer, "We are transmitting messages to the homes via the children." Other techniques include rewarding schoolchildren with a new school bag when they report cases of Guinea worm disease, which helps with disease surveillance.

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# Hubeida Iddirisu



Volunteer Sulley Zakaria treats 10-year-old Hubeida Iddirisu at her home in February 2007. She had three painful Guinea worms emerging from her body that year.



"I probably caught them when accepting a drink from a neighbor during my rounds of charcoal selling," she said.



Today, Liberia is Guinea worm free, well liked around the neighborhood, and able to carry out her daily chores plus a job several hours a day to earn money to help support her grandmother and three siblings, and pay their school fees.



She's a bright "A" student, who gets high grades despite her long hours of work. Many children are robbed of an education by Guinea worm disease when it incapacitates them, forcing them to miss school and fall behind in their studies.



As part of intensified eradication efforts, easy-to-use SOKA water pumps were installed at the Dukanani Dam in December 2007. The pumps have spouts on which filters are tied so water can be filtered on the spot. Such pumps limit the number of gatherers entering the dam.



Dam guard Alhassen Alhassen changes the filter on a SOKA water pump. Paid for his labors with a bicycle to ride to work each day, his job is to prevent anyone with an emerging Guinea worm from stepping into the dam.

Boys often collect water to sell in town. During the outbreak of 2007, it was discovered that water vendors had sold unfiltered water to residents of Savelugu during the previous year's drought and when the water supply system had broken down. In response, the Guinea worm program has educated water vendors about the importance of filtering and created special filters that fit atop their large steel water drums to ensure quick and easy filtering.





Water vendors head to Savelugu town in donkey-pulled carts. Approximately 80 percent of Savelugu's water is supplied by vendors like these.







Opposite: Volunteer Ibrahim Fuseini looks for any holes or damage to one of the filters used by the water vendors.

New filling points for water tankers allow close monitoring to make sure water is filtered into drums prior to distributing them to villages in the area. Measures have been put into place to fine tanker drivers and owners who refuse to filter water.



Despite the improvements in water filtration and other methods to fight Guinea worm disease, challenges remain. A Guinea worm field officer (second from right) convinces a reluctant commercial water tanker driver to filter water before he disburses it to townsfolk. For the drivers, time is money.



Trained Guinea worm program staff meticulously measure Dukanani Dam to apply the correct amount of a larvicide called ABATE®, which is donated by BASF. Water sources in endemic areas are treated with the safe chemical, which helps prevent Guinea worm disease.



In addition to treating stagnant water sources with larvicide and filtering all drinking water, another way to stop Guinea worm disease is through boreholes, deep wells that tap groundwater, which Guinea worm larvae cannot contaminate. Installing such wells is expensive and slow, but also helps prevent other diseases.



Ghanaian media are a major partner in the fight against Guinea worm disease, educating decision makers and leaders nationwide. Ghana's Minister of Health Major Courage E.K. Quashigah (retired) convenes semiannual briefings for the press to review Ghana's progress toward eradicating Guinea worm disease. Several workshops and field trips to Guinea worm-endemic communities also have taken place. Pictured here, Regional Guinea Worm Manager Gilbert Dery (right) addresses the press at a workshop.

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It is vital that the Guinea worm message reach communities from every angle possible—whether during water collection at dawn or at late-night village dance parties, locally known as Tora dances. Guinea worm educator Yakubu Fuseini (above) delivers health education messages during dance breaks.



Village leaders, such as Naa Mumunai Abduhai (above left), chief of Zoggu village, Northern Region, also play a critical role in monitoring the behavior of community members and thus helping to stop the disease.



Region	2007	2008	2009	2010	2011	2012	2013	2014	2015
NORTHERN	763	78	465	229	246	257	102	77	
UPPER-WEST	206	27	11	8	2	1	2	0	4
	2008	10	5	1	2	1	0	0	1
	2009								
VOLTA	19	18	10	1	10	5	1	1	
	2008	6	2	9	9	1	3	0	1
	2009								
OTHERS	33	11	1	2	2	0	1	0	
	2008	14	1	5	9	0	2	0	
	2009								
TOTAL	421	606	455	623	337	373	168	77	
	2008	792	473	279	272	841	110	91	
	2009								



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Combating Guinea worm requires vigilance on many levels. Authorities in Savelugu and Tamale, including Dr. Andrew Seidu Korkor (left), head of Ghana's Guinea Worm Eradication Program since 2000, warn of the danger of complacency. "I feel elated about the successes. But a big challenge lies ahead to sustain the gains," said Dr. Seidu. "We need to keep our good team together, to motivate and support them. We still have a lot of work to do. Ghana might report fewer than 500 cases this year, but we're working toward zero cases."

### **Ghana's target: Stop transmission in 2008**

# Sadia Musina



Sadia Mesuna, 6, was in agony in February 2007 as three Guinea worms emerged from her feet, forcing her to spend two months at the containment center. "It was very painful, especially when they were dressing my wounds," Sadia said. "It feels more painful than stepping on fire coals or being cut. And you don't feel like eating anything."

After treatment, Sadia recovers in a quiet corner, also rediscovering her sense of humor as she dons a volunteer's sunglasses, worn upside down.



While at the containment center in 2007, Sadia and a friend, Fatawu Yakubu, look at a picture book about the dreaded disease, learning that "you get Guinea worm from the water. If you drink it unfiltered, you get Guinea worm," she said.



A year later, Sadia has no Guinea worm disease and can participate in her family's daily activities, such as collecting water.



At home with her grandmother, her mother, and two sisters, Sadia shells nuts from the farm, which they package and sell for income—activities she missed last year because she could barely walk due to Guinea worm disease.



Sadia returns some days to her school, but after her two-month absence with Guinea worm disease in 2007, she struggles to cope and catch up.



"I'll only drink filtered water from now on," vowed Sadia.

# A TIMELINE: GUINEA WORM IN MODERN GHANA

1987

In Tamale, 25 percent of secondary school students were unable to attend classes for several weeks because they were crippled with Guinea worm disease.

1988

Ghana hosts the Second African Regional Guinea Worm Conference, attended by President and Mrs. Carter. The national Guinea Worm Eradication Program is launched.

1989

First national case survey conducted: 179,670 cases found in more than 6,000 villages, establishing extent of Guinea worm disease nationwide.

1990

Funded by the government of Japan, 159 wells are installed in the Nanumba district. As a result, between 1989 and 1990, cases of Guinea worm disease drop 77 percent in the district, and, simultaneously, yam production increases 33 percent as fewer farmers are incapacitated due to the disease.

1993

After only four years, eradication efforts reduce the number of cases to 17,000.

1994

Severe insecurity due to ethnic fighting in the Northern Region stops Guinea Worm Eradication Program operations.

1995

Inadequate funding and other obstacles stall program.

2000

After five years of stagnation, a grant from the Bill & Melinda Gates Foundation to The Carter Center and the Ghana Guinea Worm Eradication Program begins to slowly improve the effectiveness of interventions against transmission of the disease. Ghana coordinates efforts of major Guinea worm partners, creating the Ghana Interagency Coordinating Committee.

2006

The Carter Center and UNICEF support the Ghana Red Cross Society to mobilize 6,000 of its Women's Club members to work with other village volunteers and help detect and contain cases in endemic villages.

2006

Potable water supply system serving metropolitan Tamale (capital of Northern Region) and Savalugu town stops operating, forcing more residents to drink unsafe water from dams, leading to a Guinea worm outbreak involving hundreds of cases a year later in Savalugu town. International attention from the outbreak and lack of overall progress spur the government to provide increased support for Guinea worm eradication.

2007

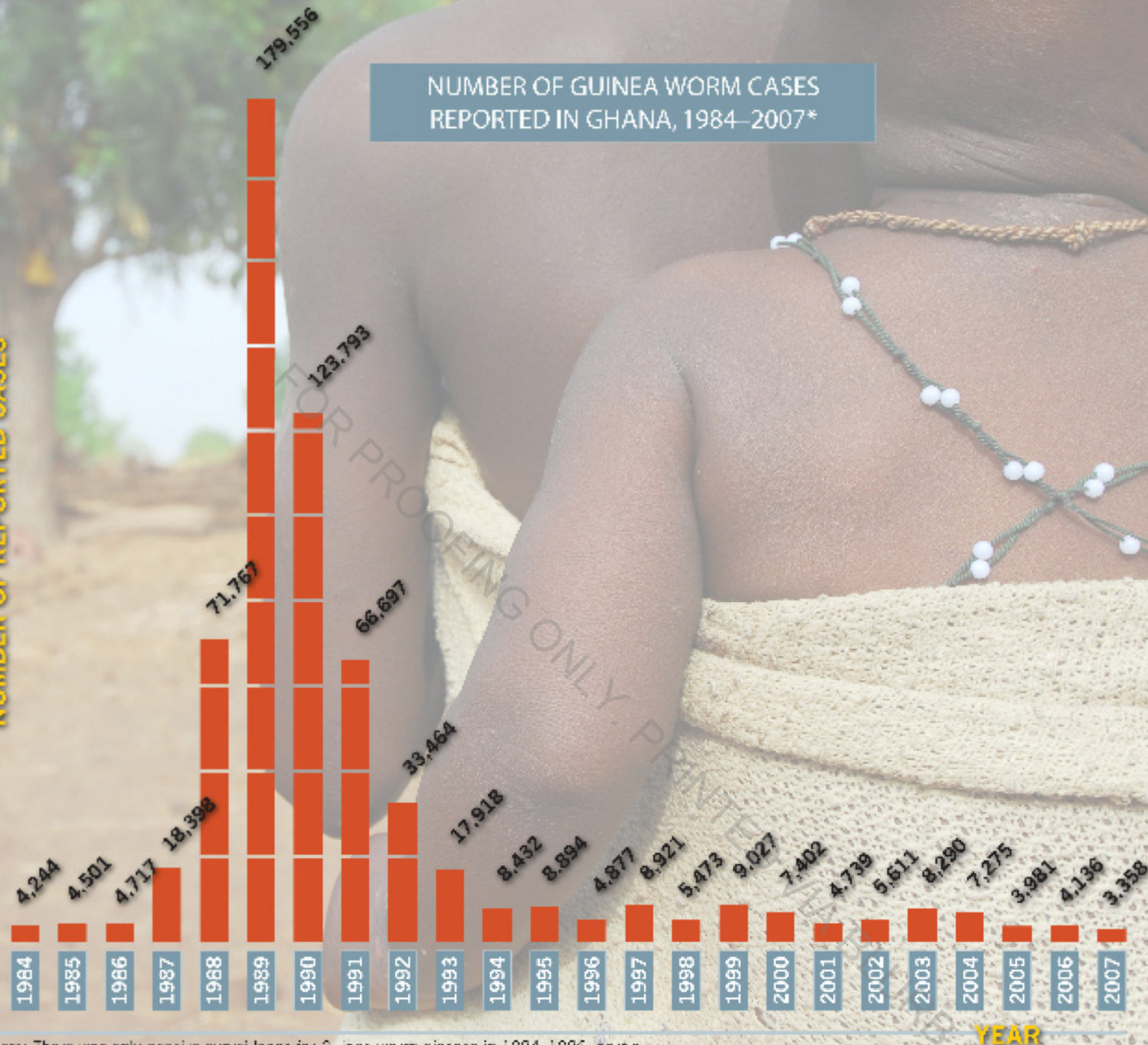
April marks beginning of observed reductions in cases of Guinea worm disease with more accelerated reductions starting in October.

2008

Buoyed by recent success, Ghana intensifies efforts to reach zero cases.

NUMBER OF REPORTED CASES

NUMBER OF GUINEA WORM CASES  
REPORTED IN GHANA, 1984–2007\*

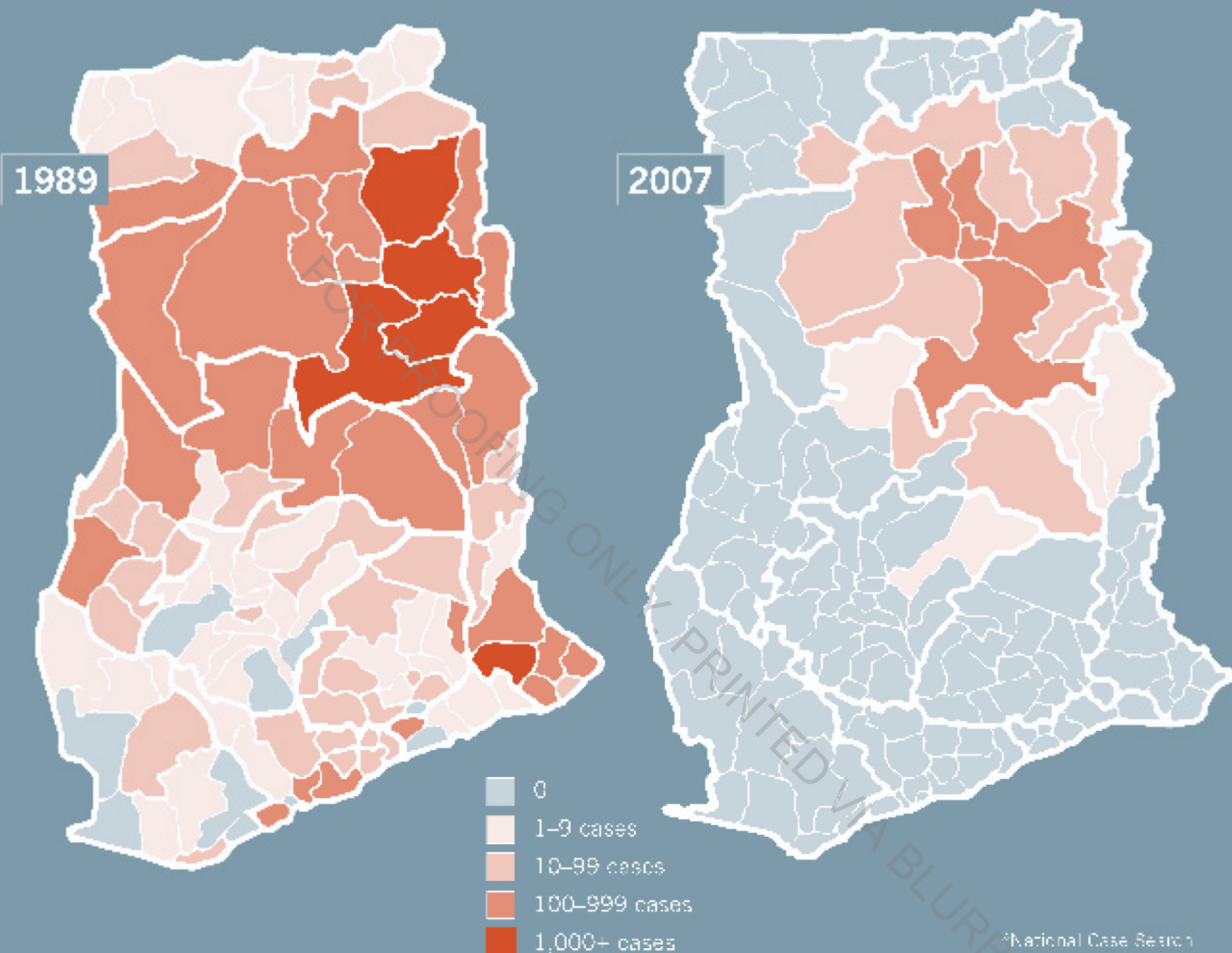


Note: There was only passive surveillance for Guinea worm disease in 1984–1986, partial surveillance in 1987–1988, and nationwide active surveillance in 1989 and thereafter.

YEAR

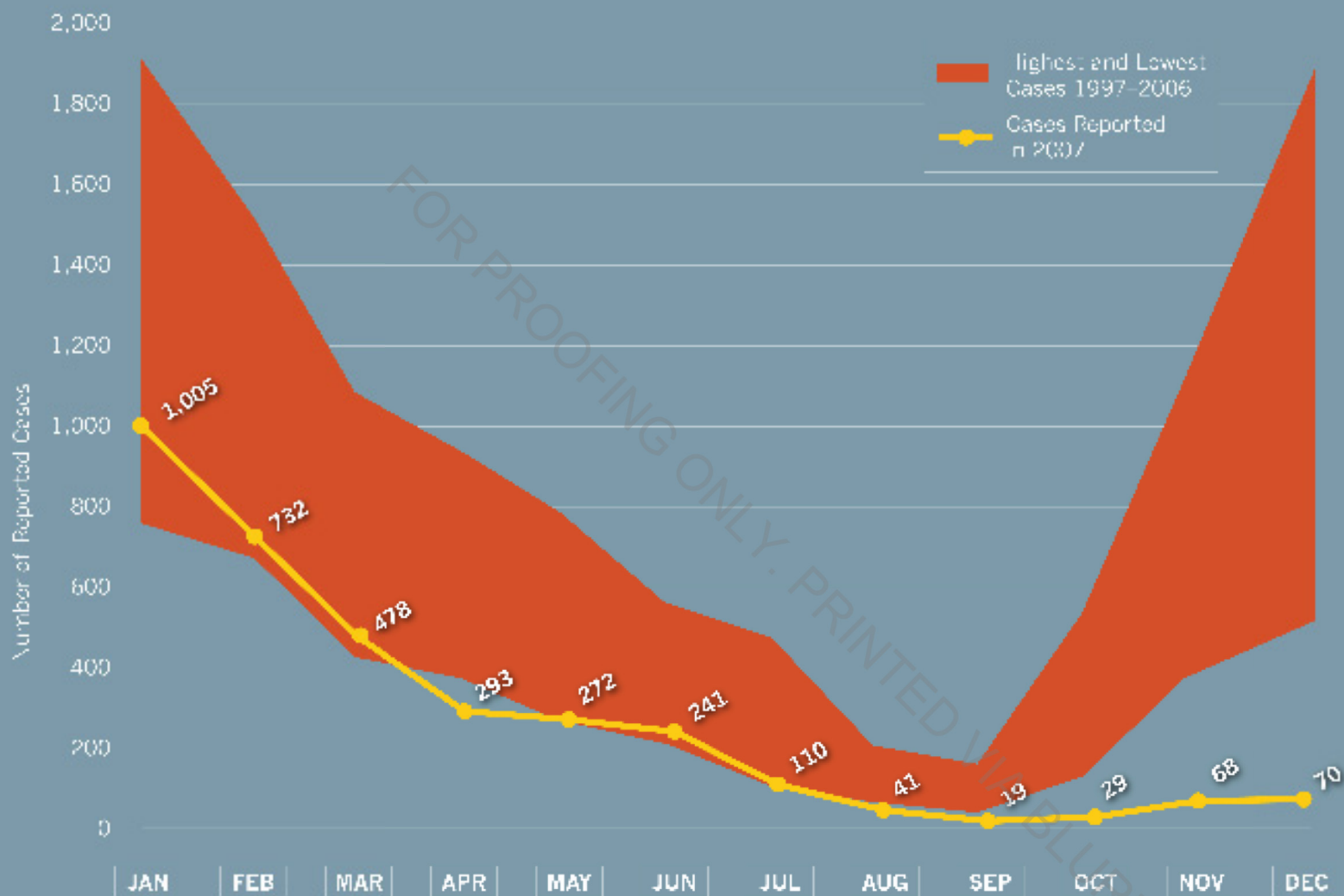
\*Provisional

DISTRIBUTION IN GHANA OF 179,556 CASES OF GUINEA WORM DISEASE IN 1989\*  
AND 3,358 CASES OF GUINEA WORM DISEASE IN 2007\*\*





# CASES OF GUINEA WORM DISEASE REPORTED DURING 2007\* VERSUS HIGHEST AND LOWEST NUMBER OF CASES REPORTED DURING THE PRECEDING 10 YEARS (1997-2006)

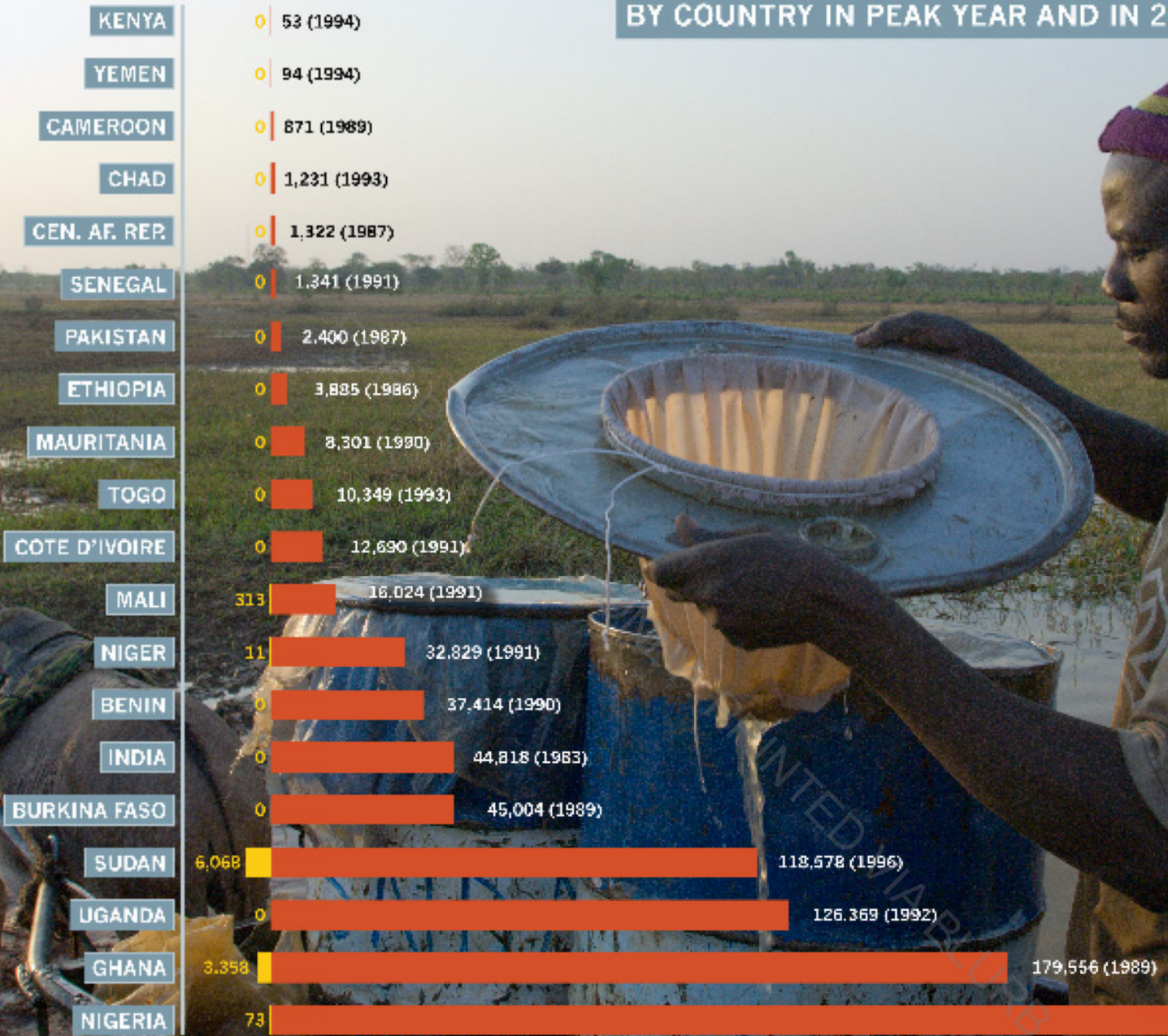


\*Provisional

CASES REPORTED IN 2007\*

CASES REPORTED IN PEAK YEAR

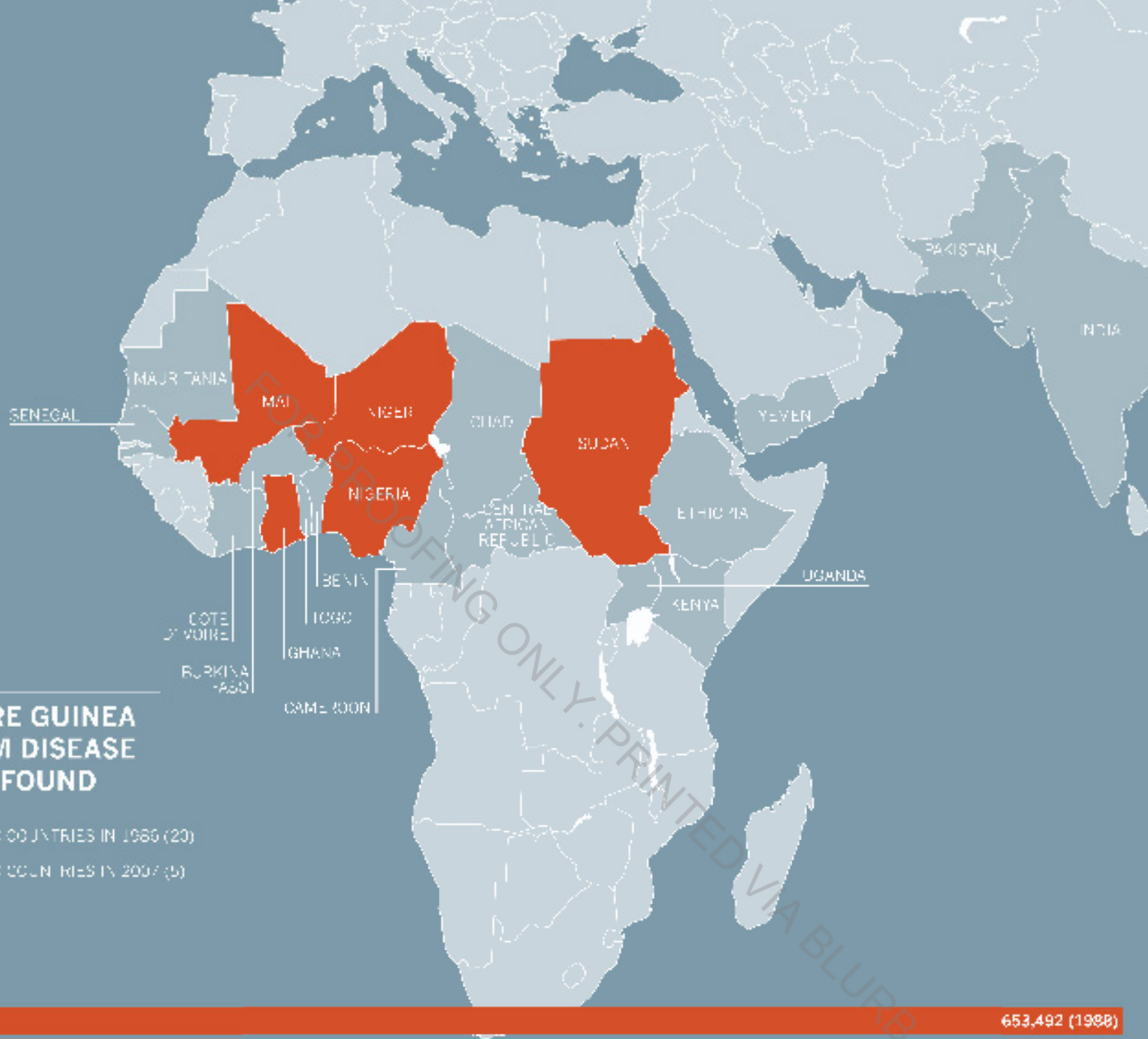
# CASES OF GUINEA WORM DISEASE BY COUNTRY IN PEAK YEAR AND IN 2007\*



\*True signal

## WHERE GUINEA WORM DISEASE IS FOUND

- ENDEMIC COUNTRIES IN 1989 (20)
- ENDEMIC COUNTRIES IN 2007 (5)



## ACKNOWLEDGEMENTS

### Major international partners and donors in support of the Carter Center's assistance to Ghana's campaign to eradicate Guinea worm disease

#### Major Partners

Government of Ghana  
The Carter Center  
UNICEF  
U.S. Centers for Disease Control and Prevention  
World Health Organization

#### Governments

Canadian International Development Agency (CIDA)  
Denmark  
Finland  
Japan  
Japan International Cooperation Agency (JICA)  
Kuwait Fund for Arab Economic Development  
Luxembourg  
The Netherlands  
Norway  
Oman  
OPEC Fund for International Development  
Saudi Arabia  
Saudi Fund for Development  
United Arab Emirates

United Kingdom Department for International Development (DFID)  
United States Agency for International Development (USAID)

#### Organizations

American Red Cross/Ghana Red Cross  
Japan Overseas Cooperation Volunteers  
Nippon Keidanren  
U.S. Peace Corps  
Voice of America

#### Foundations

Hugh J. Andersen Foundation  
Boston Foundation  
Crabby Beach Foundation  
Diebold Foundation  
Bill & Melinda Gates Foundation  
Emery C. Jr. and Nancy F. Herman Fund  
Conrad N. Hilton Foundation  
John C. and Karyl Kay Hughes Foundation  
John P. Hussman Foundation  
Morningside Foundation  
Salus Mundi Foundation  
Osprey Foundation of Maryland  
P Twenty-One Foundation

Mary Lynn Richardson Fund  
Seyfarth Shaw Charitable Foundation  
United Nations Foundation  
Woodbury Foundation

#### Corporations

BASF Corporation  
E.I. du Pont de Nemours  
Environmental Systems Research Institute, Inc. (ESRI)  
Global Aero Logistics/North American Airlines  
Google.org  
Johnson & Johnson  
Kimberly-Clark Corporation  
Precision Fabrics Group, Inc.  
Vestergaard Frandsen  
Wyeth (formerly American Cyanamid, American Home Products)

In addition, many generous individuals have supported Ghana's Guinea Worm Eradication Program.

## Special Thanks

*Ghanaians who have provided exceptional leadership for Ghana's Guinea Worm Eradication Program include:*

Dr. Sam Bugri  
National Program Coordinator  
1988–2000

Dr. Andrew Seidu Korkor  
National Program Coordinator  
2000–present

Ms. Lamisi Mbillah, Miss Ghana 2005,  
Miss World Beauty With a Purpose

And thousands of Ghanaian village  
volunteers

Special recognition to former U.S.  
President Jimmy Carter and Rosalynn  
Carter, co-founders of The Carter  
Center, who have inspired the  
international campaign to eradicate  
Guinea worm. Additional recognition  
and thanks to program leader Dr.  
Ernesto Ruiz-Tiben and the Center's  
Guinea Worm Eradication Program  
staff.



Like the other children highlighted throughout this book, the girl pictured with President Carter at the beginning of this book, Ruhama Issah, also is free of Guinea worm disease this year. "I had three worms last year, but none this year. The Guinea worm program volunteers came to teach us about unfiltered water. I don't drink it anymore," she said.

*Principal photography for this book by Louise Gubb. Thanks to the people of Savelugu for sharing their stories.*

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THE  
CARTER CENTER



*Waging Peace. Fighting Disease. Building Hope.*

## **About The Carter Center**

In 1986, The Carter Center began to provide technical and financial assistance to national Guinea worm eradication programs, including Ghana's the following year, and today it spearheads the international Guinea worm disease eradication campaign.

The Carter Center was founded in 1982 by former U.S. President Jimmy Carter and his wife, Rosalynn, to advance peace and health worldwide. A not-for-profit, nongovernmental organization, the Center has helped to improve life for people in more than 70 countries by resolving conflicts; advancing democracy, human rights, and economic opportunity; preventing diseases; improving mental health care; and teaching farmers to increase crop production. Please visit [www.cartercenter.org](http://www.cartercenter.org) to learn more about The Carter Center.

