

EYE of the EAGLE

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President Carter Reflects on Decades of NTD Work

This year, the Eye of the Eagle newsletter turns 20 years old. To mark the occasion, former U.S. President Jimmy Carter, co-founder of The Carter Center, comments below on his personal connection to neglected tropical diseases and the work of The Carter Center to fight NTDs.

Why do neglected tropical diseases matter to you?

President Carter: During our country's early years, trachoma impacted much of America; immigrants' eyelids were flipped at Ellis Island to check for signs of the disease. People who showed signs of trachoma were returned to their homeland or quarantined. During my own childhood in Plains, Georgia, trachoma impacted my community. My mother, a nurse, worked to help those suffering in our area. From a very young age, I knew that diseases like trachoma and others were life-threatening diseases of poverty, especially affecting those too poor to have proper sanitation.

My wife, Rosalynn, and I took many trips to Africa and Latin America to support the Carter Center's health programs in the field and gather firsthand knowledge of both the challenges and progress being made in countries and communities, which were often remote and under-resourced. On one of these trips, I remember speaking, with some help from an interpreter, to a 30-year-old grandmother who had been blinded by trachoma. Her blindness was completely avoidable. She held in her arms a little boy, about the same age as my youngest grandchild at the time.



Louise Grubb

In Nigeria, former U.S. President Jimmy Carter and former First Lady Rosalynn Carter, founders of The Carter Center, measure a girl's height to gauge the accurate dose of medication used to prevent schistosomiasis.

Flies clustered around the child's infected eye. I knew that with proper treatment and improved sanitation, the woman's grandson would never be blind from preventable, infectious disease.

Similarly, I've always been touched by a scene depicted in a statue in the Carter Center's gardens, and one I've often witnessed firsthand in Africa—a child guiding an elder who had been permanently blinded by the effects of river blindness. It's a haunting image of how a disease can impact an entire family's fate and ripple into the community. Yet this burden, too, can be avoided completely.

It is hard to speak of river blindness and trachoma without mentioning the Center's Guinea worm eradication efforts. I've devoted many decades to this goal, and I think The Carter Center has every indication of success. In the mid-1980s, Guinea worm disease afflicted about 3.5 million people annually in 21 countries across Africa and Asia. Last year, there were only 54 cases reported worldwide.

I regret that when I was president of the United States I didn't know about these

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Electronic
Edition

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President Carter Reflects

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neglected diseases. I only learned about them after I was out of office. It was very important to me to make addressing NTDs part of the Carter Center's mission. These diseases affect the poorest of the poor. There is no need for people to suffer when we have simple prevention strategies to assist them.

Who were the Carter Center's earliest champions?

President Carter: The Carter Center believes in partnerships. No single organization can hope to eliminate NTDs on its own. The effort requires cooperation among a diverse team of players, taking advantage of each member's strengths.

I am very encouraged by the progress that has been made against river blindness. In the 1990s, John Moores, former chairman of the Carter Center's Board of Trustees, asked me and The Carter Center to take on this project; river blindness was a forgotten disease.

Over the years, our Onchocerciasis Elimination Program for the Americas (OEPA) showed that river blindness elimination was possible in Latin America, and later we were able to use that success to encourage countries in Africa to try to eliminate the disease instead of just controlling it. With support from many partners, including ministries of health, Merck & Co., Inc. (Kenilworth, N.J., USA), USAID, Lions Clubs International Foundation, the Bill & Melinda Gates Foundation, the Carlos Slim Foundation, and others, we have successfully eliminated it in four Latin American countries. Now we are working in partnership with RTI International in Africa as part of the U.S. Agency for International Development's Act to End NTDs—East program with many different organizations. I'm proud that, with the support of other key partners, such as GSK and Merck KGaA (Darmstadt, Germany), we've been able to integrate treatments for lymphatic filariasis and schistosomiasis in many areas where we have river

blindness programs.

The Center's trachoma control efforts also would not have been possible without Pfizer, the Conrad N. Hilton Foundation, the Lions Clubs International Foundation, and many other generous supporters.

For more than three decades, beginning with Guinea worm eradication, The Carter Center has been the pioneer and leading expert in eradicating, eliminating, and controlling multiple NTDs. Across our health programs, the approach is deliberate; we use data to assess the disease burden and review our impact. The Carter Center and our partner ministries of health use this information to change interventions and implement new approaches to speed progress.

What excites you most about the future of NTDs?

President Carter: Working together, donors, endemic countries, pharmaceutical companies, and implementers are showing that we can end NTDs. The Carter Center tackles some of the most challenging diseases in the most challenging environments. Our earliest work helped to show that NTD programs were a highly efficacious and cost-effective way to provide care, and it has been exciting to see the U.S. and U.K. governments work across the political spectrum in support of these projects. It is very gratifying to see so many more people now receiving treatment.

I believe every person has the right to live a life free of unnecessary suffering, with hope that the future will be better than the past. Rosalynn and I are grateful for all the partners who work with us to eradicate and eliminate these horrible diseases to make the world more equitable and peaceful for future generations. **E**



In Afeta, Ethiopia, President and Mrs. Carter give a long-lasting insecticidal bed net to Mrs. Hlmenlike, who hosted the Carters in her home during a visit to southwestern Ethiopia.

IACO Celebrates Strides Toward Elimination in the Americas

Onchocerciasis (river blindness) now affects only 6% of the population initially at risk in the Americas—just over 30,000 Yanomami indigenous people living in the cross-border area of Brazil and Venezuela. The theme of IACO 2019 was “Brazil is close to the elimination of onchocerciasis.” The central message of the conference was that transmission of onchocerciasis is suspected to be interrupted in 61% of the at-risk population in Brazil and 79% in Venezuela.

IACO presenters heaped praise on the Yanomami indigenous health agents involved in both the Brazil and Venezuela elimination programs. These health agents directly assisted in 79% of ivermectin treatments in Venezuela and played important support roles in 54% of Brazilian communities. Abrão Xitehenawe, a Yanomami representative to IACO, said, “We need to work together to improve the health of the indigenous population of Brazil. Let’s keep going down the road of onchocerciasis elimination together.” Sílvia Nobre Waiãpi, director, Special Secretariat for Indigenous Health, and the first indigenous woman to hold this position, said to the meeting participants: “You are our heroes for helping to eliminate this disease from our Yanomami people.”

Challenges abide, however. Both countries were unable to complete assessment activities due to transportation challenges stemming from the lack of available helicopter time and, in Venezuela, fuel shortages.

IACO’s opening remarks were made by Dr. Julio Henrique Rosa Croda of the Ministry of Health in Brazil; Waiãpi; Dr. Tomas Pippo of the Pan-American Health Organization

(PAHO); Dr. Elizabeth Ferreira Rangel of the Instituto Oswaldo Cruz; Dr. Yao Sodahlon of the Mectizan® Donation Program; and Dr. Mauricio Sauerbrey of the Carter Center’s Onchocerciasis Elimination Program for the Americas (OEPA).

OEPA has committed donors who are enthusiastic in their support for the program. The Lions Clubs International Foundation has been a valued OEPA partner since 1999. A distinguished delegation of Lions



from Brazil, Venezuela, Mexico, and Colombia attended the conference. The United States Agency for International Development (USAID) has long been a key partner, and new funding from Merck & Co., Inc. and the Lions Clubs International



IACO attendees included Mauricio Sauerbrey, OEPA; Craig Withers and Frank Richards, The Carter Center; Florencio Cabrera Coello, Lions Mexico; Carlos Valencia Sr. and Lilia Morillo de Valencia, Lions Venezuela; Ricardo Gurgel de Medeiros and Vania Gurgel, Lions Brazil; Abrão Xitehenawe, Yanomami representative; Libardo Bastidas Passos, Lions Colombia; Madelle Hatch, The Carter Center; and Yao Sodahlon, Mectizan Donation Program.



Sílvia Nobre Waiãpi, director, Special Secretariat for Indigenous Health of Brazil, makes opening remarks at IACO in the PAHO office in Brazil.

Foundation was announced at the meeting.

A number of colleagues—Claudete Schuertz, Giovanini Coelho, João Batista Vieira Furtado, and Victor Py Daniel—from the early days of onchocerciasis work in Brazil attended the IACO meeting. Many of these serve on the Brazil national onchocerciasis elimination committee, and all were delighted at the progress made by the Brazilian and Venezuelan programs against great odds. **E**

Country Elimination Committees Make Recommendations to Ministries of Health in Ethiopia, Nigeria, and Uganda

Advisory committees in Ethiopia, Nigeria, and Uganda met in 2019 to discuss the status of onchocerciasis in their respective countries and make recommendations to their ministries of health to advance their efforts.

Ethiopia

The Ethiopian Onchocerciasis Elimination Expert Advisory Committee held its sixth meeting Oct. 29–31 in Addis Ababa. Hiwot Solomon, head of the Disease Control and Prevention Division of the Federal Ministry of Health, opened the meeting, which was chaired by Professor Rory Post of Liverpool John Moores University. Opening remarks were made by the Most Honorable Dr. Tebebe Berhan of the Lions Clubs of Ethiopia. Nebiyu Negussu, former national NTD coordinator at the Federal Ministry of Health, and Dr. Zerihun Tadesse, country representative for The Carter Center, are co-secretaries.

This year's meeting celebrated achievements in mapping and impact on transmission. A major goal of the program is to complete onchocerciasis elimination mapping as soon as possible. The program presented OV16 results from over 26,000 adults; these tests were performed in the Lions-Carter Center-assisted molecular laboratory at the Ethiopian Public Health Institute. Thirteen of 88 (15%) districts surveyed had 2% or higher OV16 positivity and were recommended for mass drug administration (MDA) by the committee. This would mean another 1.8 million people will become part of the national river blindness elimination program. Based on this expansion, the Carter Center's

River Blindness Elimination Program will support MDA targeting as many as 16 million people in 2020, if funding allows.

The committee reviewed results from evaluations in two areas in Oromia and Southern Nationalities and Peoples' regions where river blindness transmission may have been interrupted. However, the committee required more information from the program before making a stop-MDA recommendation. Post-treatment surveillance activities were discussed in the cross-border focus of Metema, Ethiopia, and Galabat, Sudan, where MDA was halted in 2017; the committee is developing a manual based on this experience.

There were 74 attendees at the meeting, including representatives from the Federal Ministry of Health, the Ethiopia Public Health Institute, five regions of the country, Jimma and Addis Ababa universities, and Ministry of Health of Sudan. Key partners

included The Carter Center, RTI International, Light for the World, the END Fund, USAID, and Lions Clubs International Foundation.

Nigeria

The 11th Nigeria Onchocerciasis Elimination Committee meeting took place in Abuja Dec. 10–12, 2019. The committee, chaired by Professor B.E.B. Nwoke, makes recommendations to the Federal Ministry of Health to advance the elimination of river blindness transmission in Nigeria, the most endemic country in the world for onchocerciasis. The Federal Ministry of Health was represented by Dr. C. Anyaike, national coordinator of NTDs, and M. Igbe, national coordinator of the onchocerciasis program.

On the first day of the meeting, a celebration honored those who had participated in the successful interruption of transmission of onchocerciasis and halting of mass drug administration (MDA) in the Nigerian states



Dr. Chukwuma Anyaike, Nigeria's national coordinator of NTDs, presents an award to Dr. Emmanuel Miri, Carter Center country representative.

of Plateau, Nasarawa, and Kaduna. Plateau and Nasarawa were assisted by The Carter Center and halted MDA in 2017. Kaduna was assisted by Sightsavers and halted MDA in 2018.

The committee recommended that Zamfara and Kebbi states be provisionally classified as having interrupted transmission of onchocerciasis, pending successful completion of entomology studies in 2020. Delta and Ebonyi states were reclassified as “suspected” of interrupting disease transmission; The Carter Center team in Nigeria will be conducting the entomological assessments needed to make a stop-MDA decision in those states in 2020. In addition, Plateau and Nasarawa states will launch their third-year post-treatment surveillance evaluations in 2020. These are required by the World Health Organization to attain the final classification of “onchocerciasis transmission eliminated.”

Uganda

The Uganda Onchocerciasis Elimination Expert Advisory Committee assessed progress against the disease at its annual meeting in Kampala last August.

The committee provides scientific and technical recommendations to the Ministry of Health to advance its elimination agenda. The meeting was chaired by Professor Thomas Unnasch of the University of South Florida, with David Oguttu, the national coordinator for onchocerciasis, and Peace Habomugisha, country representative for The Carter Center, as co-secretaries. The Honorable Minister of Health, Dr. Jane Ruth Aceng, opened and closed the meeting. Committee members include representatives from the Uganda Ministry of Health/District Health Services, USAID’s Act to End NTDs–East, led by RTI International

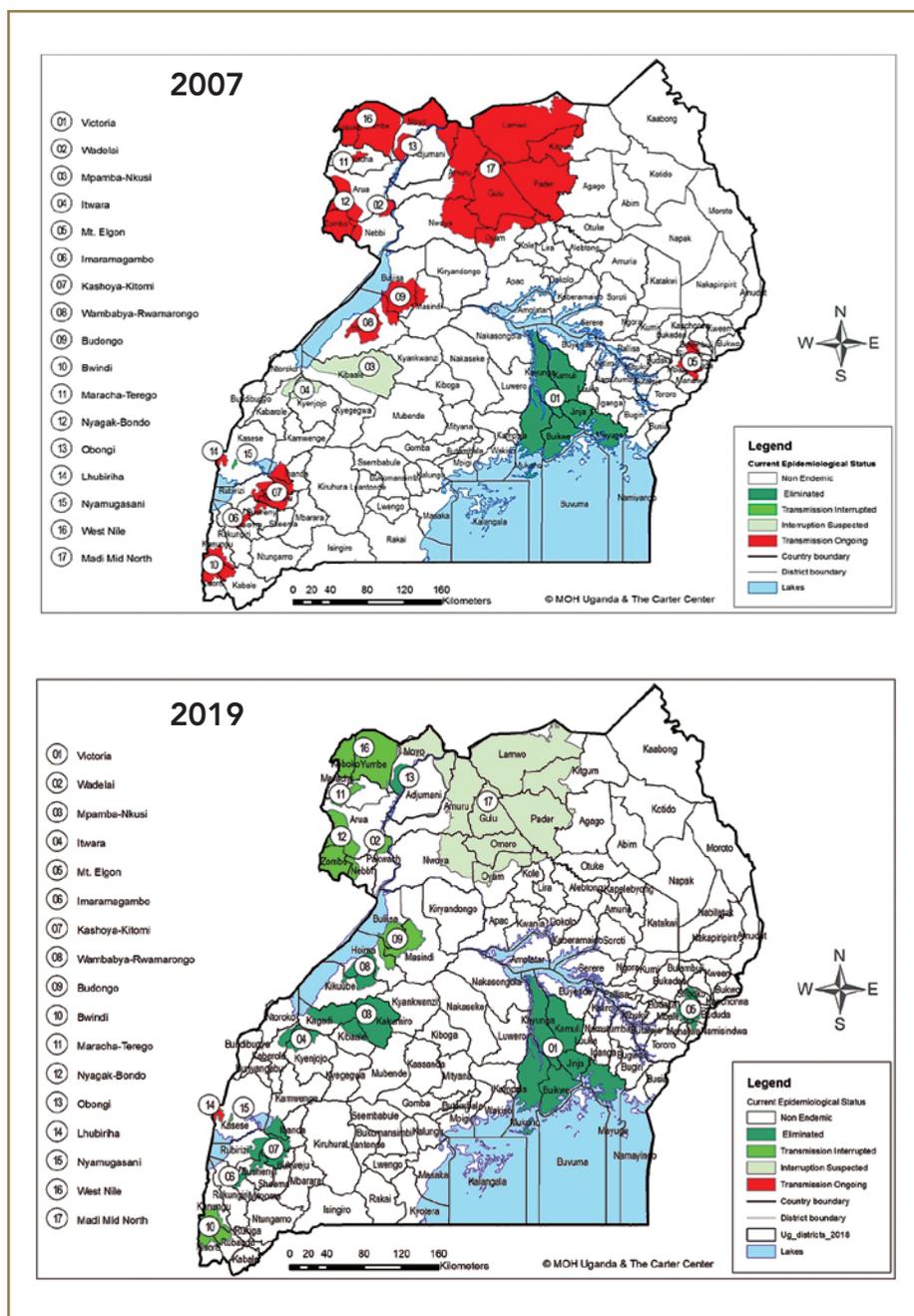


Figure 1. Maps showing levels of disease transmission in Uganda’s 17 onchocerciasis foci in 2007 and 2019.

and The Carter Center, and experts in the field of onchocerciasis elimination and control.

There were three key outcomes from this meeting: First, the Obongi focus, having successfully completed three years of post-treatment surveillance, was reclassified from “transmission interrupted” to

“transmission eliminated” in accordance with World Health Organization guidelines. This brings the total number of Uganda foci classified as eliminated to eight of 17. Second, the Nyagak-Bondo focus was reclassified to “transmission interrupted,” and as a result MDA will be stopped in 2020

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In honor of the 20th anniversary of Eye of the Eagle, Carter Center staff have looked back at the scholarly articles they have published over the years. Members of the river blindness, lymphatic filariasis, and schistosomiasis teams at The Carter Center have authored or co-authored 112 articles, chapters, and letters resulting from the staff's work since the river blindness program was launched in 1996. This includes 23 annual anonymous reports in the World Health Organization's "Weekly Epidemiological Report," documenting the remarkable progress of the Carter Center's Onchocerciasis Elimination Program for the Americas (OEPA). Many of these publications have provided data needed for the World Health Organization's guideline development process.

Journals Where Published

- Acta Tropica
- American Journal of Tropical Medicine and Hygiene
- Annals of Tropical Medicine and Parasitology
- Bulletin of the Pan American Health Organization
- Bulletin of the World Health Organization
- Filarial Journal
- Lancet
- Malaria Journal
- Morbidity and Mortality Weekly

- Report of the U.S. Centers for Disease Control and Prevention
- New England Journal of Medicine
- PloS Neglected Infectious Diseases
- Trends in Parasitology
- Social Science and Medicine

Topics Explored

- Establishing treatment objectives/ goals and monitoring treatment coverage
- The role of women in the programs
- *Loa loa* issues
- Kinship structures and community-directed treatment strategies
- Strategies and approaches of control versus elimination of transmission programs
- Integration of neglected tropical disease (NTD) assessment and mass drug administration (MDA) activities, including triple-drug administration for simultaneous treatment of river blindness, lymphatic filariasis, schistosomiasis, and soil-transmitted helminths
- Integration of NTDs with malaria programs, including the role of bed nets in lymphatic filariasis elimination in Africa and the role of ivermectin in malaria programs
- Anti-*Wolbachia* treatment approaches
- Onchocerciasis-associated epilepsy
- Lymphatic filariasis hydrocele surgery
- Sustainability and financing of NTD programs
- Vector infection monitoring of lymphatic filariasis and river blindness programs
- Mental health in patients suffering from lymphatic filariasis-associated lymphedema
- Lab and field diagnostics for NTDs, especially the role of the OV16 ELISA
- The evolution of the role of onchocerciasis nongovernmental development organizations on the global stage in NTD efforts
- Role of national committees in onchocerciasis elimination
- Chemical and environmental control for river blindness vectors
- Use of black-fly traps
- Community knowledge, attitudes, and practices before, during, and after cessation of river blindness MDA
- Promotion of twice-per-year MDA for onchocerciasis
- Mathematical modeling of NTD transmission
- Cross-border issues
- Stop-MDA surveys for onchocerciasis in the Americas and Africa **E**

Country Elimination

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for 608,219 people. Third, the Madi-Mid North focus was reclassified as "interruption suspected." Additional data will be required, however, before

halting MDA is considered.

Over the past 12 years, Uganda has steadily progressed in its fight against river blindness (see Figure 1). Uganda's government continues to collaborate with the Democratic

Republic of the Congo and South Sudan to promote cross-border river blindness elimination activities and treat the refugee population in Uganda that may have migrated from endemic areas in those countries. **E**

Trachoma Elimination Draws Nearer to Reality

Over the last 20 years, remarkable strides have been taken toward the control and elimination of blinding trachoma. The Carter Center is recognized as a leading implementing organization in trachoma control and has made notable contributions to this effort through its collaboration with national trachoma control programs, its advocacy among partners and donors, and its original operational research initiatives and innovative integration strategies.

The Carter Center formerly assisted Ghana, Nigeria, and Uganda in their national programs to eliminate trachoma as a public health problem. Ghana was validated by the World Health Organization (WHO) in 2018 and became the first sub-Saharan African country to be so recognized for elimination of trachoma as a public health issue. The trachoma programs currently supported by The Carter Center in Ethiopia, Mali, Niger, South Sudan, and Sudan have notable progress to report in their efforts

to alleviate unnecessary blindness and suffering.

Ethiopia

In Ethiopia, where the Amhara region bears the world's most severe burden of trachoma, The Carter Center supports the Amhara Regional Health Bureau to deliver the full SAFE strategy, which comprises surgery, antibiotics, facial cleanliness, and environmental improvement. With support from the Lions Clubs International Foundation, the Lions Clubs of Ethiopia, and many other donors, The Carter Center has worked with the Amhara Regional Health Bureau to facilitate trichiasis surgical outreach, mass distribution of antibiotics, health education in communities and schools, and household latrine construction since 2001.

The Carter Center partners with the Ethiopian Federal Ministry of Health to address the needs of nearly 20 million people at risk of debilitating trachoma in Amhara. The program relies on a network of 7,000 governmental

health extension workers and 30,000 village-based volunteers, or members of the Health Development Army.

The Carter Center–assisted Ethiopia Trachoma Control Program started in the South Gondar zone of Amhara in 2000 and has since expanded to cover all 178 districts in the 12 zones of the Amhara Region. The Carter Center assists the greatest number of Zithromax[®] treatments through mass drug administration (MDA) for trachoma and the greatest number of trachomatous trichiasis (TT) surgeries of any single nongovernmental organization in the world in this region.

The Carter Center, together with the Federal Ministry of Health and other partners in Ethiopia, has demonstrated that community-directed programs can mobilize millions of people to accept treatment and adopt behavioral changes to improve their own lives, even in remote areas where there is limited access to basic medical care, water, and sanitation. The

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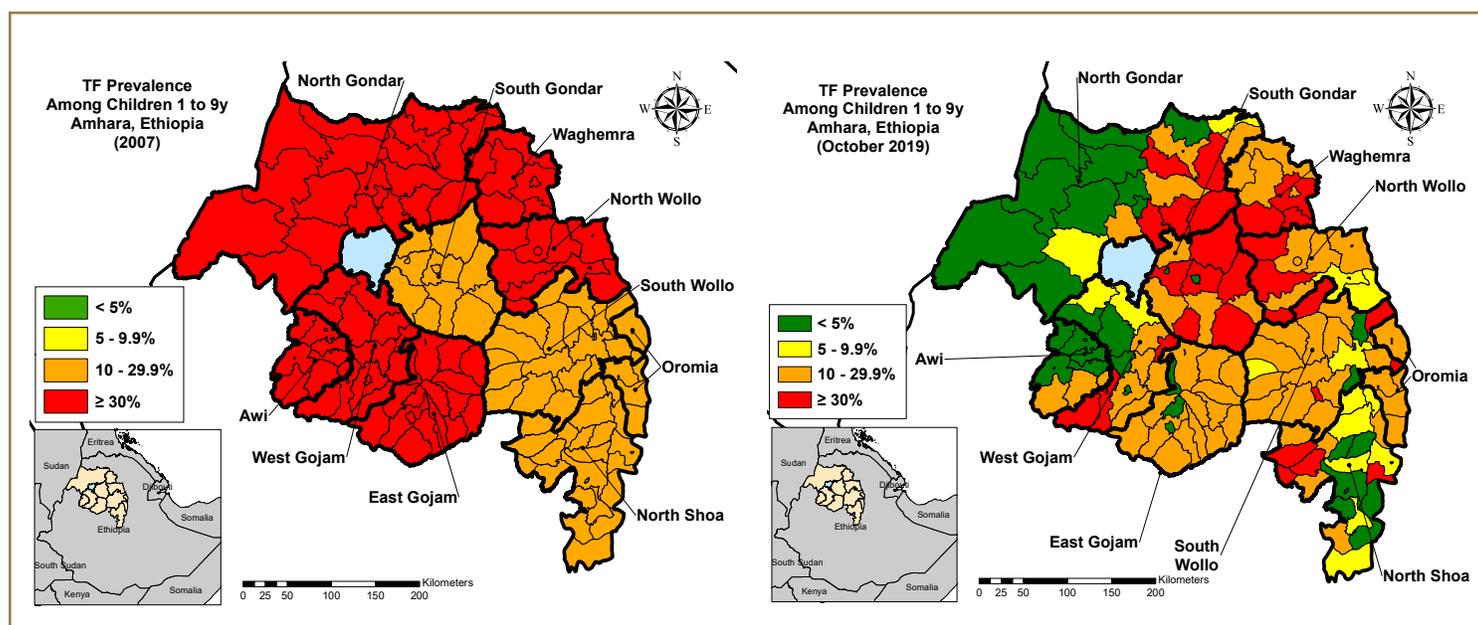


Figure 2. Prevalence of trachomatous inflammation-follicular (TF) among children ages 1 to 9 years in Amhara Region, Ethiopia, in 2007 (left) and 2019 (right).

Trachoma Elimination

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entrenched, hyperendemic nature of the disease in the Amhara region has warranted many years of intervention, which has finally resulted in substantial progress. There is considerable divergence in disease prevalence between districts, with 49 districts meeting the WHO elimination threshold of trachomatous inflammation-follicular (TF) among children ages 1 to 9 years below 5%; however, continued intervention is required in most districts. Despite the divergence, recent trachoma impact surveys indicate approximately 4.9 million people no longer require mass antibiotic treatment for trachoma as a result of the full SAFE strategy implementation throughout the region. (Figure 2 shows change in disease prevalence over time.)

The Amhara region has achieved great success providing sight-saving TT surgery to those who need it; since 2001, The Carter Center has supported more than 702,000 TT surgeries in the region, accounting for more than 80 percent of the total estimated backlog in Amhara. The Carter Center will continue to support the Amhara Regional Health Bureau to address the estimated 150,000 TT cases remaining in the region by 2023, while supporting prevention efforts to ensure others do not develop the debilitating disease.

Mali

Mali plans to eliminate blinding trachoma as a public health problem by 2020. The Malian national blindness prevention program has conducted trichiasis outreach services for over two decades, providing surgery to more than 92,000 people since 1999 with about 30,000 assisted by The Carter Center since 2008, facilitated by support from the Conrad N. Hilton Foundation, OPEC Fund for

International Development, Lions Clubs International Foundation, and other donors. The Carter Center works in collaboration with Helen Keller International and Sightsavers to implement trachoma activities and support the national program and the Ministry of Health as it nears the elimination of trachoma as a public health problem.

Despite ongoing security problems in the country, the program has continued to show great dedication to completing the remaining surveys, surgeries, and F&E activities necessary to achieve the goal. In Mali, the Programme National de Soins Oculaire (PNSO-National Eye Health Program) has almost reached the elimination threshold countrywide, with only select surveys, transition activities, and completion of the dossier required in order to be validated by WHO.

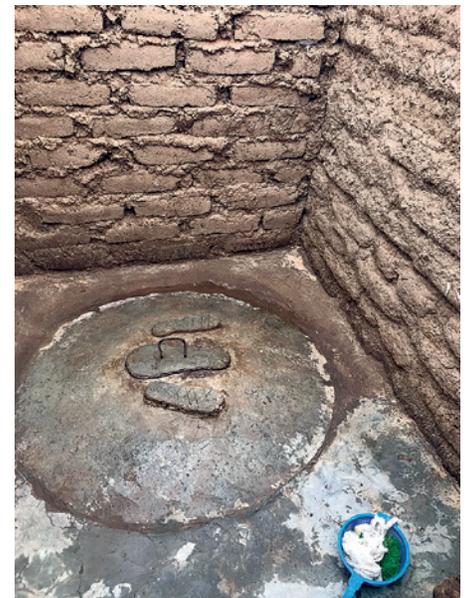
Niger

In Niger, with support from the Conrad N. Hilton Foundation and in collaboration with Helen Keller

International, OPEC Fund for International Development, Lions Clubs International Foundation, and other donors. The Carter Center has assisted the national program in making great progress toward elimination of trachoma as a public health problem by 2025. The program is expected to clear the remaining surgical backlog nationwide by 2023. An estimated 16,700 people need surgery for TT, cutting the backlog in half since 2016; the program plans to reach these individuals in the next two years. The program uses a case search approach known as *ratissage*, with teams moving from house to house in communities to screen for trichiasis and offer surgical services immediately at the nearby surgical camp. A similar method was used in Mali with great success. F&E activities have been hugely successful across Niger, with community and school health education and the use of local radio stations to broadcast messages about trachoma, and the training of community



One of the more than 3,700 trained masons in Niger constructs the concrete sanitary platform that will be part of a household latrine in the community.



Soap for hand washing sits beside a completed latrine in a household compound in Niger. Community members dig the latrine pit and collect additional sand before the platform is installed.

members, especially women, to provide health education in their communities. These activities were conducted in concert with the construction and promotion of latrines to decrease the fly population, limit transmission, and improve overall health. The Carter Center has assisted the national program in training masons to build more than 150,000 latrines in the areas most endemic for trachoma.

South Sudan

Since 2001, The Carter Center has assisted the Ministry of Health to implement SAFE activities and is recognized as the lead international agency for trachoma control in the country. In December 2013, all program activities were suspended due to heavy fighting among regional armed groups. Activities resumed in September 2014 and continued through May 2016, when activities were suspended again. In September 2017, the program was able to resume MDA activities in five counties. The Carter Center assisted the Ministry of Health as it resumed TT surgical services in July 2018. Despite ongoing conflict and insecurity throughout the country, The Carter Center has

remained committed to supporting the National Trachoma Program as it continues to work toward elimination of trachoma as a public health problem by 2030. Due to ongoing security issues in many areas, The Carter Center currently focuses its efforts on five accessible counties in the Eastern Equatoria region.

The South Sudan program has adopted a unique approach to make surgical services available to the most vulnerable and remote populations. Rather than returning patients to their homes on the day of their surgery, patients are kept overnight at the health clinic. Patients come with a caregiver and their children. They are provided a sleeping mat, bedsheet, and food during their stay. The provision of food is welcomed by patients, especially women, as the need to cook for their children is one of the main reasons why women say they do not come for surgery. Women are twice as likely as men to have TT, the advanced stage of trachoma. Staying overnight at the clinic allows patients to rest and then return to their villages the next day with their bandages removed and the success of

the surgery visible to other villagers. Since adopting this method, surgical refusals have decreased; patients have reported a positive experience, becoming advocates and encouraging others. Given the high prevalence of trachoma in South Sudan, TT, typically found in older populations, has been documented in children. There have been multiple instances where parents have brought their children to receive surgery, knowing that without interventions the children will suffer irreversible blindness.

Sudan

The Carter Center assists Sudan's National Prevention of Blindness Program to eliminate trachoma as a public health problem through the implementation of the S, A, and F components of the SAFE strategy. The E component, environmental improvement, is supported by other organizations working in the country. The national program has made significant progress toward implementation of the trachoma program throughout the country and understanding the burden of the disease in

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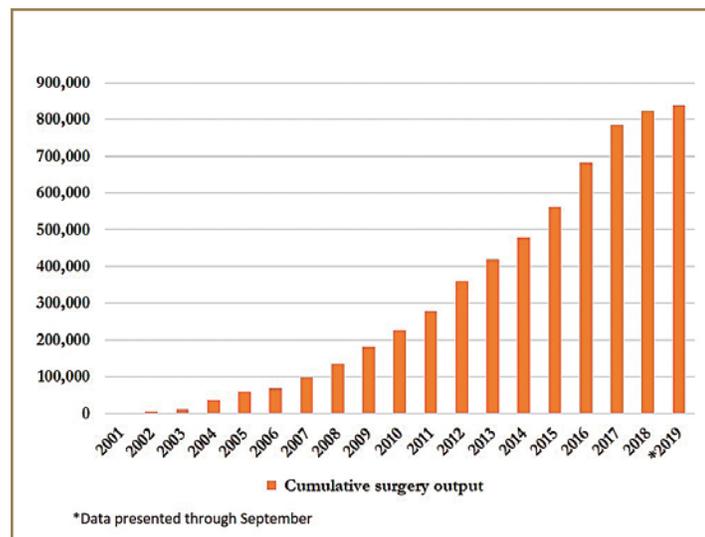


Figure 3. Cumulative number of surgeries assisted by The Carter Center to correct trachomatous trichiasis (TT), by year.

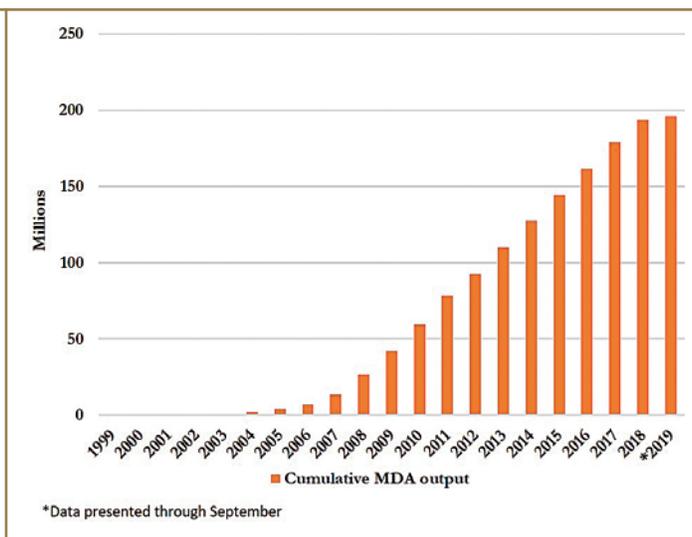


Figure 4. Cumulative number of trachoma treatments provided with mass drug administration assisted by The Carter Center, by year.

Published Works Detail 20 Years of Data-Driven Trachoma Control in Eight Countries

Since its inception, the Center's Trachoma Control Program has been committed to being data driven and strives to publish the methods, findings, and recommendations that come from programmatic activities. Publishing in peer-reviewed literature helps to inform the greater global trachoma community of the activities, successes and challenges of trachoma control in the areas where we work. Publication can also help inform policy, spark creative approaches, and provide sound rationale for advocacy. We can also help inform other large-scale public health programs in implementation activities, methods for data collection and overall management practices.

From 1999 to 2019, the Trachoma Control Program has authored or co-authored more than 75 papers in the peer-reviewed literature. The earliest work detailed the epidemiology of trachoma in southern Sudan and helped establish the height-based dosing that is now standard for mass drug administration with azithromycin. Over

the years, data have been published from eight countries, with the highest output of 39 reports coming from the Ethiopian program, followed by reports from Niger and Sudan.

Researchers with The Carter Center have been involved in work that used a wide range of methodologies, publishing quantitative and

Publication can help inform policy, spark creative approaches, and provide sound rationale for advocacy.

qualitative reports, cross-sectional studies, cohort research, and systematic reviews. Publications have most often been reports on disease prevalence, which are extremely important as these data guide interventions in programming. The Carter Center has also been involved in more than 20 publications detailing the results of randomized

control trials that are conducted to improve the trachoma interventions. These trials have helped shape global recommendations, including determining which surgical techniques are the most effective for treating trichiasis, the blinding form of trachoma. The most recent works published with Carter Center involvement have detailed the burden of trachoma in refugee camps serving South Sudanese people living in Sudan, demonstrated that monitoring of infection through in-country laboratory capacity is possible in large-scale programs, and shown that twice-annual drug administration has a mortality benefit for the youngest individuals we serve.

The Trachoma Control Program remains committed to being driven by data and will continue to publish our findings in peer-reviewed journals so that the lessons we learn can be shared by the global community, helping us to successfully eliminate trachoma as a public health problem and ultimately to improve lives. **E**

Trachoma Elimination

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areas of Darfur that were previously inaccessible. While periodic unrest in the country has impacted the Carter Center's ability to implement activities in certain areas, the Center remains focused and prepared to implement activities, specifically MDA and TT surgery camps, when security conditions allow. In addition to providing services at the typical district level,

The Carter Center has worked to implement activities in South Sudanese refugee camps and share the lessons learned from these activities with other country programs and implementing partners that are seeking to tackle the challenge of trachoma elimination in displaced populations.

Conclusion

Despite the challenges presented by insecurity and logistics in accessing the hardest-to-reach populations, Carter Center-supported programs still

manage to provide surgery for thousands of people and distribute millions of doses of antibiotic each year (see Figures 3 and 4, respectively), a success that has all affected countries on track to eliminate blinding trachoma. The programs work because of the firm commitment of government officials, Carter Center staff, donors, health extension workers, and thousands of community volunteers who deliver the drugs, surgical services, and health education to communities. **E**

Eyesight of South Sudan Displaced Residents Not Forgotten

Trachoma is a disease that affects the vulnerable and marginalized. In large parts of South Sudan, the disease is considered hyperendemic, meaning it is highly prevalent and widespread. For decades, The Carter Center has been providing trachoma services to communities at the village level throughout South Sudan. During this time, sustained access to many communities has proved challenging because of insecurity. Insecurity in the country over the last few years has resulted in mass displacement of the population, with almost 40% of the population living as refugees or internally displaced persons (IDP). Given these ever-changing population dynamics, The Carter Center attempts to ensure that people displaced from trachoma-endemic areas are not forgotten and do not risk losing their sight from trachoma after having already endured significant losses from displacement.

In August 2019, The Carter



Mass drug administration is carried out in an internally displaced persons camp in South Sudan.



Displaced South Sudanese wear bandages after eyelid surgery for advanced trachoma at a camp in Mogos.

Center worked with the South Sudan Ministry of Health, the World Health Organization, International Medical Corps (IMC), ACTED, and the Relief, Reintegration, and Protection (RRP) section of the United Nations mission in South Sudan to provide trachoma services to two IDP camps in Juba, the capital. Almost 130 camp leaders and community drug distributors were trained on trachoma: how to provide education on prevention and treatment and how to conduct mass drug distribution with Zithromax,[®] an antibiotic donated by Pfizer Inc for treatment of trachoma. Over the span of two weeks, more than 25,000 people received treatment across two IDP camps. Of these, 50 percent were children under the age of 15. Additionally, people were screened for the advanced stages of trachoma and referred to the local eye clinic for follow-up surgery

to prevent blindness. During the drug distribution, health education was provided to participants to ensure camp residents understood what they could do to further prevent the spread of the disease.

As the world continues to experience record high numbers of displacement, national programs and their supporting organizations must adapt to cater to refugees and IDPs. The Carter Center and the South Sudan Ministry of Health will continue to assist in the camps as needed and warranted over time. The Carter Center has been a leader in responding to this need and continues to demonstrate that through the power of partnership with government ministries, the United Nations, and relief organizations such as IMC and ACTED, refugees and IDPs can be successfully reached and not forgotten. **E**

20th ANNIVERSARY

Giants of Public Health Are Profiles in Persistence

The Carter Center has been a global leader in the fight against vision-stealing diseases for decades, thanks to the work of thousands of volunteers, hundreds of staffers, and a handful of extraordinary leaders. Here are glimpses of three of the latter.

Dr. Nabil Aziz Awad Alla

Dr. Nabil, the Carter Center's country representative in Sudan, has a preference for working in the field rather

than the office even though field work is inherently riskier. He nearly died of cerebral malaria during a Guinea worm surveillance trip, he visited a town under siege by warring soldiers, and he's been stranded in a car with no food, little water, and three flat tires.



With a long career in public health, Dr. Nabil Aziz Awad Alla, located in Khartoum, coordinates the Carter Center's activities in Sudan.

“Unless you go to be with your workers in the field and unless you talk to them, things will not move,” said Nabil.

As the Guinea worm eradication program's national program coordinator for Sudan's Federal Ministry of

Health in 1995, Nabil was a key figure in the so-called “Guinea worm ceasefire” during Sudan's civil war. The truce allowed health agents in conflict zones to treat not only Guinea worm, but also other diseases, including river blindness.

“It was the beginning of developing coordination between North and South Sudan,” Nabil said.

Nabil is too humble, said Ross Cox, who worked with him in the mid-1990s when Cox was with the U.S. Centers for Disease Control and Prevention.

“Nabil was able to bridge the reality of the North and the South being on separate sides because many of the people who were serving as the de facto government in the South were former colleagues and friends of his,” Cox said.

“His integrity and humanity made it possible for him to transcend the situation.”

In 2007, Nabil joined The Carter Center, where he leads the effort to eliminate trachoma and river blindness. Transmission of river blindness was eliminated in the Abu Hamad focus on the River Nile in 2015 and interrupted in the Galabat focus in 2016, events making what was once thought impossible—elimination of river blindness in Africa—seem achievable.

“The good reports [about

elimination of river blindness] you are hearing first from Latin America, then Sudan, and now Uganda have changed the minds of those who were not believing in elimination; now they are starting to believe that it is possible,” Nabil said.

Dr. Mauricio Sauerbrey

Those good reports from Latin America are due largely to the work of Dr. Mauricio Sauerbrey, director of the Onchocerciasis Elimination Program for the Americas (OEPA) since 1998.

“Guatemala and Mexico used to have the most severe cases of river blindness in the region of the Americas,” Sauerbrey said. “But, at this point, there have been no blindness cases caused by onchocerciasis in the Americas since 1995.”

Progress against the disease in the region is impressive: Mexico was verified as having eliminated it in 2015 and Guatemala followed suit in 2016. They were preceded by Colombia in 2013 and Ecuador in 2014. The success in Ecuador was seminal because the vector was most similar to the vectors in Africa, demonstrating that elimination was possible in Africa.

There are still obstacles to overcome. One is to keep the governments of each country interested in fighting a disease that “is not their top priority.”

“This is my main challenge,” Sauerbrey said. “To try to keep that political will, to be in back of the ministries of health and the authorities, pushing and pushing and pushing and pushing. It may not mean anything to them, but it does for the people of the last communities where the disease remains, so it never resurges to cause blindness again.”

Sauerbrey is an author or co-author of 29 peer-reviewed



From Guatemala City, Dr. Mauricio Sauerbrey oversees the Carter Center's campaign to rid the Western Hemisphere of river blindness through the Onchocerciasis Elimination Program for the Americas.

publications on onchocerciasis, malaria, Chagas' disease, and other parasitic diseases that impact the Americas. Those publications have helped steer best practices in the fight against river blindness.

In 2012, Sauerbrey was awarded the Merck Mectizan Award for contributions to the control and elimination of onchocerciasis. He is on the board of directors for the Latin American Federation of Parasitologists and the Central American Society of Tropical Medicine and Parasitology.

And it's all because of passion.

"Whatever you do, small or big, if you do it with passion, you'll get success," he declared. "If you don't do anything with passion, forget it; you'll never get any success. That's the main reason why I'm here."

Dr. Emmanuel Miri

Dr. Emmanuel Miri has spent decades fighting river blindness, trachoma, lymphatic filariasis, schistosomiasis, and Guinea worm disease in Nigeria.

In 1988, Nigeria had over 650,000 cases of Guinea worm in all 36 states. In 2013, Nigeria's Federal Ministry of

Health achieved certification that it had eliminated the disease nationwide. In 2012, Miri received his country's second-highest civilian honor, the Order of the Federal Republic of Nigeria, for his critical work on Guinea worm elimination.

"What I learned from the Guinea worm campaign is that these neglected tropical diseases can be eliminated," Miri said. "We did it once, so we can do it again. The advantage we have is that we're coming from a background now of having been successful, and that on its own is motivating enough."

And success is still coming. In the Nigerian states of Nasarawa and Plateau—the latter being Miri's home state and the site of the Carter Center's

national office—lymphatic filariasis and trachoma have been reduced to a point where they are no longer public health threats. Last year those two states stopped transmission of river blindness, the first to do so in Nigeria.

Still, no one—least of all Miri—believes eliminating river blindness transmission once and for all will be easy.

"In Carter Center-assisted areas in Nigeria, we're talking about covering or protecting 37 million people," Miri said. "That's a lot of people. And we're working in over 30,000 communities. In each of these communities you have two or three village volunteers, and you are generating data from them. To compile and collate all this data to reach the right decision is one of the biggest challenges that we have."

Miri is motivated to finish the fight.

"I foresee that in the next five years we should be talking about interrupting river blindness transmission in Nigeria," he said, beaming. "I think that will be great!" **E**



Dr. Emmanuel Miri, who can be found at the large Carter Center compound in Jos, Nigeria, runs programs fighting river blindness, lymphatic filariasis, schistosomiasis, and intestinal worms.

20th ANNIVERSARY

Field Visits Demonstrate Power of Partnership

Over the past 20 years, The Carter Center has had the honor of hosting some of its dedicated donors on visits to the field to see their philanthropic contributions in action. Below are just a few highlights from these visits, where members of Carter Center leadership shared the impact of the Center's work to fight disease and build hope with key donor partners whose support enables our success.

A Visit to Chad with Merck & Co., Inc. 1994



In 1999, President and Mrs. Carter hosted Roy Vagelos (center), then the CEO of Merck & Co., Inc., in Nia, Chad, where nearly all 500 villagers were infected with river blindness. President Carter said of the Center's partnership with the historic Mectizan Donation Program, "The Mectizan donation story is a powerful reminder that it is possible to help people change their lives."

A Visit to Ethiopia with Pfizer Inc and Lions Clubs International November 2013

Sally Susman (left), Pfizer Inc executive vice president, Dr. Paul Emerson (center), the Center's former Trachoma Control Program director, and the Most Hon. Dr. Tebebe Berhan (right) of the Lions Clubs of Ethiopia celebrated the delivery of the 100 millionth dose of the antibiotic Zithromax® during Maltra (malaria and trachoma) week celebrations in Dangla, Ethiopia, in November 2013. Pfizer has provided hundreds of millions of doses of the antibiotic to aid in the global campaign to wipe out blinding trachoma. President Carter has noted, "The Pfizer donation of Zithromax was momentous in trachoma control, and The Carter Center was pleased to go to scale in trachoma-endemic countries to get the medicine into the villages and demonstrate the world could end blinding trachoma."

A Visit to Nigeria with GSK and the Bill & Melinda Gates Foundation February 2007



Representatives from GSK, including David Stout (second from right), president of pharmaceuticals, and Gunther L. Faber (top), vice president for sub-Saharan Africa, and David Brandling-Bennett (third from right) of the Bill & Melinda Gates Foundation traveled to Nigeria in early 2007. GSK continues to donate albendazole tablets to eliminate lymphatic filariasis in Nigeria and Ethiopia, and the Bill & Melinda Gates Foundation has been one of the Center's most significant supporters. Above, the group learns about the suffering of two patients with swollen legs and feet, symptomatic of lymphatic filariasis infection.



Lions Clubs and Abbott Celebrate SightFirst Partnership in Ethiopia January 2016

The 15th Biannual Trachoma Campaign Week was held by the Lions-Carter Center SightFirst Initiative with a launch in Merhawi town and field visit in Bahir Dar town, Ethiopia. The initiative, which is dedicated to helping control trachoma with millions of Zithromax® treatments, surgeon trainings, community health education, and latrine construction, celebrated its 15th mass drug administration campaign by dispensing about 10 million doses of Zithromax. Carter Center CEO Ambassador (ret.) Mary Ann Peters (fourth from left), Joe Preston (fifth from left), chairperson of Lions Clubs International Foundation, and the Most Hon. Dr. Tebebe Berhan (fourth from right) of the Lions Clubs of Ethiopia and co-chair of the Lions-Carter Center SightFirst Initiative, were in attendance. A large Abbott delegation, including Dr. Jens Dhein, Andy Wilson,



Omar Riyal, and Al Reid, also attended the celebration. Abbott contributes diagnostic supplies that allow program staff to test and diagnose infection more effectively.

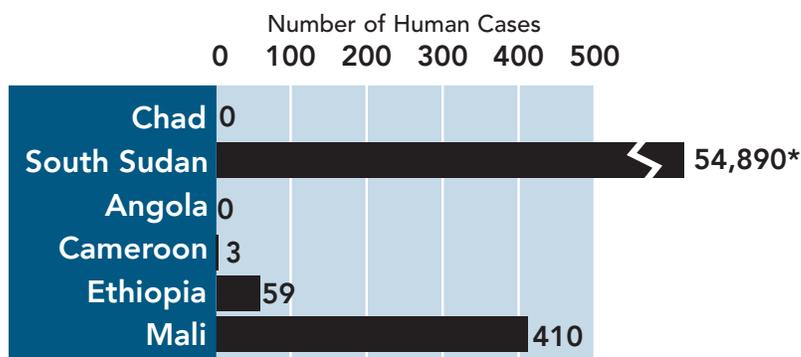


IZUMI Foundation Representatives Travel to Nigeria 2018

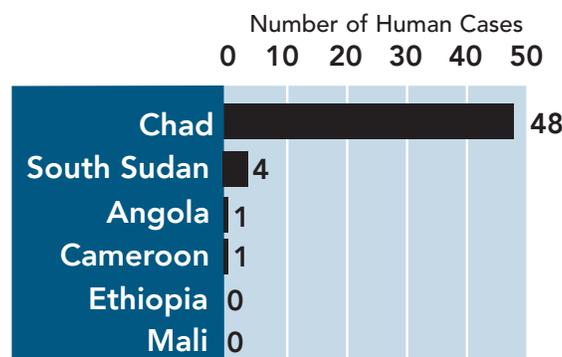
Two years ago, IZUMI Foundation representatives traveled to Munkohot, Nigeria, to see their philanthropic dedication in action. Pictured are IZUMI representatives Gretchen Stoddard (left), program director, and Yuko Yoshida (right), associate director of operations. IZUMI has been a Carter Center partner for nearly a decade, contributing substantially to the work of the Schistosomiasis Control Program in Nigeria. Schistosomiasis is a preventable parasitic disease that disproportionately affects children; it is treated with a single annual dose of praziquantel and community health education efforts. [E](#)

20th ANNIVERSARY Guinea Worm Disease Update, From 2000 to Now

January–December 2000



January–December 2019*



*This reflects all cases in Sudan in 2000; South Sudan was part of Sudan at that time.

*Provisional

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For more information about The Carter Center and its health and peace programs, visit our website at www.cartercenter.org.

To mark 20 years of Eye of the Eagle, here's a look at the newsletter's cover over time: the inaugural issue, the 10th anniversary issue, and this 20th anniversary issue. All issues, past and present, can be found on cartercenter.org.

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2010

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