

EYE of the EAGLE

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More than 1 billion people—one-sixth of the world's population—suffer from one or more neglected tropical diseases (NTDs), but only 62 percent of those afflicted are receiving care. The global NTD community, including donors, the U.S. government, and pharmaceutical companies, is working to rectify this critical gap and eventually eliminate these diseases.

The U.S. Agency for International Development has chosen RTI International, together with The Carter Center and other partners, to implement a five-year program called Act to End NTDs—East. The Carter Center has worked with RTI through another program known as ENVISION.

The Act to End NTDs—East implementers will partner with endemic countries to control or eliminate seven diseases—lymphatic filariasis, trachoma, river blindness, schistosomiasis, and three soil-transmitted helminths—using mass administration of donated medication and encouraging increased national ownership of NTD programming.

The program's approach is based on cost-effective interventions, including disease mapping, mass drug administration through communities and schools, disease-specific assessments, surveillance, diagnostics, drug procurement, and improved data management. RTI and The Carter Center will work to provide the monitoring and evaluation necessary to help countries document their achievements in reducing or eliminating NTDs.

The Act to End NTDs—East program will focus these interventions in 13 countries:



Ruth McDowell

Nigerian Lawrence Agomou's left foot is enlarged due to lymphatic filariasis. The Act to End NTDs—East program is targeting interventions for neglected tropical diseases in Nigeria and 12 other countries.

Bangladesh, Democratic Republic of the Congo, Ethiopia, Haiti, Indonesia, Laos, Mozambique, Nepal, Nigeria, the Philippines, Tanzania, Uganda, and Vietnam. Through this cooperative agreement, The Carter Center will continue to provide leadership in Uganda in river blindness, and in Nigeria in river blindness, lymphatic filariasis, schistosomiasis, and soil-transmitted helminths.

Early in 2018, the Nigeria Federal Ministry of Health announced that transmission of river blindness had been interrupted in two Carter Center-assisted states (Plateau and Nasarawa), benefiting more than 2 million people and making it the largest population ever to halt mass drug administration for river blindness. As of 2019, 300,000 people will no longer need treatment in Uganda.

As a growing number of countries take the final steps toward NTD elimination, this program focuses on the most vulnerable communities in an effort to create lasting change for future generations. **E**

Electronic
Edition

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2018 IACO Focuses on Yanomami in Brazil, Venezuela

The 28th InterAmerican Conference on Onchocerciasis (IACO) took place Nov. 7–8, 2018, in Antigua, Guatemala. The Carter Center and 45 partners in the Onchocerciasis Elimination Program for the Americas (OEPA) reviewed progress toward eliminating onchocerciasis from the Western Hemisphere.

The conference’s theme was “Walking with the Yanomami on cross-border health paths to reach the 2022 goal.” Onchocerciasis now affects just 6 percent of the population once at risk in the Americas: 32,467 Yanomami indigenous people living along the Brazil-Venezuela border.

The U.S. Agency for International Development, the Carlos Slim Foundation, and Lions Clubs International Foundation are key partners of the OEPA initiative. A delegation of Lions Clubs representatives from Brazil, Colombia, Mexico, and Guatemala attended the conference.

Conference sessions centered on efforts to eliminate river blindness among the people who reside in the Yanomami focus area, the last remaining area of onchocerciasis transmission in the Americas. The Brazil and Venezuela programs are using an array of approaches to accelerate elimination, including creating a scorecard composed of multiple indicators to identify communities in need of enhanced interventions; using satellite imagery to detect villages that are not yet



Carter Center and OEPA staff are joined by Lions Clubs representatives and their spouses at IACO. Left to right: Madelle Hatch; Dr. Ricardo Gurgel and Vania Gurgel, Brazil; Dr. Frank Richards; Kay Cabrera Coello and Dr. Florencio Cabrera Coello, Mexico; Dr. Libardo Bastidas Passos, Colombia; Craig Withers; Telma Soto and Dr. Angel Soto, Guatemala; and Dr. Dean Sienko.

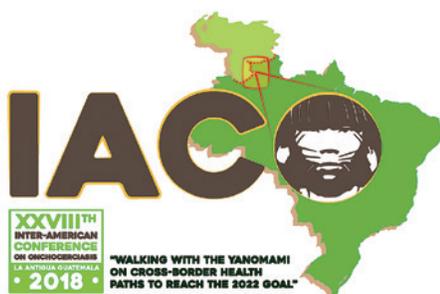


Indigenous health workers conduct health education in Brazil (left) and treatment in Venezuela (right) among the Yanomami people.

registered with the health system; using sketch maps, generated in consultation with the Yanomami people, to better understand the interconnected communities; increasing involvement of indigenous health workers; sending anthropologists to learn more about the movements of the nomadic population in order to better reach the residents; clearing overgrown aircraft landing strips deep in the jungle to allow health teams better access to communities; providing doxycycline treatment in

certain circumstances; and developing a Yanomami focus area GIS map that describes the known characteristics of each endemic community.

IACO also included post-elimination surveillance presentations for each of the four countries in the Western Hemisphere that have eliminated the disease under OEPA—Colombia, Ecuador, Guatemala, and Mexico—and for the two eliminated foci in northern Venezuela. **IE**



Elimination Committees Meet in Uganda, Ethiopia, Nigeria

Three African river blindness elimination committees met in the second half of 2018 with the support of The Carter Center. Brief reports from these meetings follow.

Uganda

The Uganda Onchocerciasis Elimination Expert Advisory Committee meets every year in Kampala and consists of institutional members from the Uganda Ministry of Health/District Health Services and partners, including The Carter Center, RTI International, Sightsavers, and at-large members who are experts in the field of onchocerciasis elimination and control.

The 11th meeting took place Aug. 7–9, 2018. The meeting was chaired by Dr. Thomas Unnasch of the University of South Florida and opened and closed by the Hon. Dr. Jane Ruth Aceng, minister of health. The meeting was observed by representatives from the Democratic Republic of the Congo and South Sudan. A key outcome from the meeting was the decision to recommend the Budongo and Bwindi foci be reclassified as having interrupted onchocerciasis transmission and for ivermectin mass drug administration and vector control activities to be stopped. A three- to five-year post-treatment surveillance period will be launched in these districts in 2019. The meeting also recommended that the Uganda Ministry of Health consult with Congolese and South Sudanese counterparts to ensure that delineation of cross-border transmission zones by binational teams proceeds smoothly.

Ethiopia

The Ethiopian Onchocerciasis Elimination Expert Advisory Committee held its fifth gathering Oct. 16–18, 2018. Hiwot Solomon, head of the Disease Control and Prevention Division of the Federal Ministry of Health, opened the meeting, which was newly chaired by Dr. Rory Post of Liverpool John Moores University, who succeeded Dr. Mark Eberhard. Dr. Zerihun Tadesse, Carter Center country representative, and Nebiyu Negussu, national NTD coordinator for the Federal Ministry of Health, are co-secretaries of the committee.

The meeting was attended by representatives from across Ethiopia's health system, as well as The Carter Center, the END Fund, RTI International, Light for the World, and Sightsavers. The theme was “Map and treat: Let's not leave any district behind.” Fittingly, results from mapping studies took a pivotal role in the agenda and discussions. The laboratory at the Ethiopian Public Health Institute provided OV16 serological results from dried blood spot surveys conducted among adults in 95 districts. Of these, the committee deemed 31 districts (33 percent) endemic and eligible for mass drug administration. From other data presented, the committee recommended that semiannual mass drug administration against onchocerciasis can be safely stopped in Awi Zone, excluding Jawi District, which has a total population of more than 700,000 people. Surveys were recommended for the Kaffa-Sheka focus in 2019 to determine whether mass drug administration can be halted there.

Nigeria

The Ninth Nigeria Onchocerciasis Elimination Committee (NOEC) meeting took place in Abuja Dec. 12–14. The committee, chaired by professor B.E.B. Nwoke, includes Carter Center staff Dr. Emmanuel Miri and Dr. Frank Richards. The Federal Ministry of Health was represented by Dr. Chukwuma Anyaie, national coordinator of neglected tropical diseases, and Dr. Joel Akilah, national coordinator of the onchocerciasis program.

The NOEC recommended that SightSavers-assisted Kaduna state stop mass drug administration for onchocerciasis in 2019, based on monitoring data indicating disease transmission has been interrupted. If the Federal Ministry of Health approves the recommendation, Kaduna will be the third Nigerian state to halt treatments, joining Carter Center–assisted Plateau and Nasarawa. Post-treatment surveillance must be conducted in each state for three to five years to assure that transmission will not resume.

The NOEC also recommended that the Federal Ministry of Health declare two additional states as “transmission suspected interrupted,” based on results from testing in children, so that these states can join two others scheduled for serology and entomology surveys in 2019.

Nigeria has seven states at or near stopping mass drug administration. During the meeting, Dr. Yao Sodahlon, director of the Mectizan® Donation Program, said, “Nigeria should be proud that it is leading the world in making such dramatic progress towards stamping out river blindness.” 

Mortality Study Shows Promising Results with Antibiotic

Results from the first phase of a landmark study, Mortality Reduction After Oral Azithromycin (MORDOR), published in the *New England Journal of Medicine* in April 2018, suggest mass drug administration of the antibiotic could have a significant impact on childhood survival.

The MORDOR study, funded by the Bill & Melinda Gates Foundation, is a partnership among the Johns Hopkins University School of Medicine, the London School of Hygiene & Tropical Medicine, The Carter Center, the Blantyre Institute for Community Outreach, the National Institute for Medical Research, and the governments of Malawi, Niger, and Tanzania.

The 24-month study, led by Thomas Lietman, Jeremy Keenan, and a team of researchers at the University of California San Francisco's Francis I. Proctor Foundation, took place in Malawi, Niger, and Tanzania—with

The Carter Center supporting work in Niger. Within the three countries, 1,533 communities were randomized to receive either a single dose of oral azithromycin or a placebo four times during the two-year study period. The results of the study found that mortality among children ages 1 month to 5 years was 13.5 percent lower in communities that had received mass administration of azithromycin, the intervention used in trachoma-endemic communities.

Notably, the greatest reduction in child mortality was seen in Niger, which had the highest childhood mortality among the three study sites but presented an 18 percent decrease.

“The results from the MORDOR



Rouhayna, age 4, drinks from a dosing cup during the ongoing MORDOR study in June 2018 in Kouhibi Koura, Niger.

study could open a door to a revolution in the way public health is done, not only in Niger, but elsewhere as well,” said Ahmed Arzika, the Carter Center MORDOR study coordinator in Niger. “Not only trachoma programs will benefit, but other diseases too.” 

Ethiopia's Amhara Schools Implement Trachoma Curriculum

In 2017, with assistance from The Carter Center, Ethiopia's Amhara regional bureaus of health and education launched the School Trachoma Health Program, a primary school curriculum to teach students behaviors to stop the spread of the infectious eye disease. Habtamu Zelalem, principal of the Zindeb Primary School in Jabi Tehnan district in West Gojjam zone, is leading the charge for implementing the new curriculum in his school and educating the surrounding community. He presented his experiences at the third annual review meeting of the region's trachoma control program July 31–Aug. 1, 2018, in Bahir Dar City.

Zelalem organized cascaded

training to ensure activities are supported and carried out from the vice principal, to the teachers, to the students, to their families, and to community groups.

Zelalem is one of over 19,000 teachers and school leaders who received training and are now supporting the new curriculum across the region.

Beyond the training, Zelalem established the Zindeb Primary School anti-trachoma club. He selected 23 girls and 18 boys who represented each community served by the school. Club members conduct facial cleanliness assessments of their peers, collect data on the availability of latrines

and handwashing facilities, helping to ensure the handwashing stations are filled with water and are in working order, contributing funds to purchase soap for fellow students, and conducting skits about trachoma prevention and educating peers and community members about the disease.

Through his presentation on his experiences, Zelalem showed the success of the program and its importance in the fight against trachoma. By highlighting the program at the annual review, the Amhara region showed its commitment to this activity as the regional trachoma control program works toward elimination of trachoma as a public health problem by 2020. 

New Approach Helps Revive South Sudan TT Surgery Program

More than 4 million people were displaced during South Sudan's civil war; some were health care workers who had supported the South Sudan Trachoma Control Program's activities by providing eye care services, including trachomatous trichiasis (TT) surgery. As peace returns to parts of the country, The Carter Center is resuming assistance to the program's surgical campaign strategy.

In Kapoeta state, it has been three years since residents have been able to access the sight-saving TT surgery. Ugandan ophthalmologist Robert Mayeku visited South Sudan in late July 2018 and conducted refresher training for five South Sudanese TT surgeons. A two-day training using World Health Organization guidelines took place prior to live-patient training. All surgeons successfully completed the training course and were certified as competent to practice TT surgeries without supervision. Following the training, the surgeons were eager to provide services to villagers.

To reach the most vulnerable and make surgical services as accessible as possible, the South Sudan program has adopted an innovative approach. 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 the 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. Patients also receive a bar



Surgeons remove bandages from patients and check for proper healing the day after TT surgery in Kapoeta state, South Sudan.

of soap when they are discharged, along with health education about the importance of keeping the face clean, especially for children.

Since adopting this method, surgical refusals have decreased; patients have reported a positive experience, becoming advocates and encouraging others. From the restart of the activities in late July through October 2018, over 420 people received surgery, 370 of whom were women. **E**

WHO Validates Ghana for Trachoma Elimination

Ghana has become the first country in sub-Saharan Africa to be validated by the World Health Organization (WHO) for the elimination of trachoma as a public health problem. From 1999 to 2011, The Carter Center assisted Ghana to increase surgical services and improve hygiene and sanitation.

Ghana succeeded in reducing trachoma as a public health problem by 2010, but it was ahead of its time: in 2010, WHO and global trachoma experts had not yet developed a process or criteria to evaluate the country's achievement. WHO created

a process in 2016 to allow for Ghana and other countries to be validated as having met the targets for elimination as a public health problem.

With financial support from the Conrad N. Hilton Foundation, The Carter Center assisted Ghana in the training of more than 8,000 community health workers, including teachers in over 400 schools, environmental health officers, and village volunteers, to deliver program messages to rural villages. Radio broadcasts carried the messages to Ghanaians in some of the most remote areas of the country. Together with partners, The Carter

Center further assisted Ghana health services to prepare a dossier, which is submitted to WHO to be considered for official validation.

"Ghana's success against trachoma shows the world and the remaining endemic countries that the greatest challenges can be overcome with persistence, political commitment, and the support of the international community," said former U.S. President Jimmy Carter, founder of The Carter Center.

The Carter Center congratulates Ghana on this achievement. **E**

40 Years On, Sudan Trachoma Worker Remains Committed

Abdalla Yousif recalls how heavy the rain was in Blue Nile state, Sudan. After four hours of torrential rain, the trachoma survey team he was traveling with decided it was best to spend the night in the car. The next morning, they did what they had done so often, they tested the road with their feet, pushed their car out of the mud, and continued to the next village.

Despite how difficult traveling in rural Sudan can be, Yousif feels it is his job to get to the people. “I even kind of enjoy the difficulty,” he said.

Yousif was born in North Kordofan state, Sudan, and completed his education at the Institute of Medical Assistants at the Khartoum Eye Hospital. Upon graduating in 1975 as an ophthalmic medical assistant, he began working on trachoma control. He remembers seeing his first case of trachoma in 1976 in Jazeera state. Since then he has remained committed to fighting the disease.

“The work in trachoma control is like your first love. You never forget it,” Yousif said.

Since 1976, Yousif has supported trachoma elimination efforts in two main ways. First, he serves as a trachomatous trichiasis (TT) case finder and assists with TT surgical camp outreaches. Yousif searches for individuals with TT so they can receive sight-saving surgery.

His second role is to serve as a trachoma grader for population-based surveys. Graders are trained to identify signs of trachoma so these surveys can get an accurate estimate of the burden of trachoma in each locality.

As a TT case finder, Yousif said that quite often people who refuse surgery do so out of fear. His strategy is to build a good relationship with



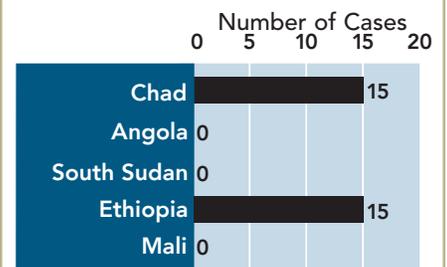
Abdalla Yousif examines the eyelids of a child during a trachoma survey in Sudan. Yousif has been working with the Federal Ministry of Health for 40 years in the fight against trachoma.

people and to involve friends and community members in convincing individuals to accept surgery. He takes great pride in those he identifies and counsels for surgery. He remembers one individual with TT in both eyes, who, following Yousif’s advice, agreed to have surgery. That person has since graduated from a medical institute and is now able to provide for his family and for his village.

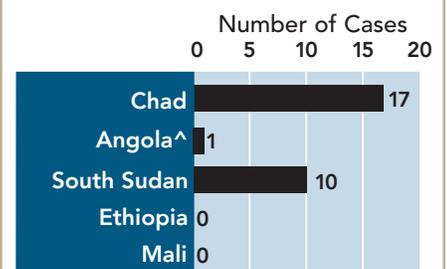
As a trachoma grader he has traveled all over Sudan. For these surveys he has climbed mountains, slept in villages, and worked with local translators to ensure quality data. He said that the trachoma situation was bad when he started working on it 40 years ago, but now it is getting better every year. He attributes this to increased awareness of trachoma, improved water and hygiene, and mass treatment with azithromycin. He remains committed to trachoma elimination, saying, “I will keep working to improve health until the last days of my life.” **E**

Guinea Worm Disease Update

January–December 2017



January–December 2018*



*Provisional

[^]Investigation of the origin of this confirmed case is ongoing.

IZUMI Foundation, Carter Center Fight Schistosomiasis in Nigeria

IZUMI Foundation, created in 1998 by the Japanese lay Buddhist order Shinnyo-en, has partnered with The Carter Center since 2006 to provide health education and treatment for schistosomiasis in six Nigerian states.

Schistosomiasis is caused by a parasite that lives in a person's veins near the bladder and intestines. It most commonly affects school-aged children who come into contact with the parasite during their daily chores or at play in activities involving freshwater. Later stages may cause bloody urine and abdominal pain. The infection can be treated with a single oral dose of the medicine praziquantel.

IZUMI has supported the provision of nearly 8 million praziquantel treatments to the Carter Center-led program, the largest schistosomiasis treatment initiative in Nigeria.

Because many communities are

endemic to multiple diseases at once, the Center often provides three medicines at one time that in combination treat river blindness, lymphatic filariasis, schistosomiasis, and several kinds of intestinal worms. Integrating drug delivery has been shown to reduce costs by 40 percent and save time for community members who volunteer as drug distributors and health educators.

In addition to drug distribution, health education is a key element of the schistosomiasis program. Because community life in Nigeria revolves around rivers and ponds, the primary message is to avoid urinating or defecating in water and to take praziquantel when offered during community drug distribution. In 2017



Children in Nigeria are treated with praziquantel provided by IZUMI Foundation and The Carter Center to treat schistosomiasis.

alone, IZUMI support provided health education training to 4,523 teachers and 1,958 health workers in Nigeria.

Last summer, IZUMI Foundation representatives traveled with Carter Center staff to meet with schoolchildren in Jos, Nigeria, who benefited from treatment and health education. **E**

Center Staff Present Research at Tropical Medicine Meeting

The American Society of Tropical Medicine and Hygiene annual meeting brings together more than 4,000 attendees from the tropical medicine and global health sectors. Twelve Carter Center staff members attended the society's 67th annual meeting Oct. 28–Nov. 1 2018, in New Orleans. A total of 13 abstracts from the Center's staff were included as posters, presentations, and symposia.

The River Blindness Elimination Program team delivered three oral presentations and two poster presentations. Moses Katarbarwa, epidemiologist, discussed the need to use molecular techniques rather than dissection to accurately detect *Onchocerca volvulus* in vector *Simulium* black flies. Lindsay Rakers, associate director,

presented on OV16 antibody detection by either ELISA or rapid diagnostic test formats to assess hypoendemic onchocerciasis in southeast Nigeria. Frank Richards, director, participated in a seminar about the development of ivermectin as an *Anopheles* vector control tool for malaria. Katarbarwa presented a poster on the delineation of onchocerciasis transmission zones in Ethiopia, and Emily Griswold, associate director, delivered a poster on the Carter Center milestone of stopping a total of 6 million ivermectin treatments for onchocerciasis in seven countries.

Scott Nash, epidemiologist with the Center's Trachoma Control Program, gave an oral presentation

on population-based prevalence of trachomatous scarring in the trachoma-hyperendemic setting of Amhara, Ethiopia. Angelia Sanders, associate director with the Trachoma Control Program, gave an oral presentation on progress toward achieving trachoma elimination as a public health problem, focusing on data gathered over six years in Al Rahad locality in Sudan. Sanders also led a symposium on survey methodologies used to determine prevalence of neglected tropical diseases in refugee camps. Caleb Ebert, Andrew Nute, Christina Robert, and Eshetu Sata, all with the Trachoma Control Program, presented posters that focused on SAFE strategy activities in Ethiopia's Amhara region. **E**

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Uganda Dedicates New NTD Program Building in Kampala

On Nov. 16, 2018, Uganda dedicated a two-story building to house programs combating neglected tropical diseases (NTDs). Prime Minister Ruhakana Rugunda and Minister of Health Jane Ruth Aceng welcomed Ambassador (ret.) Mary Ann Peters, Carter Center CEO, to the dedication on the campus of the Ministry of Health's Vector Control Division in Kampala.

The building was constructed with support from The Carter Center as part of efforts to increase interventions against NTDs. Representatives from the World Health Organization and its Expanded Special Project for Elimination of Neglected Tropical Diseases, Lions Clubs, RTI International, the Mectizan Donation Program, SCI, Sightsavers, and several universities attended the celebration.

The prime minister commended

The Carter Center for collaborating with Uganda since 1996. Noting that the country had eliminated Guinea worm disease in 2009, Rugunda said: "It is gratifying that Uganda is leading in the elimination of NTDs in the African region. I know partners have played a big role in this, and I applaud you for being passionate."

Peters commended Uganda for being one of the first countries to adopt a nationwide policy of elimination of river blindness transmission, saying it is because of that decision that close to 1.2 million Ugandans are

no longer at risk of the disease. She also noted that trachoma will likely be eliminated as a public health problem in Uganda in 2019. **E**

Frank Richards



In November 2018, drummers celebrate the dedication of a new NTD building (shown on right) in Kampala, Uganda.