



# Eye of the Eagle



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## Trachoma Review Focuses on Elimination Targets

The 12th annual review of the Carter Center's Trachoma Control Program was held Feb. 22–24, 2011, in Atlanta. The theme of the meeting was “Achieving Elimination Targets,” and participants discussed the considerable progress made by the programs. Some, such as Ghana and Mali, are preparing to demonstrate that blinding trachoma has been eliminated as a public health problem, while others like Nigeria are just getting started.

During the review, each national program reported on progress made during 2010 (see Table 1) and

targets for 2011 (see Table 2). Other presentations included results of impact surveys in Ethiopia; an innovative postendemic surveillance system proposed for Mali; an integrated malaria and trachoma coverage survey in Nigeria; an evaluation of a latrine promotion program in Ethiopia; an integrated trichiasis and Guinea worm case search in Ghana; and updates on ongoing studies of absorbable versus silk sutures, epilation versus surgery for minor trachomatous trichiasis, and the rational use of azithromycin in treating trachoma.

Additionally, the World Health Organization (WHO) clarified new guidelines for starting and stopping trachoma interventions generated from the Third Global Scientific Meeting on Trachoma; Dr. Don Hopkins, Carter Center vice president for health programs, gave an overview of findings from the International Task Force on Disease Eradication meeting that was convened to review progress on trachoma control; and the International Trachoma Initiative discussed new initiatives.

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## Center Assists in Over 14 Million River Blindness Treatments for 2010

At the annual review of the Carter Center's River Blindness Program in March, it was reported that Carter Center–assisted treatments with the medicine Mectizan® (donated by Merck) in 2010 reached 14.6 million. This is the highest number of treatments in one year in the program's 15-year history.

The program review took place Feb. 28–March 2, 2011, at Carter Center headquarters in Atlanta

*Kal Alphonsus and Dr. Abel Eigege prepare to test black fly (Simulium) specimens for Onchocerca volvulus DNA, which is evidence of onchocerciasis transmission, in the Carter Center laboratory in Jos, Plateau state, Nigeria. Over 10,000 flies in six local government areas were tested by the lab in 2010, and all were negative, which suggests that interruption of transmission of onchocerciasis has been achieved.*



Frank O. Richards Jr.

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# Trachoma

## Trachoma Review

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Cumulative progress in trachoma control supported by The Carter Center includes the following:

- More than 220,000 people suffering from trichiasis have benefited from surgery.
- Nearly 1,000 surgeons have been trained to correct trichiasis.
- More than 56 million doses of azithromycin have been distributed.
- More than 10,000 communities receive ongoing health education.
- More than 2 million latrines have been constructed.

Representatives from six Carter Center–assisted programs—Mali, Niger, Nigeria, Sudan, South Sudan, and

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**Table 1** Summary of National Data from Trachoma Control Program Interventions (Carter Center–Assisted Countries)

|                                                    | Mali      | Niger     | Sudan |         | Ethiopia   | Nigeria   | Total      |
|----------------------------------------------------|-----------|-----------|-------|---------|------------|-----------|------------|
|                                                    |           |           | GOS** | GOSS*** |            |           |            |
| <b>Surgery (S)</b>                                 |           |           |       |         |            |           |            |
| Surgeries                                          | 9,321     | 7,683     | 1,718 | 2,227   | 59,058     | 12,000    | 92,007     |
| 2010 Target                                        | 12,910    | 13,900    | 3,000 | 6,500   | 85,000     | 10,000    | 131,310    |
| Percent Coverage                                   | 72.2%     | 55.3%     | 57.3% | 34.3%   | 69.5%      | 120.0%    | 70.1%      |
| <b>Antibiotics (A)</b>                             |           |           |       |         |            |           |            |
| <i>Azithromycin</i>                                |           |           |       |         |            |           |            |
| Doses                                              | 3,082,808 | 3,456,380 | 718   | 435,558 | 18,404,655 | 1,247,332 | 26,627,451 |
| 2010 Target                                        | 3,542,332 | 3,845,445 | 0     | 895,000 | 21,600,000 | 1,435,800 | 31,318,577 |
| Percent Coverage                                   | 87.0%     | 89.9%     | N/A   | 48.7%   | 85.2%      | 86.9%     | 85.0%      |
| <i>Tetracycline</i>                                |           |           |       |         |            |           |            |
| Doses                                              | 63,018    | 82,670    | 438   | 45,474  | 545,330    | 24,000    | 760,930    |
| 2010 Target                                        | 70,847    | 86,685    | 0     | 17,000  | 480,000    | 40,000    | 694,532    |
| Percent Coverage                                   | 88.9%     | 95.4%     | N/A   | 267.5%  | 113.6%     | 60.0%     | 109.6%     |
| <b>Facial Cleanliness and Health Education (F)</b> |           |           |       |         |            |           |            |
| Villages with health education                     | 6,500     | 634       | 20    | 3,226   | *          | 2,624     | 13,004     |
| 2010 Target                                        | 12,000    | 571       | 477   | 4,674   | *          | 13,240    | 30,962     |
| Percent Coverage                                   | 54.2%     | 111.0%    | 4.2%  | 69.0%   | N/A        | 19.8%     | 42.0%      |
| <b>Environmental Improvements (E)</b>              |           |           |       |         |            |           |            |
| Latrines                                           | 17,695    | 15,199    | N/A   | 330     | *          | 0         | 33,224     |
| 2010 Target                                        | 25,000    | 15,000    | N/A   | 411     | 17,152,252 | 10,500    | 17,203,163 |
| Percent Coverage                                   | 70.8%     | 101.3%    | N/A   | 80.3%   | N/A        | 0.0%      | 0.2%       |

National Data as Reported for 2010 at the Twelfth Annual Program Review, Atlanta, Georgia, February 22–24, 2011

\*National target not presented

\*\*GOS: Government of Sudan

\*\*\*GOSS: Government of South Sudan

N.B. These are national level data from interventions supported by all partners, not exclusively supported by The Carter Center.

**Table 2** National Trachoma Control Program Annual Targets 2011 (Carter Center–Assisted Countries)

|                                               | Mali      | Niger     | GOS**   | GOSS*** | Ethiopia   | Nigeria   | Total      |
|-----------------------------------------------|-----------|-----------|---------|---------|------------|-----------|------------|
| <b>Surgery</b>                                |           |           |         |         |            |           |            |
| Individuals to receive surgery for trichiasis | 7,900     | 11,244    | 5,000   | 6,500   | 140,059    | 4,500     | 175,203    |
| <b>Antibiotic</b>                             |           |           |         |         |            |           |            |
| Doses of azithromycin to distribute†          | 2,033,326 | 5,561,942 | 442,931 | 858,800 | 24,000,000 | 3,175,392 | 36,072,391 |
| Doses of tetracycline ointment to distribute  | 40,667    | 113,510   | 14,039  | 75,500  | 480,000    | 120,000   | 843,716    |
| <b>Facial cleanliness</b>                     |           |           |         |         |            |           |            |
| Villages to reach through health education    | 5,000     | 654       | 260     | 5,201   | *          | 13,240    | 24,355     |
| <b>Environmental change</b>                   |           |           |         |         |            |           |            |
| Household latrines to construct               | 15,000    | 15,000    | *       | 330     | 2,100,000  | *         | 2,130,330  |

All targets are subject to change

\*Target not presented

\*\*GOS: Government of Sudan

\*\*\*GOSS: Government of South Sudan

†Antibiotic targets do not reflect International Trachoma Initiative–approved allocations of Zithromax

Targets as presented at the Twelfth Annual Program Review, Atlanta, Georgia, February 22–24, 2011

# Trachoma

## Analysis Shows MalTra Treatment Value, Cost

A cost analysis of MalTra mass-treatment weeks held last year in Ethiopia has shown that \$100 treated up to 450 people and that the market value of those 450 treatments was more than \$11,500. MalTra (malaria-trachoma) weeks are large-scale weeklong campaigns that aim to treat the population of Ethiopia's Amhara region for trachoma and malaria and provide health education.

Covering eastern Amhara in April 2010 and the western area in November 2010, health workers and volunteers distributed the antibiotic azithromycin to a total of 14,620,300 people and the eye ointment tetracycline to 368,264 infants and pregnant women. People were also screened for malaria; 95,697 people in the region were treated. The entire population of 18.5 million people was involved in trachoma and malaria health education events.

The Carter Center found that the cost to treat an individual with azithromycin less than a quarter—about 22 cents. During the campaigns, each \$100 of support from the Center was sufficient to treat up to 450 people. However, the market value of the azithromycin (Zithromax®)—donated by partner Pfizer Inc through the International

Trachoma Initiative—for those 450 doses is more than \$11,500, which shows the magnitude of the donation and partnership.

In addition, an average of two or three of the 450 people would receive treatment for malaria with frontline artemisinin-based combination therapy donated by the Global Fund, valued at around \$4. To reach 450 people, a team of four composed of one health extension worker and three village volunteers would have to work for about one and a half days, adding the value of six workdays to the total. Thus, \$100 of implementation funds leverages more than \$11,500 of

donated drugs and six workdays.

The trachoma control program in Amhara is a partnership of the Lions-Carter Center SightFirst initiative and the Amhara Regional Health Bureau and operates 52 weeks a year, not just during the two MalTra weeks. The mass drug administration is accompanied by (a) the provision of corrective surgery at health centers and through targeted campaigns, (b) hygiene promotion and behavior-change programs to empower people to protect themselves from malaria and trachoma, and (c) a highly effective sanitation program that promotes the construction of household latrines.



Paul Emerson

*A mule carts a load of Zithromax in the Amhara region of Ethiopia. A cost analysis showed that \$100 in implementation funds is sufficient to treat 450 people with Pfizer Inc-donated Zithromax, valued at over \$11,500.*

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Ethiopia—participated in the meeting. Also in attendance were donors and partners from WHO, the International Trachoma Initiative, Pfizer Inc, Helen

Keller International, Sightsavers, the Bill & Melinda Gates Foundation, the F.I. Proctor Foundation at the University of California San Francisco, the London School of Hygiene and Tropical Medicine, the Kilimanjaro Centre for Community Ophthalmology,

local Lions Clubs and Lions Clubs International Foundation, Conrad N. Hilton Foundation, U.S. Centers for Disease Control and Prevention, Emory University, the Task Force for Global Health, and the Tanzania Ministry of Health.

# Trachoma

## Sudan Government Provides Surgical Clinic on Wheels

In March, the Sudan government in Khartoum presented a new truck—customized as a mobile clinic for surgery—to the National Eye Care Program to support trachoma and river blindness control programs in Sudan's northern states. The truck is an all-terrain four-wheel-drive, three-axle Mitsubishi modified for use by the programs. The air-conditioned body has two fully equipped operating rooms and a third multipurpose room that can be used as a laboratory, for preoperative counseling and record collection, or for sterilizing surgical instruments.

Both the Sudan river blindness and trachoma control programs have made tremendous strides in recent years. In the river blindness program, the Abu Hamad focus is progressing toward

halting transmission of that disease through an accelerated treatment schedule. The trachoma control program has mapped disease prevalence in all districts except Darfur and found that of the 88 districts surveyed, only three have a prevalence that exceeds the World Health Organization's threshold for enhanced intervention, and 11 are now in the 5-to-9 percentage-level range for which focal intervention is warranted.

The district-level surveys allow estimation of the number of patients with severe blinding trachoma who would benefit from immediate surgical intervention. Recently, active case searches in which community workers went house to house screening patients and national program staff

followed up to provide counseling and surgery indicated that the number of trichiasis patients (i.e., those who need surgery) may be lower than previously estimated. The new mobile surgical clinic will improve the facilities available to program staff when they travel into the rural and desert regions.

The mobile surgery clinic was put to immediate use in March, when it accompanied the Zithromax® distribution teams in Al Gallabat locality in Al Gedaref state, providing a place for eyelid surgery to be provided for trichiasis patients identified during distribution. The truck is the latest display of commitment to the elimination of blinding trachoma by Sudan's federal Ministry of Health.

Paul Emerson



*A new mobile surgical clinic was donated by the Sudan government for eye care.*

*Inset: Inside the truck during its presentation to the program are (left to right) Dr. Kamal Hashim, director of the National Program for Prevention of Blindness; Dr. Nabil Aziz, The Carter Center; Dr. Elsaddig Gesm Allah, state minister of health; Dr. Paul Emerson,*

*The Carter Center; and Dr. Isam Mohammed Abdalla, undersecretary, Ministry of Health.*



# River Blindness

## River Blindness Review

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with over 60 field staff, experts, and donors in attendance. Topics included program performance, assessment of impact, and special research projects. The integration of river blindness programs with other public health initiatives, such as lymphatic filariasis, malaria, schistosomiasis, trachoma, and vitamin A supplementation, was also discussed.

Alongside Carter Center staff were officials from the ministries of health of Cameroon, Ethiopia, Nigeria, Sudan, and Uganda and representatives of the African Program for Onchocerciasis Control, Bill & Melinda Gates Foundation, Centers for Disease Control and Prevention, Emory University, GlaxoSmithKline, Izumi Foundation, Lions Clubs and Lions Clubs International Foundation, Merck and the Mectizan® Donation Program, Sightsavers International, Task Force for Global Health, Sudan's University of Medical Science and Technology, and the U.S. Agency for International Development. Dr. Frank Richards, director of the Carter Center's lymphatic filariasis, malaria, river blindness, and schistosomiasis programs, chaired the meeting.

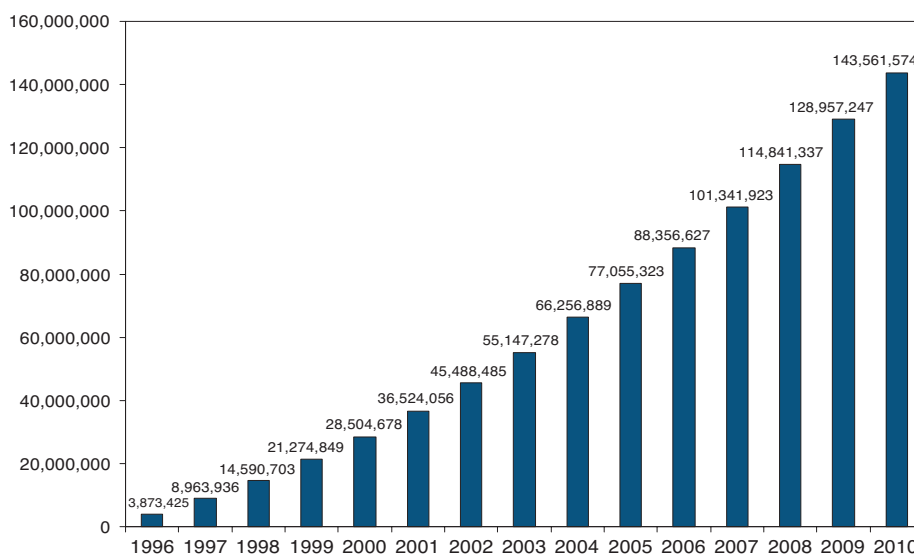
In addition to treatments assisted in five African countries, the Carter Center-led Onchocerciasis Elimination Program for the Americas (OEPA) reported treatments by the ministries of health in six Latin American countries—Brazil, Colombia, Ecuador, Guatemala, Mexico, and Venezuela. As shown in Table 3, treatments assisted in the 11 countries in 2010 reached 97 percent of the 2010 targeted, treatment-eligible population

**Table 3 River Blindness Treatments Assisted by The Carter Center in 2010\***

|                 |                        | 2010 UTG or UTG(2) | 2010 Treatments   | 2010% UTG or UTG(2) achieved |
|-----------------|------------------------|--------------------|-------------------|------------------------------|
| <b>Cameroon</b> | Annual                 | 1,893,821          | 1,823,700         | 96%                          |
| <b>Ethiopia</b> | Annual                 | 3,465,107          | 3,298,195         | 95%                          |
| <b>Nigeria</b>  | Annual                 | 5,500,208          | 5,443,800         | 99%                          |
| <b>OEPA</b>     | Semiannual             | 652,506            | 616,360           | 94%                          |
| <b>Sudan</b>    | Semiannual             | 206,550            | 210,326           | 102%                         |
|                 | Annual                 | 122,154            | 119,519           | 98%                          |
|                 | <b>Sudan Subtotal</b>  | <b>328,704</b>     | <b>329,845</b>    | <b>100%</b>                  |
| <b>Uganda</b>   | Semiannual             | 1,759,108          | 1,690,592         | 96%                          |
|                 | Annual                 | 885,043            | 865,302           | 98%                          |
|                 | <b>Uganda Subtotal</b> | <b>2,644,151</b>   | <b>2,555,894</b>  | <b>97%</b>                   |
| <b>Total</b>    | Semiannual             | 2,618,164          | 2,517,278         | 96%                          |
|                 | Annual                 | 11,866,333         | 11,550,516        | 97%                          |
| <b>Total</b>    |                        | <b>14,484,497</b>  | <b>14,067,794</b> | <b>97%</b>                   |

\*Nigeria and Uganda also assisted 536,533 passive treatments in 2010.

**Figure 1 Over 140 Million Cumulative Mectizan Treatments Delivered by Carter Center-Assisted River Blindness Programs, 1996–2010**



(i.e., the ultimate treatment goal, or UTG). Treatments are made possible by a grassroots network of community-directed ivermectin distributors. About 200,000 distributors were trained in 2010, managed by more than 30,000 community supervisors and Ministry of Health district personnel. More than 143 million cumulative treatments

have been assisted by the program since 1996 (see Figure 1).

There is growing interest in moving from a control strategy (indefinite treatments) to an elimination strategy (where treatments can end because parasite transmission has been interrupted). Current

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# River Blindness

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elimination efforts are based on more intensive use of Mectizan®, in twice-per-year or even four-times-per-year treatments, and elimination goals have been set for all six countries in the Americas and specific foci in Uganda and Sudan. In 2010, the program assisted in over 12 million annual treatments using the control strategy and over 2.5 million treatments using the elimination strategy. In Plateau and Nasarawa states in Nigeria, where annual ivermectin and albendazole treatments are given for lymphatic filariasis elimination, there was evidence in 2010 that onchocerciasis transmission also has been interrupted.

Country-specific statistics and achievements are discussed below.

## Nigeria

Over 5.4 million Mectizan mass treatments for river blindness were assisted by the program in Nigeria in 2010 (99 percent UTG), as well as 531,365 passive treatments provided through clinics. Nigeria trained or retrained over 60,000 community-directed distributors.

In Plateau and Nasarawa states, the River Blindness Program is integrated with the Lymphatic Filariasis (LF) Elimination Program (with funding from the Gates Foundation and GlaxoSmithKline), and Mectizan treatments for river blindness were combined with albendazole to interrupt LF transmission; the Center assisted in about 3.2 million combined treatments with Mectizan and albendazole. This is a reduction from years past because in 2010 the program did not provide treatment in five local government areas that appear to have successfully interrupted LF transmission.

LF is transmitted by *Anopheles* sp. mosquitoes, so the program is aided by the Nigeria national malaria program distribution of over 63 million long-lasting insecticidal bed nets with the support of multiple donors, including the Global Fund.

In 2010, Carter Center–assisted praziquantel treatments reached their highest level—1,328,886 treatments—and exceeded 1 million treatments for the third consecutive year. Treatments occurred for the first time in Edo state, made possible with funding from the Izumi Foundation.

The majority of the praziquantel used in Nigeria has been donated to The Carter Center through the World Health Organization (WHO) by Merck KGaA (E-Merck) of Germany; the remainder is purchased with other funds donated to The Carter Center.

## Ethiopia

The Lions-Carter Center partnership in Ethiopia assisted in treating 3,298,195 individuals to prevent river blindness (onchocerciasis) in 2010, 95 percent of the UTG. The Carter Center–assisted malaria program continued to integrate efforts with the river blindness program in 2010 as part of the MalOncho (malaria-onchocerciasis) project, with community-directed distributors there trained to monitor bed-net use and discuss their use and care with families. During 2010, 42,887 community-directed distributors were trained. Thanks to GlaxoSmithKline support, for the second year combined Mectizan and albendazole treatments were provided for LF elimination in onchocerciasis-endemic areas of Gambella region. With this funding, the Ethiopia program assisted in 73,435 combined treatments in 2010, 87 percent of the UTG. LF mapping was completed with the help of researchers at Addis Ababa University.

## Cameroon

A total of 1,823,700 individuals in North and West regions received Lions-Carter Center–assisted mass Mectizan treatments in 2010, 96 percent of the UTG. Trained community-directed distributors numbered 23,623. At the meeting, Cameroon reported on several studies, including one in the North region that showed that hypoendemic onchocerciasis regions, which are not

## Venezuelan Focus to Stop Treatment

The Venezuela government announced on May 13 that in 2011 it will stop Mectizan® mass drug administration in the Northcentral focus. This decision follows a recommendation by the Program Coordinating Committee of the Onchocerciasis Elimination Program for the Americas (OEPA) to halt treatments there based on

epidemiological indicators showing transmission had been interrupted.

The Northcentral focus will now enter a three-year period of post-treatment surveillance to detect any recrudescence of onchocerciasis transmission. This is the first focus in Venezuela to halt Mectizan treatment, and the eighth of the 13 foci in the Americas region.

# River Blindness

targeted by control programs, likely have low-grade indigenous transmission of onchocerciasis. The study concluded that if elimination of onchocerciasis transmission becomes a goal, then current treatment zones will need to expand.

## Uganda

Treatment figures for the Lions-Carter Center river blindness program in Uganda continued to climb as more areas move to an elimination strategy (twice-per-year treatment) supported by the Uganda Ministry of Health. The program assisted in 2,555,894 treatments in 2010. Of these treatments, 865,302 were annual treatments in control areas, and 1,690,592 were twice-per-year treatments in elimination areas. Uganda achieved 97 percent of its treatment targets. In 2010, the program trained 77,249 community-directed distributors and hosted the third Uganda Onchocerciasis Elimination Executive Advisory Committee meeting in August 2010. The partners discussed and agreed upon national guidelines for focal elimination of onchocerciasis transmission and recommended that ivermectin treatments be halted and post-treatment surveillance started in Wadelai focus.

## Sudan

The Sudan Lions-Carter Center effort, based in Khartoum, reported Mectizan

treatment figures that included annual treatments in control areas and twice-per-year treatments in the Abu Hamad elimination focus, in accordance with the policy of the Sudan Ministry of Health. The reported 119,519 annual treatments in 2010 in control areas and 210,326 twice-per-year treatments in the elimination focus achieved 100 percent of overall treatment targets. Sudan trained 3,270 community-directed distributors. Assessments, which include serological and entomological studies, are progressing to determine if onchocerciasis transmission has been interrupted in Abu Hamad.

## The Americas

The aim of the Onchocerciasis Elimination Program for the Americas (OEPA) is to interrupt disease transmission in the region of the Americas by 2012. The OEPA coalition includes the ministries of health of the six affected countries, The Carter Center, Lions Clubs and Lions Clubs International Foundation,

Bill & Melinda Gates Foundation, Pan American Health Organization (PAHO)/WHO, Mectizan Donation Program and the Centers for Disease Control and Prevention. Of the 13 endemic foci in six countries (see Table 4), eight foci are no longer providing Mectizan treatment, including Venezuela's Northcentral focus, which stopped mass treatment activities at the end of 2010. Three of the eight foci in 2010 passed successfully through three years of post-treatment surveillance and thus have eliminated onchocerciasis. See Table 4 for details on the status of all 13 foci.

Mass treatments for onchocerciasis are still ongoing in five foci in four countries; a total of 616,360 treatments were given in 2010, 94 percent of the goal. Since 2007, active eye disease attributable to onchocerciasis was found only in Brazil and Venezuela, and since 1995 no new cases of blindness attributable to onchocerciasis have been reported by the ministries of health in the Americas.

**Table 4** Current Status of Ocular Morbidity and Transmission of Onchocerciasis in the Americas Region, 2011

| Focus                    | Has Blindness Been Eliminated? | Has Ocular Morbidity Disappeared? | Transmission Status |
|--------------------------|--------------------------------|-----------------------------------|---------------------|
| Santa Rosa, Guatemala    | Yes                            | Yes                               | Eliminated in 2010  |
| Escuintla, Guatemala     | Yes                            | Yes                               | Eliminated in 2010  |
| North Chiapas, Mexico    | Yes                            | Yes                               | Eliminated in 2010  |
| Lopez de Micay, Colombia | Yes                            | Yes                               | Interrupted in 2007 |
| Huehuetenango, Guatemala | Yes                            | Yes                               | Interrupted in 2008 |
| Oaxaca, Mexico           | Yes                            | Yes                               | Interrupted in 2008 |
| Esmeraldas, Ecuador      | Yes                            | Yes                               | Interrupted in 2009 |
| Northcentral, Venezuela  | Yes                            | Yes                               | Interrupted in 2010 |
| South Chiapas, Mexico    | Yes                            | Yes                               | Suppressed          |
| Central, Guatemala       | Yes                            | Yes                               | Suppressed          |
| Northeast, Venezuela     | Yes                            | No                                | Ongoing             |
| Amazonas, Brazil         | Yes                            | No                                | Ongoing             |
| South Venezuela          | Yes                            | No                                | Ongoing             |

# Global Health News

## Over 4.4 Million Bed Nets Distributed Last Year in Nigeria, Ethiopia

**T**he second annual review of the Carter Center Malaria Control Program was held on Feb. 25, 2011, at Carter Center headquarters in Atlanta, Ga. Carter Center staff reported on the progress of Carter Center malaria control activities in Ethiopia and Nigeria and discussed with partner organizations the unique strengths of the Center's malaria programs, the particular challenges facing them, and the plans for the upcoming year. Special sessions by Carter Center staff focused on behavior change communication, routine surveillance, and mass drug administration for malaria.

Among the more than 50 participants at the meeting were representatives of the Bill & Melinda

Gates Foundation, Emory University, the Centers for Disease Control and Prevention (CDC), Columbia University, Development Finance International, PATH's Malaria Control and Evaluation Partnership in Africa, the Task Force for Global Health, and Vestergaard Frandsen, in addition to staff from Carter Center country and headquarters offices and the ministries of health in Ethiopia and Nigeria. The meeting was co-chaired by Dr. Frank Richards, director of the Carter Center's malaria, river blindness, lymphatic filariasis, and schistosomiasis programs, and Dr. Paul Emerson, director of the Carter Center's trachoma program and co-director of the malaria program.

The year 2010 saw a record number of long-lasting insecticidal bed nets distributed with assistance from The Carter Center, as is illustrated by Figure 2, which shows the annual number of bed nets distributed by country since 2004. The Carter Center provided a combination of technical, financial, and in-kind support for the distribution of over 1.4 million bed nets in Plateau state, Nigeria, and a combined total of close to 3 million bed nets in the Amhara and Southern Nations, Nationalities, and



Frank O. Richards Jr.

*The Carter Center bids farewell to staff members Dr. Patricia Graves, epidemiologist, and Dr. Teshome Gebre, country representative for Ethiopia. Dr. Graves is moving to Australia, and Dr. Gebre has accepted a position with the International Trachoma Initiative. Both will be missed. Dr. Zerihun Tadesse is the new country representative in Ethiopia.*

People's (SNNP) regions of Ethiopia. Another highlight for 2010 was the provision of antimalarial treatments to over 95,000 individuals who were diagnosed with malaria based on rapid diagnostic tests or clinical signs during mass drug administration for trachoma in Ethiopia.

The following summarizes presentations on program activities in Nigeria and Ethiopia.

### Nigeria

At the program review, Adamu Sallau, coordinator of the Nigeria Carter Center malaria program, summarized in-country activities. In mid-2010, the program began intense efforts for the Nigerian government's nationwide scale-up for impact of malaria control activities. In August and September, The Carter Center surveyed 2,806 households in Plateau and Abia states to establish baseline data for the evaluation of activities associated with the scale-up. Preliminary results indicate that of those individuals tested for malaria by rapid diagnostic

Zerihun Tadesse



*In Ethiopia, a community-directed drug distributor (left) demonstrates use of the MalOncho flip chart as project adviser Ambaye Arero (right) looks on during supportive supervision activities.*

testing, 45.1 percent in Plateau state and 39.4 percent in Abia state tested positive and were subsequently treated appropriately.

In October, the Nigeria staff began preparing for a mass bed-net distribution campaign in Plateau state. The Carter Center provided financial and technical assistance for this campaign, which culminated in the distribution of 1,424,254 bed nets in Plateau in December. In total, The Carter Center assisted with the distribution of 1,460,754 bed nets in Nigeria in 2010, including 15,000 donated by Vestergaard Frandsen for distribution in Ebonyi state. In early 2011, the Carter Center's Nigeria program assisted in the distribution of another 2.2 million bed nets in Ebonyi and Enugu states in southeastern Nigeria. The Carter Center surveyed four local government areas of Ebonyi and Imo states in November 2010 to assess the prevalence of lymphatic filariasis and malaria as part of an ongoing research project supported by the Bill & Melinda Gates Foundation on the impact of bed nets on lymphatic filariasis.

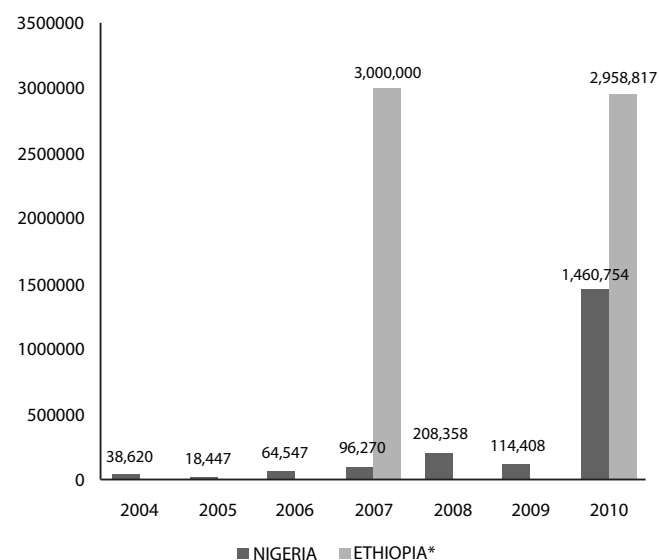
## Ethiopia

Dr. Zerihun Tadesse of the Carter Center's Ethiopia office presented at the program review on malaria activities in the context of two integrated programs: MalTra, which integrates malaria education and mass screening and treatment of fever cases during mass drug administration for trachoma, and MalOncho, which involves community-directed distributors of ivermectin treatments for onchocerciasis in malaria health education activities and the monitoring of bed net ownership in households.

In 2010, a combined total of 95,897 rapid-diagnostic-test positive or clinical malaria cases were treated during MalTra IV (April 2010) and MalTra V (November 2010). A rapid assessment of the malaria situation in western Amhara was conducted to address concerns about the high rapid-diagnostic-test positivity rate of 67.7 percent reported during MalTra V. Preliminary findings indicate that the high rates may have been due to a combination of health extension worker error when using rapid diagnostic tests; social pressure to treat all fevers, which may have resulted in the recording of negative cases as positive to justify the decision to treat; and reporting errors. Dr. Tadesse described the actions that have been taken to address these problems prior to the May 2011 MalTra VI campaign. In the Amhara region, Carter Center staff also collected routine data on bed net ownership, use, and care at both the school and household levels.

In the Carter Center–assisted MalOncho areas, a total of 42,887 community-directed distributors were trained to provide malaria health education in the context of delivering more than 3 million annual ivermectin treatments in 14,065 communities in

**Figure 2 Bed Nets Distributed in Ethiopia and Nigeria with Assistance from The Carter Center, 2004–2010**



\*These totals do not include 1,220 long-lasting insecticidal bed nets distributed in Ethiopia between 2007 and 2009 to replace nets collected from households for operational research on net durability.

the five regions of SNNP, Amhara, Oromia, Benshangul-Gumuz, and Gambella. Dr. Tadesse noted that The Carter Center had identified widespread shortages of rapid diagnostic tests and drugs in these MalOncho areas as well as problems in the use of epidemic monitoring charts and malaria diagnostic procedures at the health-post level. Carter Center Ethiopia staff are working with the regional health bureaus and the federal Ministry of Health to solve these problems.

The Carter Center provided technical and financial support to assist with the distribution of 2,958,817 bed nets in Ethiopia in 2010 (see Figure 2). In eastern Amhara, 1,156,345 bed nets were handled as part of a mass net distribution and replacement campaign. At the request of the SNNPR Ministry of Health, the Center assisted with training and the development and printing of materials for a campaign that distributed 1,802,472 bed nets.

## Study: Bed Nets May Halt Transmission of LF in Nigeria

The Carter Center is working with the ministries of health in Imo and Ebonyi states in southeastern Nigeria to determine whether the strategy of using bed nets to control malaria will also reduce transmission of lymphatic filariasis (LF) in areas where mass drug administration cannot be used safely due to the presence of the parasitic infection *Loa loa*, which is transmitted by the bite of tabanid flies.

In areas coendemic for LF and *Loa loa* infections, there is a risk of serious adverse reactions when individuals with heavy *Loa loa* infections are treated with ivermectin for onchocerciasis or with ivermectin and albendazole for LF. As a result, *Loa loa* is a serious constraint to the expansion of onchocerciasis and LF



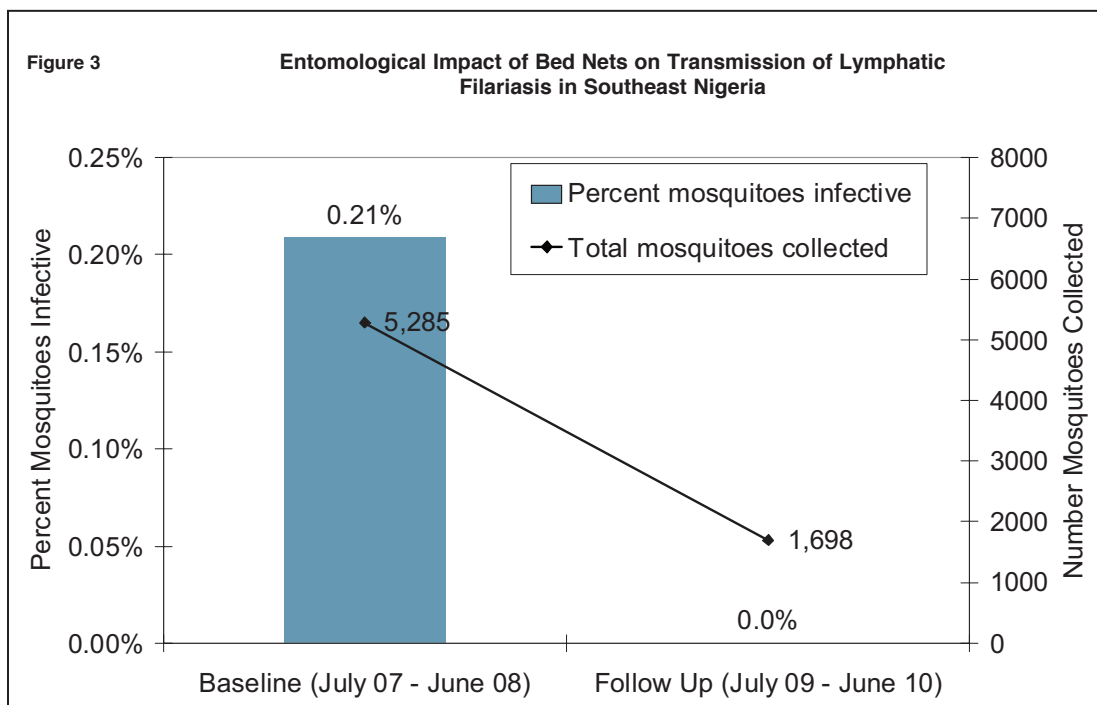
*A Nigerian mother and child sit in front of the bed net in their home.*

elimination efforts based on mass drug administration in parts of Nigeria, as well as in many other parts of Africa.

In Nigeria, an estimated 70.7 million or more people are at risk of LF, making the country the third-highest endemic country for the disease.

In the study, supported by the Bill & Melinda Gates Foundation, more than 150,000 long-lasting insecticidal bed nets were distributed in the local government areas of Abakaliki and Ohajiegbema to reach all age groups and cover all sleeping spaces in July 2008. Household surveys showed that the proportion of households with at least one bed net increased from 5.5 percent to 66.3 percent after distribution. In six sentinel villages, *Anopheles* mosquitoes have been collected by pyrethrum knockdown every month since July 2007. Collected mosquitoes have been dissected to determine rates of LF infectivity (L3 stage larvae). A preliminary analysis (see Figure 3) compares mosquito collection numbers and L3 infection rates before bed net distribution

(i.e., for the year July 2007–June 2008) with a similar time period starting one year after bed net distribution (July 2009–June 2010). The results show substantial decreases in mosquito abundance and infective rates, suggesting potential interruption of LF transmission by bed nets alone, without requiring mass drug administration. The study will continue for an additional transmission season this year.



## New Guidelines Pose Schistosomiasis Challenge

Expanded mapping for schistosomiasis and new guidelines from the World Health Organization (WHO) lowering treatment thresholds have increased the number of treatments needed in Delta and Edo states in southeastern Nigeria.

Nearly 36 million Nigerians are estimated to be infected with schistosomiasis and another 124 million are at risk. A waterborne disease, children bear the highest risk of infection and morbidity. A single dose of praziquantel given annually, however, can significantly reduce the infection and associated morbidity. Since 1999, The Carter Center has assisted the Nigeria Ministry of Health in distributing praziquantel in areas where the Center is already working to combat river blindness through mass distribution of Mectizan.®

The schistosomiasis efforts in Nigeria have increased dramatically in recent years. Due to a large donation of praziquantel from Merck KGaA (E-Merck) and the World Health Organization, as well as programmatic support from the Bill & Melinda Gates Foundation, Hussman Foundation, and Izumi Foundation, the number of treatments in which The Carter Center has assisted rose from fewer than 200,000 annually in 2007 to over 1 million annually since 2008.

In Edo state, Carter Center–assisted efforts to treat communities endemic for urinary schistosomiasis have progressed slowly because the communities must be mapped before treatment can begin. To map

an area, health workers test urine samples from school-age children using rapid urinary test strips, called dipsticks, that detect blood, a reliable indicator for the presence of an infection with the parasite that causes urinary schistosomiasis (*Schistosoma haematobium*). Figure 4 shows the geographic locations of communities in Edo state where school-age children have high (over 49 percent), moderate (10–49 percent), or low (less than 10 percent) prevalence of infection. Its extremely focal nature is the reason why Carter Center–assisted programs map schistosomiasis village by village.

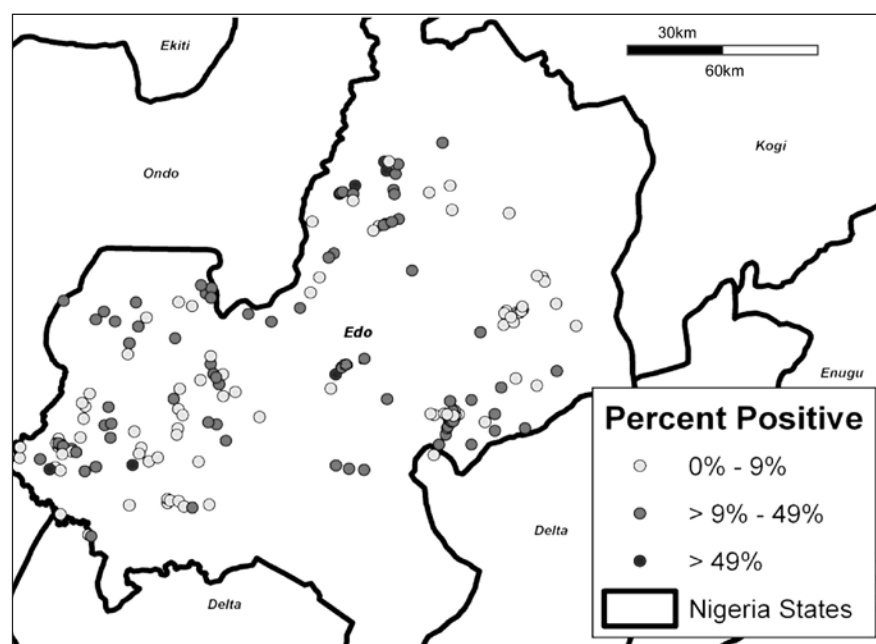
Following current WHO guidelines, mass treatment with praziquantel is provided to all children in communities where prevalence is greater than 10 percent and to children and adults where prevalence exceeds 49

percent. The program has identified 80 of 175 communities in Edo state that require treatment and treated more than 112,000 people in 2010.

In neighboring Delta state, an older Carter Center–assisted schistosomiasis program had been using 1993 WHO guidelines that set a higher prevalence threshold of 20 percent for mass treatment with praziquantel. In 2011, the program will switch to the current WHO guidelines, which means treatment will now be provided where infection rates are 10 percent or more in school-age children. Program staff will revisit communities previously assessed at a prevalence rate of 10–20 percent to treat all children in those areas. This will add an estimated additional 43,000 children to the roughly 200,000 individuals already

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**Figure 4** Prevalence of Blood in Urine Among School-Age Children in Edo State, Schistosomiasis Surveys, 2010



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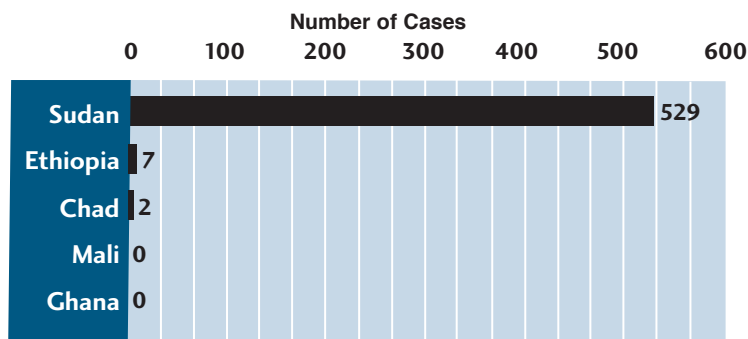
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being targeted there.

Notwithstanding the challenges of identifying eligible communities and handling the changing guidelines, The Carter Center continues to advocate for greater expansion of the schistosomiasis program. In 2010, more than 1.3 million treatments of praziquantel in four Nigerian states were provided by Carter Center–assisted programs. This was the highest number of treatments in a single year since praziquantel treatment was started in 1999, and the number is expected to grow even larger in 2011.

## Guinea Worm Update: 538 Cases Since January

**Distribution by Country of 538 Reported Cases of Dracunculiasis: January–May 2011\***



\*Provisional

Cases reported Jan.–May 2010 = 525

Cases reported Jan.–May 2011 = 538

% Change in cases = +2%

Transmission was reportedly prevented in 413 (77%) of 538 cases reported.

Includes two cases imported into Ethiopia from Southern Sudan.