THE CARTER CENTER'S ASSISTANCE TO RIVER BLINDNESS CONTROL PROGRAMS: ESTABLISHING TREATMENT OBJECTIVES AND GOALS FOR MONITORING IVERMECTIN DELIVERY SYSTEMS ON TWO CONTINENTS

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Abstract. Periodic mass treatment with ivermectin in endemic communities prevents eye and dermal disease due to onchocerciasis. As part of an international global partnership to control onchocerciasis, The Carter Center's Global 2000 River Blindness Program (GRBP) assists the ministries of health in ten countries to distribute ivermectin (Mectizan, donated by Merck & Co.). The GRBP priorities are to maximize ivermectin treatment coverage and related health education and training efforts, and to monitor progress through regular reporting of ivermectin treatments measured against annual treatment objectives and ultimate treatment goals (e.g., full coverage, which is defined as reaching all persons residing in at risk villages who are eligible for treatment). Since the GRBP began in 1996, more than 21.2 million ivermectin treatment encounters have been reported by assisted programs. In 1999, more than 6.6 million eligible persons at risk for onchocerciasis received treatment, which represented 96% of the 1999 annual treatment objective of 6.9 million, and 78% of the ultimate treatment goal in assisted areas.

INTRODUCTION

Infection with the vector-borne parasite *Onchocerca volvulus* (human onchocerciasis) is characterized by skin and eye lesions. The infection is transmitted in rural areas by *Simulium* species black flies that breed in rapidly flowing

Carter Center-Assisted Onchocerciasis Control Programs

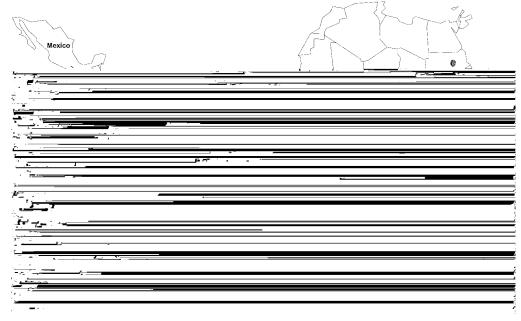


FIGURE 1. Areas in 10 countries assisted by the Global 2000 River Blindness Program of The Carter Center.

monitoring of treatments. This paper will present a compilation of the 1996–1999 treatment data reported by GRBP-assisted programs and discuss how treatment objectives and goals are established to assess how GRBP assisted areas are progressing toward reaching full treatment coverage.

METHODS

GRBP-assisted areas. During the period 1996-1999, the GRBP assisted ministries of health in ivermectin delivery activities in 10 countries in Africa and the Americas (Figure 1). The GRBP assisted in nine of 32 onchocerciasis endemic states in Nigeria (Abia, Anambra, Delta, Ebonyi, Edo, Enugu, Imo, Nasarawa, and Plateau States),9,10 in 10 of the 18 endemic districts in Uganda (Adjumani, Apac, Gulu, Kabale, Kasese, Kisoro, Mbale, Moyo, Nebbi, and Rukungiri Districts),11,12 and in two of 10 endemic provinces in Cameroon (North and West Provinces).13 In Sudan, where the program must contend with a civil war that has waged for more than 15 years, the GRBP assisted the ministry of health (in Khartoum) to provide treatments in areas controlled by the Government of Sudan, as well as three NGDOs based in Nairobi (Aktion Afrika Hilfe, International Medical Corps, and World Vision International) to distribute ivermectin in parts of areas controlled by opposition forces in the south.14-16 Through the Onchocerciasis Elimination Program for the Americas (OEPA), the GRBP assisted in all endemic areas of all six endemic countries in the Americas (Brazil, Colombia, Ecuador, Guatemala, Mexico, and Venezuela).16 13

who can receive ivermectin in accordance with the Mectizan Donation Program guidelines. Persons who should *not* receive treatment (ineligibles) were young children (less than five years of age, body weight less than 15 kg, or height less than 90 cm), anyone in poor health, pregnant women, or women nursing newborn infants less than one week of age. Annual orders for ivermectin tablets were calculated based on known or estimated (calculated to be 85% of the total population) eligible population figures.

GRBP-Assisted Programs: Percent of Ultimate Treatment Goals reached in 1999

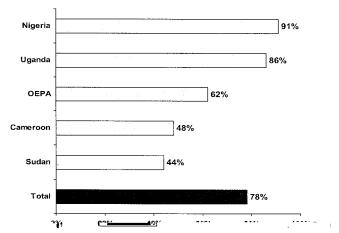
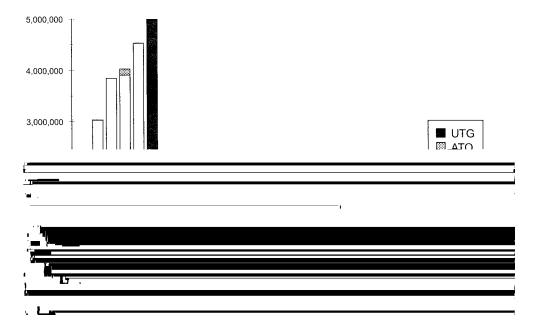


FIGURE 2. The Carter Center's Global 2000 River Blindness Program (GRBP) program progress is shown toward reaching the ultimate treatment goal of 8,554,746 persons (defined as the sum of the known or estimated eligible populations living in all at risk villages in the assisted area). Overall success in 1999 averaged 78%, led by the Nigerian (91%) and Ugandan (86%) programs.

Carter Center-assisted Programs: 1996 - 1999 Ivermectin Treatments and Annual Treatment Objectives (ATOs), with Ultimate Treatment Goals (UTG), by Program



FIGURE

Table 1

Onchocerciasis: 1999 ivermectin treatment figures for The Carter Center's Global 2000 River Blindness (GRBP)-assisted areas in Nigeria, Cameroon, Uganda, and collaborative programs in Latin America and Sudan

Country/Tx Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	% ATO	% All GRBP TX
Nigeria	ATO(earp) = 4	,475,000	ATO(arv) =	7,859											
TX(earp) TX(arv)	694 2	58,917 164	725,212 1,385	286,772 498	435,729 845	1,046,684 1,664	376,844 704	522,614 828	445,982 806	138,233 115	366,456 800	128,540 113	4,532,677 7,924	101% 101%	69% 59%
Uganda	ATO(earp) = 8e	68,466	ATO(arv) =	1,730											
TX(earp) TX(arv)		13,966	173 31	16,230 166	145,995 166	135,944 255	68,869 344	34,477 50	99,827 171	164,298 299	139,440 248	248	819,467 1,730	94% 100%	12% 13%
Cameroon	ATO(earp) = 8	17,134	ATO(arv) =	2,476											
TX(earp) TX(arv)	72,902 210	28,849 155	20,325 85	20,015 109	56,551 134	32,367 77	65,069 150	85,704 501	104,671 298	116,336 134	38,729 49	36,926 265	678,444 2,167	83% 88%	10% 16%
OEPA	ATO(earp) = 34	45,512	ATO(arv) =	1,798											
TX(earp) TX(arv)			126,987 986			1,479				139,727 499		5,682 69	273,875 1,554	79% 86%	4% 12%
Sudan	$ATO(earp) = 3^{\circ}$	76,310	ATO(arv) =	Unknown											
TX(earp) TX (arv)		8,556	23,045	32,108	44,261	28,017		1,072	7,379			175,652	326,779	87%	5%
Total	ATO(earp) = 6	,882,422	ATO(arv) =	13,863											
TX(earp) TX(arv)	80,285 212	110,288 319	895,742 2,487	355,125 773	682,536 1,145	1,382,739 1,996	510,782 1,198	643,867 1,379	657,859 1,275	558,594 1,047	544,625 1,097	347,048 447	6,631,242 13,375	96% 96%	100% 100%

ATO = annual treatment objectives; earp = eligible at-risk population; arv = at-risk villages; TX = mass treatment; OEPA = Onchocerciasis Elimination Program for the Americas.

erage, which occurs when the treatment services have expanded to all at risk villages defined through rapid assessment exercises. The second element is full population coverage, which occurs when ivermectin tablets reach all eligible persons known or estimated to live in those at risk villages. Combined, these two elements define a numerical

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