DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Centers for Disease Control
And Prevention (CDC)

Memorandum

Date: September 29, 2023

From: WHO Collaborating Center for Dracunculiasis Eradication, CDC

Subject: GUINEA WORM WRAP-UP #302

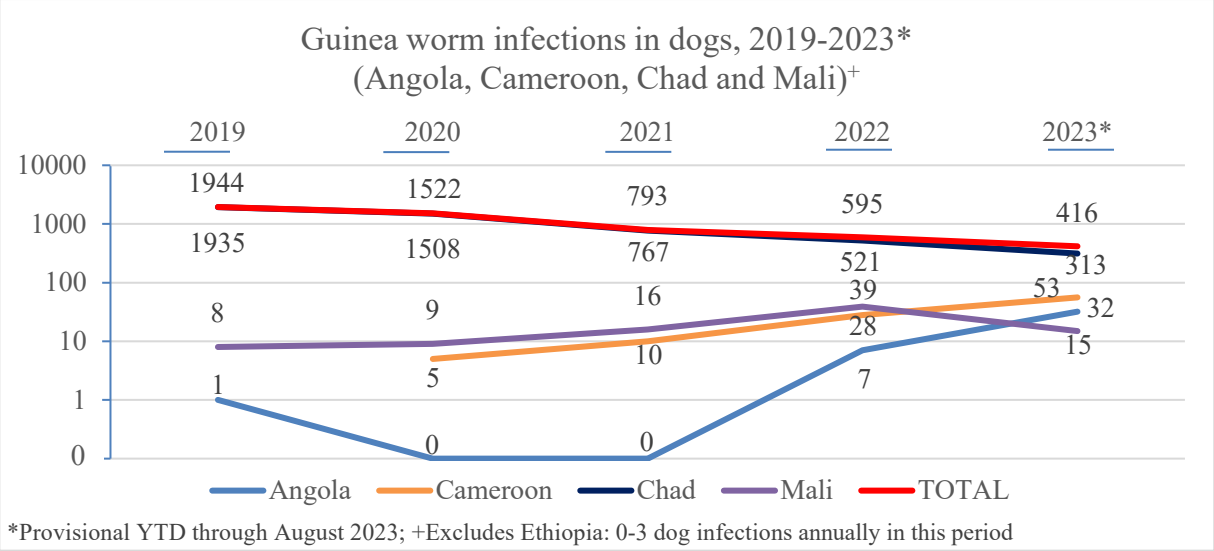
To: Addressees

"He wasn't asking about politics or the economy.
He just wanted to know what the Guinea worm count was."
(Carter Center CEO Paige Alexander, describing a telephone conversation with President Carter shortly before his 99th birthday)

HUMAN CASES -33%, DOG INFECTIONS -11% IN JANUARY-AUGUST 2023

Programs have provisionally reported 6 Guinea worm cases (67% contained) in January-August 2023, compared to 9 cases in humans in January-August 2022, which is a 33% reduction in human cases so far this year. Animal infections declined by only 10%, from 528 to 475 provisional infections (73% contained) during the same period, including an 11% reduction in dog infections, from 459 to 413 (74% contained). Significant increases in confirmed GW infected dogs in Angola (from 7 to 32) and Cameroon (from 27 to 53) masks Chad's 24% reduction in dog infections (from 411 to 313) during this period (Figure 1). This is the fourth successive year that Chad has reduced dog infections (-22% in 2020, -49% in 2021, -32% in 2022, -24% in 2023 so far). In 2022, Chad reported Guinea worm infections in 21 districts, while Mali and South Sudan each reported infections in only 4 districts, Angola and Ethiopia in 2 districts, and Cameroon in 1 district. Mali and South Sudan also reported that surveillance and interventions were constrained by insecurity in some affected areas. As Figure 2 illustrates, the main GW transmission seasons in Angola, Cameroon, Chad, Ethiopia, Mali, and South Sudan differ, with peak transmission typically extending through September in Chad and Mali, and through October in South Sudan. Table 3 in the previous issue of *Guinea Worm Wrap-Up* (#301) summarizes the number of dog infections reported by country and by month during 2022, with the proportion of infections that countries reported contained. Table 2 in this issue shows similar data for countries during January-August 2023.

Figure 1



*Provisional YTD through August 2023; +Excludes Ethiopia: 0-3 dog infections annually in this period

Detect every GW infection immediately. Contain every GW. Find the source of every GW infection.

CAMEROON: ONE HUMAN CASE CONFIRMED

Laboratory tests carried out by the Centers for Disease Control and Prevention (CDC) have confirmed a case of Guinea worm disease in a 7-year-old girl, a goat farmer in the village of Naiguissia, in the arrondissement of Guere, in the Far North region of Cameroon. The first of her two worms appeared on 1st May 2023, and she was taken to the health center for isolation. Her infection was *detected early*, three days before the first worm appeared, and appears to have been *contained*, but the *presumed source* of her infection is *unknown*. She had a history of travel to a community bordering Chad in the 8 months prior to the appearance of the first worm. The program subsequently treated four ponds around the girl's home with Abate.

The suspected case of Guinea worm in a 67-year-old farmer in the village of Massa-Koutweita, near Nouldaina, which was reported in July this year (see *Guinea Worm Wrap-Up #300*) was not Guinea worm.

Cameroon has reported confirmed Guinea worm infections in 53 dogs (98% believed to be contained) so far in 2023, out of 244 dog specimens and 5 cat specimens, some of which are still awaiting laboratory examination at University of Georgia-Athens. These infections all occurred in the district of Guere, in the Far North region of Cameroon, on one side of the Logone river, which faces the endemic district of Bongor, in the Chadian province of Mayo Kebbi East. The families living on either side of the border in the two districts form a single epidemiological unit, travelling back and forth with their dogs and sharing markets, etc. Twelve years after Cameroon was certified free of Guinea worm in 2007, this district of Cameroon reported 1 human case in 2019; 1 human case, 1 infected cat and 5 infected dogs in 2020; 10 canine infections in 2021; and 28 canine infections in 2022. (The number of infected dogs in the neighboring district of Bongor, Chad, also increased each year in 2019-2022: 5, 1, 14, 46). The World Health Organization (WHO) has supported this program since the discovery of the first new case of Guinea worm in 2019, including active community-based surveillance and vector control with Abate in 2020, and has provided a technical assistant in the district since December 2021. GWEP Cameroon has started proactively tethering dogs in 3 villages in the health area of Nouldaina, the epicenter of the epidemic, in Guéré Health District, at the end of 2021. The program also extended active surveillance in January 2022 from 15 villages in the Nouldaina health area to 26 villages in total, including the neighboring health areas of Gobo (4), Polgue (3), and Bangana (2), all in the Guéré Health District, and finally Dana (2) in neighboring Yagoua Health District.

The Carter Center has supported the program by assigning two technical assistants to the epidemic zone, one in November 2022 and the other in January 2023, for periods of 9 and 6 months respectively. Cameroon is offering a cash reward equivalent to around US$170 for reporting a case of Guinea worm in a human, and US$17 for reporting and tethering an infected animal.

ETHIOPIA

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MINISTRY OF HEALTH-ETHIOPIA

Surveillance. Ethiopia has not reported a Guinea worm infection in a human in January-August 2023. The peak transmission season in Ethiopia is April-August. As of July 2023, the Ethiopia Dracunculiasis Eradication Program has 198 villages (VASs) and 225 Non-Village Areas (NVAs: temporary farms, fishing, hunting, or gold mining settlements) under active surveillance (Level 1) in Gog and Abobo districts of Gambella Region. A house-to-house case search of villages in Level 2 surveillance areas visited 19,277 households and interviewed 57,678 persons in July.

Surveys of cash reward awareness in July found 99%, 97%, and 62% of 558 persons in Gog district knew of the reward for reporting Guinea worm infection in humans, domestic animals (dogs or cats), and wild animals, respectively, while 97%, 88%, and 90% of 449 persons surveyed in Abobo district were aware of the respective reward. In January-July 2023, the EDEP reported 19,234 rumors of Guinea worm

infections in humans or animals in Levels 1, 2 & 3 surveillance areas; over 99% were investigated within 24 hours. It inspected 280 baboons/monkeys/apes (killed or found dead by villagers or trapped by researchers) during the same period, none of which had signs of Guinea worm infection.

Interventions. The EDEP carried out 3,102 Abate treatments in January-June 2023 in 100% of eligible water sources of Gog and Abobo districts and treated 1,100 of 1,150 eligible unsafe water sources in July 2023, when 50 water sources could not be treated because of insecurity. The program supported tethering of 1,748 dogs and 225 cats in both districts in July, which was 100% of those eligible. Surveys of aquatic waste management in 153 VASs and NVAs in Gog (74) and Abobo (79) districts in July found 92% (1402/2622) of targeted households in Gog district and 37% (1928/5182) of targeted households in Abobo district had pits for burying aquatic waste properly, while 93% of the households with pits in Gog and 81% of households with pits in Abobo were using them properly. The standards for aquatic waste management burial were recently increased, which resulted in most of Abobo's aquatic waste burial holes not being deep or secure enough to meet the programs new requirements. Thirty percent of Ethiopia's 198 villages under active surveillance and 93% of 225 NVAs do not have access to safe drinking water, including only 8 of 137 commercial farms with safe water.

Genomics. According to Drs. Liz Thiele and Jessica Ribado, (Visiting Scholar at Vassar College and Senior Research Scientist at BMGF, respectively), preliminary genomics results suggest a mix of transmission patterns can be observed in Ethiopia. Genetic analysis of Guinea worm specimens from domestic cats in **PRC Agnuak** in 2020 finds evidence of clustered transmission. Six of the 8 cats were likely infected by larvae originating from one of two emergent worms in 2019 (i.e., 1 of 2 larval cohorts). Guinea worms found in these cats did not appear to originate from the same larval cohort as any of the 11 human cases detected in the country that year (i.e., there was no evidence of full siblingship between cat worms and human worms in Ethiopia in 2020), though 3 human infections were also detected in PRC Agnuak (see *Guinea Worm Wrap-Up #271*). Likewise, genomic profiles of Guinea Worm from cases implicated in an outbreak among migrant laborers at **Goyi Farm** in 2017 (specimens from 12 of 14 cases submitted, with usable genetic data being returned for 7 and 10 specimens for microsatellite and mitochondrial analysis, respectively) corroborate epidemiological findings that infections likely resulted from exposure to a point source and single larval cohort (see *Guinea Worm Wrap-Up #251*). Conversely, genetic data from worms collected from 5 of 7 human cases associated with an outbreak at **Duli Farm** in 2020 (see *Guinea Worm Wrap-Up #268*) are not consistent with a single origin of infection. The GW larvae producing the infections detected in 2020 originated from multiple female worms that emerged and contaminated the environment in 2019. Epidemiologic investigations found that at least 6 of the 7 human infections had taken drinking water the year before from two ponds, Lel Aber and Lel Bonge. Both water sources were frequented by a baboon troop with at least one infected baboon in 2019. Genetic evaluation of that baboon's worm did not reveal a direct epidemiological link between the baboon infection and subsequent human infections. These findings suggest that the two water sources were contaminated by multiple emerging worms in 2019.

MALI

Mali has reported 15 confirmed Guinea worm infections in dogs (11 contained) and one contained cat infection in January-August 2023. It has not reported a human case since September 2021. The main transmission season here is June- September. Mali has 2,215 villages under active surveillance in Macina, Markala, Tominian, and San districts of Segou Region, and Djenne, Mopti, Youwarou, and Tenenkou districts of Mopti Region. The program conducted a cash reward survey in Tominian, Markala, Macina, Mopti, and Djenne districts in July which found 89% of the 5,784 persons surveyed knew of the reward for reporting an infected person or animal. Confirmed infections so far in 2023 have all been in Macina district.

Mali began proactive tethering of dogs and cats in at-risk villages late in 2021. As of August 2023, an average 82% (801/976) of eligible dogs in Djenne, Macina, and Markala districts were proactively tethered, and 93% (904/969) of eligible cats in Djenne and Macina districts were proactively tethered. Reports in July 2023 found that 78% of villages under active surveillance in Macina district have at least

one safe source of drinking water, and 68% (23/34) of households visited and 73% (8/11) of fish sellers were managing fish guts properly.

The three-year-old Peace-through-Health Initiative held a conference and joint workshop in Bamako on August 9-10, 2023. The meeting had over 130 participants from the four target districts of Macina, Tenenkou, Tominian, and Youwarou, and included representatives from the Ministry of Health and other Malian government ministries, embassies (including one of the project's donors, the Government of Belgium), The Carter Center's GWEP, and other Non-Governmental Organizations. This meeting was a significant milestone for the project and was welcomed by the communities. It brought the representatives together for the first time to discuss the impact of the project in target communities and develop a strategy for further documentation of the project.

National Program Coordinator Dr. Cheick Oumar Coulibaly and four other Malian delegates participated in a cross-border meeting with representatives from Burkina Faso, Cote d'Ivoire, Guinea, and Niger that was organized by WHO and the WHO Regional Office for Africa and held in Abidjan on August 24-25, 2023. Niger participated by video conference. The meeting discussed strategies and mechanisms to strengthen surveillance in areas of the neighboring countries that border Mali, which is the only remaining dracunculiasis-endemic country in West Africa.

We regret to report that the President of Mali's National Committee for Certification of Guinea Worm Eradication, Prof. Abdel Kader Traore, died in France on August 15, 2023. He served as president of the committee since 2015, and formerly headed the Department of Medicine at Point G Hospital in Bamako.

CHAD: 5 CONFIRMED HUMAN CASES

Chad has reported 5 confirmed human cases (3 contained) in January-August 2023, compared to 6 human cases reported during the same period of 2022. Chad reduced the number of dog infections by 24% in January-August 2023 compared to 411 dog infections in January-August 2022. The human cases in 2023 are summarized below:

- Chad Case #1: 31 May 2023. Balwai village/Korbol district/Moyen Chari Province. 9 y/o male (brother of case #2), Boua ethnicity. *Detected early (5/27); Contained; Source: unknown*. No history of travel outside of village area during probable period of infection. No known GW infection in village since September 2020. No safe drinking water source in village. The two unsafe water sources were treated with Abate within 14 days.
- Chad Case #2: 19 June 2023. Balwai village/Korbol district/Moyen Chari Province. 14 y/o male (brother of case #1), Boua ethnicity. *Detected early; Contained; Source: unknown.* No history of travel outside of village area during probable period of infection. No known GW infection in village since September 2020. No safe drinking water source in village. The two unsafe water sources were treated with Abate within 14 days.
- Chad Case #3: 7 July 2023. Goudoum Goudoum village/Bailli district/Chari Baguirmi Province. 6 y/o female, Gam ethnicity. *Detected late; Not contained; Source: probably indigenous (infected dog in village in May 2022), from drinking water.* No history of travel outside of village for four years. Village has 11 functional borehole wells. Contaminated water treated with Abate within 14 days.
- Chad Case #4: 17 July 2023. Balwai/Korbol district/Moyen Chari Province. 25 y/o female (stepmother of cases #1 & 2), Boua ethnicity. *Detected early (7/12); Contained; Source: unknown.* No history of travel outside of village area during probable period of infection. No known GW infection in village since September 2020. No safe drinking water source in village. The two unsafe water sources were treated with Abate within 14 days.
- Chad Case #5: 29 July 2023. Garwaye village/Guelendeng district/ Mayo Kebbi East Province. 8 y/o male, Massa ethnicity. *Detected late; Not contained; Source: probably indigenous (3 infected dogs in village in May, June, and August 2022).* Borehole well within 100 meters of household. No history of travel outside of village during the probable period of infection. All nearby surface water sources had dried up when this case occurred, so none were treated with Abate.

Table 2

Number of Dogs with Guinea Worm infections and number reported contained by month 2023, and Number Reported Contained by Month during 2023*
(Countries arranged in descending order of infections in 2022)

COUNTRIES WITH TRANSMISSION OF GUINEA WORMS	NUMBER OF CASES CONTAINED / NUMBER OF CASES REPORTED													% CONT.
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL*	
CHAD	**5 / 8**	**4 / 8**	**27 / 38**	**33 / 39**	**42 / 57**	**43 / 55**	**50 / 54**	**40 / 54**					**244 / 313**	**78%**
MALI	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**	**3 / 3**	**4 / 4**	**0 / 1**	**4 / 7**					**11 / 15**	**73%**
CAMEROON	**18 / 18**	**31 / 31**	**3 / 4**	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**					**52 / 53**	**98%**
ANGOLA	**0 / 0**	**0 / 2**	**0 / 30**	**0 / 0**	**0 /0**	**0 / 0**	**0 / 0**	**0 / 0**					**0 / 32**	**0%**
ETHIOPIA	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**					**N / A**	**N / A**
SOUTH SUDAN	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**	**0 / 0**					**N / A**	**N / A**
TOTAL*	**23 / 26**	**35 / 41**	**30 / 72**	**33 / 39**	**45 / 60**	**47 / 59**	**50 / 55**	**44/ 61**					**307 / 413**	**74%**
% CONTAINED	**89%**	**85%**	**42%**	**85%**	**75%**	**80%**	**91%**	**72%**	**N / A**	**N / A**	**N / A**	**N / A**	**74%**	

Provisional

Cells shaded in black denote months when zero indigenous cases were reported. Numbers indicate how many cases were contained and reported that month.

Numbers indicate how many cases were contained and reported that month.

Table 3

Number of Laboratory-Confirmed Cases of Guinea Worm Disease, and Number Reported Contained by Month during 2023*
(Countries arranged in descending order of cases in 2022)

COUNTRIES WITH TRANSMISSION OF GUINEA WORMS	NUMBER OF CASES CONTAINED / NUMBER OF CASES REPORTED													% CONT.
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL*	
CHAD	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1	1 / 3	0 / 0					3 / 5	60%
SOUTH SUDAN	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0					0 / 0	N / A
ETHIOPIA	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0					0 / 0	N / A
CENTRAL AFRICAN REPUBLIC	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0					0 / 0	N / A
MALI	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0					0 / 0	N / A
CAMEROON					1 / 1								1 / 1	100%
TOTAL*	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	1 / 1	1 / 3	0 / 0					4 / 6	67%
% CONTAINED	N / A	N / A	N / A	N / A	100%	100%	0%	33%	N / A	N / A	N / A	N / A	67%	

Provisional

Cells shaded in black denote months when zero indigenous cases were reported. Numbers indicate how many cases were contained and reported that month.

Numbers indicate how many cases were contained and reported that month.

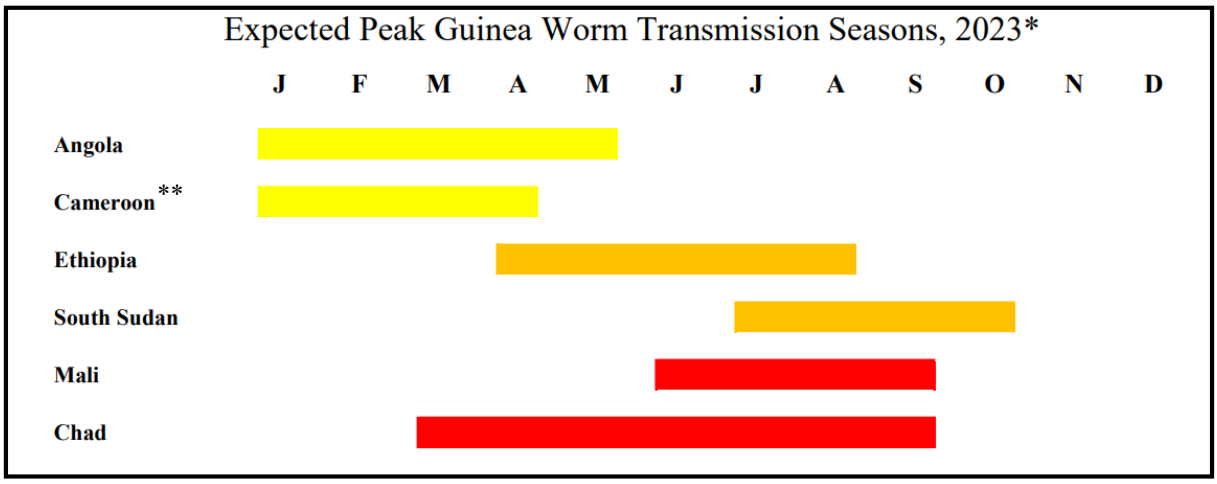
Number of Laboratory-Confirmed Cases of Guinea Worm Disease, and Number Reported Contained by Month during 2022
(Countries arranged in descending order of cases in 2021)

COUNTRIES WITH TRANSMISSION OF GUINEA WORMS	NUMBER OF CASES CONTAINED / NUMBER OF CASES REPORTED													% CONT.
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL	
CHAD	0 / 0	1 / 2	0 / 0	0 / 0	0 / 0	0 / 1	0 / 1	1 / 2	0 / 0	0 / 0	0 / 0	0 / 0	2 / 6	33 %
SOUTH SUDAN	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 1	1 / 2	1 / 1	0 / 0	0 / 0	3 / 5	60 %
MALI	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	N / A
ETHIOPIA	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	1 / 1	100%
CENTRAL AFRICAN REPUBLIC	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	100 %
CAMEROON	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	N / A
TOTAL	0 / 0	1 / 2	0 / 0	0 / 0	0 / 0	0 / 1	1 / 3	2 / 3	2 / 3	1 / 1	0 / 0	0 / 0	7 / 13	54 %
% CONTAINED	N / A	50 %	N / A	N / A	N / A	0 %	33 %	67 %	67 %	100 %	N / A	N / A	54 %	

Cells shaded in black denote months when zero indigenous cases were reported. Numbers indicate how many cases were contained and reported that month.

Numbers indicate how many cases were contained and reported that month.

Figure 2



* Guinea worm *risk* is year-round in all six countries; in Chad, *transmission is year-round.*
** Chad-Cameroon cross-border area

On September 12, 2023, Dr. Ernesto Ruiz-Tiben and Emilia Ruiz presented Carter Center CEO Paige Alexander two quilts they were donating to The Carter Center. One quilt comprising pieces of "Guinea worm cloth", is dedicated "In honor of all Guinea worm warriors 1981-2023" and was made by Mrs. Ruiz. Dr. and Mrs. Ruiz-Tiben commissioned the other quilt, which includes t-shirts from several national Guinea Worm Eradication Programs. The quilts will be displayed at the Center.

Are the right people receiving the *Guinea Worm Wrap-Up?*
We remind leaders of National Guinea Worm Eradication Programs to make sure all appropriate persons are receiving the *Guinea Worm Wrap-Up* directly, by email. With frequent turnover of government officials, representatives of partner organizations, and recruitment of new Guinea worm program staff, keeping desired recipients up to date is challenging. Frequent review of who is receiving the newsletter directly is advised. To add an addressee, please send their name, title, email address, and preferred language (English, French, or Portuguese) to Dr. Sharon Roy at CDC (gwwrapup@cdc.gov).

Note to contributors: Submit your contributions via email to Dr. Sharon Roy (gwwrapup@cdc.gov) or to Adam Weiss (adam.weiss@cartercenter.org), by the end of the month for publication in the following month's issue. Contributors to this issue were: the national Guinea Worm Eradication Programs, Dr. Donald Hopkins and Adam Weiss of The Carter Center, Dr. Sharon Roy of CDC, and Dr. Dieudonné Sankara of WHO. Formatted by Jacqueline Mullen.

WHO Collaborating Center for Dracunculiasis Eradication, Center for Global Health, Centers for Disease Control and Prevention, Mailstop H21-10, 1600 Clifton Road NE, Atlanta, GA 30333, USA, email: gwwrapup@cdc.gov, fax: 404- 728-8040. The GW Wrap-Up web location is https://www.cdc.gov/parasites/guineaworm/wrap-up
Back issues are also available on the Carter Center web site in English, French, and Portuguese and are located at

http://www.cartercenter.org/news/publications/health/guinea_worm_wrapup_english.html.

http://www.cartercenter.org/news/publications/health/guinea_worm_wrapup_francais.html

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World Health Organization

CDC is the WHO Collaborating Center for Dracunculiasis Eradication.