



Date: October 30, 2023
From: WHO Collaborating Center for Dracunculiasis Eradication, CDC
Subject: GUINEA WORM WRAP-UP #303
To: Addressees

There comes a point where we need to stop just pulling people out of the river. We need to go upstream and find out why they're falling in.
 Desmond Tutu

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

Stopping and Tracing Guinea Worm Transmission in 2023

	Sex/Age	Village	Date	Contained	Source
CHAD	M/9	Balwai	31 May	Yes	<i>Unknown</i>
	M/14	Balwai	19 Jun	Yes	<i>Unknown</i>
	F/6	Goudoum Goudoum	7 Jul	<i>Uncontained</i>	Indigenous
	F/25	Balwai	17 Jul	Yes	<i>Unknown</i>
	M/8	Garwaye	29 Jul	<i>Uncontained</i>	Indigenous
CAMEROON	F/7	Naiguissia	1 May	Yes	<i>Unknown</i>

SOUTH SUDAN



South Sudan has reported no confirmed Guinea worm infection in a human or animal in January-September 2023. The peak transmission season for Guinea worm in South Sudan is July-October.

South Sudan Guinea Worm Eradication Program (SSGWEP) Director Mr. Samuel MAKOY Yibi, Carter Center Country Representative Mr. Jim Niquette, and Field Communications and Coordination Officer Henry Maku visited Jonglei State from September 29 to October 14, 2023 (Niquette through October 6). The purpose of their visit was to assess the status of interventions on the ground and discuss 2024 plans for the 35-person team in Jonglei State. Jonglei is arguably the most challenging location in South Sudan, with almost no vehicle or motorcycle movement as an option during the endemic season, because of heavy rains. Carter Center Associate GWEP Director, Giovanna Steel, MA, made a supportive visit to

South Sudan from August 29 to September 27, 2023. She traveled with Director Makoy to Awerial, Rumbek, and Tonj East Counties on September 1-11 and participated in a two-day workshop in Juba on September 19-20 with Makoy and Niquette to review plans for the remainder of the year and for next year's Guinea worm season. Carter Center Vice President for Overseas Operations Craig Withers, MBA, MHA was in South Sudan September 19-22, 2023, during which he also participated in the two-day workshop and met with Director Makoy, Country Representative Niquette, other members of the SSGWEP, and other Ministry of Health officials.

We regret to report that SSGWEP Field Officer John Makor Garang died of a snake bite on September 8, 2023. The snake bite occurred in early July but was not reported to the program until September 7. He received some treatment in July but left before completing the full course of therapy. John had worked with the SSGWEP off and on since 2021 as both a field office and an Abate team member. He was stationed at Bunagok, in Awerial County of Lakes State. We extend our sympathies to his family, friends, other relatives, and colleagues.

ETHIOPIA: ONE INFECTED DOG



The Ethiopia Dracunculiasis Eradication Program (EDEP) has reported a confirmed Guinea worm infection in a 1-year-old female dog detected in Atheti village in Gog district of Gambella Region. The dog was detected with a blister on August 7, and the worm began emerging on August 8, 2023. The infection was *contained*, but the *source* of this infection is *unknown*. Atheti village has been a well-known focus of Guinea worm endemicity for several years; Atheti's last known Guinea worm infection occurred in November 2021 in a dog, whose infection was not contained. The only known Guinea worm infections in Gog district in 2022 were in Chieng village (2.5 miles-4 km-from Atheti village: 1 dog, infection contained) and Gutok village (15 miles-25 km-from Atheti: 2 infected baboons, not contained). This year's infected dog was not tethered during the period of likely infection in 2022 because it was a puppy, less than three months old. The puppy may have accessed an interrupted area of Awowi stream where it followed children who go there for bathing. Household members also revealed that children of the household frequently catch small and medium sized fish there and reportedly fed some of the fish to the dog. Trackers in the Baboon Study Project believe this stream might have been contaminated in 2022 by an undetected infected baboon that belonged to one of three baboon troops in the area. The peak transmission season for Guinea worm transmission in Ethiopia is April-August.

September 20-22, 2023, in coordination with the EDEP, Dr. Paul Mainuka, WHO/UCN cluster lead and Dr. Zeyede Kebede, NTD program coordinator of the WHO country office visited Nyangatom, a formerly endemic district in South Omo Zone of South Omo Zone of Southern Nations, Nationalities and Peoples Region. The objective of the visit was to conduct precertification assessment and strengthen the cross-border surveillance with areas bordering South Sudan. From October 17-20, 2023, the same team visited Gambella region to monitor the implementation of Guinea worm eradication program activities in the refugee camps and cross border areas of the region with South Sudan. They also visited Jewi refugee camp, which is one of the five camps being supported by WHO in Gambella Region.

ANGOLA



Genomics. Angola has reported 3 humans and 40 dogs with confirmed Guinea worm disease since discovering its first case in 2018. As of June 2023, the CDC laboratory has received 45 specimens from Angola, of which 31 specimens have undergone genetic sequencing so far. (Note that *number of specimens* may differ from number of infections or cases, as individual hosts may have multiple emerging worms and all collected worms are being included in genetic analyses.) Additional specimens collected during 2023 are still in possession of the ministry of health in Luanda. Analysis of mitochondrial DNA suggests the 31 sequenced specimens, collected from human and dog hosts, share genetic similarity and are unique to Angola when compared to the incomplete but growing genetic library of global Guinea worm specimens. However, microsatellite DNA suggests multiple infections are being missed in Angola. In 28 specimens

with usable microsatellite sequence data (1 human specimen and 3 dog specimens from 2019, 7 dog specimens from 2022, and 17 dog specimens from 2023) only one pair of probable full siblings has been encountered. These observations suggest that each of the other 26 specimens with usable microsatellite sequence data originated from unique larval pools derived from unique emerging worms. How long Guinea worm transmission has been occurring in Angola and whether it was imported from a now-eliminated source in another country are unknown, but the genetic data from Angola are consistent with indigenous, endemic transmission for all cases and infections observed in country to date.

IN BRIEF:

Chad has reported 5 human Guinea worm infections (60% contained) and 456 animal infections (75% contained; 371 dogs, 85 cats) in January-September 2023. This is a 17% reduction in human cases, a 19% reduction in animal infections, and a 23% reduction in dog infections. Cat infections increased by 10%, from 77 to 85, between the same periods of 2022 and 2023. Karmen Unterwegner, MPH and Dr. Alexandra Sack of The Carter Center were recently in Chad on a support-supervisory trip.

Cameroon. The Carter Center has contracted a Cameroonian technical advisor, Mr. Wilfred Ngwa, who is in the field already, and a second Cameroonian TA, Mr. Patrick Nkamedjie, whose contract begins on October 30th, to assist Cameroonian health authorities in combatting Guinea worm infections in Far North Region's Guere district, which borders endemic Bongor district in Chad's Mayo Kebbi East Province. Ms. Robyn Carter, who assisted the Cameroonian program on behalf of the Center since early this year, will help train the new TAs and handover to them.

Mali has reported 20 confirmed dog infections (75% contained) and 4 confirmed cat infection (3 contained) in January-September 2023. This is a 20% reduction in animal infections from the 30 animal infections (57% contained) reported in the same period of 2022 (Table 1). Mali has not reported a human Guinea worm case since September 2021.

NEW SENIOR ASSOCIATE DIRECTOR OF RESEARCH

Epidemiologist Dr. Maryann G. Delea has transitioned into the Senior Associate Director of Research at Carter Center GWEP headquarters to coordinate research in support of National Guinea Worm Eradication Programs. Dr. Delea earned her MPH degree from the Rollins School of Public Health at Emory University and her PhD degree from the London School of Hygiene and Tropical Medicine. She also has experience as a former Technical Assistant to the South Sudan GWEP. Congratulations, Maryann!!

MALI GWEP LISTING OF ANIMAL INFECTIONS: YEAR 2023																
#	Region	District	Health Zone	Village	Ethnicity	Profession	Host	Host name	Probable origin	Date of detection	Date of emergence	Entered water?	Abate Applied? (Y/N)	Contained ? * (Y/N)	Confirmed Y/N	Total # of GW
1	Segou	Macina	Kolongo	Kolongo Bozo	Bozo	Housewife	Dog	Bozi	Kolongo Bozo	24-05-23	25-05-23	No	No	Yes	Yes	1
2	Segou	Macina	Kolongo	Kolongo Bozo	Bozo	Farming/fishing	Dog	Police	Kolongo Bozo	24-05-23	25-05-23	No	No	Yes	Yes	1
3	Segou	Macina	Kolongo	Kolongo Bozo	Bozo	Housewife	Dog	Betesinidon	Kolongo Bozo	24-05-23	25-05-23	No	No	Yes	Yes	1
4	Segou	Macina	Kolongo	Kolongo Bozo	Bozo	Farming/fishing	Dog	Yerebalo	Kolongo Bozo/Barakabougou	06-05-23	06-05-23	No	No	Yes	Yes	1
5	Segou	Macina	Kolongo	Kolongo Bozo	Bozo	Farming/fishing	Dog	Police Mamady Traore	Kolongo Bozo	11-06-23	11-06-23	No	No	Yes	Yes	1
6	Segou	Macina	Kolongo	Kolongo Bozo Hamlet	Bozo	Farming/fishing	Dog	Police Amido Keita	Barakabougou	11-06-23	11-06-23	No	No	Yes	Yes	1
7	Segou	Macina	Kolongo	Kolongo Bozo	Bozo	Farming/fishing	Dog	Sinikossouma	Kolongo Bozo	27-06-23	27-06-23	No	No	Yes	Yes	1
8	Segou	Macina	Macina Central	Nemabougou/Macina town	Bozo	Farming/fishing	Dog	Chio	Nemabougou	16-06-23	20-06-23	Yes	Yes	No	Yes	1
9	Segou	Macina	Macina Central	Ke Bozo	Bozo	Farming/fishing	Dog	Soria	Ke Bozo	25-07-23	08-03-23	Yes	No	Yes	Yes	1
10	Segou	Macina	Macina Central	Nemabougou/Macina town	Bozo	Farming/fishing	Dog	Ongoiba	Nemabougou	08-08-23	08-08-23	Likely	Yes	No	Yes	1
11	Segou	Macina	Macina Central	Guenda	Minianka	Farming	Dog	Kaba	Unknown	08-08-23	08-09-23	Likely	Yes	No	Yes	1
12	Mopti	Djenne	Djenne Central	Tolober/Djenne town	Bozo	Fishing	Dog	Pipi	Djenne	08-08-23	08-10-23	No	Yes	Yes	Yes	1
	Mopti	Djenne	Djenne Central	Tolober/Djenne town	Bozo	Fishing	Dog	Pipi	Djenne	08-08-23	20-08-23	No	Yes	Yes	Yes	1
13	Segou	Macina	Kolongo	Kolongo Bozo	Bozo	Farming/fishing	Cat	Ourereta	Kolongo Bozo	13-08-23	13-08-23	No	No	Yes	Yes	1
14	Segou	Macina	Kolongo	Kolongo Bozo	Bozo	Household	Dog	Sinikolossi	Kolongo Bozo	17-08-23	17-08-23	No	No	Yes	Yes	1
15	Segou	Macina	Macina Central	Guenda	Bozo	Fishing/Farming	Dog	Kowili	Unknown	17-08-23	18-08-23	Likely	Yes	No	Yes	1
16	Segou	Macina	Macina Central	Ke Bozo	Bozo	Housewife	Cat	Mouche	Ke-Bozo	22-08-23	22-08-23	No	No	Yes	Yes	1
17	Segou	Macina	Kolongo	Kolongo Bozo	Bozo	Fishing/Farming	Dog	Brota	Kolongo Bozo	08-09-23	22-08-23	No	No	Yes	Yes	1
18	Segou	San	Lafiabougou	Lafiabougou	Bomou	Housewife	Cat	Mouche Coulibaly	Unknown	24-08-23	24-08-23	Likely	Yes	No	Yes	1

19	Segou	Macina	Macina Central	Ke-Bozo	Bozo	Housewife	Cat	Mouche Cisse Kobila	Ke-Bozo	28-08-23	28-08-23	No	No	Yes	Yes	1
20	Segou	Macina	Kolongo	Kolongo Bozo	Bozo	Fishing/Farming	Dog	Felix	Kolongo Bozo	18-08-23	02-9-23	No	No	Yes	Yes	1
21	Segou	Tominian	Fangasso	Sokoura	Bobo	Dog trader	Dog	No name	Medina Coura, quartier of Mopti town	04-09-23	04-09-23	No	No	Yes	Yes	1
	Segou	Tominian	Fangasso	Sokoura	Bobo	Dog trader	Dog	No name	Medina Coura, quartier of Mopti town	04-09-23	04-09-23	No	No	Yes	Yes	1
	Segou	Tominian	Fangasso	Sokoura	Bobo	Dog trader	Dog	No name	Medina Coura, quartier of Mopti town	04-09-23	04-09-23	No	No	Yes	Yes	1
22	Segou	Macina	Kolongo	Kayo(Bozo)	Bambara	Fishing/farming	Cat	Mahoret	Kayo Bozo	09-11-23	09-11-23	No	No	Yes	Yes	1
23	Segou	Macina	Macina Central	Nemabougou /Macina town	Sonhai	Farming	Dog	Brice	Nemabougou	09-12-23	09-12-23	Likely	Yes	No	Yes	1
24	Segou	Macina	Kolongo	Kolongo Bozo	Soninke	Farming/fishing	Dog	Sabounouma	Kolongo Bozo	09-12-23	09-12-23	No	No	Yes	Yes	1
25	Segou	Markala	Konou	Konou	Bozo	Farming	Dog	Coulibaly	Unknown	09-12-23	13-09-23	Yes	Yes	No	Yes	1

Table 2

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	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				0/0	N/A
ETHIOPIA	0/0	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				0/0	N/A
MALI	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0				0/0	N/A
CAMEROON					1/1				0/0				1/1	100%
TOTAL*	0/0	0/0	0/0	0/0	2/2	1/1	1/3	0/0	0/0				4/6	67%
% CONTAINED	N/A	N/A	N/A	N/A	100%	100%	33%	N/A	N/A	N/A	N/A	N/A	67%	
<i>*Provisional</i>														
	Cells shaded in black denote months when zero indigenous cases were reported. Numbers indicate how many cases were contained and reported that month.													
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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.													
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RECENT PUBLICATIONS

Wang Y, Perini T, Keskinocak P, Smalley H, Swann J, Weiss A, 2023. Evaluating the effectiveness of potential interventions for Guinea worm disease in dogs in Chad using simulations. *Am J Trop Med Hyg* 109:835-843. <https://www.medrxiv.org/content/10.1101/2023.05.22.23290350v1.full.pdf>

Inclusion of information in the Guinea Worm Wrap-Up does not constitute “publication” of that information.
In memory of BOB KAISER

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

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



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CDC is the WHO Collaborating Center for Dracunculiasis Eradication.