DEPARTMENT OF HEALTH & HUMAN SERVICES

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

Memorandum

Date: January 27, 2021

From: WHO Collaborating Center for Dracunculiasis Eradication, CDC

Subject: GUINEA WORM WRAP-UP #274

To: Addressees

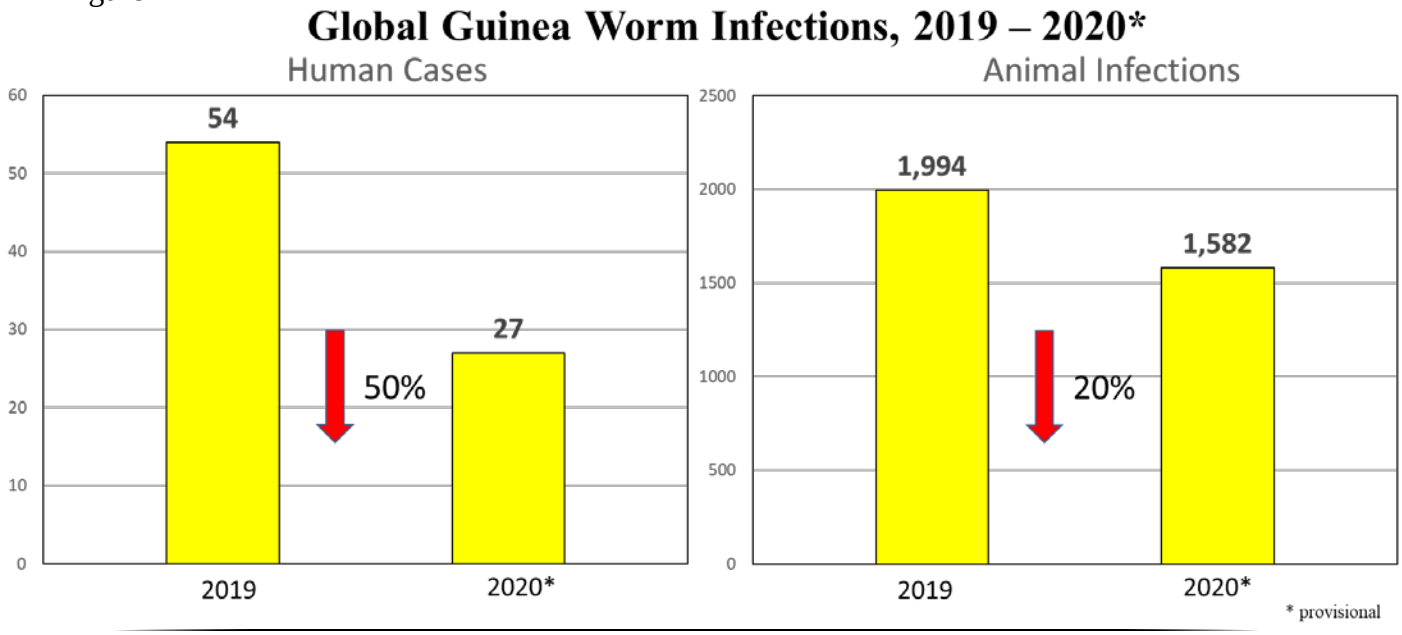
The worm will be the judge of the quality of our work last year.
MAKOY Samuel Yibi

Hope is not an intervention.
Don Hopkins

FEWER GUINEA WORM INFECTIONS IN 2020

As shown in Figure 1, the Guinea Worm Eradication Program (GWEP) reduced Guinea worm cases in humans by 50% and animal infections by 20% overall last year, for a provisional total of 27 human cases and 1,598 infected animals in 2020 (Figure 1). Only 2 non-endemic countries (Democratic Republic of Congo, Sudan) and 5 endemic countries (Angola, Chad, Ethiopia, Mali, South Sudan) remain to be certified as free of *Dracunculus medinensis* by the World Health Organization (WHO). WHO is helping both non-endemic countries complete preparations to be considered for certification, hopefully this year. The biggest challenges remaining to eradication are dog infections in Chad, baboon infections in Ethiopia, and insecurity in Mali, as well as the constant risk of common-source water-borne outbreaks in humans everywhere the parasite still exists.

Figure 1



- **South Sudan** is the closest of the endemic countries to stopping transmission. Preliminary laboratory analysis suggests that its Guinea worms now have the least genetic diversity among endemic countries (excluding Angola). South Sudan's Guinea Worm Eradication Program (SSGWEP) reported 6 cases in 4 localities in 2016, 0 cases in 2017, 10 cases (9 localities in a newly pacified area) in 2018, 4 cases (2 localities) in 2019, and has provisionally reported 1 case (contained) in 2020. It has found only one infected animal, a dog in a household with human cases in 2015. Residual challenges include sporadic insecurity, population displacements, and extreme mobility of cattle herders. In November 2020, the SSGWEP had 1,493 villages under active surveillance and investigated 99% of 4,008 rumors within 24 hours. From January to November 2000 the program screened over 282,106 persons about the disease, investigated over 55,226 rumors, and found about 78% of persons surveyed knew of its US$301 (equivalent) cash reward for reporting a case (see issue #272).

- **Mali** may be the second-closest country to stopping transmission. In 2016-2020 it has provisionally reported only 1 human case (2020) but 54 infected dogs and 4 cats. As in Chad, the on-going infections of animals occur in a riverine ecology, Mali's Inland Delta of the Niger River, and now may be transmitted mostly by eating fish that are paratenic and/or transport hosts of the parasite, likely not by drinking water. Most transmission occurs in June-October (rainy season); none in December-April. Insecurity has impeded program activities since a coup in 2012 but improved somewhat in 2020. Mali's Ministry of Health, regional health leaders in Mopti, and local health authorities in Tenenkou, which is one of seven insecure endemic districts where dogs are bred and likely become infected, held a well-received inaugural workshop with community representatives to discuss local peace, conflict, and health issues in September 2020, assisted by The Carter Center. Table # 2 summarizes some key indicators of this program in 2018-2020.

- **Chad** is the farthest country from interrupting Guinea worm transmission, reporting about a thousand infected animals (mostly dogs, a few cats, rarely wild cats) and 12-48 human cases annually in 2016-2020. Most infections apparently are transmitted by eating raw or poorly cooked fish but Chad's GWEP reported a common-source water-borne outbreak of human cases in 2019. The main endemic area is over 400 miles (667+ kilometers) along the Chari River, with year-round transmission peaking in March-September. Intense seasonal fishing by community members at the end of the dry season is a distinctive feature. Two human cases and 2-4 dogs reported among shared populations in border villages across the river in Cameroon in 2019 and 2020 appear to have been infected in Chad. Chad improved containment rates and Abate coverage in 2019-2020 and reduced animal infections by 22% and human cases by 75% in 2020 compared to 2019 (Table 3). Chad began a new strategy of proactive containment of dogs in March 2020. In 2020 it had 2,329 villages under active surveillance, investigated over 134,000 rumors of Guinea worm

infection, and found 85% of persons surveyed knew of its US$100 equivalent reward for reporting a case.

- **Ethiopia** provisionally reported 11 humans and 15 animals (8 cats, 4 baboons, 3 dogs) with Guinea worm infections in 2020, after finding a total of 18 human cases and 56 infected animals in 2016-2019. In 2020 Ethiopia's Dracunculiasis Eradication Program (EDEP) contained all except the baboon infections. Preliminary analysis suggests that the genetic diversity of Ethiopia's Guinea worms is slightly more than in South Sudan and Mali but much less than Chad. The human cases in 2020 occurred in two common-source water-borne outbreaks in which people without convenient safe drinking water drank unfiltered water from non-Abated ponds shared by baboons living in nearby forests. The 8 cats reported from Pugnido Refugee Camp in July-August 2020 also were likely exposed to a common source of infection in nearby Abawiri village, where there was an infected dog in 2018, an infected baboon in 2017, and an uncontained human case in 2016. Proactive tethering of dogs that began in 2018 (avg. 12.5 infected dogs annually in 2015-2018) reduced dog infections by 80% to 2 and 3 infected dogs in 2019-2020 respectively. The endemic area over the past decade is a 50x25 mile (80x40 kilometer) forested area in Gog district of Gambella Region; Abate treatments in this area doubled in 2018 – 2020 (Table 4). The COVID-19 pandemic impeded field research on baboons in 2020, but research will resume in 2021. Due to security concerns, there is a high level of population movement between South Sudan and Ethiopia at their common border across the Gambella region in Ethiopia. In response to this, the EDEP is conducting increased cross border surveillance including among refugees and at crossing points. To strengthen surveillance and response for Guinea worm disease among people crossing the border from South Sudan, WHO and the FMoH carried out assessment of Raad entry point in Dima district of Ethiopia and Pibor County in South Sudan 19 to 26 December 2020; a plan to increase cross-border surveillance in Dima district is being implemented.

- **Angola** was officially declared endemic in 2020 after three consecutive years with confirmed infections, but the level of Guinea worm endemicity is still uncertain. Only three human cases and one infected dog have been detected since the first case was discovered in 2018, all in Namacunde and Cuvelai districts of Cunene Province between January and April: one human each year and a dog in 2019. Angola's Ministry of Health established active community-based surveillance by trained village volunteers in 54 villages at risk starting in August 2020, assisted by WHO and The Carter Center. Efforts are being made to strengthen and expand the Community Based Surveillance in all risk areas in the country.

Table 1

Confirmed Guinea Worm Infections**, 2020*

	In Animals	In Humans
Chad [1]	1,570	12
Ethiopia[2]	15	11
Mali[3]	8	1
South Sudan	0	1
Angola	0	1

[1] 1,507 dogs, 61 cats, 2 wild cats
[2] 3 dogs, 8 cats, 4 baboons
[3] 8 dogs
* Provisional
** Cameroon also reported 1 human case, 4 dog infections, and 1 cat infection in border villages that were likely infected in Chad.

Table 2

Mali Guinea Worm Eradication Program
Interventions, Impact, & Surveillance, 2018 – 2020*

	2018	2019	2020*
Interventions			
% Abate Coverage	100%	100%	100%
% Infection Contained	80%	67%	50%
% Safe Drinking Water	94%	100%	100%
Impact			
# Infected Locations	17	8	7
# Infected Humans & Animals	20	9	10
# Guinea Worms	31	32	15
Surveillance			
# Villages under Active Surveillance / % Reporting Monthly	903 / 100%	2,802 / 100%	2699 / 99%
# Persons Searched in Integrated Surveys	624	188,033	165,215
# IDSR Reporting Units / % Reporting	NA	1,391 / 96%	1166 / 82%
% Reward Awareness / Amount	80% **/ US$100; US$20	77% **/ US$340; US$17	78% **/ US$340; US$17
# Rumors / % Investigated within 24 hours	424 / 99%	211 / 99%	194 / 99.9%
# Laboratory Specimens Sent to CDC	20	9	13

***** Provisional (January – December)
** Level I and Level II areas

Table 3

Chad: Number of dogs with Guinea worm infections by district, 2019-2020*

District/Region	2019	2020	% Change
Bailli/CB	359	235	-35%
Kyabe/MC	346	253	-27%
Guelendeng/MKE	243	221	-9%
Sarh/MC	238	265	11%
Mandelia/CB	156	122	-22%
Danamadji/MC	138	101	-27%
Bousso/CB	112	44	-61%
Massenya/CB	72	76	6%
Korbol/MC	70	33	-53%
Biobe /MC	62	62	0%
Kouno/CB	30	22	-27%
Dourbali/CB	29	9	-69%
Moissala/MDL	24	4	-83%
9e Arrondissement/NDJ	15	11	-27%
Bere/Tandjile	10	12	20%
Bedaya/MDL	5	8	60%
Bongor/MKE	5	1	-80%
Haraze/SLM	5	4	-20%
Moulkou/MKE	4	6	50%
Ndjamena Sud/NDJ	4	8	100%
Aboudeia/SLM	4	1	-75%
Korbol/CB	1	0	-100%
Benoye/LOC	1	2	100%
Kouno/MC	1	0	-100%
Kolon/Tandjile	1	1	0%
Mangalme/Guera	0	1	-
Am Timan/SLM	0	2	-
Kelo/Tandjile	0	1	-
TOTAL	1935	1507	22%

* Provisional

Table 4

Ethiopia Dracunculiasis Eradication Program
Interventions, Impact, & Surveillance, 2018 – 2020*

	2018	2019	2020*
Interventions			
# Abate Treatments	4,660	7,337	9,399
% Infection Contained	41%	25%	91%
% Safe Drinking Water in VAS	64%	75%	71%
Impact			
# Infected Locations	12	11	15
# Infected Humans & Animals	17	8	26
# Guinea Worms	24	61	125
Surveillance			
# Villages under Active Surveillance / % Reporting Monthly	125 / 96%	1,090 / 99%	190 / 99%
# Persons Searched in Integrated Surveys	543,138	1,078,465	713,033
# IDSR Reporting Units / % Reporting	20,356 / 89%	20,356 / 92%	N/A / NA
% Reward Awareness/ Amount	81% / $100 USD	82% / $345 USD	83% / $345 USD
# Rumors / % Investigated within 24 hours	16,035 / 99%	21,646 / 99%	18,833 / 99.9%
# Laboratory Specimens Sent to CDC	30	19	61

*****Provisional (January – November)

TWO AT-RISK ETHIOPIAN COMMUNITIES GET SAFE WATER

On December 28, 2020, the Goyi Investment Farm installed a hand pump on the borehole well that was drilled in May 2020. Goyi Farm was the location of the common-source water-borne outbreak when 15 migrant laborers, most from Anfilo district in Oromia Region, suffered Guinea worm infections in September-December 2017. On January 5, 2021, the handpumps of two boreholes in chronically endemic Atheti village in Gog district of Gambella Region were successfully repaired and are now functional. These important successes resulted from persistent advocacy by the Ethiopia Dracunculiasis Eradication Program, other local and national officials, and international partners. Providing convenient, safe sources of drinking water to these two communities at risk will help prevent other water-borne outbreaks in Ethiopia like those in 2017 and 2020. However, many other Ethiopian communities still at risk also need and deserve safe drinking water.

From December 18 – 25, 2020 Dr. Zerihun Tadesse, the Carter Center Country Representative, led a field visit to Gambella Region, accompanied by the National Program Coordinator and Program Manager, Mr. Kassahun Demissie. The team visited many villages and potential unsafe water sources including Lel Bonge pond and Wankod streams, observed Abate and environmental management activities, and assessed the health, social and economic impacts of GW on 2020 Duli

cases, and the outlook towards ending GW transmission in the community. Dr. Zerihun provided the cash reward to reporters of four human cases and eight cat infections detected in 2020 in PRC – Agnua. The ceremony included the Gog Woreda administrator, Mrs. Abwola Okwayo, her cabinet members, the PRC Agnua refugee camp protection officer, EDEP national coordinator, Carter Center GW staff and the refugee communities. At the end of his visit, Dr. Zerihun and Mr. Kassahun Demissie debriefed on their field visit observations and major challenges with the Gambella Region president His Excellency Mr. Omod Ojulu and his Cabinet members. They discussed how delays in maintaining Ablen solar borehole caused the residents in Atheti and Duli Village to resort to different unsafe water sources, and how the commitment of investment farm owners to provide safe water to their workers has not shown any improvement. The latter problem prolongs the great risk of another GW outbreak like the one in 2017 or maybe even larger.

Lastly, the Gambella People National Regional State (GPNRS) appointed a new Head of Regional Bureau of Health (RHB), effective 20 September 2020, Mr. Rout Gatwech. He earned his BSC degree in Public Health from Haramayia University and was appointed as head of Regional Water Irrigation Resources Development for four months and Consultant of Health Emergency under UNICEF for 3 years before his appointment as head of the RHB. The EDEP welcomes the new head of RHB and looks forward to his stewardship in the eradication of Guinea worm disease from Gambella and Ethiopia overall.

CAMEROON-CHAD BORDER INFECTIONS

Cameroon reported a case of Guinea worm disease in 2019 in a 49-year-old Massa woman in the village of Dabana, located in the Nouldaïna health area in Guéré health district (HD) of the Far North region of Cameroon. The infection was likely a result of a cross-border transmission from nearby Chadian villages. Nouldaina village is located about 1.5 km from the Logone River, which serves as the border with Chad in the Bongor Health District, more precisely in the Nahaïna area of responsibility. The villages reporting infections in dogs and humans are part of a local epidemiological cluster comprising the same communities living on both sides of the Cameroon-Chad border in this area (see Figure 2).

In response to this cluster of infection, Chad's Program has developed, with the support of WHO, an active community-based surveillance and response mechanism. A total of 1068 households received regular visits in 2020 and health educators as well as community awareness were conducted in 19 churches, 21 mosques, 11 markets, 35 places of mourning as well as 47 places of celebration in the villages of Dabana (Kokaina neighborhood) and Nouldaina (the 2 villages hosting all of the infections reported in 2019 and 2020) and 7 neighboring villages in the same health catchment area of Nouldaïna health center, as well in Tchoffi village in the district of Moulvoudaye- which reported an imported suspect case in 2019. In addition, vector control interventions have been ramped up, treating an average of 68 ponds per month with Abate in all localities with reported infection, (ii) tethering 15 dogs, (iii) purchasing and destroying 200Kgs of fish guts (intestines).

On the other hand, the GWEP in Cameroon has strengthened: (i) the capacity of 285 health personnel and community health workers from 15 health districts bordering Chad to conduct community-based surveillance of GW, GW case and infection management as well as Abate

application for copepods' control, (ii) communication and community awareness by broadcasting 2,304 spots on 12 community radio stations and raising community awareness by distributing 5,050 leaflets and putting up 4,100 posters about the reward.

Table 5 shows the impact of the interventions in 2020, with the notification of 60 rumors and GW infections investigated, including 7 instances where sample specimens were sent to the CDC laboratory- one confirmed case in a 4 year old girl in the village of Dabana with a history of staying in neighboring Chad in the previous 10 months and 6 infections confirmed in animals (5 dogs and 1 cat). These samples came from the same Dabana and Nouldaina villages where a relentless vector control effort through the treatment of ponds with Abate, purchase and proper disposal of fish intestines and tethering of dogs are being pursued in addition to conducting active community based surveillance of GW through house to house visits and community outreach in markets, mosques, churches, and places of celebration and mourning.

During 2021, Cameroon GWEP will focus on further strengthening the surveillance and response in the 15 health districts bordering Chad, scaling up community-based surveillance through house to house visits in all villages at the border areas with Chad particularly in Nouldaïna health zone: Vector control interventions are being pursued and strengthened so as to cover 100% of eligible water bodies in all 1+ villages; Active collection and proper disposal (frying) of fish guts will be intensified, as well as preventive tethering of all dogs in 1+ and at risk villages.

Figure 2

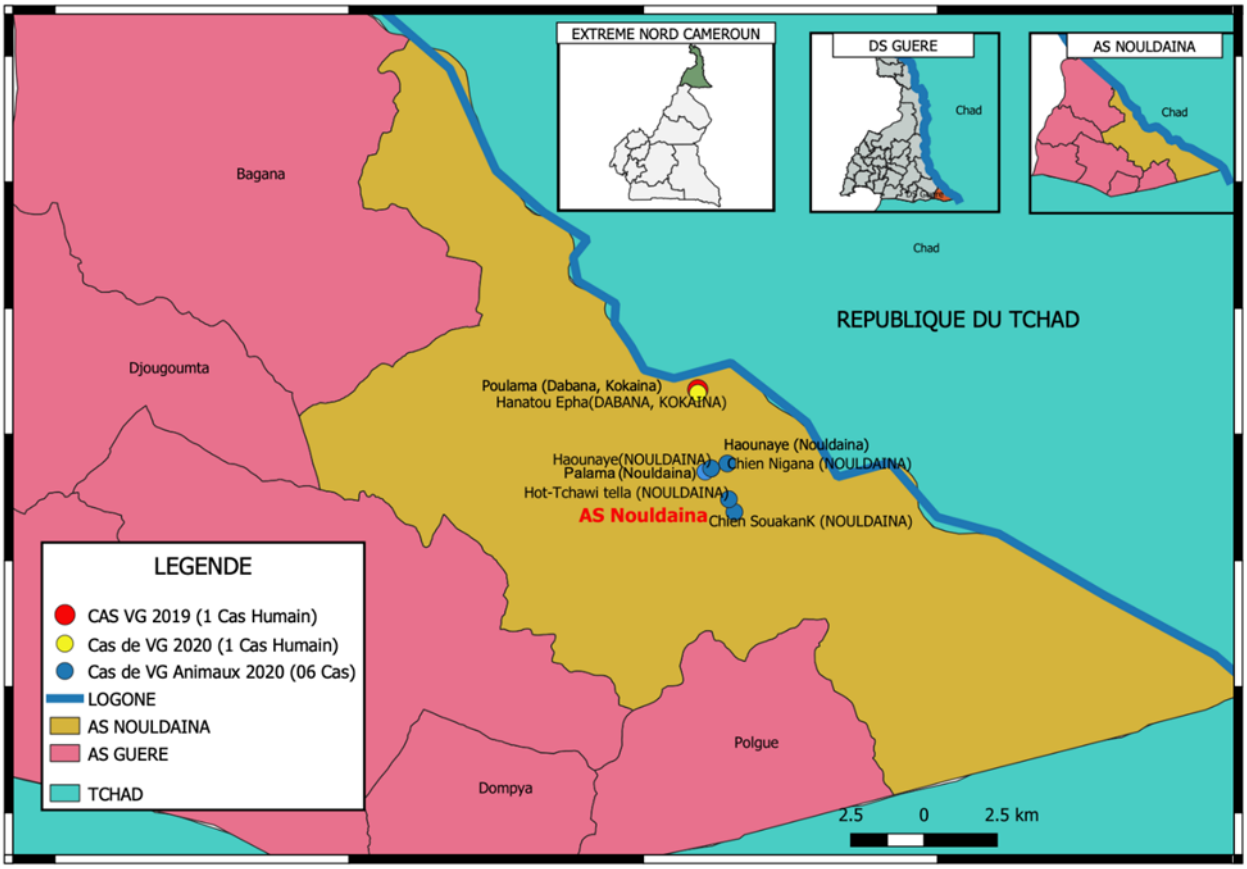


Table 5

Cameroon Guinea Worm Eradication Program
Interventions, Impact, & Surveillance, 2019 – 2020*

	2019	2020*
Interventions		
% Abate Coverage	100%	100%
% Infection Contained	67%	50%
% Safe Drinking Water	100%	100%
Impact		
# Infected Locations	1	1
# Infected Humans & Animals	1	1
# Guinea Worms	0	6
Surveillance		
# of villages under active surveillance / % reporting per month	NA	8 / (100%)
# of people seen during home visits	NA	9 693
% of Heath districts reporting	89%	93%
# of reward awarded	1	1
# of rumors human/ investigated within 24 hours	3/ 100%	37 / 100%
# of villages under active surveillance / % reporting per month	NA	8 / (100%)
# of worm samples from humans sent to CDC	3	1
# of laboratory confirmed human cases	1	1
# of animal rumours/ % investigated within 24 hours	0	23/ 100%
# of worm samples from animals sent to CDC	3	7
# of laboratory confirmed infected animals	0	6

***** Provisional

Number of Laboratory-Confirmed Cases of Guinea Worm Disease, and Number Reported Contained by Month during 2020*

(Countries arranged in descending order of cases in 2019)

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^	1 / 1	0 / 2	0 / 3	1 / 2	2 / 2	0 / 0	0 / 1	0 / 1	0 / 0	1 / 1	0 / 0	0 / 0	5 / 13	38%
SOUTH SUDAN	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%
ANGOLA	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0%
ETHIOPIA	0 / 0	0 / 0	0 / 0	7 / 7	0 / 0	0 / 0	0 / 0	2 / 2	1 / 1	1 / 1	0 / 0	0 / 0	11 / 11	100%
MALI §	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0%
TOTAL*	1 / 1	0 / 2	0 / 5	8 / 9	2 / 2	0 / 0	1 / 2	2 / 3	1 / 1	2 / 2	0 / 0	0 / 0	17 / 27	63%
% CONTAINED	100%	0%	0%	89%	100%		50%	67%	100%	100%			63%	

*Provisional

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

Shaded cells denote months when one or more cases of GWD did not meet all case containment standards.

§Reports include Kayes, Koulikoro, Segou, Sikasso, and Mopti, Timbuktu and Gao Regions; contingent on security conditions during 2018, the GWEP continued to deploy one technical advisor to Kidal Region to oversee the program.

^ Cameroon reported one case in February that was most likely infected in Chad.

Number of Laboratory-Confirmed Cases of Guinea Worm Disease, and Number Reported Contained by Month during 2019^

(Countries arranged in descending order of cases in 2018)

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 / 2	1 / 1	1 / 2	2 / 3	8 / 13	6 / 10	3 / 5	3 / 7	2 / 4	0 / 0	0 / 2	0 / 0	26 / 49	53%
SOUTH SUDAN	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 1	1 / 2	0 / 0	0 / 0	0 / 0	2 / 4	50%
ANGOLA	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0%
ETHIOPIA	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	0%
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	0%
TOTAL*	0 / 3	1 / 1	1 / 2	2 / 3	8 / 13	6 / 10	3 / 6	4 / 8	3 / 6	0 / 0	0 / 2	0 / 0	28 / 54	52%
% CONTAINED	0%	100%	50%	67%	62%	60%	50%	50%	50%	#DIV/0!	0%		52%	

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

Shaded cells denote months when one or more cases of GWD did not meet all case containment standards.

§Reports include Kayes, Koulikoro, Segou, Sikasso, and Mopti, Timbuktu and Gao Regions; contingent on security conditions during 2018, the GWEP continued to deploy one technical advisor to Kidal Region to oversee the program.

^Cameroon reported one case in March that was likely infected in Chad.

RECENT PUBLICATIONS

Priest, JW et.al., 2021. Development of a multiplex bead assay for the detection of canine IgG4 antibody responses to Guinea worm. Am J Trop Med Hyg 104:303-312. doi: https://doi.org/10.4269/ajtmh.20-0914

World Health Organization, 2021. Summary of the 31st meeting of the International Task Force for Disease Eradication, 20-21 October 2020. Wkly Epidemiol Rec 96:1-10. (This meeting discussed the impact of the COVID-19 pandemic on 7 eradication and elimination campaigns: Guinea worm disease, polio, measles & rubella, malaria, river blindness, lymphatic filariasis, and trachoma.)

World Health Organization, 2021. Monthly report on dracunculiasis cases, January-October 2020. Wkly Epidemiol Rec 96:10-11.

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. Dieudonne Sankara of WHO.

WHO Collaborating Center for Dracunculiasis Eradication, Center for Global Health, Centers for Disease Control and Prevention, Mailstop A-06, 1600 Clifton Road NE, Atlanta, GA 30329, USA, email: gwwrapup@cdc.gov, fax: 404-728-8040. *The GW Wrap-Up web location is* http://www.cdc.gov/parasites/guineaworm/publications.html#gwwp
Back issues are also available on the Carter Center web site English and French 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

World Health Organization

CDC is the WHO Collaborating Center for Dracunculiasis Eradication