

Memorandum



Date: April 16, 2021
From: WHO Collaborating Center for Dracunculiasis Eradication, CDC
Subject: GUINEA WORM WRAP-UP #276
To: Addressees

The dogs bark, but the caravan moves on.
Arab proverb

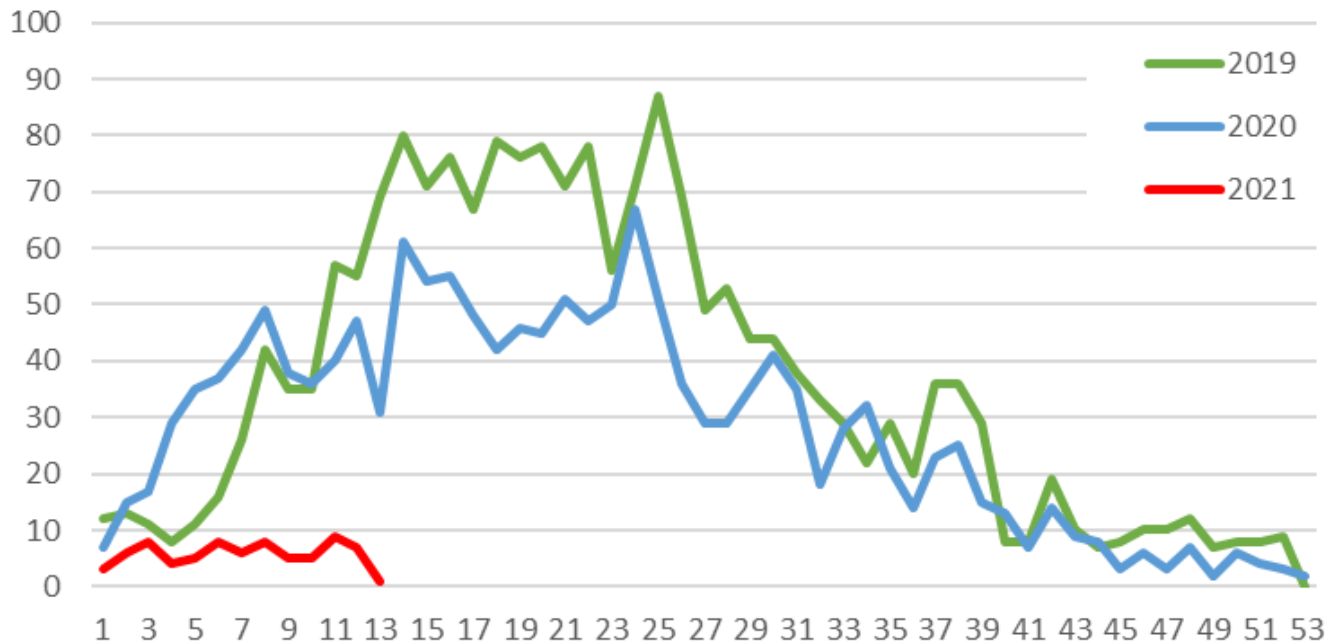
There is no such thing as a sporadic case.
Joel Breman

**ANNUAL INTERNATIONAL REVIEW MEETING OF PROGRAM MANAGERS
MEETS VIRTUALLY**

Over 140 persons participated in the annual International Review Meeting of Guinea Worm Eradication Program Managers organized by The Carter Center in cooperation with the World Health Organization (WHO) that occurred virtually on March 16-19, 2021. The National Program Coordinators from five endemic countries (Angola, Chad, Ethiopia, Mali, South Sudan), two countries in the pre-certification phase (Democratic Republic of Congo, Sudan), and Cameroon presented final official data for 2020 on behalf of their countries. The Carter Center’s Board of Trustees Chairman Mr. Jason Carter, Chief Executive Officer Mrs. Paige Alexander, and Vice-President for Health Programs Dr. Kashef Ijaz; WHO Director General Dr. Tedros Ghebreyesus

Figure 1

Dog Infections per Week, Chad 2019-2021



and Director of WHO’s Department of Control of Neglected Tropical Diseases Dr. Mwele Malecela greeted participants in recorded opening remarks. Ministerial representatives included the Honorable Minister of Health of Mali Dr. Fanta Siby, Ethiopian State Minister for Health Dr. Dereje Gameda, State Secretary for Health of Chad Dr. Djiddi Ali, and National Neglected Tropical Diseases Program Coordinator of Angola Dr. Cecelia de Almeida. Six members of the International Commission for the Certification of Dracunculiasis Eradication (Dr. Joel Breman, Dr. Sarah Cleaveland, Dr. Mark Eberhard, Dr. Robert Guiguemde, Dr. Pascal Magnussen, Prof. David Molyneux) also participated. Representatives from major donors to the global Guinea Worm Eradication Program included Dr. Jordan Tappero (The Bill & Melinda Gates Foundation), Dr. Nat Brittain (Foreign, Commonwealth & Development Office of the United Kingdom), Dr. Rita Oliveira (Children’s Investment Fund Foundation), Dr. Abdulredha Bahman (The Kuwait Fund), Ms. Jessica Rockwood (BASF), among others.

Table 1 summarizes the total numbers of Guinea worm infections in humans and animals, the percentage of all Guinea worm infections in 2020 that were contained and the percentage of cases whose presumed sources of infections were identified in each country. Country reports are summarized on the following pages. This meeting also reviewed on-going research initiatives to help understand transmission dynamics better and develop additional diagnostics and interventions, including serology, genomics, anti-helminthics, and satellite technology to identify surface water beneath forest/vegetation canopy.

Table 1

Guinea worm infections in humans and animals, and the percentage of Guinea worm infections in 2020 that were contained			
	Total GW Infections (human/animal)	% GW Infections Contained	% Human Case Sources Identified
Chad	12/1571	81%	25%
Ethiopia	11/15	85%	100%
Mali	1/9	50%	0%
South Sudan	1/0	100%	0%
Angola	1/0	0%	0%
Cameroon	1/6	0%	0%
TOTAL	27/1,601	81%	52%

SOUTH SUDAN



The South Sudan Guinea Worm Eradication Program (SSGWEP) reported 1 case of Guinea worm disease in 2020 and it contained that case. South Sudan has reported only one infected animal ever, a dog in a household with two human cases, in 2015. The program believes the 2020 case was infected in his home village in Tonj East County, where he lived during his presumed period of infection in 2019, and not in Tonj South County where his infection was detected in 2020. Tonj South County has had no known Guinea worm case since 2012; the most recent known case in Tonj East County was in 2016. Since neither locality had a known Guinea worm infection in 2019, the source of South Sudan’s 2020 case is not identified according to the

definition of a presumed source of infection (see page 14). The transmission season is May-September. Key intervention indicators are summarized in Figure 3. The SSGWEP sent specimens from 33 animals and 27 humans to CDC in 2020. South Sudan's National Certification Committee did not meet in 2020 because of the Covid-19 pandemic. This report was presented by SSGWEP Director Mr. Makoy Samuel Yibi.

South Sudan has reported no Guinea worm infections so far in 2021.

SSGWEP Surveillance Snapshot 2020

Accessibility: 100%

Villages reporting 1+ GW infection: 1

Number of bomas by risk level: 2 in level 1; 8 in level 2; 70 in level 3

Villages under Active Surveillance (VAS): 851 (466 level 1, 385 level 2)

Monthly reporting rate for VAS: 99%

Number of rumors: humans 58,051 (99% investigated in 24h), animals 570 (99% investigated in 24h)

Cash reward awareness: 71% (levels 1 & 3)

Cash reward amount: 50,000 SSP (US\$280 equivalent) for reporting a human case; US\$26 equivalent for reporting infected animal

Integrated surveys: 352,356 persons (trachoma, river blindness)

Number and reporting rate for IDSR (Integrated Disease Surveillance and Reporting): 1,434 boma units, 79% reporting rate

% presumed sources of human cases identified*: 0% (0/1)

% human and animal Guinea worm infections contained: 100% (1/1)

*see definition page 16.

MALI



Mali's Guinea Worm Eradication Program (MGWEP) reported 1 case of Guinea worm disease (uncontained) and 9 infected dogs (5 contained) in 2020 (Table 2). The human case was detected in her home district of Baroueli/Segou Region, but she had visited Macina district/Segou Region in much of the peak transmission season of 2019 during her presumed period of infection. Baroueli's most recent known Guinea worm infection was a human case in 2012; Macina had dogs with Guinea worm infections in 2018, 2019, and 2020. The MGWEP is working with endemic residents of some endemic and at-risk communities to begin pro-active tethering of dogs in 2021. The MGWEP participated in a working session in Mopti on February 15-17, 2021 with 35 community leaders, including women and youth, from Tenenkou district/Mopti Region to establish public health priorities for the Peace through Health initiative to implement before this year's rainy season begins in June, in follow-up to the inaugural workshop with community representatives held in September 2020. Tenenkou is one of seven insecure endemic districts where dogs are bred and likely become infected (Figure 2). Local workers trained by the MGWEP conduct active surveillance and report to the program monthly in insecure areas, but headquarters staff cannot supervise them in person. The MGWEP held two workshops with veterinary services in Segou and Mopti on February 9-13 to strengthen collaboration for detecting, notifying, and containing Guinea worm infections in animals. The workshops recommended including Guinea

worm on the list of priority veterinary diseases, formalizing consultation between human and animal health sectors at all administrative levels and involving veterinarians in investigation of animal rumors. Mali's Department of Veterinary Services recently tasked their decentralized regional offices in Segou and Mopti to integrate Guinea worm reporting in their weekly surveillance report. The main transmission season is July-November. Key intervention indicators are summarized in Figure 3. The National Certification Committee met four times in 2020. This report was presented by MGWEP National Program Coordinator Dr. Cheik Oumer Coulibaly.

Mali has reported one confirmed dog infection (contained) so far in 2021 (see issue #275).

MGWEP Surveillance Snapshot 2020

Accessibility: 96%

Villages reporting 1+ GW infection: 7

Number of districts by surveillance level: 5 in level 1; 7 in level 2; 63 in level 3

Villages under Active Surveillance (VAS): 2,699 (1,174 level 1, 1,525 level 2)

Monthly reporting rate for VAS: 99%

Number of rumors: humans 164 (99% investigated in 24h), animals 28 (100% investigated in 24h)

Cash reward awareness: 79% humans, 72% animals

Cash reward amount: US\$360 equivalent for reporting a human case, US\$18 for reporting infected animal

Integrated surveys: 5,963 persons (polio, supervisory visits)

Number and reporting rate for IDSR (Integrated Disease Surveillance and Reporting): 1,416 units, 82%

% presumed sources of human cases identified*: 0% (0/1)

% human and animal Guinea worm infections contained: 50% (5/10)

*see definition page 16.

Table 2

MALI GWEP LISTING OF HUMAN CASE AND DOG INFECTIONS: YEAR 2020

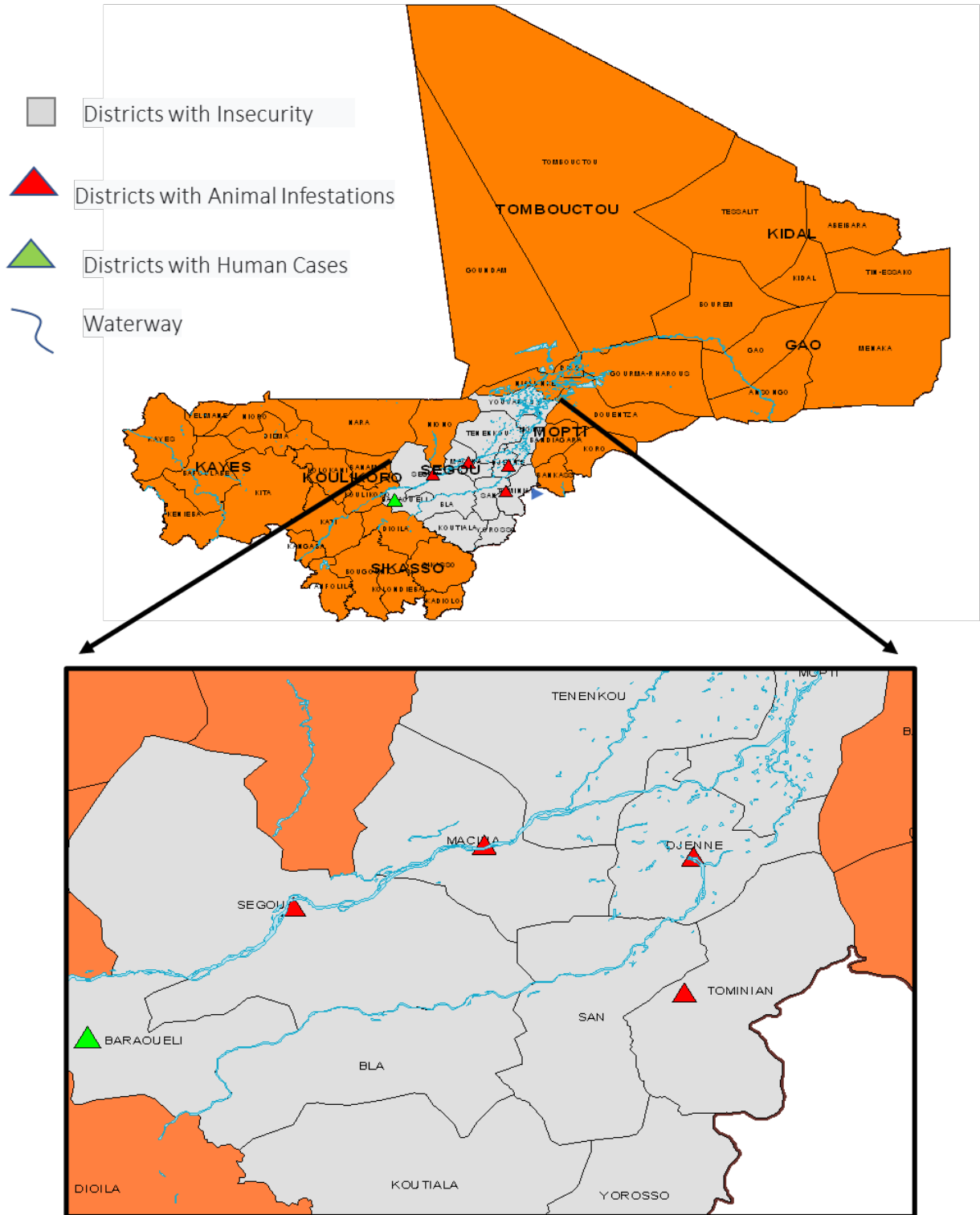
Case #	Region	District	Health zone	Village	Ethnicity	Profession	host	Probable origin	Date of detection	Date of emergence	Entered Water?	Water source Treated? (Y/N)	Contained(Y/N)	Total # of worms
1	Segou	Baroueli	Konobougou	Konobougou	Bozo	housewife	Human	Komara(Miacina)	23-mars-20	23-mars-20	No	No	No	2
2	Segou	Tominian	Ouan	Ouan	Bobo	farming	Dog	Djenne	12-juil.-20	12-juil.-20	Probable	Yes	No	1
3	Segou	Macina	Kolongotomo	Kolongotomo	Minianka	farming	Dog	Kolongotomo	13-août-20	13-août-20	Probable	Yes	No	2
4	Mopti	Djenné	Djenné Central	Djenné town (Youbkaina)	Peulh	farming	Dog	Djenne	19-août-20	19-août-20	Probable	Yes	Yes	1
5	Segou	Macina	Kolongotomo	Bozo Hamlet	Bambara	farming	Dog	Unknown	27-août-20	28-août-20	Probable	Yes	No	4
6	Segou	Macina	Macina Central	Macina town(Némabougou Bellah Wéré)	Bozo	farming	Dog	Unknown	01-sept.-20	02-sept.-20	Probable	No	Yes	1
7	Mopti	Djenne	Djenné Central	Doteme(Djenné town)	Peulh	housewife	Dog	Djenne town	Sept.12th-20	Sept.12th-20	Probable	No	No	2
8	Segou	Macina	Kolongotomo	Kolongotomo	Bozo	fishing	Dog	Kolongotomo	Sept. 14th-20	Sept.15th-20	No	No	Yes	1
9	Mopti	Djenne	Djenné Central	Diobororo(Djenné town)	Bozo	fishing	Dog	Djenne town	18 Sept.20	22 Sept.20	No	No	Yes	1
10	Segou	Markala	Sansanding	Gomadaga	Bozo	fishing	Dog	Unknown	03-nov.-20	03-nov.-20	Probable	Yes	Yes	1

* All isolation criteria must be met:

- i. The dog must be detected and tethered within 24 hours of emergence.
- ii. The dog did not enter a water source with a worm emerging.
- iii. The dog was tied up before the worm came out until the wound healed and the household received the proper education.
- iv. Supervisor confirms guinea worm infection within seven (7) days of emergence.

Figure 2

Map of Mali Showing Endemic and 2020 at Risk Districts with Insecurity



ETHIOPIA



The Ethiopia Dracunculiasis Eradication Program (EDEP) reported 11 cases of Guinea worm disease (all contained) in humans, 8 cats (all contained), 3 dog (all contained), and 4 baboon (none contained) infections in 2020. The human cases occurred in two separate point source outbreaks in Gog district of Gambella Region: 7 cases at Duli Farm (April 2-April 22) and 4 cases in PRC Agnua, Pochalla D (August 9-October 11) that were exposed to contaminated water from Lel Bonge pond and Ogul ponds, respectively. The cats may have been infected by a shared source of contaminated water or food in or near PRC Agnua (July 27-August 20). An updated line list of Guinea worm cases in humans in 2020 is in Table 3. The EDEP has steadily increased the number of ponds treated with Abate in the limited at-risk areas of Gog and Abobo districts of Gambella Region, from 2,957 (2017) to 4,668 (2018), 7,217 (2019), and 9,936 (2020). Ethiopia began proactive tethering of dogs and cats in at-risk villages in 2018 to reduce the risk of GW infections in domestic animals that roam freely and to increase containment of future domestic animal infections. EDEP targets 55 villages in Gog and Abobo districts for proactive tethering; the proportion of eligible animals proactively tethered increased from 89% in 2019 to 99% in 2020. Key intervention indicators are summarized in Figure 3. The peak transmission season is May-August. The EDEP sent specimens from 11 human cases and 15 animal infections to CDC in 2020. The National Certification Committee met twice in 2020. This report was presented by EDEP National Program Coordinator Mr. Kassahun Demissie.

Ethiopia has reported one provisional human case (contained) in 2021 (see issue #275).

In parallel, cross border surveillance is being reinforced and surveillance activities and response as well as cross are being strengthened in the refugee camps of Gambella and Benishangul Gumuz regions of Ethiopia. In the first quarter of 2021:

- Two-days training was provided for a total of 312 community health workers and 15 supervisors on GWD surveillance and communication in nine refugee camps of Benishangul Gumuz and Gambella regions
- 506 rumors and suspected cases were reported in nine refugee camps of Gambella and Benishangul Gumuz regions, of which 504 (99.6%) were investigated within 24 hours of receiving reports. None of rumors and suspected cases were confirmed as a guinea-worm case.

GWD and cash reward awareness survey was conducted in five refugee camps of Gambella region with average sample size of 350 people per camp. Accordingly, 87.6% of the interviewed individuals knew methods of GWD prevention, 86% heard about the cash reward and 74% mentioned the correct amount of cash.

EDEP Surveillance Snapshot 2020

Accessibility: 100%

Villages reporting 1+ GW infection: 17

Number of districts by surveillance level: 2 in level 1; 14 in level 2; 818 in level 3

Villages under Active Surveillance (VAS): 353 (190 level 1, 163 level 2)

Monthly reporting rate for VAS: 100%

Number of rumors: humans 15,224 (99% investigated in 24h), animals 5,228 (99% investigated in 24h)

Cash reward awareness: 95% humans and animals (levels 1 & 2)

Cash reward amount: US\$240 equivalent for reporting a human case, US\$12 for reporting infected animal

Integrated surveys: 151,538 persons (polio, trachoma, +)

Number and reporting rate for IDSR (Integrated Disease Surveillance and Reporting): 20,644 units, 91%

% presumed sources of human cases identified*: 100% (11/11)

% human and animal Guinea worm infections contained: 85% (22/26)

*see definition page 16.

Table 3

Ethiopian Dracunculiasis Eradication Program (EDEP) Line Listing of Cases: 2020

Case #	Age	Sex	Ethnicity	Occupation	Village of Detection	Zone	Woreda	Kebele	Date of Detection	Date of Emergence	Contained (yes / no)	Entered water
1	14	F	Agnuak	Student	Duli Village (Angota Side)	Agnua	Gog	Gog Dipach	2-Apr-20	2-Apr-20	Yes	No
2	12	F	Agnuak	Student	Duli Village (Angota Side)	Agnua	Gog	Gog Dipach	4-Apr-20	4-Apr-20	Yes	No
3	35	M	Agnuak	Farmer	Duli Village (Angota Side)	Agnua	Gog	Gog Dipach	5-Apr-20	5-Apr-20	Yes	No
4	30	M	Agnuak	Hunter, wood collector, and honey collector	Metaget Dipach	Agnua	Gog	Gog Dipach	6-Apr-20	6-Apr-20	Yes	No
5	17	F	Agnuak	Hunter, wood collector, and honey collector	Duli Village (Angota Side)	Agnua	Gog	Gog Dipach	8-Apr-20	8-Apr-20	Yes	No
6	40	M	Agnuak	Hunter, wood collector, and honey collector	Wadmaro	Agnua	Gog	Gog Dipach	8-Apr-20	8-Apr-20	Yes	No
7	40	M	Agnuak		Wadmaro	Agnua	Gog	Gog Dipach	22-Apr-20	22-Apr-20	Yes	No
8	60	F	Agnuak	House wife /wood collector	Duli Village (Angota Side)	Agnua	Gog	Gog Dipach	23-Apr-20	23-Apr-20	Yes	No
9	50	M	Agnuak	hunter	Pochalla D: PRC- A	Agnua	Gog	PRC Agnuak	12-Aug-20	12-Aug-20	Yes	No
10	30	M	Agnuak	hunter	Angundack (Diredawa)	Agnua	Gog	Agenga	17-Aug-20	17-Aug-20	Yes	No
11	40	M	Agnuak	farmer	Pochalla D: PRC- A	Agnua	Gog	PRC Agnuak	7-Sep-20	8-Sep-20	Yes	No

ChAD



Chad's Guinea Worm Eradication Program (CGWEP) reported 12 cases of Guinea worm disease (5 contained) in humans, 1,508 infected dogs (1,252 contained), and 63 infected cats (32 contained) in 2020. One of the human cases (#10, worm emerged July 10, 2020) is believed to have been infected in Am-Timan district of Salamat Region, where a Guinea worm case (#40) occurred in the village of Amdabri on July 30, 2019; two other human cases (#7, #8) resided in Bogam (which had a water-borne outbreak in 2019) during 2019 and 2020 (Table 4). Eighty-seven percent (87%) of households surveyed in villages with Guinea worm infections were found to practice safe disposal of fish waste. Key intervention indices are summarized in Figure 3. Transmission occurs year-round, but the peak transmission season is March-July. Chad offers a cash reward equivalent to approximately US\$100 for reporting a human case of Guinea worm disease and equivalent to US\$20 for reporting an infected animal. The CGWEP sent specimens from 38 humans, 18 dogs, and 8 cats to CDC in 2020. Chad had a national certification committee going into Chad's attempt to get certification in October 2009. It is no longer functional. This report was presented by CGWEP National Program Coordinator Dr. Philippe Tchindibet Ouakou.

Chad has reported a provisional total of 66 infected dogs (80% contained) in the first eleven weeks of 2021, compared to 436 infected dogs reported in the same period of 2020. This is a reduction of 83% in infected dogs so far in 2021. Surveillance sensitivity remains high: 15,187 rumors of human and animal infections reported in January and February 2021 compared to 14,036 rumors in January-February 2020 (Figure 1). Chad has reported 1 confirmed human case in 2021, from Am-Timan district of Salamat Region,

CGWEP Surveillance Snapshot 2020

Accessibility: 96%

Villages reporting 1+ GW infection: 436

Number of districts by surveillance level: 24 in level 1; 4 in level 2; 103 in level 3

Villages under Active Surveillance (VAS): 2,311 (2,211 level 1, 100 level 2)

Monthly reporting rate for VAS: 100%

Number of rumors: humans 57,536 (98% investigated in 24h), animals 76,539 (98% investigated in 24h)

Cash reward awareness: humans 85% of 5,548, animals 82% of 5,548

Cash reward amount: US\$100 equivalent for reporting a human case, US\$20 for reporting infected animal

Integrated surveys: pending

Number and reporting rate for IDSR (Integrated Disease Surveillance and Reporting): pending

% presumed sources of human cases identified*: 25% (3/12)

% human and animal Guinea worm infections contained: 81% (1,289/1,583)

*see definition page 16.

Table 4

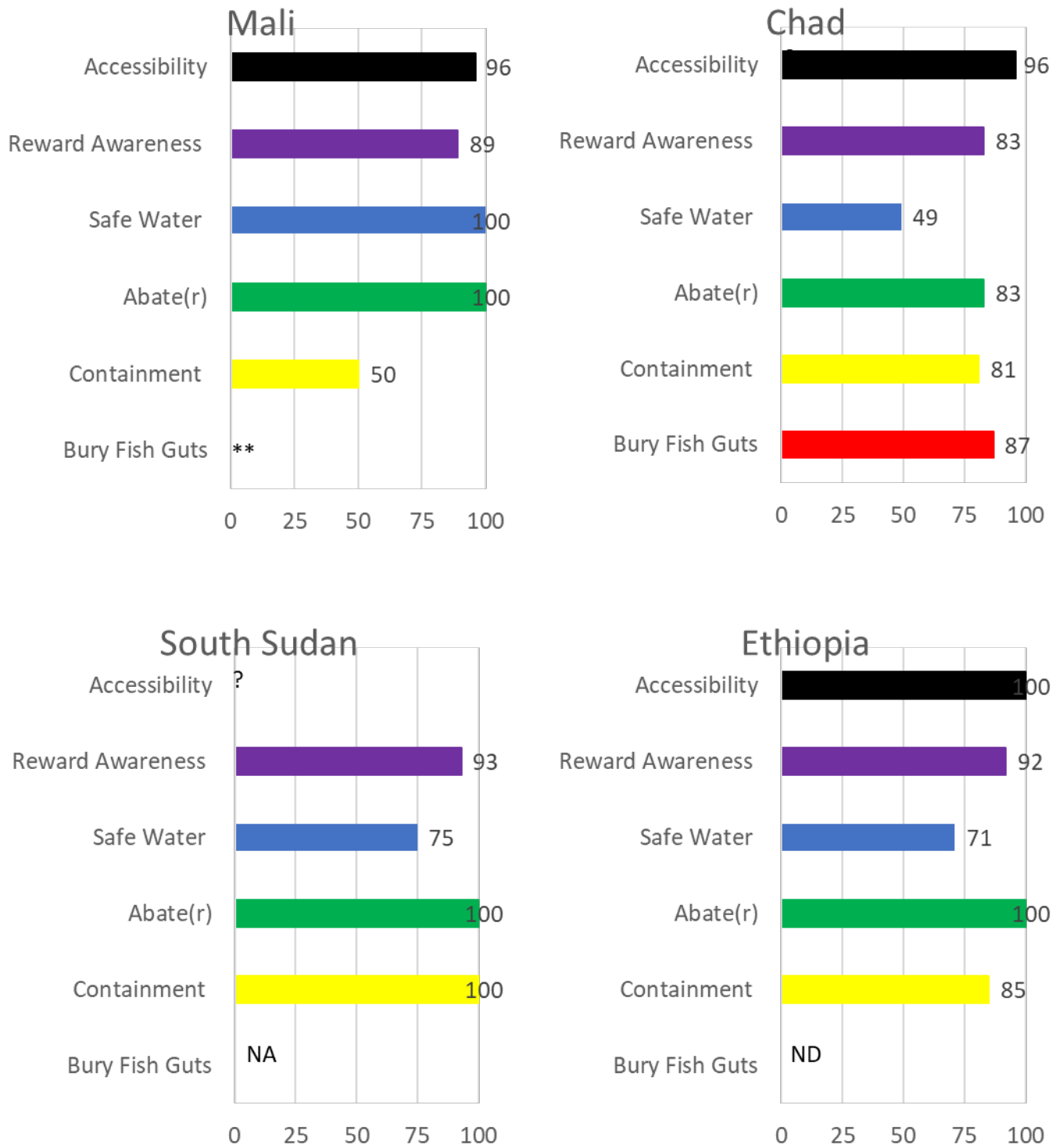
Chad Guinea Worm Eradication Program: GWEP Line Listing of Confirmed Cases: Year 2020

Case #	Age	Sex	Ethnicity	Occupation	Village of Detection	Zone	District	Region	Date of Detection	Date of Emergence	Contained (yes/no)	Entered water
1	32	M	Marba	Farmer	Bouar Baguirmi	Gambarou	Mandelia	Chari Baguirmi	3-Jan-20	3-Jan-20	Yes	No
2	11	F	Sara Kaba	Child	Kyabe	Kyabe	Kyabe	Moyen Chari	16-Feb-20	16-Feb-20	No	No
3.1	10	M	Daye	Child	Kemkian	Kemkian	Sarh	Moyen Chari	1-Mar-20	1-mars-20	No	Yes
3.2	10	M	Daye	Child	Kemkian	Kemkian	Sarh	Moyen Chari	1-Mar-20	1-mars-20	No	Yes
4	43	F	Goulaye	Child	Congo Sara	Banda	Sarh	Moyen Chari	9-Mar-20	08-mars-20	No	No
5.1	10	M	Hadjarai	Child	Marabodokouya 1	Marabe	Kyabe	Moyen Chari	2-May-20	9-mars-20	No	-
5.2	10	M	Hadjarai	Child	Marabodokouya 1	Marabe	Kyabe	Moyen Chari	19-Mar-20	21-mai-20	No	No
6.1	8	M	Hadjarai	Child	Marabodokouya 1	Marabe	Kyabe	Moyen Chari	6-Apr-20	06-avr-20	No	No
6.2	8	M	Hadjarai	Child	Marabodokouya 1	Marabe	Kyabe	Moyen Chari	21-Apr-20	06-avr-20	No	No
6.3	8	M	Hadjarai	Child	Marabodokouya 1	Marabe	Kyabe	Moyen Chari	21-Apr-20	24-avr-20	No	No
6.4	8	M	Hadjarai	Child	Marabodokouya 1	Marabe	Kyabe	Moyen Chari	9-May-20	24-avr-20	No	No
7	6	M	Arabe	Pecheur	Bogam	Liwi	Aboudeia	Salamat	30-Apr-20	09-avr-20	Yes	No
8.1	8	F	Arabe	Child	Bogam	Liwi	Aboudeia	Salamat	7-May-20	07-mai-20	yes	No
8.2	8	F	Arabe	Homemaker	Bogam	Liwi	Aboudeia	Salamat	8-Mar-20	28-mai-20	yes	No
9	41	M	Kouifa		Bemadjirondjo	Kemata	Sarh	Moyen Chari	30-Apr-20	19-mai-20	yes	No
10	20	M	Arabe		Matadjana	Matadjana	Matadjana	Wadi-Fira	9-Jul-20	10-juil-20	No	No
11.1	32	F	Baguirmi		Naraye	N'djamena Bou-Bouso	Matadjana	Chari Baguirmi	13-Aug-20	13-août-20	No	Yes
11.2	32	F	Baguirmi		Naraye	N'djamena Bou-Bouso	Matadjana	Chari Baguirmi	13-Aug-20	17-août-20	No	Yes
11.3	32	F	Baguirmi		Naraye	N'djamena Bou-Bouso	Matadjana	Chari Baguirmi	13-Aug-20	19-août-20	No	Yes
12	35	M	Arabe	Farmer	Amsigane	Al-ardep	Aboudeia	SLM	17-Sep-20	10-oct-20	yes	No

Chad Guinea Worm Eradication Program: GWEP Line Listing of Confirmed Cases: Year 2021

Case #	Age	Sex	Ethnicity	Occupation	Village of Detection	Zone	District	Region	Date of Detection	Date of Emergence	Contained (yes/no)	Entered water
1	22	F	Arabe	Homemaker	Amdabri	Gozdarat	Amtiman	Salamat	1/9/2021	2/1/2021	yes	no

Figure 3 Guinea Worm Eradication Program Indices Coverage*



*see criteria for each indicator in text. NA = Not applicable. ND = No data available.

*December 2020

** The MGWEP encourages households to dry fish guts and sell them to chicken farmers.

Table 5

Number of Laboratory-Confirmed Cases of Guinea Worm Disease, and Number Reported Contained by Month during 2021*
(Countries arranged in descending order of cases in 2020)

COUNTRIES WITH TRANSMISSION OF GUINEA WORMS	NUMBER OF CASES CONTAINED / NUMBER OF CASES REPORTED												TOTAL*	% CONT.	
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER			
CHAD [^]	0 / 0	1 / 1	0 / 0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	1 / 1	
ETHIOPIA	0 / 0	0 / 0	0 / 0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	0 / 0	
SOUTH SUDAN	0 / 0	0 / 0	0 / 0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	0 / 0	
ANGOLA	0 / 0	0 / 0	0 / 0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	0 / 0	
MALI	0 / 0	0 / 0	0 / 0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	0 / 0	
TOTAL*	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	
% CONTAINED	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	

*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.

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												TOTAL*	% CONT.	
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER			
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	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	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 / 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	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 / 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	0 / 0	17 / 27	63%
% CONTAINED	100%	0%	0%	89%	100%	100%	50%	67%	100%	100%	100%	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.

ANGOLA



Angola reported one confirmed human case (uncontained) of Guinea worm disease in 2020 and investigated 3 rumors of cases within 24 hours. Since a human case was discovered unexpectedly in 2018 during pre-certification surveys, the Angolan Ministry of Health has identified a total of 3 confirmed human cases and 1 confirmed dog infection; all were detected in Cunene Province in the southern part of the country during January-April (rainy season) in 2018-2020. The source of infection has not been found for any of the cases or dog infection. Fifty-four communities are considered at-risk in three *municípios* (districts): Cuanhama, Namacunde, and Cuvelai. The ministry has trained village volunteers and community-based health workers, sensitized over 1500 health professionals, provided health education to community members, and distributed cloth filters, assisted by the World Health Organization and The Carter Center. Angola offers a cash reward of 55,000 kwanzas (US\$88 equivalent) for reporting a case of Guinea worm disease; the ministry distributed 27,100 posters advertising the reward in 2020. The National Technical Committee for the Certification of Guinea Worm Eradication was formed in 2017 and met three times in 2020. This report was presented by National Neglected Tropical Diseases Program Coordinator Dr. Cecilia de Almeida.

Angola has reported no Guinea worm infections in humans or animals so far in 2021.

Cameroon. The WHO National Program Officer Dr. Etienne Nnomzo'o presented this report. Cameroon reported 1 human case of Guinea worm disease (not contained), 5 infected dogs (not contained), and 1 infected cat (not contained) in 2020. The affected villages in Nouldaina health area of Guere district in Cameroon's Far North Region are within 2.5 kilometers (1.5 miles) of the Logone River border with Chad's Bongor Health District (Mayo Kebbi Est Region), which reported 5 dogs with Guinea worm infections in 2019. The human case and six infected animals in 2020 as well as a single human case in the same area of Cameroon in 2019 are presumed to have become infected in Chad, since they are effectively part of the same communities living on both sides of the international border (see map in *Guinea Worm Wrap-Up* #274). Analysis and comparison of the genetic profiles of recent Guinea worms from Cameroon and Chad may clarify the relationships and source of infections detected in Cameroon. WHO is providing technical and financial support to Cameroon. Cross-border collaboration between the GWEPs of Chad and Cameroon is being reinforced. Cameroon responded to 37 rumors of human Guinea worm cases and 23 rumors of animal infections in 2020. The cash reward for reporting a case of Guinea worm disease in Cameroon is 100,000 CFA (US\$181 equivalent); the country will add a reward for reporting infected dogs in 2021. Cameroon's last known indigenous Guinea worm case was in 1997; it was certified free of Guinea worm transmission ten years later.

Democratic Republic of Congo. Dr. Serge Nkoy, National Guinea Worm Program Coordinator, presented the report on this country in the pre-certification stage. The country now called the Democratic Republic of Congo (DRC) has never reported an endemic case of Guinea worm disease or animal infection and has not reported an imported case in over 60 years. This country has many flowing rivers and one of the highest annual rainfalls in Africa and is not very receptive to Guinea worm transmission. With WHO's assistance, DRC's Ministry of Health has conducted multiple extensive surveys as integrated active surveillance nationwide in cooperation with mass immunization and mass drug administration programs and Ebola activities since 2016, in addition to passive surveillance by fixed medical facilities. It investigated 7 rumors within 24 hours in

2018-2020. It has publicized a reward equivalent to US\$400 for reporting a Guinea worm infection and found 10% reward awareness among 13,300 persons queried in 2020. Three consultants provided by WHO in the final quarter of 2020 helped draft a preliminary Country Report which national authorities are currently revising. The covid-19 pandemic and insecurity in some eastern parts of the country have constrained some activities.

Sudan. Mr. Elrofaay A. elazim Mohammed, National Guinea Worm Program Coordinator, presented this report. Sudan reported its last indigenous case of Guinea worm disease in 2002 and its last imported case of the disease in Radoum, South Darfur in September 2013. Sudan maintains passive surveillance for Guinea worm disease via its Integrated Disease Surveillance and Reporting (IDSR) system, which includes 5,911 health facilities and 1,791 sentinel sites. Mass Drug Administration programs for lymphatic filariasis, schistosomiasis, onchocerciasis and trachoma have distributed over 9,000 cards with photographs to help identify Guinea worm cases. It conducts active surveillance in about 10,000 villages and investigated 63 rumors within 24 hours in 2020. WHO has provided more than one million health education materials. There is a focal person for Guinea worm disease in the Ministry of Livestock. The Ministry of Health publicizes a cash reward of 50,000 Sudanese Pounds (US\$1,000 equivalent) for reporting a Guinea worm case in a human. The amount of the reward of 50 000 SDG is shared as follows: 20 000 SDG for the patient, 20 000 SDG for the informant and 10 000 SDG for the health worker. A hotline is activated to report if someone seen a case of guinea-worm disease in Sudan to call 1382 or report to the nearest health facility immediately. Cash reward awareness is estimated at 37%. No reward is offered for reporting Guinea worm in an animal since no animal infection or rumor has been reported in Sudan. The country received a visit by WHO headquarters staff in November 2019, which was delayed due to security concerns; a visit in 2020 was postponed because of the Covid-19 pandemic. WHO is assisting Sudan to prepare its draft Country Report which Sudan plans to submit for consideration by the International Commission for the Certification of Dracunculiasis Eradication in August 2021 and the final Report in September 2021.

To achieve the certification criteria for GWD free Sudan and to raise awareness among the general population in 18 states including formerly endemic states; the advocacy workshop with IMAMs of 17/18 states was organized where more than 44 people participated actively and committed to ensure GWD messages in 'Jumma Kutba' as well in the community. IEC material including public leaflets and GWD ID cards were distributed during a workshop.

Outcome of Group work and workshop:

1. All agreed to raise the GWD messages on prevention, reporting and reward system during Friday Prayers.
2. All 17 states IMAMs will also inject messages during all RAMADAN prayer gatherings.
3. The public awareness leaflets will be distributed to all attending the mosques and in community.
4. They also committed to wear GWD ID cards in their most of religious meetings and visits to community.
5. The religious leaders will be coordinating state level awareness meetings with NTD focal person of SMOH.

World Health Organization - Sudan, with Federal Ministry of Health, and Ministry of Religious Affairs; on 12th April 2021, launched the “Sudan Khali Mein El Ferendit ” campaign to spread & raise awareness, report GWD rumours, on occasion of Holy month of Ramadan, as continued efforts to achieve GWD certification for Sudan by 2021.

MODIFIED INTERVENTION INDICES TO REFLECT VARIABLE MODES OF TRANSMISSION

With *D. medinensis* infections occurring in animals in three of the final four endemic countries (South Sudan is the exception) and evidence mounting to suggest that the infection is being transmitted to humans and animals not just by drinking water, as before, but likely also by people and animals eating raw or undercooked transport hosts such as small fish (up to 2-3.inches/5-7.5 cm long) and/or raw fish guts, as well as perhaps by eating undercooked aquatic paratenic hosts such as frogs and larger fish, Guinea Worm Eradication Programs have adopted new interventions to counter the new challenges. Given this new situation we suggest that national GWEPs monitor a modified set of operational indicators. Among the former indicators, trained village volunteers, regular health education, and reporting by villages under active surveillance, including endemic villages, can be assumed as at or near 100%. Coverage with cloth filters protects against contaminated drinking water, such as in Ethiopia in 2017, but not against eating an infected transport or paratenic host which may now be the most common mode of infection for humans and animals in Chad and Mali. The suggested indicators now are:

- Reward awareness. Combined results for VAS levels I & II (endemic and high-risk villages) for reporting human and dog infections: % aware of persons surveyed. *Detect infections quickly.*
- Containment of infected humans and animals. % of infected humans and animals contained or tethered. *Prevent contamination.*
- Abate coverage. % cumulative villages where Abate applied this year in villages with infections in current or previous year. Water bodies may be ineligible for Abate treatment from time to time when they become too large (>1000mx3) or dry up. *Prevent infection and contamination.*
- Bury fish guts. % of people surveyed In VAS level I with demonstrated fish gut burial practice. *Prevent Infection.*
- Safe water source. % of VAS level I villages with at least one functioning source of safe drinking water. *Prevent large point source outbreaks.*
- Accessibility. % of VAS level I (endemic villages+) that are safely accessible by the program.

The latter indicator, as first reported on in GW Wrap-Up #257, is intended to estimate GW programs' safe access to areas of greatest concern now for supervision and interventions. After transmission is interrupted nationwide, the entire country will need to be accessible for adequate surveillance and certification. Our first concern now, however, is to stop transmission, which requires safe access. The four main considerations for the new

indicator are: 1) the denominator = surveillance level 1 (known or suspected endemic) plus option to include other areas if judged appropriate; 2) scores are 0 = not accessible for supervision and interventions, 1 = partly accessible, 2 = fully accessible; 3) administrative level= district or county; 4) all GW infections count, whether human or animal. Total score is sum of scores for all districts/counties of concern divided by maximal score (2x total number of districts/counties of concern) times 100 = percentage. A country's score may change with changes in security situations on the ground.

DEFINITION OF A PRESUMED SOURCE OF GUINEA WORM INFECTION

A presumed source/location of a human dracunculiasis case is considered identified if:
The patient drank unsafe water from the same source/location (specify) as other human case(s) or an infected domestic animal 10-14 months before infection, or

The patient lived in or visited the (specify) household, farm, village, or non-village area of (specify) a Guinea worm patient or infected domestic/peri-domestic animal 10-14 months before infection, or

The patient drank unsafe water from (specify) a known contaminated pond, lake, lagoon or cut stream 10-14 months before infection.

If none of the above is true, the presumed source/location of the infection is unknown. Whether the patient's residence is the same as the presumed source/locality of infection or not should also be stated in order to distinguish indigenous transmission from an imported case.

HISTORICAL FLASHBACK

May of this year will be the 35th anniversary of when the Thirty-Ninth World Health Assembly in 1986 adopted the first resolution that endorsed the goal of "eliminating dracunculiasis, country by country, in association with the International Drinking Water Supply and Sanitation Decade", using a combined strategy of provision of safe water sources, active surveillance, health education, vector control, and personal prophylaxis. It was the mid-point of the Water and Sanitation Decade (1981-1990). The resolution was co-sponsored by Burkina Faso, Cameroon, India, Mauritania, Nigeria, Uganda, and the United States. Introduced by Uganda, the resolution was adopted unanimously but set no target date. In 1988 African Ministers of Health, meeting as the annual African Regional Committee of the World Health Organization, adopted a resolution calling for dracunculiasis to be eradicated by the end of 1995, a target date that was endorsed by the World Health Assembly in a new resolution in 1991. Chad, Ethiopia, Kenya, and Sudan began their national Guinea Worm Eradication Programs in 1994.

TRANSITION

The Carter Center's Country Representative to South Sudan, Mr. Jake Wheeler, left that position on March 19, 2021. He was Deputy before being appointed Acting Country Representative in April 2019, then Country Representative. Ms. Giovanna Steel is serving as Acting Country Representative. Thank you, Jake, and Godspeed!

RECENT PUBLICATIONS

Boyce MR, Carlin EP, Schermerhorn J, Standley CJ. A One Health Approach for Guinea Worm Disease Control: Scope and Opportunities. Tropical Medicine and Infectious Disease. 2020;5(4). doi:10.3390/tropicalmed5040159

Durrant C, Thiele EA, Holroyd N, et al. Population genomic evidence that human and animal infections in Africa come from the same populations of *Dracunculus medinensis*. PLoS Neglected Tropical Diseases. 2020;14(11):e0008623. <https://doi.org/10.1371/journal.pntd.0008623>

Gebre, T. 2021. Rethinking disease eradication: putting countries first. International Health. <https://doi-org.proxy.library.emory.edu/10.1093/inthealth/ihab011>

Gonzalez Engelhard CA, Hodgkins AP, Pearl EE, Spears PK, Rychtar J, Taylor D. A mathematical model of Guinea worm disease in Chad with fish as intermediate transport hosts. Journal of Theoretical Biology. March 2021:110683. doi:10.1016/j.jtbi.2021.110683

Guagliardo, S et.al., 2021. Correlates of variation in Guinea worm burden among infected domestic dogs. Am J Trop Med Hyg xx:pp-pp. doi:10.4269/ajtmh.19-0924

Rubenstein, B. L., Roy, S. L., Unterwegner, K., Yerian, S., Weiss, A., Zirimwabagabo, H., Chop, E., Romero, M., Ouakou, P. T., Moundai, T., & Guagliardo, S. A. J. (2021). Community-based Guinea worm surveillance in Chad: Evaluating a system at the intersection of human and animal disease. PLoS Neglected Tropical Diseases, 15(3), e0009285. <https://doi-org.proxy.library.emory.edu/10.1371/journal.pntd.0009285>

Setback for campaign to eradicate Guinea worm disease. The Veterinary Record. 2020;187(10):382-383.

Senyonjo, L., Downs, P., Schmidt, E., Bailey, R., & Blanchet, K. (2021). Lessons learned for surveillance strategies for trachoma elimination as a public health problem, from the evaluation of approaches utilised by Guinea worm and onchocerciasis programmes: A literature review. PLoS Neglected Tropical Diseases, 15(1), e0009082. <https://doi-org.proxy.library.emory.edu/10.1371/journal.pntd.0009082>

Thach PN, van Doorn HR, Bishop HS, et al. Human infection with an unknown species of *Dracunculus* in Vietnam. International Journal of Infectious Diseases : IJID : official publication of the International Society for Infectious Diseases. March 2021. doi:10.1016/j.ijid.2021.02.018

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, Andrew Nute and Adam Weiss of The Carter Center, Dr. Sharon Roy of CDC, and Dr. Dieudonne Sankara of WHO.

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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



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