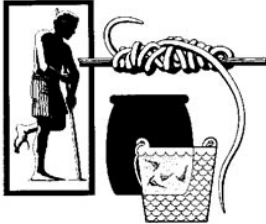


Memorandum



Date: August 8, 2019
From: WHO Collaborating Center for Dracunculiasis Eradication, CDC
Subject: GUINEA WORM WRAP-UP #262
To: Addressees

“The public interest requires doing today those things that men of intelligent good will would wish, five or ten years hence, had been done.” Edmund Burke

ABDULRAHMAN AL-AWADI (1936-2019), ICCDE CHAIRMAN



**World Health
Organization**

It is with deep sadness and painful regret that we report the recent passing of Dr. Abdulrahman A. Al-Awadi on July 6, 2019. As President of the Thirty-third World Health Assembly, Dr. Al-Awadi signed the declaration of global eradication of smallpox with World Health Organization Director-General Dr. Halfdan Mahler on May 8, 1980. When the World Health Organization (WHO) established the independent International Commission for the Certification of Dracunculiasis Eradication (ICCDE) in 1995 he was elected chairman of the Commission.

After studies in his native Kuwait, Dr. Al-Awadi received his advanced education at the American University of Beirut (B.S., 1958) in Lebanon, the University of Aberdeen (M.D., 1963) in Scotland and Harvard University (M.P.H., 1965) in the United States. According to the *Kuwait Times*, he joined Kuwait's Ministry of Health in 1963, was elected to the National Assembly in 1975, and served as Minister of Public Health (1975-1983), Minister of Public Health and Minister of Planning (1983-1986), Minister of Planning (1988-1990), and Minister of State for Cabinet Affairs (1990-1991). As Minister of Public Health, he led a “comprehensive health renaissance where most hospitals were built and the medical mission for Hajj was developed”. In 2011 he received an award from His Highness the Amir Sheikh Sabah Al-Ahmad Al-Jaber Al-Sabah for his 30 years of service to Kuwait.

ICCDE member Dr. Abdhakeem Alkohani of Yemen remembers that Dr. Al-Awadi “was very supportive to Yemen's health system in the 1970s and 1980s through the Yemeni-Kuwait Health Committee and established a Kuwaiti Hospital in Sana'a”. ICCDE member Prof. David Molyneux of the United Kingdom wrote that “Kuwait will mourn the passing of a hugely respected and influential leader”. The head of the Dracunculiasis Eradication Unit at WHO, Dr. Dieudonne Sankara, said “we

have lost a great Guinea worm warrior, a brilliant scientist, and a wonderful person” while CDC’s Dr. Sharon Roy recalled “his experience, insights, wisdom, and sense of humor”. Dr. Donald Hopkins of The Carter Center remembers Dr. Al-Awadi as a compassionate and forceful public health physician and leader with an ever-present sense of humor and who was dedicated to Guinea worm eradication. Fluent in Arabic, English and French, as chair of the ICCDE he oversaw certification by WHO of 199 countries, areas and territories as free of dracunculiasis; only seven countries remain to be certified. He signed the “Geneva Declaration” on Guinea Worm Eradication with President Carter and ministers of health of the remaining endemic countries during the World Health Assembly in May 2004, participated in four annual Informal Meetings on Guinea worm eradication during World Health Assemblies in 2007, 2011, 2012, and 2013, and attended a national review meeting of the South Sudan Guinea Worm Eradication Program in Juba in December 2011. We regret that this ardent supporter could not witness the end of the Guinea worm campaign and certification of dracunculiasis eradication.

CHAD: ERADICATION ESCALATION



Chad has reported 1,516 dogs and 21 cats with Guinea worm infections in January-July 2019,(Table 1) compared to 834 infected dogs and 18 cats in the same period of 2018. Twenty-four cases of Guinea worm disease were reported in humans in January-July 2019 vs. 10 cases in January-July 2018. Some of the increase in infected dogs reported probably resulted from expansion of the number of villages under active surveillance (VAS) from 1,895 at the end of 2018 to 2,138 as of May 2019. Intensified surveillance this year has generated a five-fold increase from 6,023 rumored infections in dogs and humans in January-May 2018 to 32,338 rumors in January-May 2019. The increase in human cases, however, is due to an outbreak of 12 cases (confirmed as of June; 9 contained) associated with the village of Bogam in Aboudeia district of Salamat Region since April this year. Bogam, a village of ~1000 population, had a borehole installed a few years ago but the pumping system failed. The village has no immediate commitment to be provided safe water, and is apparently experiencing an exceptional water borne outbreak from a contaminated source shared by several people. Abate was applied to this year’s suspected contaminated water source since June 12. This is the first such outbreak that has occurred in Chad since Guinea worm cases were re-discovered there in 2010 (Table 1). Two epidemiologists from the Centers for Disease Control and Prevention (CDC) will help evaluate Chad’s Guinea worm surveillance system in August-September 2019.

In addition to surveillance, Chad’s GWEP has intensified *containment* by tethering infected dogs, and application of *Abate* for control of copepod vectors of the parasite starting in 2018. The containment rate for infected dogs increased from 74% in January-June 2018 to **79%** in January-June 2019, while the cumulative proportion of 1+ villages with Guinea worm cases or infected dogs that were treated with Abate monthly increased from 24% in 2018 to **79%** as of May 2019. The crude average of households surveyed in VAS Level I villages with demonstrated fish gut burial practices rose from 79% in 2018 to **85%** in January-May 2019. Meanwhile field and laboratory research continues to investigate whether transmission to dogs occurs mainly by eating transport hosts such as fingerlings (small fish) or infected paratenic hosts such as frogs or both, or by some other means. The Carter Center intends to increase support to help Chad’s GWEP expand its village-based surveillance network, improve containment of dogs and other interventions, and increase supervisory capacity.

Mario Romero, the Deputy Country Representative for The Carter Center in Chad, will leave his post in August. THANK YOU Mario!! And Best Wishes in your future endeavors.

Table 1

Chad Guinea Worm Eradication Program
GWEP Line Listing of Confirmed Cases: Year 2019*

Case #	Age	Sex	Ethnicity	Village of Detection	District / payam / woreda	County / Region	Date of Emergence (D/M/Y)	Nb of worms	Case Contained	Patient contaminated sources of water (Yes/No)	ABATE applied (Yes/No)	Source* of infection established? (Yes/No)	Date sent to CDC (D/M/Y)
1	33	M	Mbao	Ngargue (Quartier Kormada)	Bailli	CB	01-janv.-19	1	no	Probably	yes	Suspected	09-janv.-19
2	11	M	Sara Kaba	Dangala Kanya (Quartier Kibita)	Kyabe	MC	05-janv.-19	1	no	Probably	yes	Suspected	11-janv.-19
3	13	M	Sara Kaba	Marabe 2 (Quartier Dilibi)	Kyabe	MC	15-Fev-19	1	yes	no	no	Suspected	22-Fev-19
4	64	F	Sara Kaba	Kyabe (Hors-zone)	Kyabe	MC	24-mars-19	1	no	yes	yes	Suspected	03-avr.-19
5	M	4	Ngambaye	Mourkou	Dourbali	CB	16-avr.-19	1	yes	no	no	Suspected	08-mai-19
6	58	M	Sara-Goulaye	Gassaou/Ndjourou	Bouso	CB	23-avr.-19	4	yes	no	no	Suspected	08-mai-19
7	19	F	Torom	Bogam	Aboudeia	SLM	19-avr.-19	2	No	no	no	Suspected	08-mai-19
8	24	F	Torom	Bogam	Aboudeia	SLM	07-mai-19	1	No	no	no	Suspected	13-mai-19
9	50	F	Torom	Bogam	Aboudeia	SLM	9-May-19	1	yes	no	no	Suspected	13-mai-19
10	22	F	Torom	Bogam	Aboudeia	SLM	12-May-19	1	yes	no	no	Suspected	31-May
11	23	F	Torom	Bogam	Aboudeia	SLM	19-Jun-19	1	yes	no	yes	Suspected	19-Jul
12	30	m	Torom	Bogam	Aboudeia	SLM	23-May-19	1	yes	no	yes	Suspected	31-May
13	8	F	Torom	Bogam	Aboudeia	SLM	23-May-19	1	yes	no	yes	Suspected	19-Jul
14	50	m	Rachid	Amhabile	Aboudeia	SLM	31-May-19	1	yes	no	no	Suspected	24-Jun
15	15	M	Torom	Bogam	Aboudeia	SLM	5-Jun-19	1	yes	yes	yes	Suspected	19-Jul
16	44	m	Boua	Mama	Korbol	MC	7-Jun-19	1	no	Probable	yes	Suspected	24-Jun
17	6	F	Torom	Bogam	Aboudeia	SLM	10-Jun-19	1	yes	no	yes	Suspected	28-juin-19
18	30	M	Torom	Bogam	Aboudeia	SLM	10-Jun-19	1	no	no	yes	Suspected	19-Jul
19	6	F	Sara Kaba /Koulfa Zahawa	Bemadjirodjo	Sarh	MC	11-Jun-19	1	no	yes		Suspected	28-juin-19
20	35	m	Arabe	Amhabile	Aboudeia	SLM	12-Jun-19	1	yes	no	no	Suspected	24-Jun
21	11	F	Sara Kaba	Ngondei	Kyabe	SLM	(may 2019)	2	no	yes	yes	Suspected	9-Jul
22	5	F	Torom	Bogam	Aboudeia	SLM	23-Jun-19	1	yes	no	yes	Suspected	19-Jul
23	70	F	Torom	Bogam	Aboudeia	SLM	28-Jun-19	1	yes	no	yes	Suspected	19-Jul
24	10	m	Sara Kaba	Marakouya 2	Kyabe	MC	10-Jul-19	1	no	Probable	yes	Suspected	19-Jul

* provisional

CAMEROON: GW IN PATIENT ON CHAD BORDER

A 49-year-old woman of Massa ethnicity from the village of Dabana in Guere health district of Cameroon's Extreme-Far North Region observed a white worm emerging from a large ulcerative wound on her lower right leg on March 22, 2019. This was brought to the notice of health authorities during a national immunization campaign in the district at the time. The worm was completely extracted on March 29 by the head of the health zone and placed in alcohol. The patient reportedly gave contradictory statements about her movements during January-May 2018, the probable period of her infection. Her village is located on the border with Chad, about 1.5 kilometers from the Logone River, and her home is only 400 meters from a large pond, formed from a tributary of the Logone river, which she and other members of the community use for washing. According to unconfirmed reports of a joint investigation by Cameroonian and Chadian health authorities in May 2019, at least one dog with a Guinea worm was seen in Dabana around January 2019, and another alleged infected dog in the Cameroonian village of Bastebe, on the other side of the river from the Chadian village of Zigui on May 2, 2019, which dog reportedly also had a GW infection in about June 2018. The worm specimen was received at CDC on August 1, 2019 and determined to be morphologically consistent with Guinea worm. The CDC will further evaluate the specimen through PCR. The source of infection is uncertain as to whether the case was imported from Chad or indigenous to Cameroon.

ETHIOPIA: 18 MONTHS NO HUMAN CASE, 10 MONTHS NO INFECTED CAT, 9 MONTHS NO INFECTED DOG

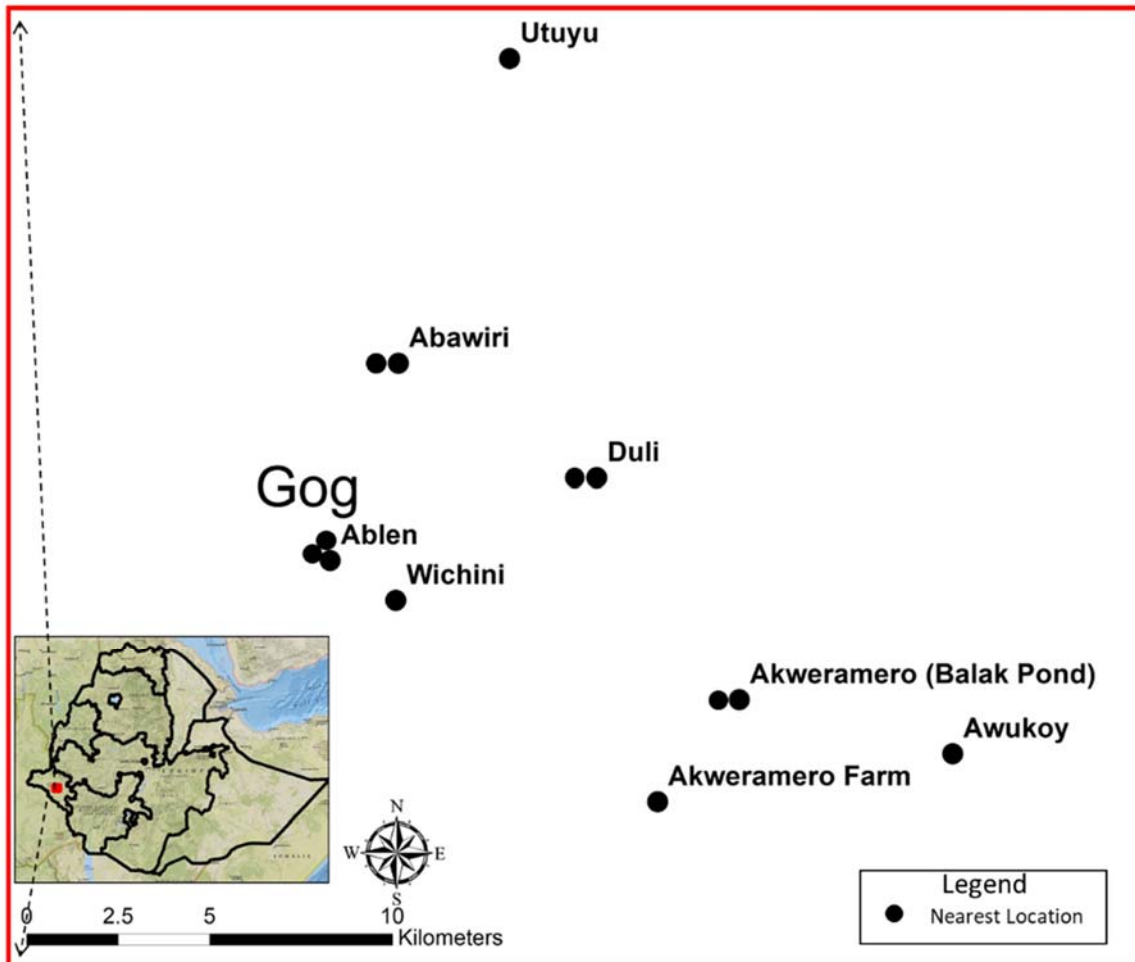


As of the end of June 2019 Ethiopia reported its most recent case of Guinea worm disease in a human 18 months ago (December 2017), its most recent Guinea worm infection in a dog 9 months ago (September 2018), and its most recent infected cat was 10 months ago (August 2018). During January-June 2018, Ethiopia reported 8 infected dogs, 2 infected cats, no human case, and no infected baboon, compared to no infected dog, cat or human, and 6 infected baboons in the same period of 2019. Surveys to assess the level of awareness of the cash reward for reporting Guinea worm cases that were conducted in six Level II districts of Gambella Region and Nyangatom district of SNNPR in June found 89% of 930 persons surveyed knew of the reward; 58% of 1125 persons surveyed in Level III districts of Amhara Region and SNNPR were aware of the reward. The Ethiopia Dracunculiasis Eradication Program (EDEP) continues its aggressive practices of monthly application of Abate to water sources in Gog and Abobo districts of Gambella Region, and proactive tethering of domestic dogs and cats in the at-risk area since April 2018. After detecting a group of suspect GW infections in baboons (see below) the team in Gog district hired ten hunters to help identify and map previously unknown water sources deep in the associated forest areas, six of which were treated with Abate immediately.

The study of Guinea worm epidemiology in baboons and dogs that began in Gog district in April 2018 led by principal investigator Dr. James Zingeser of The Carter Center conducted a second round of trapping and examining olive baboons in June 2019 to complement the 28 baboons trapped in January 2019. Supervised by Dr. Desalegn Getahun (Ethiopian Public Health Institute), the second round of trapping in June captured and examined a total of 33 additional baboons from four different troops. Seven telemetry collars were deployed across four troops in June. Including the collars deployed in January, five of the six focal troops under surveillance are now being tracked with GPS telemetry collars until June 2020. The project will continue physical tracking of the six troops at least until then also, in addition to ongoing passive surveillance by hunters and other villagers. In contrast to the first

round of trapping in January when none of the baboons examined showed any signs of Guinea worm infection, suspect Guinea worms were extracted from four of the trapped baboons in June. The team also examined a worm found under the skin of a dead leopard that was trapped accidentally by hunters in Abobo district on July 8 which was confirmed to be a Guinea worm in the CDC laboratory. Infections in baboons in 2013-2019 are focal in time and place, with 13 of the 15 confirmed GW infections in baboons up to now having occurred in June, July or August, and all 15 in Gog district, where most of the recent GW infections in humans, dogs and cats were also located ([Map 1](#)). Although not strictly comparable to the report of the single infected baboon discovered by villagers in 2018 (August) with four Guinea worms emerging from its body, finding Guinea worms in 4 of the 33 live baboons that were trapped and released by the study team in June 2019 (including 2 with emerging worms) plus 2 dead baboons discovered in June 2019 (including 1 with emerging worms) underscores that Guinea worm transmission continued among baboons in 2018 despite apparent absence of transmission to humans, dogs and cats. *The case definition for Guinea worm disease requires that the worm be confirmed by laboratory tests and that the worm is detected while emerging from a lesion in the skin (some Guinea worms never emerge from the body), so Guinea worms that are discovered inside an animal's body do not meet the case definition, even if confirmed by the laboratory as D. medinensis. However, whether a Guinea worm emerges from an animal or not, that host animal's location and infection should still trigger aggressive and thorough interventions, even if the worm did not emerge.*

Map 1 Locations Where Baboons with Confirmed Guinea Worms Were Detected in Ethiopia, 2013 – June 2019



MALI: NO HUMAN GW CASE IN THREE AND A HALF YEARS



Mali has reported no human with Guinea worm disease since November 2015. It has reported 2 dogs (contained) with confirmed Guinea worm infection in January-July 2019, compared to 7 infected dogs reported in the same period of 2018. The first infected dog was detected in Tominian district (Sokoura village) of Segou Region in May, but had been recently imported from Sabare village in Tenenkou district of Mopti Region (see previous issue). Tominian district also detected the second dog infection in Masso village on July 25. That dog, which was tethered on the same day, had been imported from Diafarabe in Tenenkou district of Mopti Region in April 2019. In convenience samples totaling 255 persons surveyed in surveillance Level II areas of Mopti Region in April and June 2019, 92% of those surveyed were aware of the cash reward for reporting a human case of Guinea worm disease and 80% knew of the reward for reporting an infected dog.

The National Program Coordinator of Mali's GWEP Dr. Cheick Oumar Coulibaly and Carter Center Country Representative Mr. Sadi Moussa made a supervisory visit to Segou Region on June 16-22. In Segou they visited the districts of Tominian, San, Bla, Macina and Markala. They found good collaboration between dog traders and GW workers in Tominian and Markala districts and noted that veterinary agents were involved in GW surveillance of dogs in Markala and Macina. Dr. Drissa Toure, the Regional Health Director of Segou, informed them that he had made a supervisory visit to Tominian, Macina and Markala districts in May. Based on the reported origin in Diondiori health area of Tenenkou district in adjacent Mopti Region of infected dogs that were detected in Tominian district of Segou Region in 2016, 2017, 2018 and 2019, the program believes an on-going source of Guinea worm contamination exists in Diondiori health area of Tenenkou, which unfortunately is an insecure district and only partly accessible to the GWEP. The journey by bicycle of traders from the inland Niger Delta area in Mopti Region to Tominian district in Segou Region is about 300 kilometers (~180 miles) round trip and takes about ten days. The journey by bicycle of traders and dogs is about 150 kilometers (~90 miles) and takes about five days.

NPC Dr. Coulibaly and Sadi Moussa made a supervisory visit to Djenne and Mopti in Mopti Region on July 24-28. In Mopti they met with Regional Health Director Dr. Aguisa Maiga and discussed security and GW surveillance in Tenenkou, Yowarou and Mopti districts. Because of limitations in access to the localities at risk, information is reported to the health district by telephone and via markets. The cash reward for reporting is promoted by radio broadcasts. In Djenne district the team met with the district medical officer and the GW technical assistant. A suspect GW infection in a dog was reported in Djenne town in July and the team investigated that suspect infection. The dog reportedly does not eat raw fish, but frequents a large pond near the owner's house. The pond was treated with Abate and the team recommended that all dogs visiting that pond should be monitored. The team also visited Yebe health area where a dog infection was reported in 2018.

Members of Mali's National Committee for Certification of Dracunculiasis Eradication made supervisory visits to Kayes Region and Bamako district. The Vice President of the Committee, Dr. Alhousseini Maiga led the mission in Bamako district.

SOUTH SUDAN: ZERO CASES IN JANUARY-JULY 2019



The South Sudan Guinea Worm Eradication Program (SSGWEP) has detected no case of Guinea worm disease in January-July 2019, compared to 7 cases (1 contained) that were reported during the same period of 2018. South Sudan reported 3 other cases (2 contained) in August-September 2018, but the program's results so far this year are impressive. A suspected case of GWD that occurred in Tonj North County of Tonj State (part of former Warrap) in June this year was determined to be caused by an incompletely healed infection in the same woman a year ago. A detailed timeline of this case that is included below also illustrates the level of detail and precision that is now necessary in investigating these final cases in humans.

TIMELINE GW CASE IN TONJ NORTH COUNTY, SOUTH SUDAN

2018

- July 14-August 18. 35 y/o Dinka woman has 5 GWs after itching, swelling and blisters before each worm. Infection detected July 15; admitted to CCC on July 17. The first worm was not contained; the other 4 were contained. Water sources in the area were treated with Abate July 19.
- None of the 5 worms were removed completely; all were broken. After the wounds healed, a tender hard spot remained on her right leg/calf where four of her worms emerged. CDC confirmed a specimen from her worm #1 or #2 as GW.
- This was the first time she ever had GWD, there was no other known GW infection in this area in 2018; the source of her infection was unknown. She was only in Tonj North County the past year.
- July-November. She remained at the Case Containment Center in Athiengpuol village, Akop payam, Tonj North County from July until discharged on November 23rd.
- She reports using only borehole water or filtered water since July 2018.

N.B.: This woman could not have infected herself in 2018, since she was admitted to CCC soon after her uncontained first worm emerged and larvae from that worm would not have had time to become infective in a copepod. If her water source had been contaminated by someone else, others using that source should have been infected and apparent by now also.

2019

- June 19. Lump appears in same woman on same spot of inner right calf as GW lesion in 2018; preceded by no blister or symptoms, got gradually larger.
- June 28. Admitted to Case Containment Center.
- June 29. Swelling was incised, released thick pus and blood.
- July 1. A ~5 inch (~13 centimeters) piece of dead worm removed from wound; no larvae released on controlled immersion. The infection was contained. A specimen of the worm was sent to CDC for analysis, as well as her other 4 worms from 2018.
- This patient will remain at the CCC with her husband, children and mother-in-law until the end of 2019

N.B.: If this woman was infected by contamination from someone else soon before she entered the CCC in July 2018, that could have produced a GW to emerge in June/July 2019. Favoring the hypothesis that the infection this year is from part of a worm left over from 2018 are 1) this year's worm emerged in the same spot where a tender hard spot remained after last year's infection, 2) no prodromal symptoms before this year's emergence, 3) this year's worm emerged dead from a pus-filled abscess. The segment of this year's worm is at least 5 inches (13 centimeters) long, but its quality is not yet known. Absence of other cases nearby this year and/or genetic comparison with last year's worm specimens may provide additional information.

ANGOLA



Carter Center CEO Ambassador Mary Ann Peters, Vice President for Health Dr. Dean Sienko and GWEP Director Mr. Adam Weiss visited Angola June 15-19 to advance discussions with the Angolan Ministry of Health towards a Memorandum of Understanding between The Carter Center and the ministry for cooperation on Guinea worm eradication in Angola. The visit included discussion with Angolan Minister of Health the Honorable Silvia Lutucuta, the WHO Country Representative Dr. Hernando Agudelo, and several secretaries of state (Ministries of External Relations, Human Rights & Justice, and Finance), as well as representatives of the U.S. Centers for Disease Control and Prevention. Angola discovered its first confirmed case of Guinea worm disease in April 2018. It reported another confirmed case in January 2019, and a confirmed Guinea worm infection in a domestic dog in April 2019.

ICCDE WORKING GROUP ON ANIMAL CERTIFICATION MEETS



**World Health
Organization**

At its Thirteenth Meeting in Addis Ababa in April 2019 the International Commission for the Certification of Dracunculiasis Eradication (ICCDE) decided to establish a Working Group on Animal Certification to help consider criteria for assessing transmission of Guinea worm infections among animals, such as the infections of domestic dogs and cats with *Dracunculus medinensis* that are now occurring in Angola, Chad, Ethiopia and Mali. Under the chairmanship of Prof. Sarah Cleaveland, a veterinarian from the University of Glasgow, the Working Group, that also includes Prof. Pascal Magnussen (University of Copenhagen) and Prof. Robbie McDonald (University of Exeter), Prof. David Molyneux (emeritus of Liverpool School of Tropical Medicine), Drs. James Zingeser and John Bryan II (The Carter Center), and Dr. Dieudonne Sankara (World Health Organization) as experts and resource persons to advise them when they met on June 13-14 at the University of Exeter in the UK. During its early deliberations the Working Group agreed that criteria for declaring freedom from Guinea worm infection in animals should be practical and feasible, and that it will be important to consider differences in the epidemiology of Guinea worm transmission in the remaining endemic countries.

Table 2

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	0 / 1	2 / 3	5 / 7	6 / 9	0 / 1	/	/	/	/	/	14 / 24	58%
SOUTH SUDAN	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	/	/	/	/	/	0 / 0	0%
ANGOLA	0 / 1	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%
MALI §	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	/	/	/	/	/	0 / 0	0%
TOTAL*	0 / 3	1 / 1	0 / 1	2 / 3	5 / 7	6 / 9	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	14 / 25	56%
% CONTAINED	0%	100%	0%	67%	71%	67%	0%						56%	

*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.

Number of Laboratory-Confirmed Cases of Guinea Worm Disease, and Number Reported Contained by Month during 2018*
(Countries arranged in descending order of cases in 2017)

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	1 / 1	1 / 1	0 / 0	1 / 1	0 / 0	1 / 5	1 / 4	0 / 0	0 / 1	0 / 0	1 / 3	7 / 17	41%
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%
SOUTH SUDAN	0 / 0	0 / 0	0 / 0	0 / 0	0 / 2	0 / 2	1 / 3	1 / 2	1 / 1	0 / 0	0 / 0	0 / 0	3 / 10	30%
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%
ANGOLA^	/	/	/	0 / 1	/	/	/	/	/	/	/	/	0 / 1	0%
TOTAL*	1 / 1	1 / 1	1 / 1	0 / 1	1 / 3	0 / 2	2 / 8	2 / 6	1 / 1	0 / 1	0 / 0	1 / 3	10 / 28	36%
% CONTAINED	100%	100%	100%	0%	33%	0%	25%	33%	100%	0%	100%	33%	36%	

*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.

^ Investigation of the origin of this case is ongoing. Preliminary outcomes indicate there is no current or historical evidence of human or animal infections in the district of residence.

RECENT PUBLICATIONS

Edungbola LE, 2019. The Eradication of Dracunculiasis (Guinea Worm Disease) In Nigeria: An Eyewitness Account. London: Academic Press/Elsevier 121pp. <https://doi.org/10.1016/B978-0-12-816764-9.00001-8> [This informative book includes rich details and anecdotes that convey many specific challenges and triumphs of Guinea worm eradication in Nigeria.]

World Health Organization, 2019. Monthly report on dracunculiasis cases, January-April 2019. Wkly Epidemiol Rec 94:307-8. <http://www.who.int/wer>

Yembilah NN, 2019. A retrospective overview of factors that influence Guinea worm epidemic in Northern Region of Ghana. Ghana J Development Studies 16:108-134. DOI// <http://dx.doi.org/10.4314/gjds.v16i1.6>

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. 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

