

Date: February 28, 2019
From: WHO Collaborating Center for Dracunculiasis Eradication, CDC
Subject: GUINEA WORM WRAP-UP #259
To: Addressees

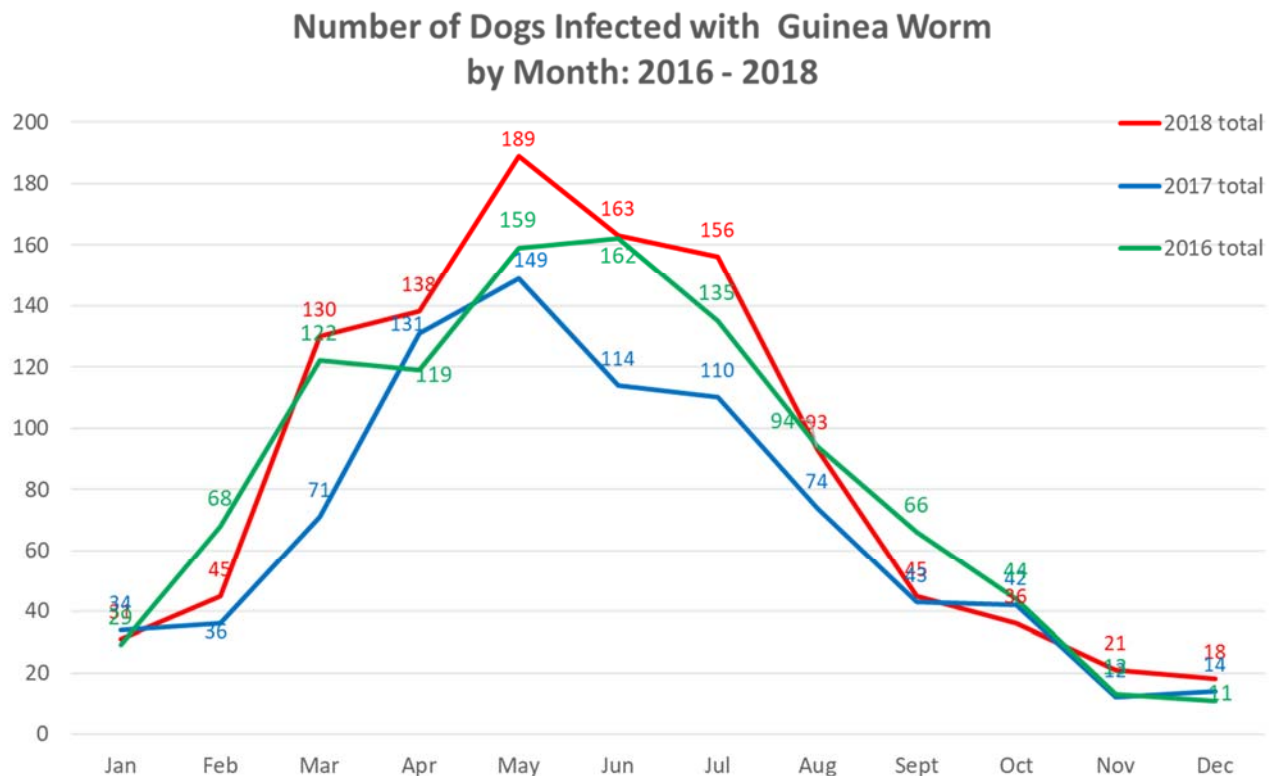
The war on Guinea worm will be won by village-to-village combat.

CHAD’S CHALLENGE



Chad is now the largest source by far of all Guinea worms remaining in the world, reporting a total of 2,044 emergent Guinea worms from 1,040 infected dogs, 25 infected cats, and 17 human cases of Guinea worm disease in 2018. Moreover, the large number of reported infected dogs has been similar in 2016, 2017 and 2018 (Figure 1), as have the much fewer numbers of infected cats and humans.

Figure 1



Fortunately, most of the endemic areas are fully accessible to Chad's Guinea Worm Eradication Program (GWEP), except for some seasonal flooding and limited insecurity. With heroic efforts, Chad's program raised the rate of **dog containment** to 76% and 75% in 2017 and 2018, achieved reported fish gut burial rates of 79% and applied Abate in 19% and 24% of endemic villages in the same two years, while expanding the nationwide mass communication campaign launched in July 2017 to increase knowledge of how to prevent the infection and awareness of the cash reward for reporting the infection. Results to date overall suggest that these levels of intervention must be increased even higher in order to stop Guinea worm transmission in Chad. Guinea worm's potential reproductive rate allows a single imported human case to spread infection to as many as 85 new humans in one year when transmission is by drinking water, but it's not clear what the reproductive rate would be in transmission to dogs by a paratenic or transport host. We do know that each uncontained Guinea worm can release hundreds of thousands of larvae into the environment. Chad's GWEP aims to scale up monthly Abate treatments to all 1+ villages of 2018 in 2019. It also needs to increase the containment rate for infected dogs and add health education to warn against eating raw fingerlings (see below) in order to reduce transmission to dogs this year. Moissala district of Mandoul Region and Sarh district of Moyen Chari Region achieved significant reductions of -57% (from 30 to 13) and -24% (from 211 to 160) in dog infections between 2017 and 2018. Notably, the -57% reduction in Moissala district in 2018 followed containment of 26 (86%) of its 30 infected dogs in 2017. A line listing of the human cases is in Table 1.

Minister of Health visits endemic villages. In a welcome show of political support, Chad's Minister of Public Health the Honorable Mr. Aziz Mahamat Saleh visited the Guinea worm endemic villages of Reni in Bedaya district of Mandoul Region and Kemkian in Sarh district of Moyen Chari Region on Friday February 8 and Saturday February 9, 2019, respectively. In his remarks the honorable minister emphasized Chad's "ABC strategy" of Abate, Burial of fish guts and Containment of infections in animals and humans. He was accompanied in the tour by directors and advisors from his ministry, including the national coordinator of Chad's Guinea Worm Eradication Program, Dr. Tchindebet Ouakou, as well as representatives of the World Health Organization (WHO), UNICEF, The Carter Center, and UNAIDS.

Annual Program Review. Chad held its annual in-country Program Review in N'Djamena on January 23-24, 2019. The meeting was opened by Chad's Minister of Public Health the Honorable Mr. Aziz Mahamet Saleh. National Program Coordinator Dr. Tchindabet presented an overview of Chad's GWEP in 2018, which was followed by detailed presentations of the status of the program in individual regions. Participants at the review included Carter Center Vice-President Dr. Dean Sienko, Mr. Adam Weiss, Dr. Hubert Zirimwabagabo, Dr. Sarah Guagliardo, and Ms. Karmen Unterwegner, and Dr. Dieudonne Sankara of WHO. Dr. Sienko and the Director General of the Ministry of Public Health, Dr. Rohingalau Dondou, also officially opened a newly constructed addition to the building housing the national secretariat and headquarters of the GWEP.

ARE FINGERLINGS (YOUNG FISH) A MAJOR SOURCE OF GW TRANSMISSION?

Small fish (young fish about the size of a finger, or "fingerlings"), which use copepods as a major food source, may be an important link in Guinea worm transmission to animals in Chad, Ethiopia and Mali. Retired CDC researcher Dr. Mark Eberhard has observed large numbers of such small fish discarded and accessible to dogs during mass fishing along the Chari River in **Chad**. Others

Table 1

Chad Guinea Worm Eradication Program
GWEP Line Listing of Confirmed Cases: Year 2018*

Case #	Age	Sex	Ethnicity	Village/Locality of Detection			Date GW emerged (D/M/Y)	Nb of worms	Case contained? (Yes/No/Pending)	Patient contaminated sources of water	Date ABATE applied (D/M/Y)	Source* of infection established? (Yes/No)	Worm Specimen	
				Village	District/payam/woreda	County/ Region							Date sent to CDC (D/M/Y)	Diagnosis
1	22	F	Sara Kaba	Madjiyam	Marabe	Moyen Chari	27-Jan-18	1	Yes	No	N/A	No	30-Jan-18	15-Feb-18
2	25	F	Sara Kaba	Dangala Kanya	Marabe	Moyen Chari	19-Feb-18	1	Yes	No	N/A	No	02-Mar-18	26-Mar-18
3	50	M	Djam	Guelbodane	Korbol	Moyen Chari	19-Mar-18	1	Yes	No	N/A	No	22-Mar-18	13-Apr-18
4	7	M	Mouroum	Moursal	Bailli	Chari Baguirmi	28-May-18	1	Yes	No	N/A	No		21-Sep-18
5	25	F	Rachide	Am-Habile	Aboudeia	Salamat	01-Jul-18	1	No	No	N/A	No	09-Jul-18	23-Jul-18
6	56	M	Arabe	Djoballa 4	Bouso	Chari Baguirmi	02-Jul-18	1	No	Yes	6-Jul-18	No	09-Jul-18	15-Aug-18
7	45	F	Foulata	Am-Dabri	Amtiman	Salamat	05-Jul-18	4	Yes	No	N/A	No	09-Jul-18	23-Jul-18
8	20	F	Rachide	Am-Habile	Aboudeia	Salamat	18-Jul-18	2	No	No	N/A	No	28-Jul-18	09-Aug-18
9	20	M	Dadjo	Am-Habile	Aboudeia	Salamat	18-Jul-18	2	No	possible		No	23-Jul-18	21-Sep-18
10	60	M	Rachide	Am-Habile	Aboudeia	Salamat	29-Aug-18	7	No	possible		No	14-Aug-18	21-Sep-18
11	10	F	Baguirmi	Boubou Tabana	Bouso	Chari Baguirmi	18-Aug-18	1	No	Yes	28-Aug-18	No	31-Aug-18	18-Sep-18
12	30	M	Sara Kaba	Marakouya 2	Kyabe	Moyen Chari	08-Aug-18	1	No	Possible		No	31-Aug-18	13-Sep-18
13	25	M	Arabe	Am-Dabri	Amtiman	Salamat	26-Aug-18	4	Yes	No	N/A	No	06-Sep-18	18-Sep-18
14	39	M	Nangdjere	Kobkouale-yang	Bere	Tandjile	08-Oct-18	1	No	No	N/A	No	19-Oct-18	18-Sep-18
15	15	M	Sara	Sarh (Quartier Maroc)	Sarh	Moyen Chari	06-Dec-18		No	No	N/A	No	17-Dec-18	17-Dec-18
16	20	F	Arabe	Am-Dabri	Amtiman	Salamat	12-Dec-18		Yes	No	N/A	No	10-Jan-19	10-Jan-19
17	35	M	Mousgoum	Damata 1	Mandelia	Chari Baguirmi	13-Dec-18		No	yes	22-Dec-18		20-Dec-18	20-Dec-18

* Provisional

have reported seeing children eating poorly cooked or raw fingerlings in Guinea worm endemic parts of **Ethiopia's** Gog district and feeding such small fish raw to dogs. Similar practices may occur also in riverine areas of **Mali** where Guinea worm infections of domestic dogs and cats persist even after transmission to humans was stopped three years ago. Researchers at the University of Georgia/USA have shown in the laboratory that fingerlings, for which copepods are a major food source, could serve as transport hosts when Guinea worm larvae in copepods they ingested remain viable for short periods and are able to infect ferrets to which the fingerlings are fed*. Reports that fishermen along the Chari River began using nets with smaller mesh sizes in recent years in response to ecological changes associated with over-fishing and drought might suggest an increase in discarded smaller fish and exposure of dogs in those areas. Programs should consider health education messaging to discourage allowing dogs access to raw fingerlings and urge that fingerlings be well cooked, smoked or dried in the sun before being eaten by humans or dogs.

MALI: TRANSMISSION AREAS ARE PARTLY OUT OF REACH



After a twenty-year long struggle that seemed about to succeed before a coup d'etat disrupted the country in 2012, Mali's Guinea Worm Eradication Program (GWEP) is again nearing success. Unfortunately, the program now has sustained endemic transmission in dogs with the same species of Guinea worm that infects humans, even after it **stopped transmission to humans in Mali 3 years ago (2016-2018)**. Mali reported 1 infected dog in 2015, 11 in 2016, 9 in 2017, and 18 in 2018. Most of the dog infections are *detected* in Tominian district of Segou Region, which is accessible to the program, but the dogs are bred and become *infected* in a small adjacent area of Mopti Region before being taken to Tominian and sold for food. That area of Mopti Region has not been fully accessible to the GWEP since 2012 because of insecurity. The part of Mopti where dogs are being infected with Guinea worm is riverine, part of the inland delta of the Niger River (Figure2), with familial and commercial fishing similar to the endemic areas of Chad. Consumption of raw fingerlings (small fish) by dogs may be an important factor in Guinea worm transmission here as well as elsewhere (see above). Since 2017, Mali's GWEP also has reported 1 infected domestic cat in 2017 and 2 in 2018 that were born and resided in Tominian district. A line list of the infected animals in 2018 is in [Table 2](#). Sixteen (89%) of the infected dogs and none of the cats in 2018 were contained (**80% containment of 20 infected animals**). Mali's GWEP has conducted limited active surveillance, health education and other interventions periodically, advertised a cash reward for reporting infected animals and humans, worked with Non-Governmental Organizations, United Nations agencies and others to maintain limited surveillance and health education about preventing Guinea worm infections in some of the insecure areas concerned (the GWEP team made recent supervisory visits to Tominian, Yorosso and Segou districts, including dog markets in Tominian, in December), but because of insecurity the GWEP secretariat has not visited the areas where transmission is occurring. The program cannot stop Guinea worm transmission in this final focus without full, safe access.

Annual Program Review. Mali held its annual in-country Program Review in Bamako on January 28-29, 2019. The Secretary General of the Ministry of Health and Public Hygiene, Dr.

* Cleveland CA, Eberhard ML, Thompson AT, Smith SJ, Zirimwabagabo H, Bringolf R, Yabsley MJ, 2017. Possible role of fish as transport hosts for *Dracunculus* spp. Larvae. Emerging Infectious Diseases 23:1590-1592.

Table 2

Mali Guinea Worm Eradication Program

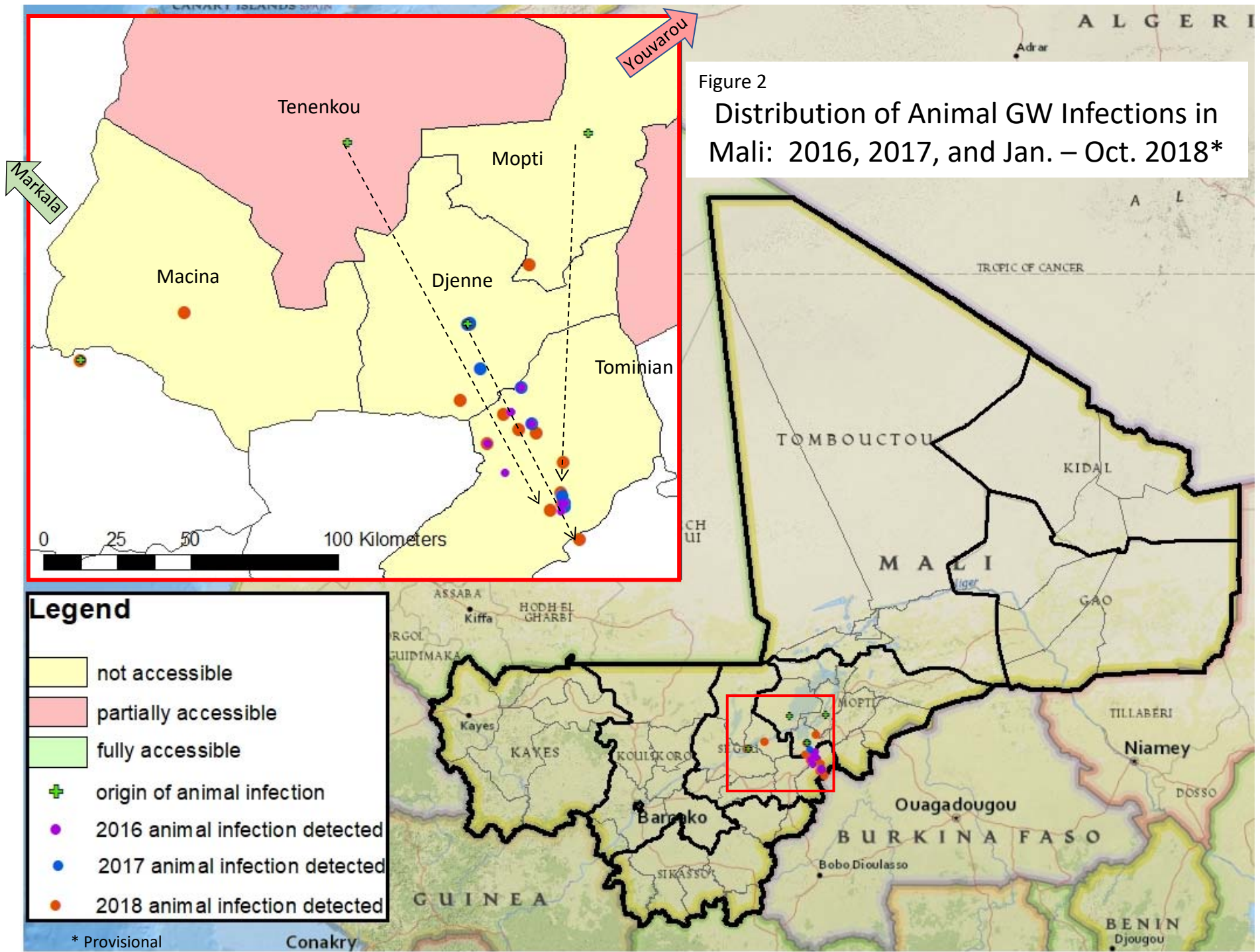
Listing of Animal Infections: 2018*

Animal Serial No.	Region	District	Health Area	Village	Ethnicity of Animal Owner	Occupation of Animal Owner	No. of GWs	Animal	Containment ^ (Yes/No)	Date of detection	Date GW emergence	Water Source Contamination? (Yes/No/likely)	Abate applied (Yes/No)	Lab Confirmed
1	Segou	Tominian	Fangasso	Tierakuy	Bobo	farming	2	dog	Yes	16-May-18	16-May-18	No	No	YES
2	Segou	Tominian	Togo	Matina	Bobo	farming	1	dog	Yes	9-Jun-18	10-Jun-18	No	No	YES
3	Segou	Markala	Babougou	Barakabougou	Bozo	Fishing	2	dog	No	26-Jun-18	26-Jun-18	Probable	Yes	YES
4	Segou	Macina	Central	Gueda	Bambara	farming	1	dog	No	12-Jul-18	12-Jul-18	Probable	Yes	YES
5	Segou	Macina	Central	Gueda	Bozo	fishing/farming	1	dog	No	11-Jul-18	9-Jul-18	Yes	Yes	YES
6	Segou	Tominian	Ouan	Ouena	Bobo	housewife	1	cat	No	27-Jul-18	27-Jul-18	Probable	Yes	YES
7	Segou	Tominian	Fangasso	Soumankuy	Bobo	farming	3	dog	Yes	14-Jul-18	14-Jul-18	Probable	Yes	YES
8	Segou	Tominian	Fangasso	Mampe	Bobo	farming	1	cat	No	27-Jul-18	15-Aug-18	Probable	Yes	YES
9	Mopti	Djenne	Kouakourou	Yonga Bozo	Bozo	fishing	1	dog	Yes	8-Aug-18	13-Aug-18	No	No	YES
10	Mopti	Djenne	Senossa	Senossa	Peul	farming/fishing	1	dog	Yes	29-Aug-18	31-Aug-18	No	No	YES
11	Mopti	Djenne	Keke	M'Biabougou	Bobo	farming	1	dog	Yes	23-Aug-18	23-Aug-18	No	No	YES
12	Segou	Tominian	Fangasso	Sounde	Bobo	farming	1	dog	Yes	31-Aug-18	4-Sep-18	No	No	YES
13	Segou	Tominian	Fangasso	Masso	Bobo	farming	1	dog	Yes	4-Sep-18	6-Sep-18	No	No	YES
14	Segou	Tominian	Fangasso	Sokoura	Bobo	fish trader	1	dog	Yes	9-Sep-18	17-Sep-18	No	Yes	YES
15	Mopti	Djenne	Central	Djenne	Bozo	fishing	1	dog	Yes	4-Sep-18	17-Sep-18	No	No	YES
16	Mopti	Djenne	Yebe	Kotorodaga(gomitogo)	Bozo	fishing	7	dog	Yes	6-Oct-18	6-Oct-18	Yes	No	YES
17	Mopti	Djenne	Central	Djenne(Farmatala)	Fulani	Tailor	1	dog	Yes	2-Oct-18	12-Oct-18	No	No	YES
18	Mopti	Djenne	Mourrah	Mourrah	Bozo	fishing	1	dog	Yes	8-Oct-18	8-Oct-18	No	No	YES
19	Segou	Tominian	Diamakan	Bonadaga	Bobo	butcher	2	dog	Yes	15-Oct-18	17-Oct-18	No	Yes	YES
20	Mopti	Djenne	Kouakourou	Kouakourou	Bobo	fishing	1	dog	Yes	4-Nov-18	4-Nov-18	No	Yes	YES

*Provisional

^ All of the containment criteria must be met:

1. The animal must be detected and tethered with in 24 hours of worm emergence.
2. The animal must not have entered a source of water with an emergent GW.
3. The animal is tethered prior to GW emergence until all worms are extracted, and owners received health education.
4. A supervisor confirms the infection with GW within 7 days of worm emergence.
5. Abate is applied to water sources to prevent the possibility of transmission of GWs within 15 days of the contamination event.



Mamma Coumare, opened the meeting and urged participants to intensify their efforts in 2019 in order to ensure continued zero Guinea worm infections in humans and animals. National Program Coordinator Dr. Cheick Oumar Coulibaly presented an overview of Mali's GWEP in 2018, which was followed by detailed presentations of the status of the programs in individual regions. Participants at the review included former national coordinators of the GWEP, members of the National Commission for the Certification of Dracunculiasis Eradication, the president of the Intersectorial Group, regional health officials, representatives of the national veterinary services and the national directorate for water supply, and the national programs against lymphatic filariasis and human African trypanosomiasis, as well as representatives of the World Health Organization (WHO), UNICEF, The Carter Center, the Non-Governmental Organization HELP, and KYNE Inc. On January 30-31 the deputy national director of health and WHO convened a workshop to discuss measures to interrupt transmission of Guinea worm infections in animals in Mali that included participants from the national GWEP, WHO, The Carter Center, the regional health directors for Mopti and Segou Regions, as well as others, and which made several recommendations for the GWEP.

ETHIOPIA



Ethiopia reported **no case of Guinea worm disease in humans in 2018**, although the Ethiopian Dracunculiasis Eradication Program (EDEP) did detect Guinea worm infections in 11 dogs (6 contained), 5 cats (1 contained) and 1 baboon (uncontained) during the year, for an overall **41% containment of 17 infected animals** (Table 3). Since about mid-year however, the program has helped villagers proactively tether over 80% of domestic dogs and cats in high risk areas of Gog and Abobo districts of Gambella Region. The EDEP responded to a provisional total of 10,903 rumors of Guinea worm disease in 2018; it had 151 villages under active surveillance in Gog, Abobo and Anfilo districts; and found estimated average awareness of the cash reward for reporting a GW infection of humans and of animals to be 93% and 83% respectively in Gog and Abobo during the year. On January 17-20, 2019 Carter Center GWEP Program Director Mr. Adam Weiss and Carter Center Ethiopia Country Representative Dr. Zerihun Tadesse made a supervisory visit to the highly-endemic villages of Atheti, Wichini and Ablen.

A team of scientists led by Carter Center veterinarian epidemiologist Dr. James Zingeser and attending veterinarian Dr. Fekadu Shiferaw collected blood and tissue samples from 28 olive baboons in Gog district to help understand Guinea worm transmission dynamics in troops in that enzootic area. The team included primatologists Prof. Jeffrey Rogers and Prof. James Else from Baylor College of Medicine and Emory School of Medicine, respectively, and others. Dr. Jessica Bryant of the University of Roehampton attached satellite telemetry collars to four adult female baboons in two different troops. The collars transmit location data that allows the team to track troop movements, even in densely forested areas. Each baboon was carefully examined for physical signs of current or past Guinea worm infection, and no signs were detected. Blood and tissue samples will be analyzed in collaborating laboratories in the coming months.

Gambella Regional President, National Minister of Health, and Goodwill Ambassador conduct advocacy visit. Minister of Health of Ethiopia His Excellency Dr. Amir Aman, Regional president, His Excellency Mr Ojulu Omod, Director General Dr Ebba Abate, the Deputy Dr Beyene Moges and the national GWEP coordinator Mr Mesfin Wossen from the Ethiopian Public

Table 3

Ethiopia Dracunculais Eradication Program

Listing of Animal Infections: 2018*

Animal Infection ID	Region	Zone	Village of Detection	Type of Animal	Name of Animal	Containment (yes/no)	Date Worm Detected	Date Worm Emerged	Water Source Contaminated (yes/no)	Date Abate Applied	Lab Confirmed
A1.1	Gambella	Agnua	Kidane Farm-Athibir	Dog	Opota	yes	15-Apr-18	15-Apr-18	no	On active abate cycle	Yes
A2.1	Gambella	Agnua	Abawiri	Dog	Apanyingo	no	7-May-18	Unknown	yes	Abawiri on abate cycle. Utuyu-Nyikani abated on 10-May-18	Yes
A3.1	Gambella	Agnua	Atheti	Dog	Rangowang	no	10-May-18	10-May-18	Unknown	On active abate cycle	Yes
A4.1	Gambella	Agnua	PRC Agnuak: Pochalla A	Dog	Magor	no	14-May-18	14-May-18	yes	16-May-18	Yes
A4.2	Gambella	Agnua	PRC Agnuak: Pochalla A	Dog	Magor	yes	9-Jul-18	9-Jul-18	no	On active abate cycle	
A5.1	Gambella	Agnua	Utuyu-Nyikani	Dog	Jwokochado	yes	17-May-18	17-May-18	no	On active abate cycle	Yes
A6.1	Gambella	Agnua	Atheti	Dog	Ambach	yes	19-May-18	19-May-18	no	On active abate cycle	Yes
A7.1	Gambella	Agnua	Awukoy	Dog	Watawat	no	30-May-18	30-May-18	Unknown	1-Jun-18	Yes
A8.1	Gambella	Agnua	Atheti	Dog	Jok-ceri	yes	31-May-18	31-May-18	no	On active abate cycle	Yes
A8.2	Gambella	Agnua	Atheti	Dog	Jok-ceri	yes	18-Sep-18	18-Sep-18	no	On active abate cycle	
A9.1	Gambella	Agnua	PRC Agnuak: Akobo E	Cat	Jwokokunyi	no	19-Jun-18	19-Jun-18	Unknown	On active abate cycle. Contaminated ponds abated on 21-Jun-18	Yes
A10.1	Gambella	Agnua	PRC Agnuak: Pochalla D	Cat	Obang	no	22-Jun-18	22-Jun-18	Unknown	On active abate cycle. Contaminated ponds abated on 21-Jun-18	Yes
A10.2	Gambella	Agnua	PRC Agnuak: Pochalla D	Cat	Obang	yes	10-Aug-18	10-Aug-18	no	On active abate cycle	Yes
A11.1	Gambella	Agnua	PRC Agnuak: Pochalla D	Cat	Adokho	yes	31-Jul-18	31-Jul-18	no	On active abate cycle	Yes
A11.2	Gambella	Agnua	PRC Agnuak: Pochalla D	Cat	Adokho	yes	31-Jul-18	31-Jul-18	no	On active abate cycle	Yes
A12.1	Gambella	Agnua	Atheti	Dog	Windex	yes	1-Aug-18	1-Aug-18	no	On active abate cycle	Yes
A13.1	Gambella	Agnua	PRC Agnuak: Pochalla B	Cat	Moabena	no	2-Aug-18	2-Aug-18	Unknown	On active abate cycle	Yes
A14.1	Gambella	Agnua	Akweramero Village	Dog	Ochwijjey	no	3-Aug-18	3-Aug-18	Unknown	5-Aug	Yes
A15.1	Gambella	Agnua	PRC Agnuak: Pochalla D	Cat	Akwanya	no	9-Aug-18	9-Aug-18	yes	On active abate cycle. Contaminated ponds abated on 10-Aug-18	Yes
A16.1-16.4	Gambella	Agnua	Ablen	Baboon	NA	no	20-Aug-18	Unknown	yes	On active abate cycle	Yes
A17.1	Gambella	Agnua	Athei	Dog	Kwarbakwach	yes	17-Sep-18	17-Sep-18	no	On active abate cycle	

* Provisional

Health Institute, the most honorable World Laureate Dr. Tibebe Yemane Berhan, Goodwill Ambassador for the GWEP, The Carter Center Ethiopia representative Dr Zerihun Tadesse and team , WHO delegates Dr Esther Mary Aceng and Dr Zeyede Kebede with WHO regional team, representatives from federal and regional investment agencies and other stakeholders participated in a high level advocacy visit in Gambella Region on February 18 – 19, 2019. The field visit was conducted in Goyi, Mulat and Sisay investment farms whereby the delegates were able to see the status of water supply within the farms. After the visit a panel discussion was held in Abobo with panelists from Regional water bureau, Regional health bureau, Federal and regional investment agencies, Bureau of Labor and social affairs and representative of the investors. The discussion points encompassed key achievements, major challenges and possible solutions.

The Director General of Ethiopian Public Health Institute emphasized the need for the regional government and the Ministry to bring a lasting solutions for the challenges identified in the provision of safe water in investment farm areas. The most honorable World Laureate Dr. Tibebe Yemane Berhan, Goodwill Ambassador for the GWEP, reiterated “Zero tolerance for investors who do not provide safe water to their workers.” President of Gambella Regional State, His Excellency Mr. Ojulu Omod, indicated the establishment of a board to oversee the GWEP in the region under his leadership and renewed his commitment to follow and monitor action points forwarded to each sector and partners. In his speech the Minister of Health Dr. Amir Aman provided three key action points, i.e. Institutionalize Guinea worm eradication program at each level; provide safe water points at kebele level and investment farms and strengthen the health system.

Guinea worm disease in the exhibition: WHO partly sponsored the 30th Annual conference of the Ethiopian Public Health Association which included a 3 day exhibition. Meeting participants were sensitized on Guinea worm disease and the cash reward. Leaflets, GW ID cards and posters were distributed. Over 650 members of the association visited the exhibition, including Minister of Health Dr Amir Aman. Participants were public health professionals from various regions, research institutions, Universities, Government health systems, NGOs, UN organizations, charity organizations, civic societies, Artists and Media people.



ANGOLA DISCOVERS A SECOND CONFIRMED CASE

On Wednesday, January 9, 2019, Angolan authorities informed the World Health Organization (WHO) that they had found a suspect case of Guinea worm disease with an emerging worm on January 8 in a 48 year old female resident of Ndeleme I village in Cuvelai municipality of Cunene Province. Local and provincial health staff had begun conducting a preliminary investigation within 24 hours. They were joined by a team from the national level later the same week and by a team from WHO’s Angola office and regional office the next week. Access to this area of Angola is limited because of insecurity. The worm specimen arrived at ministry of health facilities in Luanda on January 14. WHO’s Luanda office obtained the specimen from the ministry of health and shipped it on February 8 to CDC, where it was determined to be a Guinea worm on February 12. No other similar cases were found in the patient’s village or in neighboring villages or in animals. The patient travelled to Ondjiva in Namacunde municipality in September 2018.

WHO, through its country office, had already requested the Angolan Ministry of Health to formally invite The Carter Center for direct assistance in establishing active surveillance for Guinea worm infections, particularly in Cunene Province. The Angolan ministry is still addressing recommendations made in September 2018 by the international mission that investigated the case of GWD that was discovered in Angola earlier last year, including raising awareness and knowledge of health staff, and establishing a nationwide cash reward for reporting a Guinea worm infection in humans or animals. At the time she became infected the GW patient in April 2018 resided in Namacunde municipality, which also is in Cunene Province, but approximately 185km (~111 miles) distance from the January 2019 case. The rainy season in the arid area close to southern Angola's border with Namibia is December-April, which is the most likely period of peak transmission of Guinea worm infection there. WHO is also urging health authorities in Namibia to conduct a case search, train health staff and raise awareness in its northern province that borders Angola's Cunene Province. WHO certified Namibia as Guinea worm-free in February 2000. In response to the letter from former U.S. President Jimmy Carter, on February 14, 2019 President Joao Lourenco of Angola accepted President Carter's offer for The Carter Center to assist his country in Guinea Worm eradication efforts.

Figure 3

Angola Dracunculiasis Eradication Program
Villages Reporting Confirmed Cases of Dracunculiasis in 2018 and 2019*

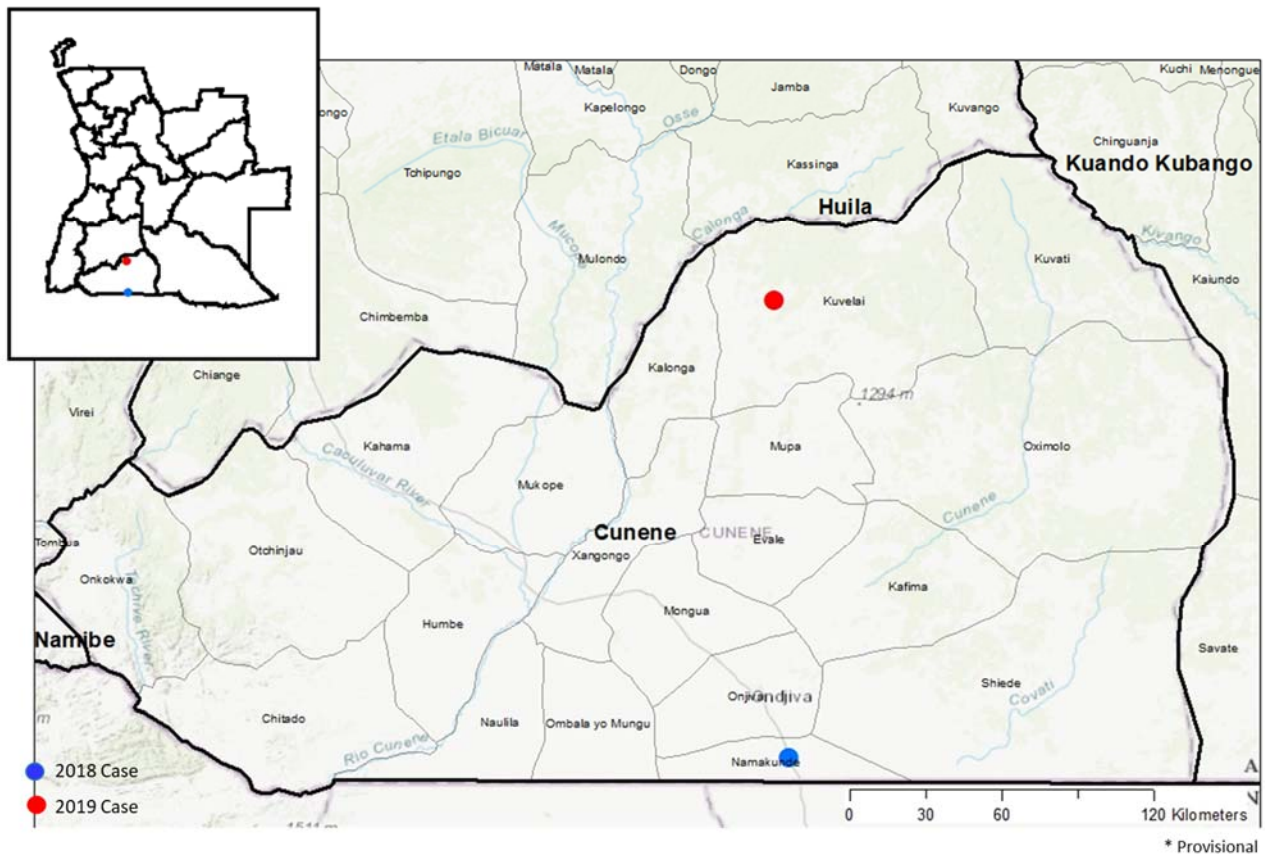


Table 4

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.

Number of Laboratory-Confirmed Cases of Guinea Worm Disease, and Number Reported Contained by Month during 2017*
(Countries arranged in descending order of cases in 2016)

COUNTRIES WITH ENDEMIC TRANSMISSION	NUMBER OF CASES CONTAINED / NUMBER OF CASES REPORTED													% CONT.
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL*	
CHAD	0 / 0	1 / 1	1 / 1	1 / 2	2 / 2	1 / 2	2 / 2	0 / 1	0 / 2	1 / 1	0 / 0	1 / 1	10 / 15	67%
SOUTH SUDAN	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%
ETHIOPIA^	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 8	0 / 4	1 / 2	0 / 1	3 / 15	20%
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 / 0	1 / 1	1 / 1	1 / 2	2 / 2	1 / 2	2 / 2	0 / 1	2 / 10	1 / 5	0 / 0	1 / 2	13 / 30	43%
% CONTAINED	0%	100%	100%	50%	100%	50%	100%	0%	20%	20%	0%	50%	43%	

*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.

^ 10 of 12 cases laboratory confirmed; 2 of 12 declared cases based on where and when these became infected in 2016, and having had signs and symptoms of GWD at the same time as others.

§Reports include Kayes, Koulikoro, Segou, Sikasso, and Mopti, Timbuktu and Gao Regions; contingent on security conditions during 2017, the GWEP continued to deploy one technical advisor to Kidal Region to oversee the program.

Cases of Guinea Worm Disease in 2017: Containment Status and Source Detection

Case #	Date Guinea Worm Emerged	Village Where Detected / District (or County)	Case Contained?	Presumed Source of Infection Identified?
Chad #1	27/2/17	Loumia/Mandelia	YES	NO
Chad #2	22/3/17	Kakale Mberi/Guelendeng	YES	NO
Chad #3	31/3/17	Bougoumene 1/Dourbali	YES	NO
Chad #4	27/4/17	Tarangara/Danamadji	NO	NO
Chad #5	11/5/17	Kira/Sarh	YES	NO
Chad #6	2/6/17	Choukara/Amtiman	YES	NO
Chad #7	10/6/17	Bembaya/Sarh	YES	NO
Chad #8	22/6/17	Ngargue Marche/Bouso	NO	NO
Chad #9	27/7/17	Djoballa 4/Bouso	YES	NO
Chad #10	29/7/17	Gouari/Sarh	YES	NO
Chad #11	25/8/17	Birme/Massenya	NO	NO
Chad #12	4/9/17	Woin/Korbol	NO	NO
Chad #13	21/9/17	Anguitey/Amtiman	NO	NO
Chad #14	1/10/17	Woin/Korbol	YES	NO
Chad #15	26/12/17	Bongoroko/Sarh	NO	NO

Ethiopia #1	25/Sep/17	Mohammed/Itang	NO	Gogi Farm / Abobo
Ethiopia #2	26/Sep/17	Gambella Town/Gambella	NO	Gogi Farm / Abobo
Ethiopia #3	Late AUG to early SEP	Gomi/Anfillo	NO	Gogi Farm / Abobo
Ethiopia #4	12/Sep/17	Gomi/Anfillo	NO	Gogi Farm / Abobo
Ethiopia #5	8/Sep/17	Gomi/Anfillo	NO	Gogi Farm / Abobo
Ethiopia #6	25/Sep/17	Gomi/Anfillo	NO	Gogi Farm / Abobo
Ethiopia #7	12/Oct/17	Gomi/Anfillo	YES	Gogi Farm / Abobo
Ethiopia #8	8/Oct/17	Gomi/Anfillo	YES	Gogi Farm / Abobo
Ethiopia #9	14/Oct/17	Duri/Anfillo	NO	Gogi Farm / Abobo
Ethiopia #10	15/Sep/17	Duri/Anfillo	NO	Gogi Farm / Abobo
Ethiopia #11	23-Sep-17	Duri/Anfillo	NO	Gogi Farm / Abobo
Ethiopia #12	22-Sep-17	Gutok/Abobo	NO	Gogi Farm / Abobo
Ethiopia #13	26-Nov-17	Gomi/Anfillo	NO	Gogi Farm / Abobo
Ethiopia #14	2-Dec-17	Gomi/Anfillo	YES	Gogi Farm / Abobo
Ethiopia #15	20-Dec-17	Amegolo/Goru Gutu	NO	Gogi Farm / Abobo

* Provisional

Chad also reported 820 infected animals 77% contained.

Ethiopia also reported 15 infected animals 40% contained.

Mali also reported 10 infected animals 80% contained.

Cases of Guinea Worm Disease in 2018*: Containment Status and Source Detection

Case #	Date Guinea Worm Emerged	Village Where Detected / District (or County)	Case Contained?	Presumed Source of Infection Identified?
Chad #1	27-Jan-18	Madjiyam /Marabe	YES	NO
Chad #2	19-Feb-18	Dangala Kanya /Marabe	YES	NO
Chad #3	19-Mar-18	Guelbodane /Korbol	YES	NO
Chad #4	28-May-18	Moursal / Bailli	YES	NO
Chad #5	01-Jul-18	Am-Habile / Aboudeia	NO	NO
Chad #6	02-Jul-18	Djoballa 4 /Bouso	NO	NO
Chad #7	05-Jul-18	Am-Dabri / Amtiman	YES	NO
Chad #8	18-Jul-18	Am-Habile / Aboudeia	NO	NO
Chad #9	18-Jul-18	Am-Habile / Aboudeia	NO	NO
Chad #10	29-Aug-18	Am-Habile / Aboudeia	NO	NO
Chad #11	18-Aug-18	Boubou Tabana / Bouso	NO	NO
Chad #12	08-Aug-18	Marakouya 2 / Kyabe	NO	NO
Chad #13	26-Aug-18	Am-Dabri / Amtiman	YES	NO
Chad #14	08-Oct-18	Kobkouale-yang / Bere	NO	NO
Chad #15	06-Dec-18	Sarh (Quartier Maroc)/Sarh		
Chad #16	12-Dec-18	Am-Dabri / Amtiman		
Chad #17	13-Dec-18	Damata 1 / Mandelia		

South Sudan #1	mid - May 2018	Adol / Rumbek Center	NO	NO
South Sudan #2	27-May-18	Malek / Rumbek Center	NO	NO
South Sudan #3	1-Jun-18	Meen (Mayen) /Rumbek North	NO	NO
South Sudan #4	14-Jul-18	Maguen / Tonj North	NO	NO
South Sudan #5	19-Jul-18	Meen (Mayen) /Rumbek North	YES	NO
South Sudan #6	25-Jul-18	Machar-Achiek / Yirol East	NO	NO
South Sudan #7	6-Jun-18	Meen (Mayen) /Rumbek North	NO	NO
South Sudan #8	20-Aug-18	Abeer /Rumbek Center	YES	NO
South Sudan #9	21-Aug-18	Tut / Nyirol	NO	NO
South Sudan #10	10-Sep-18	Abeer /Rumbek Center	YES	NO

Angola #1	Apr 18	Ondjiva / Namacunde	NO	NO
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South Sudan also reported 0 infected animals*.

Chad also reported 1,059 infected animals 75% contained*.

Ethiopia also reported 16 infected animals 41% contained*.

Mali also reported 18 infected animals 67% contained*.

MEETINGS

The 23rd International Review Meeting of Guinea Worm Eradication Program Managers will occur at The Carter Center in Atlanta, USA on March 21-22, 2019.

The 13th Meeting of the International Commission for the Certification of Dracunculiasis Eradication will be held in Addis Ababa, Ethiopia on April 25-26, 2019.

The Seventy-second World Health Assembly will be held in Geneva on May 20-28, 2019. It is expected that the annual Informal Meeting of Ministers of Health of Guinea worm-affected countries will be held on the evening of Wednesday May 22 during the Assembly, but that has not been confirmed.

RECENT PUBLICATIONS

World Health Organization, 2019. Monthly report on dracunculiasis cases, January-December 2018. Wkly Epidemiol Rec 94:78-79.

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



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