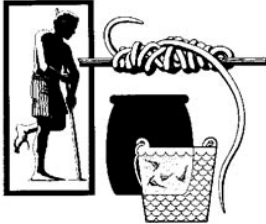


Memorandum



Date: June 15, 2017

From: WHO Collaborating Center for Dracunculiasis Eradication, CDC

Subject: GUINEA WORM WRAP-UP #248

To: Addressees

Every uncontained Guinea worm from any source can spread infection!

CHAD: DOG TREATMENTS MAY BE WORKING

Chad's Guinea Worm Eradication Program (GWEP) with the support of The Carter Center has been conducting a demonstration trial of monthly treatment of dogs at risk of Guinea worm infections since October 2016. The 5,000-6,000 dogs under treatment with Advocate® anti-helminthic (manufactured by Bayer) are in 88 villages of Danamadji, Kyabe districts of Moyen Chari Region, and Moissala district of Mandoul Region. Provisional data from January-April 2017 in 33 of the 88 villages that have had infected dogs so far this year and/or in the same period of 2016 show the number of dog infections reduced by 49% (from 174 to 89), and the number of emerging Guinea worms reduced by 63% (from 353 to 129). Elsewhere in Chad, the respective changes for the same periods are -4% and -18%, respectively. These preliminary results are not definitive but do suggest that the program may soon have a new intervention to wield against the unusual pattern of Guinea worm infections during the current outbreak in Chad. Dr. Hubert Zirimwabagabo and Dr. James Zingeser were in Chad March 31-April 23 to help supervise field activities for the dog treatment trials and to conduct refresher training. Overall, Chad has reported provisionally 16% fewer infections in dogs in January-May 2017 compared to January-May 2016; 75% of the 418 dogs reported so far this year were contained.

Chad has reported 5 confirmed cases (4 contained) in humans in January-May this year, and a sixth suspect case in May, five of which are young children (12 years or younger). Five villages associated with these cases also had one or more dogs infected with Guinea worms in 2016 and/or 2017, and two of the confirmed cases reported eating frogs or preparing frogs for other family members to eat (Figure 1 and Table 1). The program continues to document safe disposal practices regarding fish entrails of over 80% in monthly surveys of sampled households (3318/4019) in villages under active surveillance and of fish vendors in January-April 2017.

Chad's GWEP received 759 rumors of Guinea worm infections in humans in January-April 2017 as a result of tiered surveillance in Levels I, II, and III.

Surveillance Levels I, II: endemic, formerly endemic and/or at-risk areas. 1,799 villages were under active, village-based surveillance at the end of 2016 in Chari Baguirmi, Mayo Kebbi Est,

Moyen Chari, Logone Oriental, Tandjile, Mandoul and Salamat Regions (out of 21 current regions), with more to be added in Salamat and Moyen Chari Regions in 2017. The areas under active surveillance were extended progressively southward after 2012 in response to discovery of new Guinea worm infections in humans or domestic dogs (Figure 2). It is not clear if the apparent southward progression of GW infections along the Chari River is real or the result of expanded active surveillance after discovery of cases (e.g., Sarh in November 2013, Salamat in July 2015). Awareness of the cash reward in level I and II areas for reporting a GW case or an infected dog, estimated at 54% and 46% respectively in 2016, and at 78% (n=117) and 62% (n=99) in April 2017, is still below the target minimum overall, 99% of 3,093 rumors generated in Chad in 2016 were reported from Level I or II areas. WHO assisted Chad's GWEP in providing surveillance in these areas after the current outbreak was discovered in 2010 until The Carter Center began assisting interventions and village-based active surveillance there in 2012.

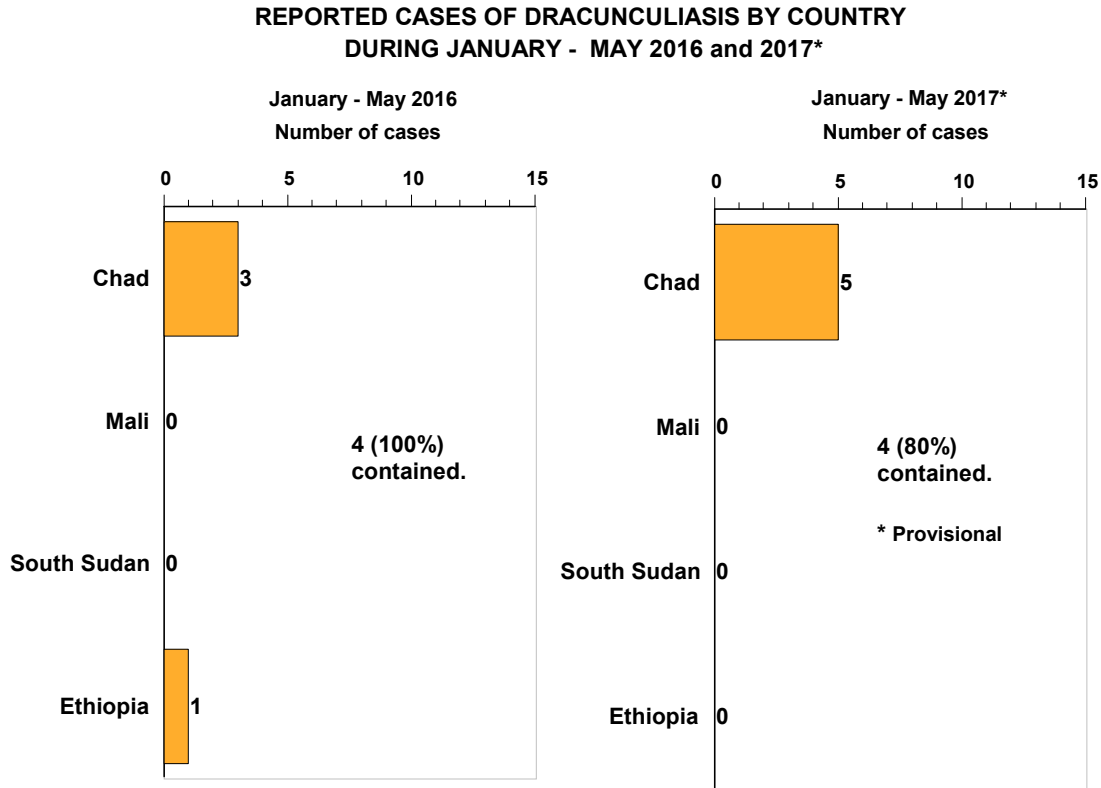
Surveillance Level III: non-endemic low risk areas. These “Guinea worm-free” areas comprise most of Chad, including the capital of N’Djamena and other large centers of population around Moundou in the southwest and Abeche in the east. These areas have been subject to passive surveillance and awareness raising since 2010/2011, including development of monthly reporting from 1,128 health centers through the WHO-assisted Integrated Disease Surveillance and Response (IDSR) network; surveys conducted during National (Polio) Immunization Days each year; searches conducted independently and in cooperation with mass drug distributions; television and national and community radio broadcasts; and town criers. Much of these surveillance activities were coordinated via six Ministry of Health surveillance hubs assisted by WHO and UNICEF and based in N’Djamena (in Chari Baguirmi Region), Sarh (Moyen Chari), Moundou (Logone Occidental), Abeche (Ouaddai), Mao (Kanem), and Mongo (Guera). The Carter Center also helped Chad’s GWEP to search villages on both sides of the Logone River in 2013. Since 2010 WHO has assisted the Chadian Ministry of health and the National Program with 10,000 guinea worm posters and 34,500 recognition cards with photographs of patients and dogs with emerging worms to aid in the searches. Ad hoc convenience surveys have estimated awareness of the cash reward for reporting a case in these areas at around 20% since 2010 (48% of 37 persons sampled in March 2017), with less than 500 rumors generated in 2011-2016. WHO assisted Chad’s GWEP in conducting surveillance in these areas until The Carter Center agreed to assume that role in 2015.

ETHIOPIA: NO CASES, TWO INFECTED BABOONS, ONE INFECTED DOG

The Ethiopia Dracunculiasis Eradication Program (EDEP) has reported no cases of Guinea worm disease in humans during January-May 2017, but reported two infected baboons and one infected dog during this period. The infected baboon in January was detected in Ablen, followed by an infected baboon in Wichini in April, and an infected dog in Ablen in May. The infected dog was contained, but confirmation is pending. Wichini and Ablen are located within a few kilometers of each other in Atheti *kebele* (sub-district) of Gog *woreda* (district) in Gambella Region. UNICEF provided funds to the Regional Water Bureau to build safe water sources in Ablen and Akweramero Farm in Gog district, and the drilling team successfully found water in Ablen for a mechanized pump system in early May.

The EDEP has conducted case searches in Level I and II areas (both under active surveillance) of recent or currently endemic districts of Gambella and SNNP Regions that reached 267,291 persons in January-April 2017. These searches and other channels have generated a total of 642 rumors so far this year. The level of awareness of the cash reward for reporting a case of Guinea worm disease was 83% (6771/8158) among persons queried in Level I and II areas in January-April, and 9% (17/200) among persons queried in Amhara and Oromiya Regions (Level III) in January-March.

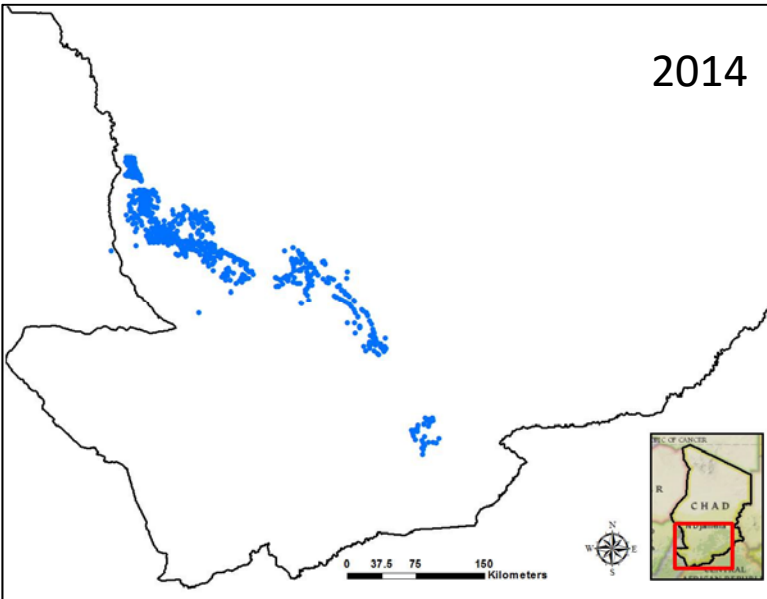
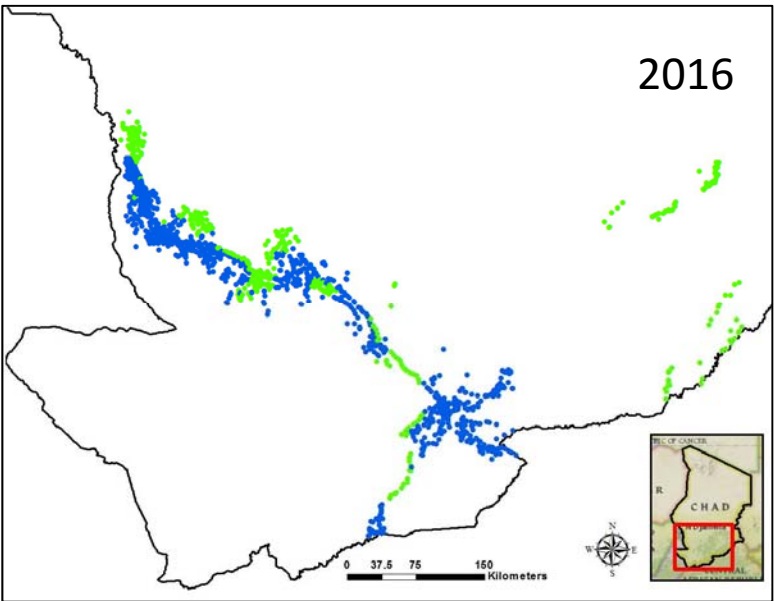
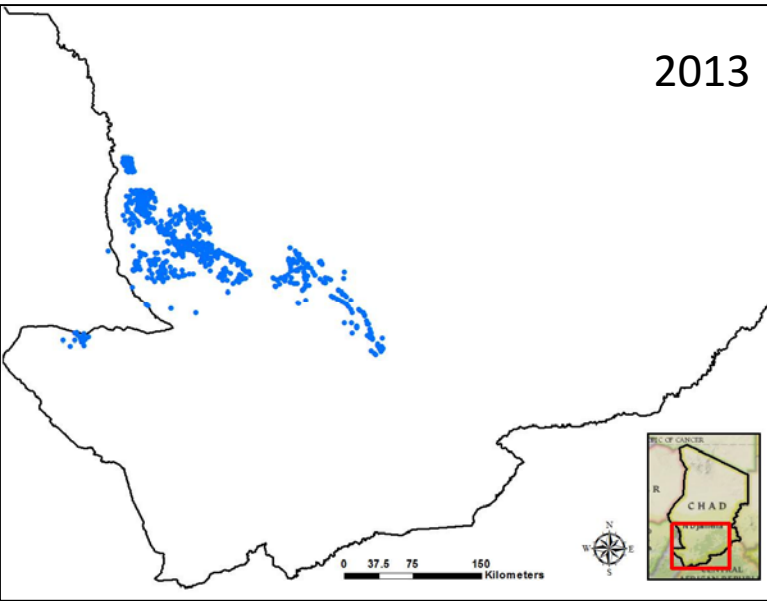
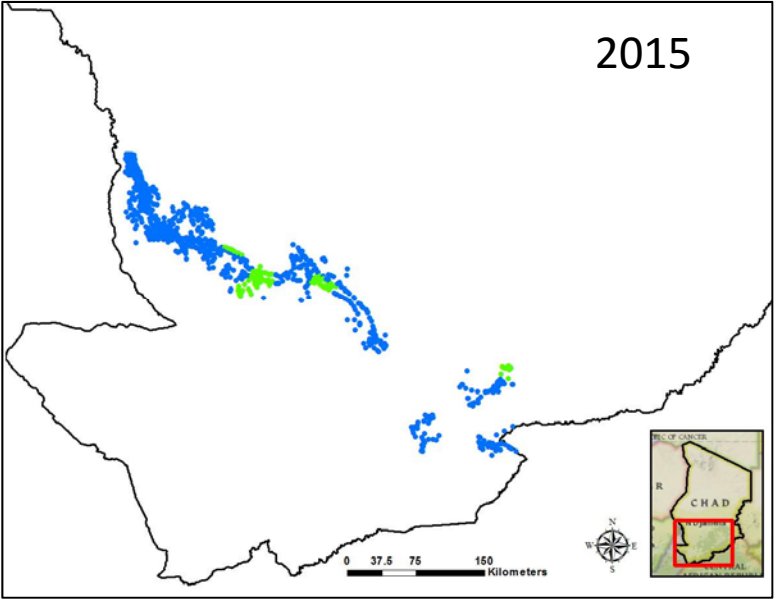
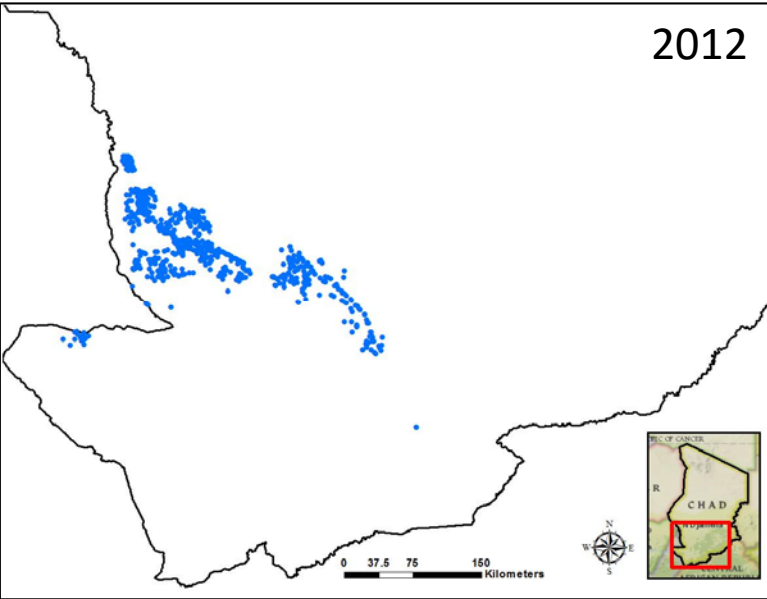
Figure 1



SOUTH SUDAN: NO CASES

The South Sudan GWEP has reported no cases of Guinea worm disease in January-April 2017. Table 3 is a revised line-listing of the six cases reported in 2016, to reflect corrections of the ages of four of the patients. Starting in May, in areas under active surveillance South Sudan doubled the reward amounts for reporting a confirmed case of Guinea worm disease in a human or an infected (and tethered) dog to 10,000 South Sudanese Pounds (~US\$90) and 2,500 South Sudanese Pounds (~US\$23), respectively, to account for inflation. WHO is helping Uganda and Ethiopia to conduct surveillance for any cases of GWD in the large numbers of refugees from South Sudan that are resident and entering Ethiopia and Uganda.

Figure 2
Chad Guinea Worm Eradication Program
Distribution of Villages under
Active Surveillance



- Level 1 villages
- Level 2 villages

Table 1

**CHAD GUINEA WORM ERADICATION PROGRAM
LINE LISTING OF CASES OF GWD: JANUARY - MAY 2017***

Case #	Age	Sex	Ethnicity	Village/Locality of Detection			Date GW emerged (D/M/Y)	Case contained? (Yes/No/Pending)	Patient contaminated sources of water (Yes/No)	Date ABATE applied (D/M/Y)	Source [^] of infection established? (Yes/No)	Worm Specimen	
				Name	District/ payam/ woreda	County/ Region						Date sent to CDC (D/M/Y)	Diagnosis
1.1	10	F	Goulaye	Loumia	Mandelia	Chari Baguirmi	27-Feb-17	Yes	No	N/A	No	13-Mar-17	21-Mar-17
1.2							5-Mar-17					13-Mar-17	21-Mar-17
2	6	F	Mberi	Kakale Mberi	Guelendeng	Chari Baguirmi	22-Mar-17	Yes	No	N/A	No	30-Mar-17	6-Apr-17
3	10	M	Mousgoum	Bougoumene 1	Dourbali	Chari Baguirmi	31-Mar-17	Yes	No	N/A	No	3-Apr-17	13-Apr-17
4	7	M	Sara Kaba	Tarangara	Danamadji	Moyen Chari	27-Apr-17	No	Yes	6-May-17	No	5-May-17	14-May-17
5	12	M	Ngambaye	Kira	Sarh	Moyen Chari	12-May-17	Yes	No	N/A	No	18-May-17	1-Jun-17

* Provisional

[^] Source: known visit or residence of patient in a known endemic village/locality or village/cluster where cases of GWD occurred 10-14 months before GW emerged, and verified by the GWEP.

Table 2

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	1 / 1	/	/	/	/	/	/	/	4 / 5	80%
SOUTH SUDAN	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%
MALI [§]	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	/	/	/	/	/	/	/	0 / 0	0%
TOTAL*	0 / 0	1 / 1	1 / 1	1 / 2	1 / 1	/	/	/	/	/	/	/	4 / 5	80%
% CONTAINED	0%	100%	100%	50%	100%								80%	

*Provisional

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

Cells shaded in yellow denote months when a case of GWD did not meet all case containment standards.

[§]Reports include Kayes, Koulikoro, Segou, Sikasso, and Mopti, Tinbuktu and Gao Regions; contingent on security conditions during 2017, the GWEP deployed 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 2016*
(Countries arranged in descending order of cases in 2015)

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	0 / 0	1 / 1	1 / 1	0 / 1	1 / 2	1 / 3	1 / 2	3 / 4	0 / 0	0 / 1	9 / 16	56%
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%
SOUTH SUDAN	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	3 / 4	0 / 0	0 / 0	0 / 1	0 / 0	0 / 1	0 / 0	3 / 6	50%
ETHIOPIA	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	2 / 3	67%
TOTAL*	0 / 0	1 / 1	0 / 0	1 / 1	2 / 2	4 / 6	1 / 2	1 / 3	1 / 4	3 / 4	0 / 1	0 / 1	14 / 25	56%
% CONTAINED	0%	100%	0%	100%	100%	67%	50%	33%	25%	75%	0%	0%	56%	

*Provisional

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

Cells shaded in yellow denote months when a case of GWD did not meet all case containment standards.

[§]Reports include Kayes, Koulikoro, Segou, Sikasso, and Mopti, Tinbuktu and Gao Regions; contingent on security conditions during 2016, the GWEP deployed one technical advisor to Kidal Region to oversee the program.

Table 3

**SOUTH SUDAN GUINEA WORM ERADICATION PROGRAM
LINE LISTING OF CASES OF GWD DURING 2016**

Case #	Village or Locality of Detection			Payam	County	Age	Sex	Date GW Emerged	Case Contained?		1 = Imported 2 = Indigenous	Home Village or Locality			Presumed Source of Infection Identified?		Presumed Source of Infection is a Known EVA?		Worm Specimen			
	Name	1 = EVAS	2 = NEVAS						(Yes, No, or Pending)	If No, Date of Abate Rx*		Name	1 = EVAS	2 = NEVAS	(Yes / No)	Description	(Yes / No)	Actions?	Date sent to CDC	Diagnosis	CDC Accession Number	
1.1	RUMCHIETH	1		WUNLIT	TONJ EAST	36	F	04/06/16	NO	9/Apr/16	2	RUMCHIETH	1		YES	RUMCHIETH	YES	ABATE WAS ALREADY APPLIED, BANDAGING AND HEALTH EDUCATION DONE	15/Jun	GUINEA WORM	PDB16-42	
2.1	ANGON	1		UDICI	JUR RIVER	13	F	09/06/16	YES	NA	2	ANGON	1		YES	WATER SOURCES AROUND THE HOUSEHOLD IN ANGON	YES	ABATE WAS ALREADY APPLIED, BANDAGING AND HEALTH EDUCATION DONE	28/Jun	GUINEA WORM	PDB16-47	
2.2								02/07/16											12/Aug			PDB16-69
2.3								06/07/16											25/Jul			PDB16-65
2.4								26/09/16														
3.1	ANGON	1		UDICI	JUR RIVER	26	M	25/06/16	YES	NA	2	ANGON	1		YES	WATER SOURCES AROUND THE HOUSEHOLD IN ANGON	YES	ABATE WAS ALREADY APPLIED, BANDAGING AND HEALTH EDUCATION DONE	25/Jul	GUINEA WORM	PDB16-62	
3.2								03/07/16											25/Jul			PDB16-62
3.3								05/07/16											25/Jul			PDB16-62
3.4								17/07/16											25/Jul			PDB16-62
3.5								25/09/16														
4.1	ANGON	1		UDICI	JUR RIVER	47	F	27/06/16	YES	NA	2	ANGON	1		YES	WATER SOURCES AROUND THE HOUSEHOLD IN ANGON	YES	ABATE WAS ALREADY APPLIED, BANDAGING AND HEALTH EDUCATION DONE	25/Jul	GUINEA WORM	PDB16-64	
4.2								28/06/16											25/Jul			PDB16-64
4.3								01/07/16											25/Jul			PDB16-64
4.4								09/07/16											25/Jul			PDB16-64
4.5								24/07/16											12/Aug			PDB16-68
4.6								28/08/16											19/Sep			PDB16-98
4.7								14/09/16											24/Sep			PDB16-116
5.1	PARIENG CC	2		PAWENG	TONJ EAST	9	M	11/09/16	NO	17/09/16	2	PALOR	2	NO	STILL UNDER INVESTIGATION				24/Sep	GUINEA WORM	PDB16-114	
5.2								25/10/16											16/Nov			PDB16-114
6.1	KHOR JAMUS	2		ROC ROC DONG	JUR RIVER	24	F	20/11/16	NO	26/11/16	2	ROC ROC DONG	2	NO	STILL UNDER INVESTIGATION		MASS EDUCATION CONDUCTED IN RAIYINHOM, CLOTH AND PIPE FILTERS DISTRIBUTED, ACTIVE CASE SEARCH, VV SELECTED, COMMUNITY MEETING HELD AND PATIENT ADMITTED TO THE CCC	5/Dec	GUINEA WORM	PDB16-142		

NEVS = Non Endemic Villages

Gardens = Farming areas of villages

CC = Cattle Camp

CCC = Case Containment Center

NB - Line List highlighted in yellow are from areas not under village based surveillance

MALI: NO CASES, NEW MINISTER OF HEALTH

Mali has reported zero cases of Guinea worm disease and no infected dogs in January-May 2017, following no cases reported for an entire calendar year for the first time in 2016. Mali has reported 103 rumors of cases, none of which were confirmed, in January-April 2017. Surveys in January-April revealed a level of awareness of the cash reward for reporting a case of GWD in humans of 80% (1417/1782) in Level II (active surveillance) areas. The level of awareness of the reward for reporting an infected dog was found to be 95% (514/539) in a Level I (endemic, active surveillance) area in January and 80% (192/240) in a Level II area in March.

On April 12, the government appointed a new Minister of Health, Prof. Samba Ousmane SOW, who formerly was advisor for health to the president in the previous cabinet. The National Commission for Certification of Dracunculiasis Eradication held its first meeting of 2017 in March under the former Minister, Dr. Marie Madeleine TOGO. The Commission also made supervisory visits to Koulikoro and Segou Regions in April.

The National Program Coordinator of Mali's GWEP Dr. Mohamed BERTHE and Carter Center Country Representative Mr. Sadi MOUSSA made a supervisory visit to Mopti and Segou Regions on April 25-28. In Mopti, where the security situation remains volatile, they met with health authorities to help strengthen GW surveillance of humans and dogs in the five districts where all infected dogs in 2016 originated. Two technical assistants are training community health workers from those districts. The team visited the regional health office in Segou, and met with the new Regional Director Dr. Gabriel GUINDO, who was formerly the national program coordinator for the GWEP. They provided instructions and support to conduct an inventory of dogs in Tominian district (where all 11 infected dogs in 2016 were detected) of Segou Region and the newly reopened districts of concern in Mopti Region. Dr. Guindo and Mr. Moussa also made a supervisory visit and met with health authorities in Kayes Region on May 15-17 to follow up recommendations from a visit in 2016 to strengthen reporting, data management and documentation at regional and district levels for pre-certification activities.

The program held a workshop on dissemination of the communication campaign on May 22-23, led by the *Centre National D'Information D'Education et de Communication pour la Sante* (CNIES), with support of the KYNE communication consultants. About 40 participants attended the workshop, representing all 11 regions, including the two new regions of Menaka and Taoudent. All the regions planned how to implement the campaign. FM radio broadcasts are a prominent feature of the campaign.

ANNUAL GW MEETING HELD DURING WORLD HEALTH ASSEMBLY

The World Health Organization's Regional Director for Africa, Dr Matshidiso Moeti, chaired the annual Informal Meeting of Ministers of Health of Guinea Worm-Affected Countries during the World Health Assembly (WHA) in Geneva on May 24, 2017. The meeting was well-attended although most ministers of health could not participate due to a concurrent reception for the newly-

elected Director-General of WHO, former Ethiopian Minister of Health and Foreign Minister Dr. Tedros Adhanom Ghebreyesus. Outgoing Director-General Dr. Margaret Chan appeared at the meeting briefly as a final indication of her enthusiastic support for the program. Participants included the Minister of Health of Ghana, Hon. Kwaku Agyeman-Manu, as well as representatives of Chad, Ethiopia, Mali, India and Abu Dhabi, and the Bill & Melinda Gates Foundation. The International Commission for the Certification of Dracunculiasis Eradication (ICCDE) was represented by Prof. David Molyneux and Prof. Abolhassan Nadim. Vice President Dr. Dean Sienko and Guinea Worm Eradication Program Director Dr. Ernesto Ruiz-Tiben, and Mr. Curtis Kohlhaas, participated on behalf of The Carter Center. WHO staff from the regions of Africa (AFRO) and Eastern-Mediterranean (EMRO) along with staff from the Headquarters attended the meeting. A full day Exhibit on Guinea Worm Eradication was displayed on this day at the WHA.

NEW FUNDING FROM BILL & MELINDA GATES FOUNDATION

BILL & MELINDA GATES foundation The Carter Center is grateful for the continued support of the Bill & Melinda Gates Foundation, particularly its recent grant of USD\$41.96 million for Guinea worm disease eradication efforts. The foundation has generously provided almost \$180 million in support of the eradication campaign since May 2000.

RECENT PUBLICATIONS

Greenwood, B., Greenwood, A., & Bradley, A.. 2017. Guinea worm infection in northern Nigeria: reflections on a disease approaching eradication. Tropical Medicine & International Health 22 (5): 558-566.

Martell, P., 2017. What it's like when a Guinea worm living inside your body suddenly burrows out. http://www.huffingtonpost.com/entry/guinea-worm-disease-eradication-south-sudan_us_59148f9ee4b00b643ebc3d61?6mb

Molyneux, D., & Sankara, D.P., 2017. Guinea worm eradication: progress and challenges—should we beware of the dog? PLoS Negl Trop Dis 11(4):e0005495. <https://doi.org/10.1371/journal.pntd.0005495>

Sreenivasan N, Weiss A, Djiatsa JP, Toe F, Djimadoumaji N, Ayers T, Eberhard M, Ruiz-Tiben E, Roy S. Recurrence of Guinea Worm Disease in Chad after a 10-Year Absence: Risk Factors for Human Cases Identified in 2010–2011. Am J Trop Med Hyg. 2017 [Epub ahead of print]

World Health Organization, 2017. Dracunculiasis eradication: global surveillance summary, 2016. Wkly Epidemiol Rec 92:269-86.

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 Dr. Ernesto Ruiz-Tiben (eruizti@emory.edu), 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, Drs. Donald R. Hopkins and Ernesto Ruiz-Tiben of The Carter Center, Drs. Sharon Roy of CDC, Dr. Dieudonné Sankara of WHO, and Dr. Mark Eberhard.

WHO Collaborating Center for Dracunculiasis, Eradication, Center for Global Health, Centers for Disease Control and Prevention, Mailstop C-09, 1600 Clifton Road NE, Atlanta, GA 30329, USA, email: gwwrapup@cdc.gov, fax: 404-728-8040. The GW Wrap-Up web location is

<http://www.cdc.gov/parasites/guineaworm/publications.html#gwwp>

Back issues are also available on the Carter Center web site English and French are located at

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

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



**World Health
Organization**

CDC is the WHO Collaborating Center for Dracunculiasis Eradication