

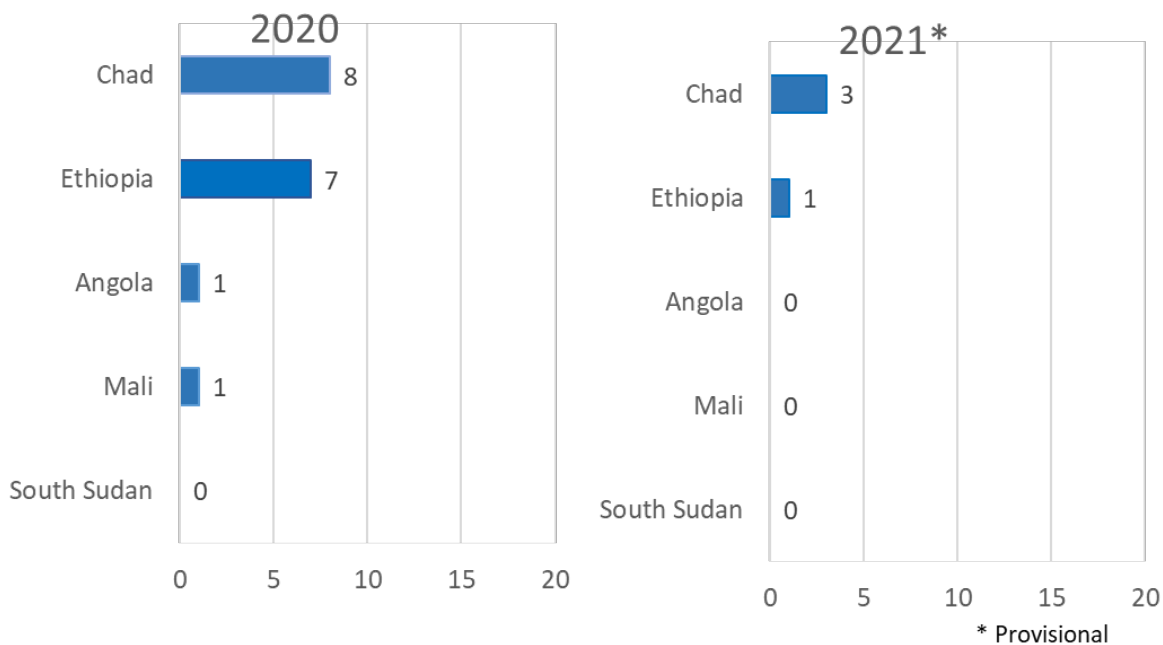


Date: May 24, 2021
From: WHO Collaborating Center for Dracunculiasis Eradication, CDC
Subject: GUINEA WORM WRAP-UP #277
To: Addressees

Detect and contain every Guinea worm! Trace source of each case!

76% FEWER CASES, 73% FEWER ANIMAL INFECTIONS IN JANUARY-APRIL

Figure 1 Confirmed Cases of Guinea Worm Disease by Country, January – April 2020 vs January – April 2021*



Provisional surveillance data for January-April 2021 shows 4 confirmed human cases of Guinea worm disease reported worldwide, which is an 76% reduction in cases compared to 17 human cases reported in the same period of 2020 (Figure 1). The four confirmed human cases occurred in Chad and Ethiopia. All three cases were contained. The presumed sources of the case in Ethiopia and one of the cases in Chad are known; the source of the other case in Chad is not (see definitions of presumed source of infection and of a contained case, below).

Provisionally, 188 animal Guinea worm infections were reported in January-April 2021, which is a 73% reduction from 684 animal infections reported in the same period of 2020. These overall provisional

reductions of 76% in human cases and 73% in animal infections for the first trimester of 2021 compare to reductions of 50% and 20% in human cases and infected animals worldwide in 2020 vs. 2019. The peak transmission seasons for Guinea worm infections are January-April (Angola), March-July (Chad), May-August (Ethiopia), May-September (South Sudan), and July-November (Mali).

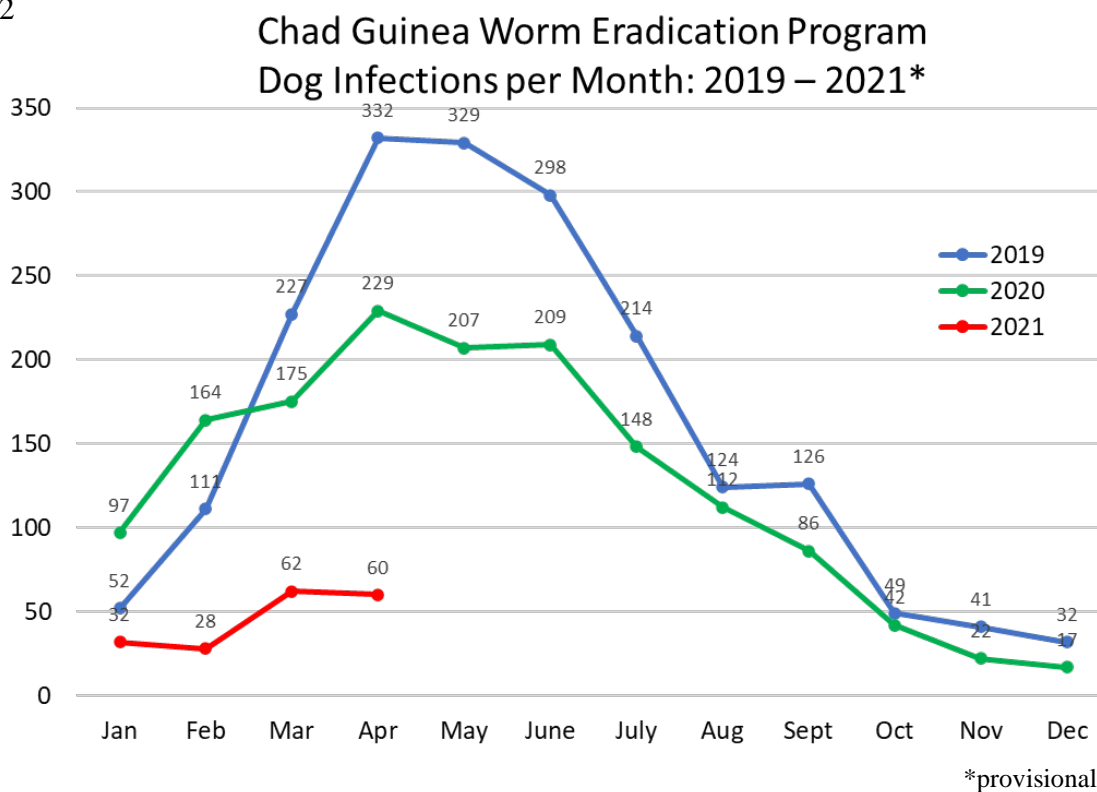
CHAD



Chad has reported 182 infected dogs (81% contained) and 4 infected cats (75% contained) in January-April 2021 compared to 679 infected animals in January-April 2020, which is a reduction of 73% in infected animals (Figure 2). Chad reported three confirmed human cases (67% contained) one in February and two in April 2021, which is a reduction of 63% from the 8 human cases Chad reported in January-April 2020.

The human case in Chad in February occurred in Am-Timan district of Salamat Region; the presumed source of that case is unknown. The second confirmed case is a 7-year-old boy from Bogam village/Aboudeia district/Salamat Region whose worm emerged on April 14 and who also was case #7 from the same village in 2020. Bogam village reported 3 Guinea worm cases in March-April 2020 and 22 cases in March-August 2019. The third confirmed case is a 3 year old girl from Bodobo 1 village in Marabe Zone, Moyne Chari Region. The worm Emerged on March 30. The current hypothesis for the presumed source of infection is in Marakouya 2 village. Specimen from one other suspect human cases in 2021 is being examined at CDC: from Balimba village/Moissala district/Mandoul Region which emerged on April 20.

Figure 2



The coverage of endemic villages in Chad with Abate and the proportion of households in at-risk villages practicing burial of fish guts remained about the same in 2019 and 2020, at approximately 83% and 87%

respectively, while reported containment of infected dogs increased marginally from 81% to 84% in that time (containment is 81% so far in 2021). The main intervention that may account for the dramatic decline in infected animals so far in 2021 however, is proactive tethering of dogs and cats in villages at risk, which Chad’s minister of health launched in March 2020 (see *Guinea Worm Wrap-Up* #267). Proactive tethering of all (or most) dogs in high risk villages during the peak transmission season *reduces exposure of all dogs* to infection from sources outside of the household, and by ensuring tethering of additional infected dogs whose Guinea worms might otherwise have been missed under the previous strategy of only tethering the few dogs seen with emerging worms, proactive tethering *reduces contamination of water bodies* with Guinea worm larvae. The 2021 year-to-date 73% reduction in infected animals in Chad is comparable to the 80% reduction of infected dogs at much smaller scale in Ethiopia in 2019 and 2020 (avg. 12.5 infected dogs/year in 2015-2018 vs. 2, 3 infected dogs in 2019, 2020) after Ethiopian villagers suggested and Ethiopia’s GWEP pioneered the innovative approach in 2018. The parallel substantial reduction in *human* Guinea worm cases in Chad so far in 2021 suggests that reduced environmental contamination with Guinea worm larvae in 2020 reduced the exposure of humans as well as animals.

Following the sudden death of Chadian President Idriss Deby Itno on April 19, six international technical assistants working in Chad were evacuated from the country and are working remotely. Ten others were out of the country and temporarily unable to return, while eight expatriates including the Carter Center Country Representative, deputy representative, data manager, program veterinarian and other senior expatriate assistants remained in Chad and continued supervisory activities with Chadian Guinea worm program leaders and staff.

ETHIOPIA



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MINISTRY OF HEALTH - ETHIOPIA

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MINISTRY OF HEALTH FOR THE PEOPLE

Ethiopia reported one human case of Guinea worm disease (contained) in January-April 2021, in Gog district of Gambella Region in February. The home village and presumed source of the case in Ethiopia is Duli farm, which had an outbreak of 7 human cases in April 2020 (see *Guinea Worm Wrap-Up* #268). The Ethiopian Dracunculiasis Eradication Program (EDEP) has reported no Guinea worm infections in animals in January-April 2021, compared to 1 infected animal, a baboon, in March 2020.

The EDEP has 198 villages under active surveillance in Gog and Abobo districts of Gambella Region. In January and February 2021 it conducted integrated case searches for GWD in some Level 2 surveillance areas in cooperation with Mass Drug Administration (onchocerciasis and lymphatic filariasis) campaigns, and in March it conducted an integrated search of some Level 2 surveillance areas in cooperation with the polio campaign. Ethiopia has reported a total of 4,230 rumors of GW infections in humans and animals in January-March, 100% of which were investigated within 24 hours. Surveys conducted in Gog and Abobo districts in March found that overall, 96% of 2,583 persons interviewed were aware of the cash reward for reporting a Guinea worm infection in a human or animal. As of March, a total of 1,906 dogs and 246 cats were proactively tethered in Gog and Abobo districts. The Gog district water office did maintenance work on the handpumps of 2 borehole wells in Atheti and Abawiri villages in January, but the borehole well in Ablen village, one of three key endemic villages (with Atheti and Wichini) in the “Guinea worm triangle” epicenter of Gog district, was still broken in March.

In April the EDEP facilitated two consultative meetings in Gog and Abobo districts to strengthen government ownership and leadership in the eradication effort. The meetings were attended by the kebele (district) cabinets, district senior office heads, the Carter Center Program Manager, and Gambella Region Public Health Emergency Management Directors, and were chaired by the respective District Administrators. Participants discussed the challenges associated with importation and release of dogs and cats, delays in maintenance of borehole wells, and the risks of using dogs for hunting in high risk areas. The district officials were mandated to take administrative measures against persons who violate the community bylaws.

In April the Ethiopian Public Health Institute, EDEP, Ethiopian Wildlife Conservation Authority, the University of Georgia/USA, and The Carter Center held a meeting to launch the next phase of the baboon study later this year. Field team members have continued to track movements of selected baboon troops during the suspension of other field studies in 2020 because of the COVID-19 pandemic. Trapping of baboons for study is expected to resume in July/August 2021.

MALI



Mali's Guinea Worm Eradication Program (MGWEP) reported a confirmed infected dog (contained) in Macina town/Segou Region in January 2021 (see *Guinea Worm Wrap-Up* #275). The MGWEP recently detected a suspect Guinea worm infection (contained) in a dog in Barakabougou village of Markala district/Segou Region on May 5, 2021; the dog was tethered two days before the worm began emerging. A specimen is being sent to CDC. Barakabougou village also reported a dog with a Guinea worm infection in June 2018, but not in 2019 or 2020, so the presumed source of this suspected GW infection is unknown. Mali reported a human Guinea worm case in Baroueli district of Segou Region in March 2020 and a dog with Guinea worm infection in Gomagada village of Markala district in November 2020, but no other animal or human Guinea worm infections in January-April 2020. Barakabougou village (13.786093N, 5.735849W) is located on the left bank of the Niger River about 23 kilometers (14 miles) from Gomagada village. Thirty dogs live in Barakabougou, including a second dog in the household of the dog with the suspected Guinea worm infection. The team that investigated the suspected dog infection reported that dogs in the fishing village consume raw fish entrails, which villagers throw into the river. The village has two boreholes, one of which is functional. The investigating team from Markala district conducted health education, distributed cloth filters and pipe filters, and surveyed 8 local ponds that were dry.

Mali (avg. 11 infected dogs/year in 2016-2020), plans to introduce proactive tethering of dogs and cats in at-risk villages in 2021. The apparent impact of this approach one year after it was introduced in Ethiopia in 2018 and in Chad in 2020 (see article on page 1) should augur well for success if it is accepted and applied by at-risk populations in Mali.

Table 1

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												% CONT.	
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER		TOTAL*
CHAD ^a	0 / 0	1 / 1	0 / 0	1 / 2	/	/	/	/	/	/	/	/	2 / 3	67%
ETHIOPIA	0 / 0	1 / 1	0 / 0	0 / 0	/	/	/	/	/	/	/	/	1 / 1	100%
SOUTH SUDAN	0 / 0	0 / 0	0 / 0	0 / 0	/	/	/	/	/	/	/	/	0 / 0	
ANGOLA	0 / 0	0 / 0	0 / 0	0 / 0	/	/	/	/	/	/	/	/	0 / 0	
MALI	0 / 0	0 / 0	0 / 0	0 / 0	/	/	/	/	/	/	/	/	0 / 0	
TOTAL*	0 / 0	2 / 2	0 / 0	1 / 2	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	3 / 4	75%
% CONTAINED	100%	100%		50%										

*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												% CONT.	
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER		TOTAL*
CHAD ^a	1 / 1	0 / 2	0 / 3	1 / 2	2 / 2	0 / 0	0 / 1	0 / 1	0 / 0	1 / 1	0 / 0	0 / 0	5 / 13	38%
SOUTH SUDAN	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	100%
ANGOLA	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0%
ETHIOPIA	0 / 0	0 / 0	0 / 0	7 / 7	0 / 0	0 / 0	0 / 0	2 / 2	1 / 1	1 / 1	0 / 0	0 / 0	11 / 11	100%
MALI [§]	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0%
TOTAL*	1 / 1	0 / 2	0 / 5	8 / 9	2 / 2	0 / 0	1 / 2	2 / 3	1 / 1	2 / 2	0 / 0	0 / 0	17 / 27	63%
% CONTAINED	100%	0%	0%	89%	100%	100%	50%	67%	100%	100%	100%	100%	63%	

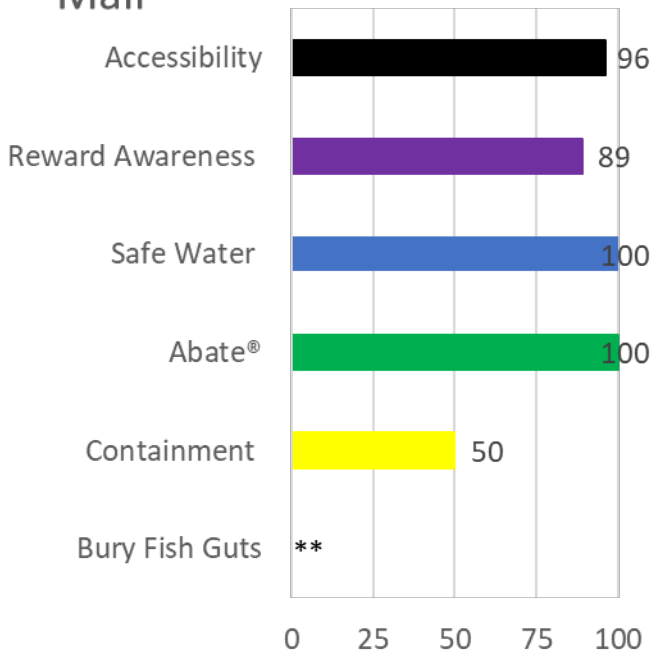
*Provisional

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.

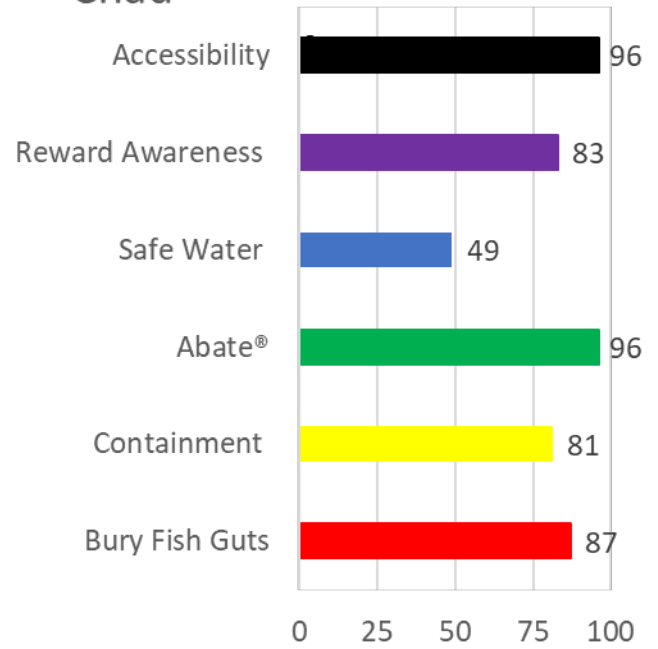
[§]Reports include Kayes, Koulikoro, Segou, Sikasso, and Mopti, Timbuktu and Gao Regions; contingent on security conditions during 2018, the GWEP continued to deploy one technical advisor to Kidal Region to oversee the program.
[^] Cameroon reported one case in February that was most likely infected in Chad.

Guinea Worm Eradication Program Indices Coverage (corrected)*

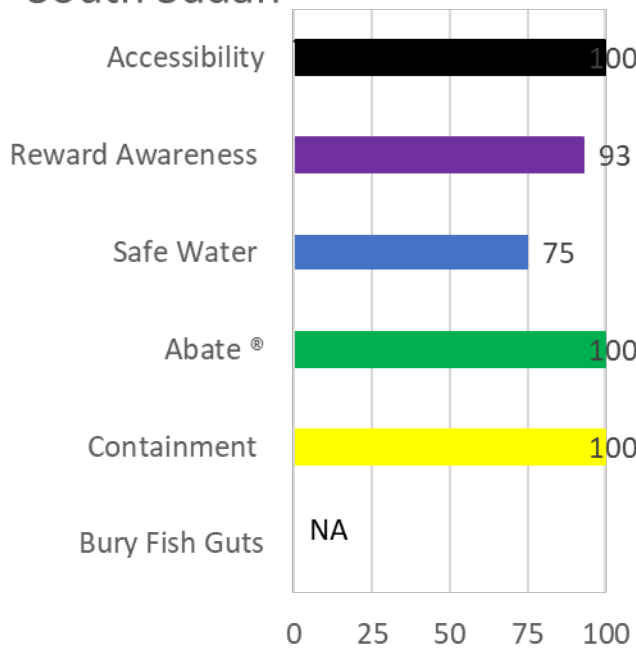
Mali



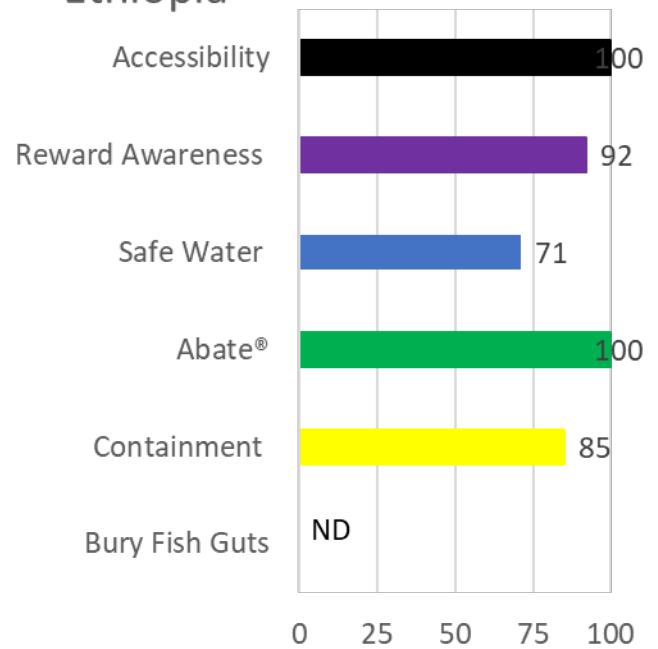
Chad



South Sudan



Ethiopia

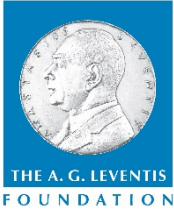


*see criteria for each indicator in text. NA = Not applicable. ND = No data available.

*December 2020

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

DONATION



The Carter Center is grateful for the support of the A. G. Leventis Foundation, which recently granted \$100,000 to the Guinea Worm Eradication Program through 2021. This support is matched by The Carter Center's Challenge Fund for Guinea Worm Eradication.

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.

DEFINITION OF A CONTAINED CASE*

A case of Guinea worm disease is contained if all of the following conditions are met:

1. The patient is detected before or within 24 hours of worm emergence; and
2. The patient has not entered any water source since the worm emerged; and
3. A village volunteer or other health care provider has properly managed the case, by cleaning and bandaging until the worm is fully removed and by giving health education to discourage the patient from contaminating any water source (if two or more emerging worms are present, the case is not contained until the last worm is pulled out); and
4. The containment process, including verification that it is a case of Guinea worm disease, is validated by a supervisor within 7 days of the emergence of the worm and
5. ABATE is used if there is any uncertainty about contamination of sources of drinking water, or if a source of drinking water is known to have been contaminated.

*The criteria for defining a contained case of Guinea worm disease in a human should be applied also, as appropriate, to define containment for an animal with Guinea worm infection.

DR. NABIL AZIZ MIKHAIL (1944-2021)
COURAGEOUS, DETERMINED GUINEA WORM WARRIOR



It is with very heavy hearts that we report the death on May 18, 2021 of Dr. Nabil Aziz, Country Representative of The Carter Center to Sudan and former National Program Coordinator of Sudan's Guinea Worm Eradication Program (SGWEP). Dr. Nabil grew up in Khartoum, a Coptic Christian in a predominantly Muslim country. He graduated from medical school in Poland in 1970 and earned a Master of Science degree from the Royal Institute of Tropical Medicine and Hygiene in Amsterdam. He served Sudan as a clinician and as a public health physician in Khartoum, Equatoria, and many other areas on behalf of the Ministry of Health. He was Director-General in the Ministry of Health of White Nile State before being appointed to lead Sudan's GWEP in September 1994.

In one of his earliest acts as head of the SGWEP, when presented with new information in February 1995 Dr. Nabil reported almost 20 times as many cases of Guinea worm disease to the World Health Organization for Sudan in 1994 as the country had reported for 1993. He convened Sudan's First National Conference on Guinea Worm Eradication in Khartoum on March 27, 1995, and summarized the SGWEP's progress at the Opening Ceremony before an audience that included Sudanese President Omar Al-Bashir, former U.S. President Jimmy Carter, the Ministers of Health of Sudan and Uganda, and many other distinguished guests. He was surprised when he learned that President Bashir declared a cease-fire in the civil war late that night after President Carter's negotiation with the two sides. The "Guinea Worm Cease Fire" lasted almost six months and accelerated Sudan's GWEP, its Onchocerciasis Control Program, and allowed many other health interventions assisted by WHO, UNICEF, and The Carter Center. During over 10 years as head of the SGWEP he traveled to supervise workers and observe program activities in affected areas of northern and southern Sudan on trips that sometimes lasted for weeks. He twice nearly died from malaria, once became lost in a dangerous area at night, and endured multiple vehicle breakdowns, entrapment in mud or desert sand, as well as contaminated food and water. He was especially proud of the outstanding database developed by the SGWEP. Dedicated to the health of all Sudanese, he overcame treacherous bureaucratic stumbling blocks, political posturing, and inter-personal minefields due to the civil war and associated suspicions, while staying focused on what he was trying to achieve and keeping always his sense of humor and ability to chuckle at absurdities. He was respected by health professionals on both sides of the conflict, many of whom were also friends. Northern Sudan eliminated Guinea worm disease in 2002. He received the Jimmy and Rosalynn Carter Award for Guinea Worm Eradication in 2004.

As Country Representative for The Carter Center beginning in 2007 after his retirement from the Federal Ministry of Health when southern Sudan assumed control of its health affairs following the Comprehensive Peace Agreement in January 2005, Dr. Nabil continued working on behalf of Sudanese, overseeing the elimination of river blindness from Abu Hamad in 2011 and (in collaboration with Ethiopia) from the cross-border area of Galabet-Metema, assisting efforts to eliminate blinding trachoma, and nurturing Sudan's adaptation of the Ethiopia Public Health Initiative to train health workers.

Dr. Nabil spoke slowly and was a gentle humanitarian. In an interview for an oral history project in 2010, he spoke warmly of his relationships with resident advisors assigned to Khartoum by The Carter Center. He also described an Eastern Orthodox tradition to mark the first Christmas and the first Easter after the loss of a beloved family member by celebrating in their memory. We shall celebrate and remember you, dear friend. Thank you! Rest in Peace. We extend our deepest condolences to your family.

RECENT PUBLICATIONS

Grobusch, M. P., Hanscheid, T. 2021. Dracunculiasis X in Vietnam: Emerging public health threat or exotic gem? International Journal of Infectious Diseases 105, 416–417. <https://doi-org.proxy.library.emory.edu/10.1016/j.ijid.2021.02.063>

Hopkins DR, Ijaz K, Weiss AJ, Roy SL, 2021. Certifying Guinea worm eradication in humans and animals (letter). The Lancet 397:793-4.. [https://doi-org.proxy.library.emory.edu/10.1016/S0140-6736\(21\)00262-2](https://doi-org.proxy.library.emory.edu/10.1016/S0140-6736(21)00262-2)

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. The correct link to this article is: <https://reader.elsevier.com/reader/sd/pii/S1201971221001041?token=F3FC02BC04475C70F39D7CC90E0D976B7D780C43B11D4A851BF2263FA8CE8B5B035C33E4910653157C889EC7D2D5810D&originRegion=us-east-1&originCreation=20210420164504>

Wilson-Aggarwal, J. K., Goodwin, C. E. D., Moundai, T., Sidouin, M. K., Swan, G. J. F., Léchenne, M., McDonald, R. A. 2021. Spatial and temporal dynamics of space use by free-ranging domestic dogs *Canis familiaris* in rural Africa. Ecological Applications, e2328. <https://doi-org.proxy.library.emory.edu/10.1002/eap.2328>

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.

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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



CDC is the WHO Collaborating Center for Dracunculiasis Eradication