DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Centers for Disease Control
And Prevention (CDC)

Memorandum

Date: August 30, 2021

From: WHO Collaborating Center for Dracunculiasis Eradication, CDC

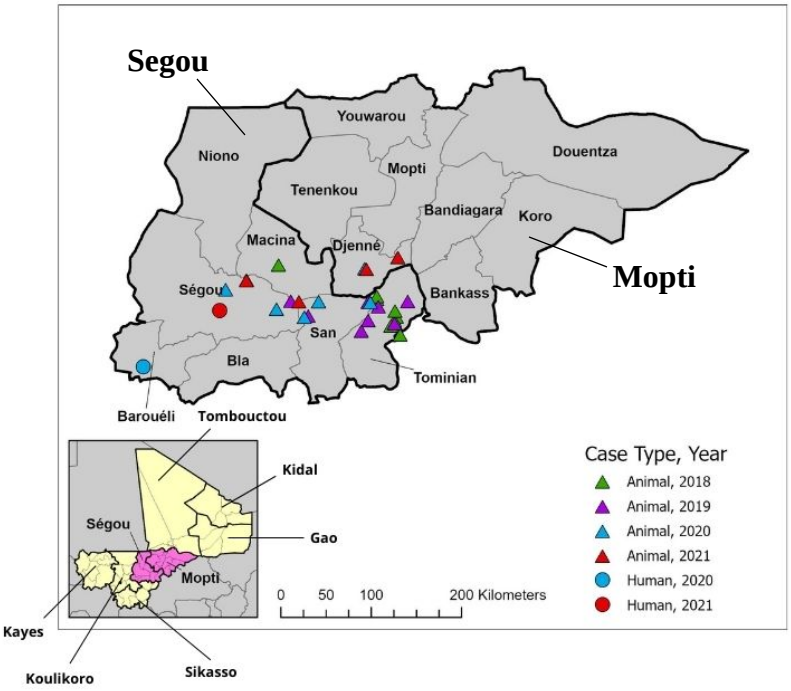
Subject: GUINEA WORM WRAP-UP #280

To: Addressees

Detect and contain every Guinea worm! Investigate the source of each case!

Figure 1

Map Showing Villages Reporting Guinea worm in Humans and/or Animals in Mali, 2018 - 2021*



MALI REPORTS A HUMAN CASE

A nine-year-old boy with an emerging Guinea worm was hospitalized in Sansanding town (N 13.481876, W 6.001333) of Markala health district/Segou *cercle* on August 3rd after a worm began emerging from his right foot that day. He had been seen with a swelling by his uncle, a Guinea worm community *relais*, on 20 July but was not referred to the health center until the worm started to emerge while he was swimming. Sansanding is located on the Niger River in the insecure "red zone", about 11 km (~6.6 miles) from Gomadaga village, which reported an infected dog on November 3, 2020, and 20 km (~12

miles) from Barakabougou village, which reported an infected dog on May 2, 2021, both of which also border the river. The boy has no history of travel outside of his hometown in the fourteen months before his infection. He helps his Bozo father in fishing, swims in the river, and sometimes eats fish that he grills himself. Sansanding has several safe water sources, including a borehole in front of the boy's household. Members of the fishing community often discard fish entrails in open areas or in the river. The town is not known to have ever had a Guinea worm in a person or animal before.

A multidisciplinary team comprising National Program Coordinator Dr. Cheick O. Coulibaly, Head of the Segou Regional Hygiene Division Mr. Mamadou S. Keita, Markala Chief Medical Officer Dr. Dramane Fomba, Carter Center Resident Representative Mr. Sadi Moussa, and several others investigated the suspect case in Sansanding on August 5th. They interviewed the patient and his family, visited Markala health district headquarters and the health center at Sansanding, met with local officials, and held a neighborhood assembly to raise awareness. Members of the team also conducted controlled immersion of the patient's foot, collected a specimen of the worm, inspected local dogs and cats, and distributed cloth filters. The CDC laboratory confirmed the worm as *D. medinensis*. Children in a Bozo family detected a suspect infection in a dog in Malobana hamlet of Sofara, along the Bani River branch about 2 km (~1.2 miles) away from Sansanding. The owner of the dog collected a specimen of the worm before the head of the Sofara health center arrived for the first investigation. The dog owner said she learned about the disease through local radio broadcasts. The district team treated two ponds in Sofara with Abate, but not the river. Sofara has at least one source of safe drinking water.

An updated line list of the four infected dogs and one human Guinea worm case detected by the Mali GWEP so far this year is in Table 1. Three of the five Guinea worm infections were contained. The source of one dog's infection whose worm emerged in Tolober neighborhood of Djenne on August 5, 2021, was apparently indigenous since Djenne had three infected dogs in neighborhoods less than one mile (1.5 km) distant in August-September 2020. The source of the first dog's infection was probably indigenous also, since the same locality in Macina town (Nemabougou/Bellah Were) reported an infected dog in September 2020. The sources of the three other infections so far this year are unknown, according to the definition in *Guinea Worm Wrap-Up* #279. Mali's GWEP discussed proactive tethering with communities in Macina, Markala, Djenne, and Tominian districts in June. The communities proposed an amount of 1000Fcfa (~US$2) per dog per day as incentives. The program will revisit communities with dog infections August 19-28 to discuss again the proposed cost for proactive tethering of their dogs. Figure 1 is a map showing the locations of all known Guinea worm cases and animal infections in Mali in 2018-2021.

This is only the second human Guinea worm infection detected in Mali since November 2015. Table 2 lists the 41 localities in Mali where Guinea worm infections have been detected from 2016 to early August 2021. All 65 infections (59 dogs, 4 cats, 2 humans) have occurred in the Inland Delta of the Niger River, with a mostly new cohort of villages reporting cases each year. Thirty-one villages only reported Guinea worm infection(s) in one year. Twenty-nine localities reported one infection each during this period. Djenne town reported 7 infections and Masso reported 5, while Mampe, Sokoura, Gueda, and Kolongotomo Bozo each reported 3 infections. The distribution of localities with infections by district is: Tominian district/Segou Region (19), Djenne/Mopti Region (15), Macina/Segou (4), Markala/Segou (2), Baroueli/Segou (1). This sparse, dispersed Guinea worm incidence in Mali in recent years is different from Mali's experience previously. It now is similar to the pattern in Chad but much less intense. Detailed genetic analyses of the Mali worms are pending.

Table 1

MALI GWEP LISTING OF HUMAN CASE AND DOG INFECTIONS: YEAR 2021

#	Region	District	Health Zone	Village	Ethnicity	Profession	Host	Probable origin	Date of detection	Date of emergence	Entered water?	Abate Applied? (Y/N)	Contained ? * (Y/N)	Total # of GW
1	Segou	Macina	Macina Central	Nemabougou/ Bellah Wèrè	Touareg	Imam	Animal	Nemabougou (Macina Ville)	13/Jan.	13/Jan.	No	Yes	Yes	1
2	Segou	Markala	Babougou	Barakabougou	Bozo	Fisherman	Animal	Unknown	3/May	4/May	No	Yes	Yes	2
3	Mopti	Djenne	Sofara	Malabano/Kaka	Bozo	Fisherman	Animal	Unknown	31/July	31/July	Yes	Yes	No	1
4	Segou	Markala	Sansanding	Walawala Bozo King (Sansanding)	Bozo	Fisherman	Human	Unknown	3/Aug.	3/Aug.	Yes	No	No	1
5	Mopti	Djenne	Djenne Central	Tolober (Djenne)	Dogon	Trader	Animal	Djenne town	5/Aug.	5/Aug.	No	No	Yes	1

* All containment criteria must be met:

i. The dog or human must be detected and tethered within 24 hours of emergence.

ii. The dog or human did not enter a water source with a worm emerging.

iii. The dog or human was tied up or isolated before the worm came out until the wound healed and the household received the proper education.

iv. Supervisor confirms Guinea worm infection/case within seven (7) days of emergence.

v. Abate was utilized if there was a possibility of a contamination.

Table 2

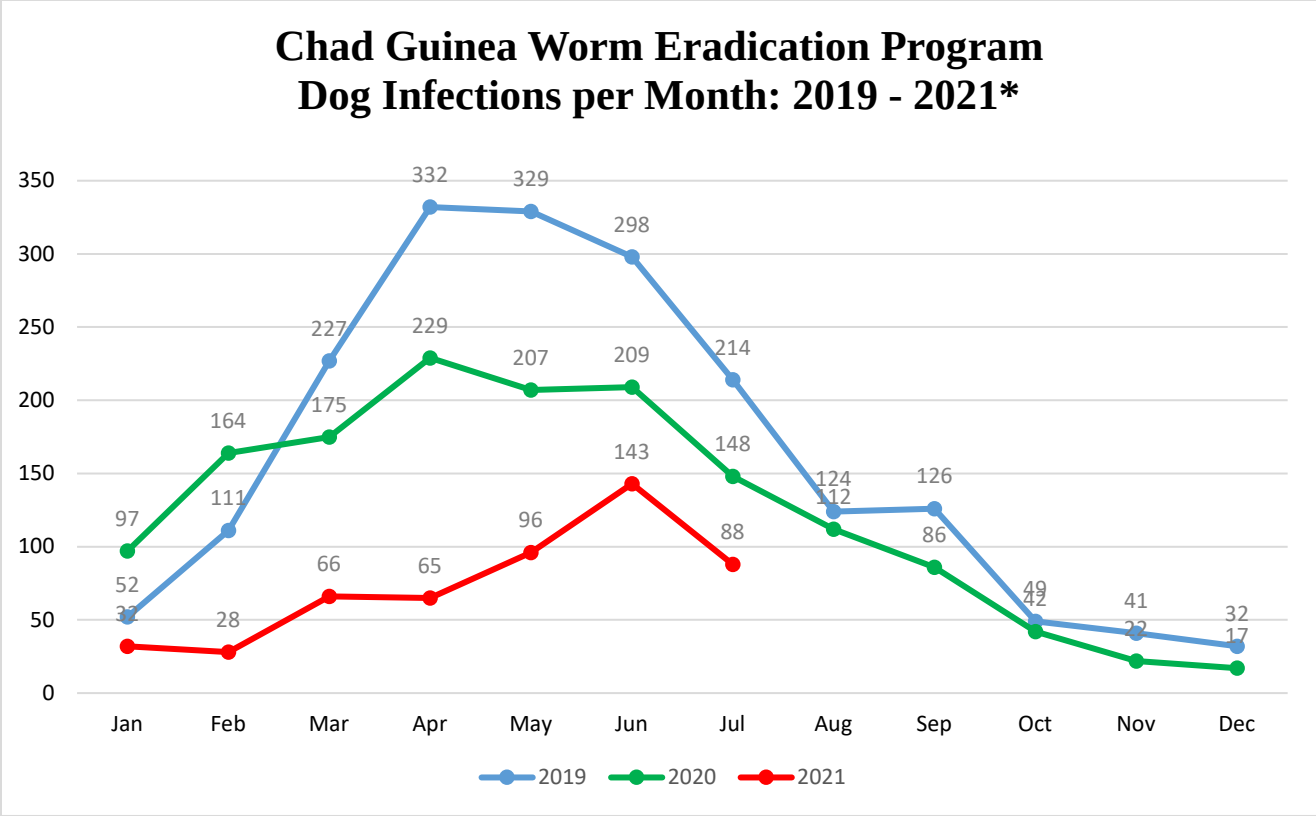
MALI GUINEA WORM ERADICATION PROGRAM
41 Localities Reporting Guinea Worm Infections in 2016 - August 2021

Village #	Village Name	Sanitary District	District	Region	Year and Number of Cases					
					2016	*2017*	*2018*	*2019*	*2020*	*2021*
1	Dimana	Fangasso	Tominian	Segou	1					
2	Masso	Fangasso	Tominian	Segou	2		1	2		
3	Mampe	Fangasso	Tominian	Segou	1	1	1			
4	Bathiridougou	Ouan	Tominian	Segou	2					
5	Kantama	Ouan	Tominian	Segou	1	1				
6	Bosokuy	Ouan	Tominian	Segou	1					
7	Parasilame	Fangasso	Tominian	Segou	1	1				
8	Tesso	Fangasso	Tominian	Segou	1					
9	Sokoura	Fangasso	Tominian	Segou	1		1	1		
10	Toubaro	Koula	Tominian	Segou		1				
11	Tako	Konio	Djenne	Mopti		1				
12	Konofia	Djenne	Djenne	Mopti		1				
13	Douguel	Ouan	Tominian	Segou		1				
14	Tolober	Djenne	Djenne	Mopti		1				
15	Kanafa	Djenne	Djenne	Mopti		1				
16	Kansara	Madiama	Djenne	Mopti		1				
17	Tierakuy	Fangasso	Tominian	Segou			1			
18	Barakabougou	Babougou	Markala	Segou			1			
19	Matina	Togo	Tominian	Segou			1			1
20	Gueda	Central	Macina	Segou			2	1		
21	Ouena	Ouan	Tominian	Segou			1			
22	Sumankuy	Fangasso	Tominian	Segou			1			
23	Yonga Bozo	Kouakourou	Djenne	Mopti			1			
24	Senossa	Senossa	Djenne	Mopti			1			
25	M'Biabougou	Keke	Djenne	Mopti			1			
26	Sounde	Fangasso	Tominian	Segou			1			
27	Djenne	Central	Djenne	Mopti			2	1	3	1
28	Kotorodaga (gomitogo)	Yebe	Djenne	Mopti			1			
29	Mourrah	Mourrah	Djenne	Mopti			1			
30	Bonadaga	Diamakan	Tominian	Segou			1			
31	Kouagourou	Kouakourou	Djenne	Mopti			1			
32	Soa	Gomitogo	Djenne	Mopti				1		
33	Kerebere	Togo	Tominian	Segou				1		
34	Gomitogo	Gomitogo	Djenne	Mopti				1		
35	Kokry Bozo	Kokry	Macina	Segou				1		
36	Konobougou	Konobougou	Baroueli	Segou					1	
37	Ouan	Ouan	Tominian	Segou					1	
38	Kolongotomo Bozo	Kolongotomo	Macina	Segou					3	
39	Macina	Macina	Macina	Segou					1	1
40	Gomadaga	Sansanding	Markala	Segou					1	1
41	Malobana	Sofara	Djenne	Mopti						1
TOTAL					**11**	**10**	**20**	**9**	**10**	**5**

CHAD

Chad is still shrinking the number of dogs with Guinea worm infections, with provisionally 58% fewer infections in January-July 2021 (518) compared to the same period during 2020 (1,229) (Figure 2). Chad also reduced Guinea worm cases in humans by 64% from 11 cases to 4 cases, and infected cats by 55% from 40 to 18 in the same period. The similar reductions in infections in response to interventions implemented in 2020 may suggest a shared modality of transmission among the three definitive host species in Chad. The containment rates for Guinea worm-infected humans, dogs, and cats in January-July 2021 are 100%, 81%, and 86%.

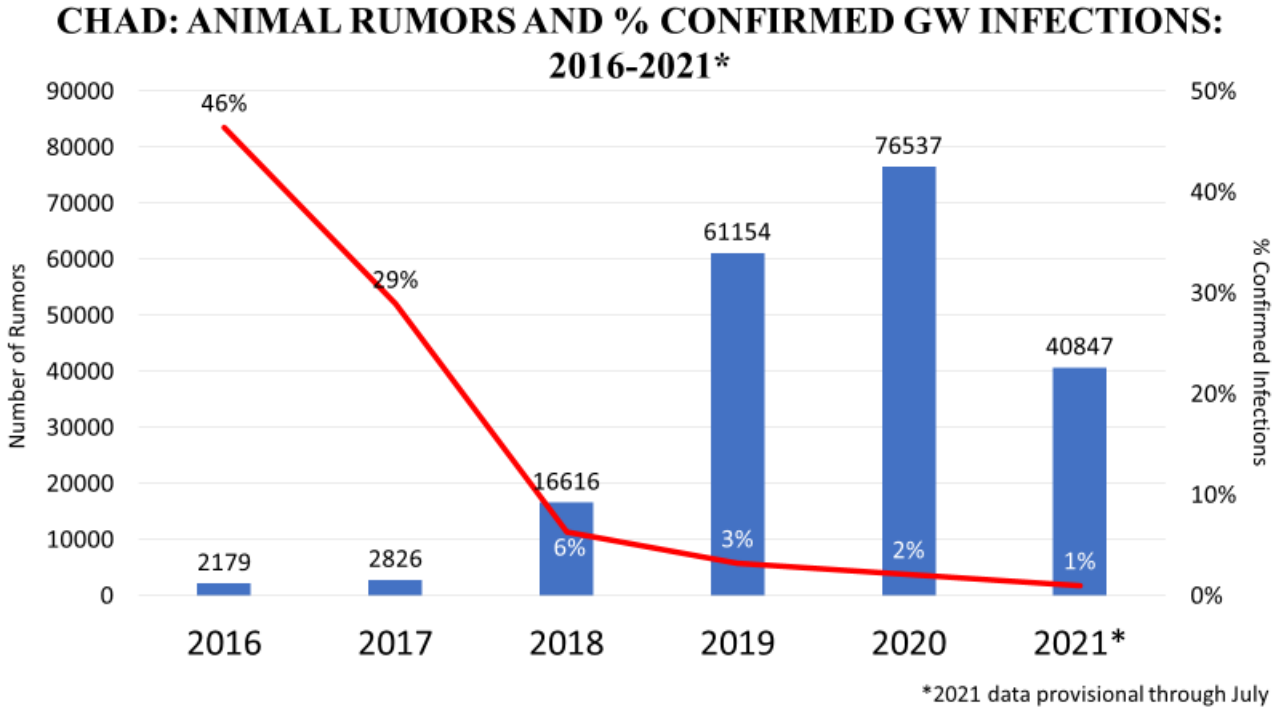
Figure 2



*Provisional

Chad's surveillance for Guinea worm infections continues to improve, as manifest by increased rumors reported and decreasing percentage of those rumors leading to confirmed cases (Figure 3). Over 40,000 rumors were reported in January-June 2021 (1% confirmed GW infections) vs. almost 32,000 rumors (2% confirmed) reported in January-June 2020. Of the four confirmed human cases in 2021, the presumed source of infection is only known for cases #2 and #3 (see line list in issue #278), according to the definition in *Guinea Worm Wrap-U*p #279. Key interventions have expanded this year, with 29,119 water sources treated with Abate in January-June 2021 vs. 13,394 sources treated in January-June 2020, and 15,699 of 21,393 (73%) eligible animals proactively tethered in 224 villages so far in 2021 vs. 6,985 of 8,079 (86%) eligible animals proactively tethered in 119 villages by the end of 2020 (Chad began proactive tethering in March 2020).

Figure 3



Chad's GWEP and allied researchers plan to conduct another trial of Flubendazole® in dogs starting in October, using a higher dose, single encounter protocol to explore further the feasibility of that drug as a treatment to prevent development of Guinea worm infections in animals. On July 26 the Chad GWEP held the first of three regional mid-term review meetings. The meeting was held in N'Djamena, where provincial health delegations reviewed activities to date in 2021 and discussed implementation of 2020 recommendations and priority actions for the remainder of 2021. In her opening address to the meeting, Deputy Director General of the Ministry of Public Health Dr. Dekandji Mbaidedji Francine highlighted the importance of cross-border surveillance with Cameroon and Central African Republic and encouraged the GWEP to involve other ministries in the fight against Guinea worm. Regional meetings were also held in Bongor and Sarh on July 28 and 30, respectively. The governors of Mayo Kebbi Est and Moyen Chari, respectively opened those two meetings, which included participation by Deputy Director of Disease Surveillance and Response at the Ministry of Health Dr. Ephraim Djoumbe and National Program Coordinator Dr. Tchindebet Ouakou, as well as health delegates from endemic provinces, and partners The Carter Center, UNICEF, and WHO.

SOUTH SUDAN: TWO CONFIRMED CASES AND ONE SUSPECT CASE

On August 13, Director General of Preventive Health Services in the South Sudan Ministry of Health Dr. John Rumunu announced that laboratory tests had confirmed a case of Guinea worm disease that was detected in Wunethony village of Pieri payam, Uror County, in Jonglei State. The patient is a 13-year-old Nuer girl whose infection was contained. The worm emerged on July 23 and was fully extracted on July 26. The South Sudan Guinea Worm Eradication Program (SSGWEP) is investigating this case and leading the response. An Abate team has been deployed and surveillance will be strengthened. The last known case of Guinea worm disease in Uror County was a 38-year-old woman in September 2013

whose worm was not contained. Nyirol County in Jonglei State had a Guinea worm case in 2013 and 2018.

The SSGWEP also reported a Guinea worm case, since confirmed by the CDC laboratory, in a 13-year-old Dinka girl whose worm emerged on July 23 in Kenegal Cattle Camp, Rumbek North County of Lakes State. Her infection was contained. The patient and her family moved frequently between villages and cattle camps in 2020 during the period when she was likely infected, where she fetched water and milked cows. The last known Guinea worm cases in Lakes State before this were four cases in Rumbek Center County and three cases in Rumbek North County in 2018 who were also cattle herders.

The SSGWEP reported 21,682 rumors of Guinea worm infections from January to June 2021. All were investigated, including 99% investigated within 24 hours. To help increase Guinea worm surveillance in the country, SSGWEP through the WHO Country Office has integrated training on Guinea worm disease, surveillance, and cash reward in the ongoing IDSR, polio and EPI field surveillance officers' trainings.

Mr. Jim Niquette, former Carter Center Country Representative in Ghana, has arrived in Juba as interim Carter Center Country Representative in South Sudan to the SSGWEP and the Trachoma Control Program. Welcome back aboard Jim!!

ETHIOPIA

The Ethiopian Dracunculiasis Eradication Program (EDEP) has reported one human case (contained, and presumed source known) of Guinea worm disease and no infected animals so far in 2021, compared to 7 humans, 3 dogs, 3 baboons, and 4 cats detected in January-July 2020. A total of 1,942 dogs and 268 cats were proactively tethered in Gog and Abobo districts of Gambella Region as of June 2021. The EDEP and associated researchers will resume trapping and examining baboons in Guinea worm-endemic and non-endemic areas of Gambella Region in October. The EDEP and field staff have continued to track six baboon troops in peri-domestic endemic areas of Gog district. The program and allies also plan to integrate data from ground tracking and GPS collars on baboons, remote sensing, and satellite imagery to help find and apply Abate® to water sources used by baboons, including under dense forest canopy, as well as water sources shared by baboons and dogs.

ANGOLA

Angola continues to make progress in expanding and strengthening community-based surveillance (CBS) activities in Cunene, which is the only province in Angola where indigenous transmission of dracunculiasis has been confirmed. Angola reported zero human cases and zero infected animals so far in 2021.

In August 2021,

- the program visited 13 at-risk villages and settlements, in two endemic municipalities (Cuanhama and Namacunde) – more than 780 persons were sensitized on the cash reward scheme and on Guinea worm disease prevention.
- 5 health facilities received direct supervision.

— 3 rumors were recorded and investigated (100%) within 24 hours in the municipality of Namacunde, Cunene; none of them turned out to be confirmed Guinea worm cases.
— 2 surveillance and follow-up visits were conducted for the 2020 human cases and the 2019 animal infection.
— 3 additional unsafe water sources were mapped, and nearly 100 families were given cloth filters.

Guinea worm surveillance is also being expanded and reinforced in three provinces – Huila Namibe and Cuando Cubango neighboring Cunene. One hundred seventy-five (175) health professionals and community health workers have been identified from 24 communes in the 3 provinces that share borders with Cunene.

During the period of April to August 2021, searches for Guinea worm cases and animal infections were integrated into other public health program field activities, such as the Angola – Democratic Republic of Congo cross-border assessment of leprosy, Buruli ulcer, yaws, and human trypanosomiasis; the Knowledge, Attitudes and Practices Malaria 2021 surveys; and the Deworming Impact Assessment. Preliminary reports indicate that 88 human rumored cases were reported in the areas visited: Uíge, Zaíre, Huambo, Cunene and Cuando Cubango. These rumors are in addition to 17 rumors reported and investigated in Angola from January to August 2021. None of these rumors have yet to be confirmed as Guinea worm.

The country is preparing to receive two technical support missions:

1) On request from the Ministry of Health Angola, and in preparation for the upcoming transmission season, the WHO is recruiting two consultants to support capacity building of the national team on vector control interventions, from the end of September to November 2021.
2) The Carter Center is organizing a follow-up visit to support GWE interventions, from September to October 2021.

Figure 4

Map of provinces neighboring Cunene, with border municipalities and Communes, targeted for the expansion of community-based surveillance – GWEP Cuene August 2021

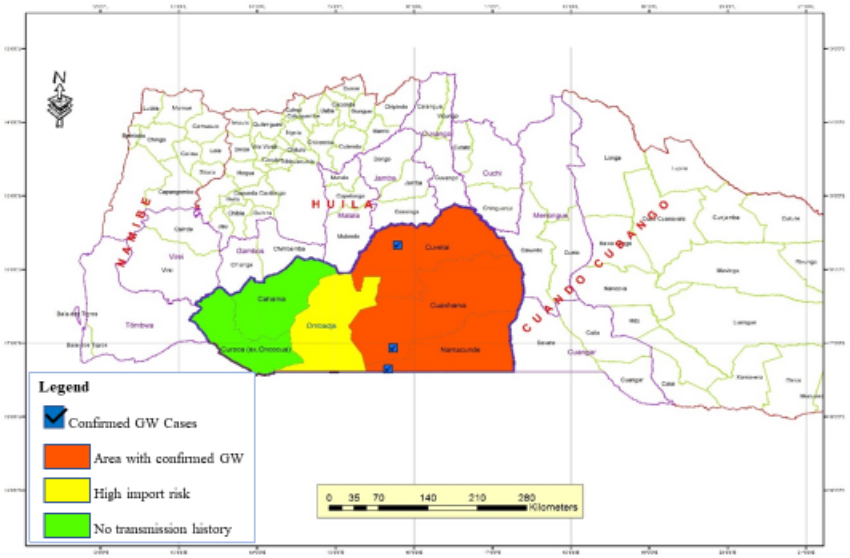


Figure 4, above, shows the geographic area selected for the first phase of expansion of the community-based surveillance (CBS) system in municipalities neighboring Cunene province, including Namibe, Huila and Cuando Cubango.

Table 3

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^	0 / 0	1 / 1	1 / 1	1 / 2	0 / 0	0 / 0	0 / 0	0 / 0	/	/	/	/	3 / 4	75%
ETHIOPIA	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	/	/	/	/	1 / 1	100%
SOUTH SUDAN	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	0 / 0	/	/	/	/	2 / 2	100%
ANGOLA	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	/	/	/	/	0 / 0	N/A
MALI	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	/	/	/	/	0 / 1	0%
TOTAL*	0 / 0	2 / 2	1 / 1	1 / 2	0 / 0	0 / 0	2 / 2	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	6 / 8	75%
% CONTAINED		100%	100%	50%			100%	0%						

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^	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%	

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 2020, 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.

RENN MCCLINTIC-DOYLE, GUINEA WORM ERADICATION STALWART, RETIRES

Mrs. Renn McClintic-Doyle, office manager for the Guinea Worm Eradication Program, retired from The Carter Center on August 2, 2021, after nearly 30 years of service. Mrs. McClintic-Doyle joined The Carter Center in 1992 to provide administrative support to Dr. Ernesto Ruiz-Tiben and the growing effort to eradicate Guinea worm disease. Her steadfast administrative support continued, eventually becoming the program's office manager. In her roles, she coordinated staff travel and support to overseas consultants, organized international program review meetings and conferences, and made certain the program could function seamlessly. In addition, she helped produce the *GW Wrap-Up*, journal articles, and health education flip charts and archive publications. She also became the resident spatial map maker, for which this publication has benefited greatly. During her tenure, Mrs. McClintic-Doyle earned a Master's degree in health care administration and a Master's in education, both from the University of Phoenix. All her achievements, both in and out of the office, helped inspire everyone who met her. Team Guinea worm misses you already, Renn, though we know your next chapter will bring you the joy and satisfaction you deserve! Thank you!!

RECENT PUBLICATIONS

Kelly-Hope L.A., Molyneux D.H., 2021. Quantifying conflict zones as a challenge to certification of Guinea worm eradication in Africa: a new analytical approach. BMJ Open 11:e049732. doi:10.1136/bmjopen-2021-049732

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, Adam Weiss, and Shandal Sullivan 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