NEWS IN FOCUS

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Men extract a Guinea worm from the leg of an infected dog in Chad, where canine cases are driving the parasite's spread.

PUBLIC HEALTH

Battle to wipe out Guinea worm stumbles

World Health Organization delays target date for eradicating the parasite to 2030.

BY LESLIE ROBERTS

A few years ago, it looked like humanity was about to wipe the debilitating parasite Guinea worm off the face of the Earth. But faced with evidence of previously unknown routes of transmission, the World Health Organization (WHO) has quietly pushed back the target date for eradication from 2020 to 2030.

"We are being realistic and down to earth," says Dieudonné Sankara, who heads the WHO's eradication effort.

So far, humanity has eradicated just one human pathogen: smallpox. The decision on Guinea worm (*Dracunculus medinensis*) is a major blow to the international partnership that has been fighting the parasite since the 1980s. Led by the Carter Center in Atlanta, Georgia, the partnership has reduced the number of new infections from 3.5 million per year in 1986 to just 28 in 2018. The disease now lingers in a handful of Central African nations.

But a series of puzzling discoveries has made the 2020 target impossible to meet. The most urgent issue is the soaring and unexplained, rate of infection among dogs in Chad — which has helped to keep Guinea worm circulating. Then there are the first known cases among people in Angola, perplexing infections ▶

in baboons in Ethiopia, and conflicts that have hampered eradication in Mali, Sudan and South Sudan. Some health experts wonder whether elimination of the parasite is possible.

"The question has been put on the table and has been on some of our minds," says Mark Eberhard, a retired parasitologist and member of a WHO advisory group whose job is to certify when Guinea worm is finally gone. He says that the dog cases suggest that eradication will be very difficult — if not impossible.

But Donald Hopkins, the tropical-medicine specialist who has led the Guinea-worm effort from its outset, is unwavering. "I am confident we will be able to wrap it up," says Hopkins, a special adviser at the Carter Center.

Guinea worm afflicts the poorest of the poor. There is no drug to treat it, and no vaccine to prevent it. People contract the parasite by drinking water that contains microscopic water fleas that carry Guinea-worm larvae. A year or so later, a worm 60 to 90 centimetres long erupts through the skin on the leg or foot. Its painful exit from the body can take weeks.

To relieve the burning sensation, many people wade into the nearest body of water. When an adult worm enters the water, it releases larvae, and the cycle starts anew.

For decades, parasitologists thought that this was the only route of transmission, and that the worm infected only people. Researchers devised a plan to eradicate the disease by teaching people to filter their drinking water and to stay out of ponds if a worm is emerging. Larvicide use complemented these measures.

The World Health Assembly endorsed the strategy in 1986. Experts thought that they could wipe out Guinea-worm disease because the parasite was not known to circulate in animals, which could help it to survive.

Those assumptions began to falter in 2010, when the disease popped up in people living along the Chari River in Chad after a ten-year absence. The cases were sporadic and dispersed, rather than clustered around contaminated water sources. Stranger still, eradication-programme staff spotted stringy worms hanging from the legs of domestic dogs. Genetic analysis confirmed that these parasites were *D. medinensis*, which had evaded surveillance in Chad for about a decade.

These developments suggested the existence of a route of transmission related to the fishing industry along the Chari River. But after eight years, researchers still haven't pinned it down. "What are we missing?" says Eberhard.

"We are being realistic and down to earth."

The number of new Guinea-worm infections in people has remained relatively constant in Chad, at about a dozen per year since 2010. Yet the number of new cases in dogs has climbed from hundreds in the early 2010s to more than 1,500 this year. "In Chad, it is clear that dogs are driving transmission," Eberhard says. "If we control it in dogs, human cases might go away."

Infected dogs have also been reported in Ethiopia and Mali, but the cases number in the tens and twenties, not the thousands seen in Chad. Researchers aren't sure why Chad has been hit so hard. "It is important that we understand more about the epidemiology of the disease — learn the really key source of infections in dogs," says Sarah Cleaveland, a veterinary surgeon and epidemiologist at the University of Glasgow, UK. She leads a WHO working group that is developing criteria to verify when animals are free of Guinea worm.

The discovery in 2013 of infected baboons in a small forested area in southern Ethiopia also has researchers scratching their heads. So far, scientists have found 15 baboons with Guinea-worm disease. A key question, Cleaveland says, is whether baboons, like dogs, can sustain transmission independently.

Then there is the emergence of Guinea-worm disease in Angola. In April 2018, an 8-year-old girl was diagnosed, followed by a second person and a dog this year.

"How long it has been there and where it came from is anyone's guess," Hopkins says. The parasite might have been lurking in Angola, or it could have hitched a ride into the country in a person or a dog. Scientists are looking for clues by sequencing DNA from Guinea-worm samples taken in Angola. The Carter Center is setting up surveillance in the country, and the WHO is working with the government of Namibia to scour its border with Angola for signs of the disease.

The WHO's new 2030 eradication target is intended to allow time not only to stop the transmission of Guinea worm, but to verify that the disease has gone. Doing so requires three or more years without an infection in a person or animal.

David Molyneux, a parasitologist at the Liverpool School of Tropical Medicine, UK, and a member of the WHO commission that will certify eradication, wonders how scientists will ever be sure that the worm has been vanquished. "Our job is to work out how you might certify a country the size of Chad free of dracunculiasis in humans and dogs. Can we ever envisage that level of surveillance?" he says.

He is pushing for a plan B in case wiping out Guinea worm proves impossible — and says that the world should celebrate what the eradication effort has already accomplished. "It has stopped millions of people from becoming disabled," he says.

But Hopkins is steadfast. "The daunting thing about eradication is there is no wiggle room," he says. "Zero is zero." ■

DATA PRIVACY

Facebook research hits a snag

Sharing user data with external social scientists proves technically difficult.

BY ELIZABETH GIBNEY

A pioneering research initiative designed to allow independent scientists to access Facebook data has run up against a major snag over privacy.

The project's goal was to enable academic researchers to study how social media is influencing democracies — and to establish a model of collaboration that would allow scientists to take advantage of tech companies' rich troves of data. But the funders backing the initiative are considering ending their support for the project because privacy issues have prevented Facebook from providing scientists with all the data that they were promised — and it's not clear when these might be made available.

Academic scientists are keen to get their hands on data from tech giants to conduct independent analyses, as concerns about misinformation on social-media sites plague political processes worldwide. The US-based research initiative — called the Social Media and Democracy Research Grants programme, launched in cooperation with Facebook last July — funded 12 projects that were designed to investigate topics such as the spread of fake news and how social media was used during elections in Italy, Chile and Germany.

But problems with the data quickly emerged: Facebook has been able to share some information with researchers, but providing them with more sensitive and detailed data without compromising user privacy proved technically more difficult than project organizers expected.

Last month, the eight charitable funders supporting the project gave Facebook until 30 September to provide the full data set; otherwise, they would wind up the programme.