

► 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.

Since the funders' statement, Facebook has released a further data set, but not the full range. Now that the deadline has passed, the Hewlett Foundation, one of the charities, says the group is assessing the next steps and determining which research proposals can be accomplished.

Other partners that have spent a year working with Facebook on data-sharing solutions say they are continuing their efforts to build a computing infrastructure that allows the company to share its data with researchers, irrespective of the funders' decisions. The partners will continue to release data sets in the coming weeks, and Facebook has more than 30 people working on the project, says Gary King, a social scientist at Harvard University in Cambridge, Massachusetts, and co-founder of Social Science One. This non-profit foundation was set up to act as a 'data broker' between Facebook and the researchers on this project and future initiatives. "To learn about societies, we must go to where the data are," says King. He says that the model his team is implementing is the only one plausible for collaborations with technology giants.

A spokesperson for Facebook told *Nature*: "This is one of the largest sets of links ever to be created for academic research on this topic. We are working hard to deliver on additional demographic fields while safeguarding individual people's privacy."

#### DATA SHORTCOMINGS

At issue is the amount and type of information that Facebook has been able to give external researchers. Data sets released so far, for example, include 32 million links, or URLs, each of which has been shared publicly by at least 100 users. These include some valuable information, such as ratings of a page's trustworthiness from third-party fact-checking sites. But the company had promised researchers around one billion links, including those largely shared privately, where fake news tends to circulate, says Simon Hegelich, a political data scientist at the Technical University of Munich in Germany. His team is studying misinformation during Germany's 2017 election. "My impression is that, at least for our project, the data that Facebook is offering is more or less useless," he adds.

Sharing data with researchers without compromising user privacy required new infrastructure. Social Science One and Facebook built a secure portal that connects to Facebook's servers and uses a mathematical technique known as differential privacy, which adds noise to the results of analyses that prevents users from becoming personally identifiable. Social-media data, although less sensitive than medical information, bring extra privacy challenges because they are connected to a person's real-world behaviour, so even if they are anonymized, it is relatively easy to identify individuals, says Jake Metcalf, a technology ethicist at the think tank Data & Society in New York City who is on the team conducting ethical reviews for proposals to the scheme. "It's a very challenging model to achieve," he says. ■



Ethiopia's highland waterfalls, where the Blue Nile begins.

#### WATER

# Nations clash over giant Nile dam

*Egypt says the Grand Ethiopian Renaissance Dam will cause water shortages — but Ethiopia stands firm.*

BY ANTOANETA ROUSSI

Environmental scientists representing Egypt, Ethiopia and Sudan are at the heart of an increasingly bitter dispute over Africa's largest hydroelectric dam, which Ethiopia is building on the Nile.

The countries' researchers met in Sudan's capital, Khartoum, ahead of a conference of water ministers on 4–5 October. The dam's environmental impacts, especially on water supplies in Egypt, topped the agenda. But the ministers' meeting ended without resolution and Egypt is now calling for the United States to become involved. Ethiopia opposes this.

Egypt is concerned that Ethiopia is moving too fast to complete the Grand Ethiopian Renaissance Dam, and that its timetable will create water and food scarcity and put millions of Egypt's farmers out of work. Ninety per cent of Egypt's fresh water comes from the Nile, which runs south to north from Ethiopia's highlands, the main source of the tributary called the Blue Nile.

Ethiopia counters that the project, which is 60% complete, is essential for its electricity needs and is a matter of national sovereignty — not something Egypt can interfere with.

According to the World Bank, 66% of Ethiopia's population is without electricity, the third highest proportion in the world. At its peak, the dam is expected to produce 6.45 gigawatts of electricity.

Ethiopia's government also says that its plan will enable countries to its north to cope more effectively with the effects of climate change. At present, unpredictable dry and wet weather in the Nile Basin — caused in part by climate change — is contributing to intermittent floods and water shortages. Ethiopia's plan will even out Nile water flow, making such events less likely, says Seleshi Bekele, Ethiopia's minister of water, irrigation and energy.

The three countries involved have established an independent expert panel, the National Independent Scientific Research Group, to help find a way forward.

#### STARTING SCHEDULE

When the dam will start operating depends on how quickly its main reservoir can be filled from Nile water, and this is central to the dispute. The reservoir provides the store of water that is used to drive turbines and generate electricity. Ethiopia wants the reservoir to be filled over 5 years, with 35 billion cubic ►