



Every last trace

How do you wipe a disease off the face of a planet, asks Meera Senthilingam

ON 12 October 1977, Ali Maow Maalin, a 23-year-old hospital cook in the city of Merca, Somalia, embarked on a journey that would both change his life and mark a moment in history. He encountered a driver in need of directions, and ended up joining him and his passengers to help guide them to their destination, just 15 minutes away.

The passengers were two children. He saw they had rashes and bumps on their face but thought nothing of it. Had he realised the nature of the place he was directing them to, he might have thought twice. A few months earlier there had been an outbreak of smallpox in a nomadic community north of Merca, and

health officials were sending suspected carriers to an isolation camp in the hope of stamping out the disease.

That is where Ali was now headed. Afraid of needles, he had never been vaccinated against smallpox. Ali's 15 minutes of kindness was enough to leave him infected with it – although unlike millions before him, he recovered. His was the last ever case of smallpox.

Smallpox remains the only human disease to have been deliberately eradicated from the face of the Earth. Defined as the complete and permanent reduction of a disease to zero new cases at a global level, eradication is a



smallpox remain a solo success?

This question has become particularly pressing with the recent resurgence of polio, declared a target for eradication in 1988. Health workers had seemed on course to meet their deadline of stamping it out by 2018. At the start of last year, polio was endemic in just three countries – Pakistan, Afghanistan and Nigeria – meaning the virus was circulating in their populations without being introduced from outside. However, the recent civil conflict in Syria means polio is now surging through the Syrian population as well as that of neighbouring Iraq. In the past six months, cases of polio have also cropped up in Ethiopia, Somalia, Equatorial Guinea and Cameroon. Last month, the World Health Organization (WHO) declared polio a public health emergency of international concern.

Smallpox proved that it was possible to eradicate a disease. Why is polio proving so tricky? And might some of the other scourges of our time, from malaria to measles, perhaps even HIV, one day be similarly squashed?

“When smallpox succeeded, there were masses of people saying this disease and that disease could be eradicated – it became ridiculous,” says Donald Hopkins, who directs health programmes at the non-profit Carter Center in Atlanta, Georgia. The reality is that although many diseases have been discussed as potential targets for eradication, only three have ever been formally targeted on a global scale: malaria, dracunculiasis (also called guinea-worm disease) and polio. Malaria was set as a target for eradication four years before smallpox, but early setbacks such as insecticide resistance stalled progress. Its eradication could soon be back on the table, but until then, efforts against dracunculiasis and polio are all we have at this level.

Even these two campaigns are starting to lag. “Smallpox was quick once decided,” explains Dina Pfeifer, programme manager for vaccine-preventable diseases and immunisation at the WHO. “We are suffering fatigue today because some efforts are taking a long time.”

When the campaign to eradicate dracunculiasis was launched, it seemed a relatively easy target: the parasitic guinea worm was confined to limited regions of Asia and Africa, and simply supplying clean drinking water could, in theory, wipe it out.

People who drink water contaminated with the parasite’s larvae develop a painful blister on their lower leg or foot about a year later. They often try to relieve the pain by dipping their leg in water, which induces the mature

challenge to say the least. Even more impressive is the speed with which it was achieved. In 1967, smallpox was responsible for 1.5 million deaths; 10 years later it was gone – although the official declaration came in 1980.

Health benefits aside, there were also sound economic reasons for wiping out the disease. Treating and vaccinating against smallpox, and its impact on the economic productivity of the people who contracted it, cost the world an estimated \$1.5 billion each year in the mid-1970s, yet the total cost of the eradication programme was just \$300 million. So, more than 35 years on, why does



Ali Maalin’s was the last ever case of smallpox. He used his survival to champion an end to polio

female, lurking in the blister, to burst out and release her larvae. “It’s a disease that no textbook can prepare you for,” says Hopkins. He has been running the WHO’s eradication campaign since 1986, and was heavily involved in the fight against smallpox before that.

In 1980, at the outset of the dracunculiasis campaign, there were 3.5 million cases of the disease in 21 countries. In 2013, there were just 148 cases reported – in Chad, Mali, Ethiopia and South Sudan. “Theoretically, it could be gone by 2015,” says Hopkins, who claims to be immune to pessimism – an important trait when fighting a tenacious disease. Two deadlines for eradicating it have been missed: one in 1995, another in 2005.

Million dollar search

Often the closer we are to wiping out a disease, the harder it gets. Public health teams can’t easily access the remote rural areas harbouring the last pockets of guinea-worm infection, assuming they even know where these are. When they do reach them, they may have just one or two cases to deal with, making it a very expensive enterprise for scant returns. “A million dollar search in Guinea found only one case,” says Sandy Cairncross at the London School of Hygiene and Tropical Medicine, who helped fight the disease in West Africa in the 1990s. Even some at the Carter Center are alarmed at the costs, but it is important to continue the fight, Hopkins insists. “If you leave it now, it will come back and spread.”

This is precisely what is now happening with polio. A war zone, as much of Syria has become, is the perfect setting for such an

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