

# Donald Ainslie Henderson

## (1928–2016)

Epidemiologist who led the effort to eradicate smallpox.

In the mid-1960s, smallpox was rampant in 31 countries in sub-Saharan Africa, Brazil and southeast Asia. Globally, between 10 million and 15 million cases were occurring each year, and one-third of those people were dying. Smallpox vaccines were of poor quality and attempts at disease surveillance wholly inadequate. In 1966, the World Health Assembly, the decision-making body of the World Health Organization (WHO), resolved to eradicate the disease. (A similar resolution had been passed in 1959, but it accomplished little, mainly because of a lack of funds and leadership.)

At the age of 38, Donald Ainslie Henderson became the head of the WHO's smallpox eradication programme. He was a revered leader for many of the 150,000 pox-warriors who marched until the last natural case of smallpox was diagnosed on 26 October 1977.

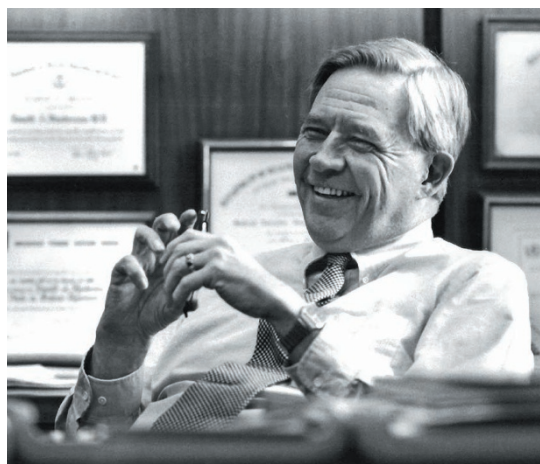
Henderson, who died on 19 August, was born in Lakewood, Ohio, in 1928 to an engineer and a nurse. He went to Oberlin College in Ohio and trained in medicine at the University of Rochester in New York, where he wrote a prizewinning paper about the 1832 epidemic of cholera in upstate New York.

In 1955, he joined the US Communicable Disease Center (now the Centers for Disease Control and Prevention, or CDC) where he was mentored by Alexander Langmuir. Langmuir had founded the Epidemic Intelligence Service (EIS) — in part to help the United States respond to biological threats. He was a demanding boss, advocating an on-the-ground approach, or “shoe leather” investigations and the importance of surveillance.

Henderson was appointed chief of the EIS programme, and later, chief of the CDC's surveillance section. In the lead-up to the 1966 WHO resolution, he'd been putting together a combined smallpox-eradication and measles-control programme involving 18 African countries. His leadership on this project resulted in him being assigned to the WHO's smallpox eradication programme.

Henderson set the vision of “smallpox zero”. Faced with poor communication, civil wars, natural disasters and WHO bureaucracy — and before the existence of computers, mobile phones or fax machines — he had little choice but to delegate authority. And he was masterful at doing so.

The pox-warrior army included 812 staff from 73 countries. At the four-room nerve



centre in Geneva, Switzerland, there were never more than ten staff members. The in-house rule was that all requests and letters had to be answered within two days. Realizing how important communication would be to the success of the effort, Henderson distributed more than 230 technical reports to keep the people involved in the programme abreast of developments. He even persuaded the WHO's *Weekly Epidemiological Record* to publish concise updates on smallpox incidence, problems and solutions. (Previously the bulletin had provided case totals with little interpretation or guidance.)

In 1967, Bill Foege, a CDC-trained missionary, showed in eastern Nigeria that vaccination of anyone who could have been exposed to the virus rather than whole populations could stop disease transmission. This ‘ring’ vaccination, the single-mindedness of fieldworkers and the concurrent invention of a two-pronged needle to simplify the vaccination procedure changed the course of the disease.

Outwardly, Henderson was very confident and optimistic about the eradication of smallpox — even when a helicopter and team members were captured by rebels in Ethiopia, civil war broke out in Pakistan, thousands of cases were discovered in Somalia, and the related human monkeypox surfaced in Zaire.

The public-health impacts of the smallpox-eradication programme are inestimable. In 1974, the WHO created an Expanded Programme on Immunization to roll out vaccination campaigns for other deadly infectious diseases. Henderson considered this to be the most important public-health legacy of the smallpox eradication programme.

In early 1977, when smallpox was endemic only in Somalia and the end was in sight, Henderson still had major careers ahead of him. He became dean of the School of Public Health at Johns Hopkins University in Baltimore, Maryland, a post he held for 13 years. He went on to serve in the US president's Office of Science and Technology and then in the Office of the Secretary of Health and Human Resources in Washington DC.

Then, in 1998, Henderson founded the Johns Hopkins Center for Civilian Biodefense Strategies (now the Center for Health Security at the University of Pittsburgh Medical Center in Pennsylvania). He was prescient. When anthrax spores were mailed to congressional and media

offices after the 11 September attacks in 2001, Henderson was called on to give advice on bioterrorism preparedness. As concerns over global bioterrorism increased, he was asked to head the new Office of Public Health Emergency Preparedness.

D.A., as he was known since childhood, was tall and would command an audience with his stentorian voice. With ebullient hospitality and kindness, he and his wife Nana (an Oberlin classmate) welcomed scores of pox-fighters and friends to their home in Geneva, often with a steak on the grill and glass of single-malt whisky in hand.

In the policy world, he was not without controversy. He was sceptical of overly ambitious disease-eradication programmes. And to the end, he advocated strongly for getting rid of all remaining samples of the variola virus that causes smallpox. That view accords with the recommendations of a 1986 WHO advisory committee, and was supported by several national microbiological societies and many countries, but has not been supported by the US and Russian governments in periodic votes at the World Health Assembly.

When asked what should be eradicated next, D.A. would often respond, “bad management!” ■

**Joel Breman** is senior scientist emeritus at the US National Institutes of Health in Bethesda, Maryland. He first met Henderson in 1967, before leaving for Guinea to work on the CDC-supported smallpox-measles programme. He later worked with him on certifying global eradication and on poxvirus research. e-mail: bremanj@mail.nih.gov

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