

One of the greatest achievements of 20th-century medicine was the global eradication of smallpox. The disease is one of the most devastating known to mankind. In 1967, it was estimated by the World Health Organization (WHO) that two million people died of smallpox that year. Smallpox is caused by the variola virus and is most often transmitted by inhaling the virus. It has an incubation period of between 7 and 17 days, after which symptoms begin to appear. The initial symptoms are flu-like. A significant feature of the disease is the development of blisters on the upper part of the body, which eventually scab over and leave scars when the scabs fall off. Around 30 per cent of those infected with smallpox die, usually within two weeks of symptoms appearing. The first attempts to control the disease used a technique known as variolation. Dried scab tissue from victims of smallpox was used to deliberately infect young people. Of those infected by variolation, one per cent died, far fewer than the 30 per cent killed by infection in the normal way. Despite the risks, variolation was still used in some remote communities until relatively recently. However, it was the discovery of vaccination by Edward Jenner in 1796 which marked a major step forward in controlling the disease. Vaccination involves the administration of a preparation that allows the body to develop resistance to a disease without having to be exposed to it. By infecting children with cowpox, a relatively minor disease, Jenner found they developed immunity to smallpox. By 1853, infants in the UK were required by law to be vaccinated against smallpox, though the vaccines used were not always effective. Further advances were made in the 1920s with the development of dried vaccines in France and the Netherlands. These were more effective but were difficult to store in hot climates. An outbreak of smallpox in New York City in 1947 led to the development of a freeze-drying technique which meant the vaccine could be stored for months without refrigeration, even in tropical climates. In 1966, the WHO set a ten-year goal for the eradication of smallpox worldwide. Considerable resources were devoted to the development of mechanisms for reporting and monitoring the disease. Improved technology and better vaccines also helped. By 1980, the WHO could formally declare smallpox eradicated worldwide. The last naturally occurring case was reported in 1977, in Somalia. The last fatality was in the UK in 1978, following the escape of the virus from a research lab. It was the first time a human infectious disease had been completely eradicated. Smallpox was no longer a killer of humanity. Smallpox has a number of unique characteristics which made its eradication possible. Its symptoms develop quickly, making those infected aware of the disease at an early stage and reducing the possibility of them unknowingly transmitting the disease to others. Because it is almost completely specific to humans, there is a very low possibility of smallpox being kept alive in animals to reinfect humans. The availability of effective vaccines was also a necessary factor. Finally, the high level of mortality from the disease made it easier to achieve global agreement on its eradication. Although smallpox has ceased to kill, it remains a potential danger to humanity. Though the possibility of the virus surviving in animals is very low, it is still a possibility. So, too, is the accidental release of material traditionally used for variolation in remote communities. However, the most pressing fear is that stocks of the variola virus set aside for research purposes could some day be used as a biological warfare agent. The proposal, in 2003, to inoculate health care staff in some countries against such a possibility shows that the potential of smallpox to kill remains as strong as ever.