

TENTH ANNIVERSARY OF SMALLPOX ERADICATION

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On 26 October 1987 the world was 100% free of smallpox for 10 years. This tenth anniversary is one of the most important health milestones achieved in the twentieth century.

These 10 years have proved incontrovertibly that smallpox *has* been eradicated, and that *no* other poxvirus has replaced it. In the meantime, millions of deaths, cases of blindness, and cases of disfigurement per year have been prevented, and some US\$1,000–2,000 million, urgently needed for other health purposes, have been saved each year as a result of eradication.

Smallpox was a common disease in most countries of the world until the early twentieth century. It claimed countless victims and severely handicapped or blinded many of those who survived. As long as it remained endemic in any country, there was a continuing threat of it being introduced into other countries anywhere in the world. It was from awareness of this threat that there arose the idea of an intensified, coordinated global effort leading gradually from control of the disease to worldwide eradication.

The ravages of smallpox have been one of the preoccupations of the World Health Organization (WHO) since its first session in 1948, when the World Health Assembly singled out the disease and put great emphasis on its control. In 1958 the Soviet delegation proposed a resolution calling for a global smallpox eradication program, and this was adopted by the World Health Assembly a year later. Although progress was made in a number of countries in the years that followed, the disease was still endemic in 31 countries with a total population of over a billion people in 1967, the year that WHO launched its Intensified Smallpox Eradication Program.

Step by step the disease was pushed back. The last known case in West and Central Africa occurred in June 1970, in Brazil in April 1971, and in Indonesia in January 1972. South-East Asia posed many difficult problems, but as a result of extensive educational and vaccination campaigns, and with increasing emphasis on surveillance and containment, the disease slowly retreated. One of the largest programs was carried out in India, with its population of 600 million and a long history of smallpox. Nevertheless, it was in Bangladesh that *vatiola major*, the most severe form of the disease, made its last stand. Despite control activities being hampered by disasters that included war, floods, and mass population movements, the last case there was reported in October 1975.

Final Victory

From Asia the focus of attention then shifted to East Africa, and after 1976 the endemic foci were confined to the Horn of Africa. In the Ethiopian Ogaden Desert, variola minor—the milder variant of smallpox—proved to be remarkably tenacious; nevertheless, the last case there occurred in August 1976; and in Kenya the last case, due to an importation, occurred at the beginning of 1977.

In the spring of 1977, smallpox spread widely through southern Somalia, which became the last stronghold of the disease. However, large-scale emergency efforts succeeded quickly, and the thousand-year-old chain of transmission was interrupted in the town of Merka, in southern Somalia, where the last case was detected in October 1977. Ali Maow Maalin, a 23-year-old hospital cook, received the dubious distinction of having the last-known case of endemic smallpox in the world.

Ten years, nine months, and 26 days had elapsed from the beginning of the Intensified Smallpox Eradication Program until this last case in Somalia. But the program staff kept up the hunt for any possible further cases.

Then, in August 1978, the disease made a totally unexpected reappearance. As the result of a laboratory accident in Birmingham, England, two further cases of smallpox occurred, one of which proved fatal. Since then, even though WHO announced a reward of US\$1,000 for the report of any new case that could be confirmed as smallpox, no cases have been found, and so the reward has not been paid.

WHO had earlier established 21 international commissions and the Global Commission for the Certification of Smallpox Eradication as watchdogs. These have verified and certified as being free from smallpox all countries reporting cases between 1967 and 1977 as well as those countries at special risk of importations.

In December 1979 the global commission solemnly declared that smallpox eradication had been achieved throughout the world, and that there was no evidence smallpox would return as an endemic disease. That declaration was certified at an epoch-making session of the Thirty-third World Health Assembly on 8 May 1980. This put the official stamp of approval on the most outstanding achievement in international public health: the eradication, for the first time in history, of a major disease.

Even then the job was not quite finished. It was necessary to convince the world community that the disease was gone forever, and to ensure that every advantage was taken of the benefits of this achievement. The Organization mapped out its “insurance” policy focusing on the main goal: safeguarding public health by maintaining the

world permanently free from smallpox. Every report of suspected cases of smallpox was treated as a public health emergency and properly investigated. Not one has proved to be smallpox.

Since 1984, variola virus has been confined to glass vials kept under high security in two WHO collaborating centers. Both centers are inspected periodically by WHO experts in microbiological safety. The culture of variola virus has ceased at both laboratories, and neither facility has plans to resume it.

In order to free the world from the need for vaccination regulations, national health authorities demanded that a smallpox vaccine reserve be kept in case of unexpected emergencies. Such a reserve stock has been maintained by WHO since 1980; this would be sufficient to vaccinate about 200 million people.

By 1985, all WHO Member States had discontinued routine vaccination against smallpox. No country in the world now officially requires a certificate from international travelers, and most countries no longer vaccinate even their military personnel against smallpox. WHO hopes that the remaining countries may elect to do likewise, since vaccination of military personnel involves risk for both the vaccinees and their contacts.

Because of its close clinical resemblance to smallpox, human monkeypox became an important disease for surveillance. Since 1970, more than 400 patients suffering from monkeypox have been recognized in seven African countries. Most of these monkeypox cases have occurred in small, remote villages in the tropical rain forest. Despite intensified surveillance, however, human monkeypox is viewed as an infrequent and sporadic zoonosis that poses neither significant health problems nor a challenge to smallpox eradication.

Benefits of Eradication

The first and most important result of eradication is the prevention of human tragedies and suffering. Back in 1967, an estimated two million people died from smallpox each year and 10 to 15 million more were affected. The suffering, disfigurement, blindness, and bereavement that the world has been spared since the disease was stamped out are incalculable.

During the thirteen-year eradication campaign (1967–1979), the international contribution is estimated to have been about US\$98 million. The endemic countries probably spent twice this amount—about US\$200 million. So it is safe to suppose that a total of about US\$300 million were spent on eradication activities, an average of US\$23 million a year.

In contrast, adding together the costs of vaccine production, maintenance of routine vaccination, patient care and treatment, loss of productivity, maintenance of surveillance and quarantine services, emergency activities, and so forth, it seems clear that smallpox had been costing the world between US\$1,000 million and US\$1,500 million a

year. Since eradication, that annual burden represents a net saving. So in economic terms, the smallpox eradication program is likely to prove one of the best investments ever made in the annals of national and international public health.

The release of funds previously tied up by smallpox could have a massive impact on public health, provided they are diverted to health development programs. National eradication programs have been terminated, but the strengthened capacity for national surveillance has remained. Voluntary workers and members of the public have been sensitized to offer their services for further cooperation with public health services. Perhaps the best dividends are the hundreds of thousands of experienced, imaginative, tireless, and dedicated health workers who have remained in the countries and who serve as a solid base for implementing other important public health programs.

In sum, victory over smallpox has implications that go far beyond one disease. It provides an outstanding example of what can be achieved when countries throughout the world join together in a common cause. It reasserts human ability to change the world for the better. And it creates a firm, strong impetus toward Health for All by the Year 2000.

Source: Revised version of the article by Z. Jezek, *Ten Years without Smallpox*, WHO Features (No. 112), World Health Organization, Geneva, 1987.

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STATUS OF MALARIA PROGRAMS IN THE AMERICAS

Introduction

Malaria in the Americas, as a general health problem, became worse in 1986 than it had been previously, as demonstrated by an increase in the annual parasite incidence and a contraction of the control program coverage (expressed as a smaller number of housing units protected by insecticide applications).

Several countries showed concern about a rise in malaria mortality, particularly in regions where *Plasmodium falciparum* was prevalent. Overall, malaria persisted or became more intense in areas where it had already existed, while its transmission resumed in previously disease-free areas. Moreover, the disease retained its predominant role in the countryside, where housing and living conditions were primitive, and impaired the population's farming, ranching, fishing, mining, and other activities.