When WHO hit the jackpot

The total cost, over 13 years, of wiping out smallpox was US $200 million. The consequent savings to the world since the late 1970s can be estimated at $1,000 million per year!

by John Wickett

In 1796 Edward Jenner discovered that vaccination protected against the killer disease smallpox. In his monograph published in 1801 he predicted that this practice would lead to the annihilation of the disease. Despite the fact that smallpox was one of the most feared killer diseases, it was not eradicated until 1977—just 181 years after his discovery.

Why the delay? In part, it was due to a lack of global coordination and cooperation which was finally provided by WHO. And money too was lacking. As always, economic considerations played a major role.

Even in the 1920s, smallpox was considered an inevitable part of life by most people and it was still occurring all over the globe. However, by the 1950s the more developed nations, that is, those with money to devote to public health measures, had eliminated endemic smallpox. But to maintain their smallpox-free status, they had to remain alert to importations and maintain routine vaccination, control and quarantine measures. This was expensive. The United Kingdom, for example, spent US $3,800,000 controlling outbreaks in 1962-63 following importations, over and above routine costs.

The establishment of the World Health Organization in 1948 provided a forum for discussing the global eradication of smallpox, but it was the Pan American Sanitary Office (PASO) which first decided to support eradication in the Americas and make funds available. PASO spent $11,126 in 1953, apparently the first multilateral expenditure towards eradication. The following year, WHO spent $7,998 on activities associated with smallpox but the global eradication of smallpox and offered 25 million doses of vaccine. Interestingly, the second paragraph of Resolution WHA11.54 referred to: "the economic aspect of the question, which shows that the funds devoted to the control of and vaccination against smallpox throughout the world exceed those necessary for the eradication of smallpox in its endemic foci and consequently the destruction of the sources from which the infection arises and spreads, and clearly indicates that the eradication of smallpox might in future make vaccination and all expenditures involved in its application redundant."

WHO's Director-General reported to the Executive Board in January 1959 that the cost of global eradication would be approximately $97,742,900 (excluding China). This was based on a calculation of 10 US cents per head to vaccinate all 977 million people living in endemic areas. In May 1959, the 12th World Health Assembly adopted the goal of global eradication of smallpox. However, no funds were allocated. A special account was opened in the Voluntary Fund for Health Promotion but this account received only donations of vaccine. Countries were urged to mount vaccination programmes in the belief that 80 per cent vaccination coverage would eliminate the disease. Tangible support was only forthcoming from PASO (which had become the Pan American Health Office (PAHO) in 1958) and from the USSR which gave substantial amounts of vaccine on a
bilateral basis direct to several countries in Asia.

Progress was minimal, despite the conviction that the eradication of smallpox would pay for itself in no more than a few years. Finally, the Intensified Smallpox Eradication Programme was voted a regular budget allocation of $2.4 million by the World Health Assembly in 1966. It was estimated that eradication would take 10 years, from 1967 to 1976, and would cost $180 million, of which $48.5 million (27 per cent) was to come from international assistance (WHO, other organizations and bilateral aid).

In 1967, estimated expenditure from all international sources was $6.5 million, coming primarily from the WHO Voluntary Fund for Health Promotion, the UN Expanded Programme of Technical Assistance, PAHO, USA bilateral support to 19 countries in western Africa, and USSR bilateral vaccine donations in Asia.

Thirteen years later, on 9 December 1979, the eradication of smallpox was certified by a Global Commission. The last case occurred in Somalia on 26 October 1977. Two years of careful verification were necessary to reassure the world that it was safe to terminate routine vaccination. The estimated total cost over 13 years was just under $200 million split equally between international and national inputs.

Was it worth it? Or rather how much was it worth to have done it? Putting a dollar figure to this involves some very sweeping assumptions, but it is interesting to try - at least to get an idea of the order of magnitude involved.

A study was undertaken to estimate the costs associated with the protection of the United States against smallpox in 1968. This was before that country stopped routine vaccination, in 1971. The breakdown was as follows:

- Vaccine administration and treatment of complications (physician and hospital services, vaccines and drugs, surveillance for complications) $93,460,000
- Earnings lost from time off work for vaccination and consequences of vaccination complications $42,196,000
- International surveillance, traffic clearance and time lost waiting for clearance $14,462,000
- Vaccination costing the US $150,118,000 in 1968 for a population of 200,710,000 equals 75 cents a head. This is exclusive of any cost associated with eradication efforts; it is a passive burden. Can we extrapolate and come up with a global figure? Why not. Obviously, the United States is at the top end of the scale; not all countries would be spending 75 cents per person. It seems reasonable though to assume we might pro-rate this amount based on relative Gross National products (GNP) per capita. Erring on the conservative side if any, we can calculate the saving to the nations of the world at the end of 1979 (when the Global Commission certified smallpox eradication) at some $1,000 million per year. So smallpox eradication paid for itself in less than three months, and the annual return on the $200 million investment works out at 500 per cent!

Looked at from another angle, the United States recouped the entire $489,782,640 which it contributed towards WHO's regular budget between 1948 and 1979, in just three years.

An investment in health is always a positive step; a determined investment can bring spectacular dividends. Health is wealth.