CHAPTER 7

ROUTINE IMMUNIZATION/HEALTH SERVICES
The Expanded Programme on Immunization

Immunization – not just against polio, but against a number of vaccine-preventable diseases - is a core part of health services in any country and one of the safest and most effective interventions in modern medicine. The World Health Organization established the Expanded Programme on Immunization (EPI) in 1974 to take vaccination against six target diseases – polio, measles, tuberculosis, tetanus, pertussis (whooping cough) and diphtheria – to the children of the world. At that time, vaccination of some type was already commonplace in some countries, but only 5% of children worldwide had been protected against those six diseases. There had been no coordinated global effort to make vaccination available to all children. The word “expanded” referred to the addition of polio and measles vaccines, which had not previously been part of the immunization programme.

Universal childhood immunization

In 1982, the World Health Assembly resolved that, by 1990, at least 80% of children in the world should be protected against the six diseases targeted by the EPI. That was to occur
by strengthening routine immunization systems in each country, rather than by the use of any mass immunization campaigns. There was no plan, at that time, to eradicate any of those diseases. Vaccines were delivered by regular health services.

The polio eradication initiative was developed with the EPI, and therefore routine immunization against polio, as a background. An integral part of the goal of eradicating polio was that it must be done “in ways that strengthen the Expanded Programme on Immunization, fostering its contribution to development of the health infrastructure and of primary health care.” The (in some ways) narrower goal of polio eradication could not be allowed to interfere with the broad goal of making vaccination against all the EPI-targeted diseases available to all children.

In the Western Pacific Region, the EPI had been established in 1976 and had made remarkable progress by the time, twelve years later, that the Region resolved to eradicate polio. The “universal childhood immunization” target of 80% was probably reached ahead of the 1990 deadline in the Region as a whole. However, there was still more work to be done in many areas where coverage was lower.

Strengthening routine immunization services in the Region was among the less glamorous aspects of the polio eradication initiative, and did not have such clear indicators of success as other parts of the programme. Its legacy may, however, be as valuable as any other outcome of the huge endeavour.

**Measuring immunization coverage**

It is not always easy to determine the percentage of children vaccinated in an area (the immunization “coverage”). The number of children in the target age group is often not known exactly, with many countries having out-of-date and possibly unreliable census data, and no universal birth registration system. The number of vaccinations given is usually reported, but is also often plagued with inaccuracies in recording and transcription as the data are aggregated up to the national level. Therefore, with uncertainty in both the numerator and the denominator, immunization coverage is inevitably somewhat uncertain.

To get a more accurate idea of immunization coverage in a country, a special coverage survey can be undertaken. That is done by asking the caregivers of some children in certain age groups which vaccinations they have received, and checking the information on immunization records if possible. WHO has developed a
standard way of conducting such surveys, using special methods to randomly select the children to be included, in order to ensure that they are representative of all children in the country or area.

Another alternative is a “seroprevalence survey,” which estimates the percentage of the population with antibodies to poliovirus. If wild poliovirus has been absent for long enough, that will be equivalent to the percentage of people who have been exposed to polio vaccine. However, WHO recommends the use of coverage surveys to assess coverage, and serosurveys are not commonly used.

Both coverage surveys and seroprevalence surveys provide a more accurate indication of the true immunization coverage in an area than simply dividing the number of children vaccinated by the total number of children in the target age group. However, they require time and expertise to be carried out and the results can only reflect coverage of previous years, instead of ongoing progress. Countries, therefore, usually use the best information available, without doing special studies, to estimate coverage. Studies are carried out only occasionally, and can be used to check the accuracy of the routine reporting system.

**Routine coverage with OPV during the polio eradication initiative**

**At the beginning**

By 1988, close to 90% of children in the Region as a whole were reported to have been given three doses of OPV through the regular health system. In EPI shorthand, the “OPV3 coverage” was almost 90%. That was a great achievement, even acknowledging that the figures might not be completely accurate. However, the overall high rate of immunization concealed a great deal of variation: there were still areas with very low coverage within the Region in which the poliovirus could continue to circulate.

Most of the non-endemic countries and areas had good OPV3 coverage. The countries with continuing or recent endemic transmission of poliovirus, not surprisingly, had lower coverage. In the Lao People’s Democratic Republic, reported coverage was only 25%, while Papua New Guinea had 43%, Viet Nam 57% and the
Philippines 65%. Cambodia at that time was still not open to the outside world and the immunization rates were unknown, but likely to have been very low. China was the only one of the polio-endemic countries with very high OPV coverage, at 96%\textsuperscript{10}. As the country with the largest population, it would have had a great influence on the overall regional coverage. However, it was in China that a huge outbreak of polio began the following year, showing that there must still have been large parts of the country with low immunity levels.

Effect of the polio eradication activities on routine coverage

One of the initial concerns about supplementary mass immunization with OPV, and about focusing such a great effort on one disease, was that routine immunization might thereby be neglected. The impact of the polio eradication programme on primary health care services had been analysed in the Americas, and both positive and negative effects had been found. However, they would not necessarily apply to the Western Pacific Region, where conditions were quite different. The EPI team at the Western Pacific Regional Office, therefore, carried out an analysis of the trends in routine immunization coverage from 1990 to 1994 in the five recently polio-endemic countries that had carried out national and subnational immunization days\textsuperscript{11}.

Rather than looking at OPV coverage, they investigated the coverage with three other vaccines which were common to all five countries: BCG (bacille Calmette-Guerin, against tuberculosis, normally given at birth); DTP (against diptheria, tetanus and pertussis, given three times in the first year of life); and measles vaccine (given towards the end of the first year of life). Some countries – the Philippines and Viet Nam - had given measles vaccine as a supplementary dose (not recorded on immunization cards and not included in

calculations of routine coverage) during national and subnational immunization days. One country – the Lao People’s Democratic Republic – had given both measles and DTP vaccines along with supplemental OPV to selected children, and had counted those doses towards routine immunization coverage. Therefore, only BCG was considered representative of routine coverage.

In all countries studied, routine coverage either remained high or increased over the period during which supplementary OPV immunization was carried out. No country suffered a significant decrease in routine immunization coverage. In China coverage with each vaccine remained above 90%. In the Philippines it remained above 85%. In Viet Nam coverage for all three vaccines rose from around 85% to 95%.

The most dramatic improvements were seen in the countries with initially low coverage. In the Lao People’s Democratic Republic, BCG coverage rose from 26% to 69%, while measles and DTP coverage also increased dramatically. As BCG was not given during supplementary immunization activities, that indicates that the overall increase in coverage was due in large part to strengthening of routine immunization services and not just to the national and subnational immunization days. Cambodia also saw marked increases in coverage: BCG coverage rose from an average of 54% between 1990 and 1993, to 78% in 1994, while DTP3 and measles coverage rose from 36% to 53%.

The role of routine immunization in keeping countries polio-free

Most countries in the Region – of those that were not polio-endemic, or recently so, at the start of the initiative – maintained control of the disease purely through routine immunization. Wild poliovirus, having disappeared from those countries some time earlier, did not re-establish transmission. We can surmise, therefore, that either it was never brought back to those countries or – perhaps more likely – any virus that was carried back by travellers was quickly stopped from circulating by the high levels of population immunity it encountered, and so was not able to cause any cases of paralytic polio.
Another lesson from Malaysia

The exception was Malaysia, where – as described in the previous chapter - an imported wild poliovirus did manage to circulate to a limited extent, causing three cases of polio. The second major lesson to be learnt – apart from the importance of surveillance, as noted above – was the necessity for routine immunization to be maintained at a high level, and to reach all segments of the population. Overall high coverage figures should not be allowed to mask the existence of underimmunized populations.

In Malaysia, the poliovirus had circulated among a group which had low immunization coverage rates because of its members’ opposition to vaccination. However, after health workers visited them and explained the importance of vaccination and the consequences of failing to vaccinate, many of those parents were happy for their children to receive OPV.

Many other polio-free countries also contained sections of population which were ambivalent about, or actively opposed to vaccination. Those groups needed to be educated about the continuing possibility of reimportation of poliovirus, and the associated risk to susceptible people. Health workers had to take care not to systematically miss certain population groups, whether because of their geographical, social or cultural isolation, perceived opposition to vaccination, or other reasons.

Malaysia’s experience highlighted the need for polio-free countries to maintain high coverage with routine immunization in order to prevent the poliovirus spreading should it be reintroduced, as well as the need for high-quality surveillance to detect any importation rapidly. No country could afford to let its rates of immunization fall, even if polio had not been seen for many years.