

SUMMARY - STATUS OF THE GLOBAL PROGRAMME

by

Dr D. A. Henderson¹

This year, the global programme of smallpox eradication, decided upon by the 1966 World Health Assembly, completes its fourth year. The changes in the extent of smallpox endemic areas, the incidence of smallpox and, in fact, our entire understanding of smallpox as a disease, have all undergone a profound change in this brief period. All of you have played a role in effecting these changes and all of you can take measurable pride in the achievements to date. The achievements in most parts of the world have fulfilled the most optimistic expectations in a way that I would venture to say have rarely been fulfilled in a cooperative international programme of this magnitude. There still remain, however, a number of deficiencies and a few programmes in which progress has been frankly disappointing.

In this introductory review, I shall endeavour to summarize briefly the status of the programme from a global vantage point elaborating as necessary both on notable achievements as well as on the more serious problem areas.

In four years, the incidence of smallpox has declined by over 75%, from a total of 131 000 cases in 1967 to a projected 30 000 cases this year (Fig. 1). During this period, the number of countries reporting smallpox has declined from 42 in 1967 to 21 this year. However, of the 21 countries reporting cases this year, 7, in fact, are non-endemic and the 82 cases which they experienced were attributable to importations.

Based on present progress in the various programmes, it is quite possible that 12 months from now, endemic smallpox will be confined to 6 countries in the world -

¹ Chief Medical Officer, Smallpox Eradication Unit, WHO, Geneva

in Africa, to Sudan and Ethiopia; and, in Asia, to India, Pakistan, Nepal and Afghanistan. However, even in Afghanistan, recent progress suggests that it too might well be smallpox-free a year from now.

The situation with regard to smallpox is indeed changing rapidly in many previously endemic countries. The question is repeatedly asked as to how such changes could occur so rapidly when, for years, many endemic countries had been conducting mass vaccination programmes with only limited success and even in countries employing good vaccine and obtaining satisfactory coverage, rapid changes such as noted during the past four years have not occurred. The principal difference between present and past efforts is one component - "surveillance". In every country where a concerted effort has been made to improve the reporting system and where a concerted effort has been made to investigate promptly and to contain every outbreak - smallpox transmission has been interrupted within two years or less. Such has occurred in many countries of Africa; such is now occurring in South America; and such is the case, for example, in major areas of Indonesia. Overall reporting today is thus considerably more complete and far more prompt than it was in 1967. The 30 000 cases recorded today is much closer to the true number of cases than was the 131 000 cases recorded in 1967.

There are, however, major problem areas where reporting and surveillance are still far from satisfactory. In the Democratic Republic of the Congo, Sudan and Ethiopia reporting has considerably improved this year and reports of cases are now received promptly by WHO. However, comparatively few cases and outbreaks are yet investigated and containment measures are limited. If present plans are implemented as expected, the next 12 months should bring a significant change. In West Pakistan, considerable progress has been made in Punjab Province but activities in the other three provinces leave much to be desired. Plans have been developed to remedy this situation. Reports of smallpox incidence submitted to WHO, however, have been greatly delayed and urgent efforts should be made to streamline the present system of reporting.

I should be less than frank if I did not note regretfully that our principal disappointment this year has been the lack of progress thus far made by India in respect to improved reporting. While in several states, at least, a higher proportion of cases now appear to come to the notice of health authorities, many are never recorded at national level. As yet, unsolved problems in communication appear to exist at all levels. This is not a small problem. For example, in one state which I visited in April, state authorities themselves recorded 1 000 more cases than were recorded at the national level and, of course, 1 000 more cases than have been reported to WHO. This has yet to be corrected. This deficit from a single state, I might note, amounts to fully 14% of all cases recorded in India this year and 4% of the world's total of cases. From several states, no reports have been received for the last 3 to 4 months and, from one state, no reports since January. While it is believed that reporting is not worse than in past years, it appears to be little improved. On the basis of other observations such as admissions to infectious disease hospitals, I believe we can conclude that smallpox incidence in India has declined. Little, however, can be concluded regarding the magnitude of decline and few conclusions can be drawn regarding the relative prevalence of disease in different parts of the country.

As examples of what can be done are the programmes in Indonesia and in Brazil - large countries which experience difficult communication problems of their own and which, at the beginning of their eradication programmes, had a less sophisticated reporting network than is present in other large countries such as India or Pakistan.

I do not mean to belabour unduly the importance of reporting and surveillance but we must bear in mind that unless an effective reporting and surveillance programme is developed, there is no prospect whatsoever for a successful eradication programme.

So much for the overall global situation with respect to smallpox incidence. Let me briefly review the status of the smallpox programmes in the American and African Regions, leaving to Drs Shafa and Oles the task of providing to you a summary of the smallpox situation in the Eastern Mediterranean and South East Asia Regions, regions of immediate concern to this Conference.

In the Americas, Brazil, since 1967, has remained the only endemic country. During the past four years, imported cases and outbreaks have been reported by three other countries but these have been rapidly contained. A programme of systematic vaccination was begun in 1967 but was slow to gain momentum. Last year, the tempo was substantially increased and 20.9 million were vaccinated in special programmes. These efforts were redoubled this year and during the first 9 months, 28% more were vaccinated than during all of last year. Results of the programme have been carefully monitored throughout by sample surveys in what can only be described as a model assessment programme. The systematic programme is expected to be concluded within the next few months. Surveillance activities were begun 18 months ago and have gradually been extended throughout the country. Until recently, reporting consisted primarily of reports from the capital cities and a few interior areas. Perhaps 3% of cases were reported. This has changed radically. Surveillance officers for each state were appointed; reporting centres were designated and weekly reports were requested as to whether or not cases were detected; and field investigations commenced. The immediate effect was a rapid increase in recorded cases as, initially, 30 cases were found during field investigations for every case reported. This year, however, incidence has declined sharply; fewer cases are now found during field investigation as reporting has become both more prompt and complete. The total of cases reported in 1970 will be the lowest in Brazil's history. More remarkable is the fact that surveillance-containment measures have developed to the point that no seasonal increase in cases occurred this year. There is cause to believe that smallpox transmission might well be interrupted within the coming 6 months. However, surveillance efforts both in Brazil and its neighbouring countries will need to be further intensified during the next two years to ensure that no residual foci remain. It is clear, however, that after 400 years of endemic smallpox, the end is at hand.

In West and Central Africa, the programme of systematic vaccination begun in January 1967, has been effectively completed throughout this vast area. A specially intensified surveillance programme was initiated in September 1968 and 12 months later the last cases were believed to have occurred. However, because of the lack of medical facilities and difficulties in transport and communication throughout this vast area, there was real concern on the part of all that the disease might persist

undetected for considerable periods in isolated foci. Intensive surveillance was continued and untold numbers of investigations were conducted of chickenpox and miscellaneous skin diseases which had been reported as suspect smallpox. One such suspect case, however, turned out to be genuine smallpox. The source of infection was traced and this led to a smouldering outbreak in a village over 500 kilometres away. The circumstances of this outbreak will be described to you during the course of the Seminar. The last case, however, experienced onset over 6 months ago.

In the remainder of the African Region, vaccination programmes are in progress in all endemic or recently endemic countries. In most, surveillance activities were undertaken from very early in the programme. To the considerable surprise of the respective health administrators, Kenya, Uganda and Malawi all became free of smallpox before special vaccination programmes were initiated; Tanzania and Zambia became smallpox-free before the halfway point in the vaccination programme was reached. At present, it is believed that Burundi and the Democratic Republic of the Congo remain the only endemic countries in the African Region. Both are now completing systematic vaccination programmes. However, surveillance activities are as yet inadequately developed for various technical and administrative reasons but are now being strengthened. Based on present progress, both countries should be free of smallpox by this time next year. As in West Africa, however, a very alert vigilance will be required for some years to come to detect possible residual foci and to prevent reintroduction of the disease from highly endemic Ethiopia and Sudan. The only area of uncertainty at the moment is Transvaal Province, South Africa, where endemic smallpox has smouldered at a low level for several years. It has been informally intimated however, that special measures have now been instituted and, in fact, no cases have been recorded since July.

In brief, in the two WHO Regions of Africa and the Americas, we believe that we are now approaching the beginning of the end. On the other hand, in the Eastern Mediterranean and South East Asia Regions, the situation might best be described as the end of the beginning.

The use of high quality freeze-dried vaccine coupled with more effective vaccination techniques has undoubtedly played a major role in progress to date. Increasing numbers of vaccine samples are being tested in WHO Reference Laboratories and are being found satisfactory. This year, over 350 lots have been tested and a higher percentage than ever have been found satisfactory. Special congratulations should be extended to the laboratories in Indonesia, East Pakistan and India for their commendable efforts. In support of programmes throughout the world, an increasing number of vaccine donations are being received from all countries, and for 3 years now, ample supplies have been available. The Soviet Union, the largest contributor, has annually contributed more than 130 million doses of vaccine and the USA, more than 40 million doses. Over 20 other countries, however, are also contributing and, I am pleased to announce that a donation of over 30 million doses to be delivered over a four-year period, was received from the Government of Canada.

The bifurcated needle and, to a lesser degree, the jet injector have been universally adopted for use except in a few remaining areas of India and Pakistan where the old rotary lancet method has not yet been abandoned. The savings in vaccine in many programmes have been as much as two- to three-fold; the take rates have considerably improved.

There are many other developments in the programme as well as various research findings of interest. However, I should like to conclude by drawing your attention to three developments of particular interest:

Smallpox Surveillance Reports in the Weekly Epidemiological Record

Every 3 weeks, we are publishing in the Weekly Epidemiological Record a summary report on the current smallpox situation as well as summary accounts of epidemiological findings of interest in various countries, reviews of the status of particular programmes, etc. A special additional printing of each issue is made and with the cooperation of the Regional Office and the respective governments this is now distributed to responsible health staff throughout India and Indonesia. This year, we are, in most instances, recording smallpox cases by country and a special table has recently been developed which shows smallpox by individual districts in India. As smallpox disappears throughout the world, we are able to prepare more detailed tables of smallpox occurrence by Province and by District in other countries to permit those at all levels to be more currently informed regarding the status of smallpox in neighbouring areas. Such tables also permit those at District and State or Province level to verify that reports submitted have been correctly registered. Such information can, of course, be of real value in adapting and modifying at every level, the strategy for direct attack on this disease. This can be useful, however, only if reports from all levels are promptly received and are as complete as possible. If not, the reports are, at best, worthless from the operational standpoint and even potentially misleading.

Smallpox teaching aids

Just received and being distributed here for the first time is a poster showing clinical smallpox and chickenpox on different days of the rash. This is intended, of course, primarily to facilitate clinical diagnosis by health workers at all levels. The pictures were selected from over 3 000 which were taken in Karachi early this year by a WHO team working in cooperation with Government and corporation health officials. Over 100 000 are being printed and will be made available on request. A teaching slide series is also under preparation and a much smaller illustrated card for the use of vaccinators and others in the field is now being planned. Other materials will be prepared depending on needs as seen by field staff.

Teaching problem in surveillance-containment operations

To be introduced for comment and evaluation at this Conference is a teaching problem related to an outbreak of smallpox. We have set aside time for a special seminar employing this problem.

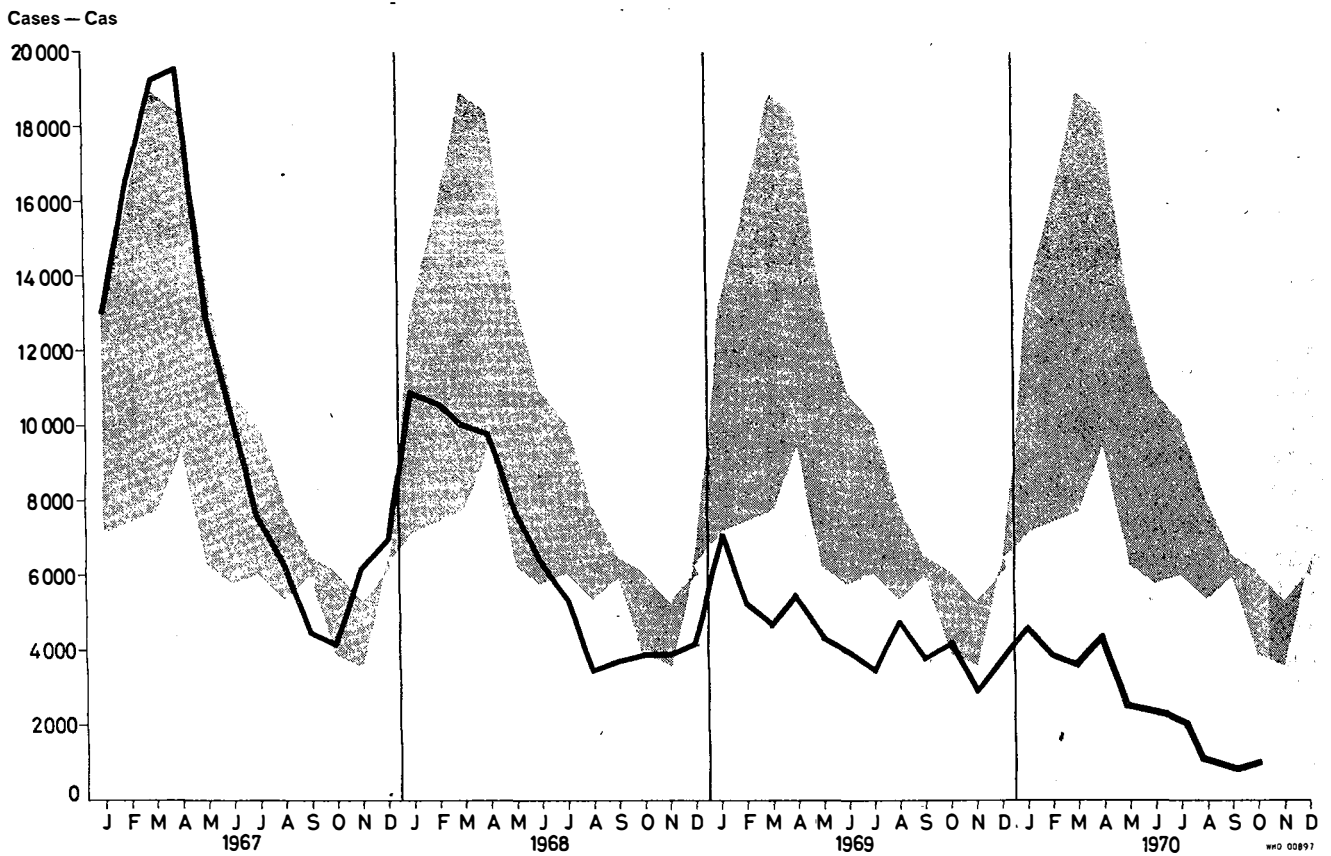
We have to date been discouraged by the poor performance of surveillance and case investigation teams in many areas. Partly, this reflects the fact that this activity has not, in the past, been given priority attention and thus, in some areas, duties of this sort have been relegated to untrained vaccinators or vaccination teams. However, an additional significant problem stems from the fact that classroom training in surveillance-containment operations, even when of good quality, has been comparatively ineffective when measured by standards of subsequent performance.

On the other hand, we have observed that when surveillance officers have been competently trained in the field in the course of actual investigations, the results have been outstanding. To train staff in the field in this manner would be ideal but it is not usually practicable, both because of the lack of suitable outbreaks at the proper time and because of the lack of adequate tutors. We felt that this problem might be solved by bringing the epidemic into the classroom.

It is clear that this Conference could not have been better timed, for we could be, I believe, on the verge of a major turning point in this programme. Why do I say this? During the period of August to November this year, we will record for all of Asia little more than 1 000 cases per month. If we assume conservatively that there are an average of 5 cases in each outbreak - this amounts to 200 outbreaks in an entire month in all of India, Pakistan, Indonesia, Nepal and Afghanistan. How much of an effort by how many persons would have been required to investigate these outbreaks properly and to take really effective containment measures? It is perfectly obvious that we are talking about a comparative handful of people - and after all, this is what smallpox eradication is all about - stopping transmission of infection - reducing the number of cases to "0". While smallpox incidence is now rising and perhaps as many as 2 000 cases may be recorded in the coming few months, I am still proposing but a limited additional effort on the part of a comparatively few people - an effort based on quality rather than quantity - an effort involving tens of thousands of vaccinations of the right people rather than millions of vaccinations indiscriminately performed. During the next 12 months, an effort of this sort could bring us closer to the goal of smallpox eradication than everything we have done in the past four years.

This Conference, as the Bangkok Conference three years ago, could be a real turning point in the global programme of smallpox eradication. Whether it is or not depends almost exclusively on the people seated here in this room.

FIGURE 1
WORLDWIDE SMALLPOX INCIDENCE, 1967 - 1970



The grey area represents the range between the highest and lowest incidence reported during the five-year period 1962-1966.