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SMALLPOX ERADICATION

Report by the Director-General

I. INTRODUCTION

In May 1959 the Twelfth World Health Assembly, in resolution WHA12.54, requested the Director-General "to collect from the countries concerned information on the organization and progress of their respective eradication programmes and to report further to the Thirteenth World Health Assembly".

On 30 July 1959 the Director-General sent a letter to the governments of countries that had reported smallpox cases in the previous three years, asking for the information requested by the Assembly. Ten replies have been received and the information provided by the countries, as well as information received from the regional offices, is presented in this report. Some data have also been obtained from replies to the questionnaire sent out in 1958. There are, however, still a number of countries for which no complete information is available.

II. THE PROBLEM

According to provisional notifications, about 75 000 cases of smallpox were reported officially in 1959 throughout the world (outside mainland China) against not less than 248 000 accounted for in 1958 (see Table 1). This improvement in the world incidence is due to the fall of the incidence in India and East Pakistan where, following the unusually high levels of 1958 (with about 216 000 cases), only 51 000 were reported during the year. However, smallpox incidence has not decreased to a considerable extent outside India and East Pakistan; about 22 000 cases were recorded during the year, against 30 000 in 1958 in Asia (outside India and Pakistan), in Africa and South America.

In ports and towns serviced by an international airport, the highest number of smallpox cases was, as usual, recorded in India (Madras 2129, Cochin 633, Bombay 519 and Delhi 401 cases) and other countries of Asia (371 in Makassar, Indonesia and

341 in Rangoon, Burma) but sporadic cases were also reported in a number of ports and airports of Africa and South America. All cases on board ship or brought by air during the year originated in Asia (see Map I).

The distribution of provisional totals of smallpox cases by countries and territories is shown on Map II.

In Africa about 14 000 cases were provisionally recorded in the continent, excluding Liberia; 1958 statistical returns show a total of about 14 000 cases in Africa outside Liberia where not less than 5000 cases were reported. In 1959 the number of cases decreased in the seven territories of former French West Africa from 6600 to about 5600 but rose in the Belgian Congo from 1200 to 2500. Smallpox cases or outbreaks were recorded in the following areas which were free from the disease during the previous year: British Somaliland, French Somaliland (in the Djibouti area) and Egypt (in Cairo). A single case was also reported at Beira in Mozambique.

Some 3000 cases were recorded in the Americas where the main foci of smallpox are still in Brazil, Colombia and Ecuador. About 1200 cases were recorded in Ecuador and less than 900 in Colombia. In Brazil about 900 cases were reported in the federal district and in 13 out of 20 State capitals for which data are available; of these cases 600 occurred at Belo Horizonte, capital of the State of Minas Gerais. A case was reported in the northern part of Chile. This country was apparently free from the disease for the last five years. It should be noted also that Mexico, Peru and Venezuela, which formerly had a high incidence, have reported no cases of the disease in recent years - a fact undoubtedly due to the eradication campaigns conducted in those countries. In Bolivia, Paraguay and Colombia, the number of reported cases has been decreasing as a consequence of vaccination campaigns being developed.

In Asia the total number of cases fell in India from 168 000 to about 45 000. The highest incidence was recorded in Orissa (about 8000 cases or 55 per 100 000 population - see inset, Map II), 5000 cases were notified in West Bengal, and about 4000 in each of the States of Madhya Pradesh, Andhra Pradesh and Madras. In Pakistan the number of cases was below 6500 in East Pakistan against 48 000 in 1958.

In Thailand, smallpox appeared in July 1959 in the southernmost provinces (Pattani and Yala) and accounted for 1548 cases, of which 1103 occurred in Pattani Province. The disease also spread to the Federation of Malaya (States of Kelantan and Trengganu). An outbreak (10 cases) occurred in Singapore in April. Smallpox was also reported in Kuwait (eight cases) where the disease was absent in 1958.

No report on smallpox has been received during the year from Yemen. However, the presence of imported cases notified in Aden Protectorate would suggest that the disease was present in the southern part of Yemen.

In Europe, imported infection accounted for nine cases at Heidelberg in Germany in January. One case, imported by air from India, was reported in East Berlin. A single case was reported at Liverpool, United Kingdom.

In the USSR, a single case was notified at Termez in the Uzbekistan SSR.

### III. EFFORTS TOWARDS ERADICATION

The programme of smallpox eradication is based on two fundamental elements: the availability in the countries concerned of a potent vaccine - potent at the moment of its inoculation - and the existence of a technical and administrative organization able to take all the necessary steps to apply this vaccine where and when it is necessary and able to provide adequate epidemiological intelligence and international quarantine measures. To this effect, WHO has continued to assist Member governments who request this assistance in the planning and organization of the different aspects of the eradication programme. Regional offices are responsible for the development and co-ordination of the eradication programmes in their respective areas. The Organization has provided technical advice on the production of freeze-dried smallpox vaccine of high quality and stability, has awarded fellowships to professional and technical personnel of vaccine production laboratories to study the techniques of freeze-dried vaccine production, and has also assisted some countries in obtaining vaccine ready for use. The services of an accredited laboratory are provided to test the purity and potency of vaccines produced by national laboratories.

WHO has offered the services of consultants to advise Member governments on the organization and operation of eradication programmes.

South-East Asia, Africa and the Eastern Mediterranean Regions still remain the more important endemic areas. Efforts are being made to plan and co-ordinate effective eradication schemes in these areas. Difficulties are, however, great, especially those related to recruitment and training of the advisory personnel, the acquirement of essential transportation equipment and, in particular, the whole technical and administrative organization to carry out an effective campaign.

A summary of the status of smallpox eradication activities in countries where smallpox cases were reported in the last three years is given below, by region.

### African Region

In 1959 this region organized a regional conference on smallpox eradication; it was attended by participants from 20 countries in the African Region and from one country in the Eastern Mediterranean Region, as well as by observers from CCTA and some national institutions. The objectives of the conference were to enable participants to exchange views on the epidemiology of smallpox in Africa, to examine the prevailing situation in the different countries of the Region, to compare practical experiences with regard to problems of smallpox control, to consider the results and progress achieved and, finally, to study and formulate criteria applicable to mass campaigns directed to the eradication of the disease from the Region. The conference made possible the collection and exchange of a great amount of information on the situation of the smallpox problem in the Region and enabled a basis to be laid for national eradication programmes and for co-operation between the countries in developing these programmes. Recommendations were produced on the different aspects of an eradication programme. It was recognized that for most of the African countries international assistance will be required in order to develop successful eradication campaigns. The participants will work out detailed plans in the immediate future.

The status of the problem in countries of the Region is as follows:

#### Bechuanaland

Smallpox vaccination is widely practised in this Protectorate. No personnel is detailed specifically for smallpox vaccination but all hospital and public health units offer vaccination, and health personnel undertake vaccination on district visits.

Freeze-dried vaccine has been used recently in areas removed from centres where refrigeration is available. As a consequence of this vaccination programme, no autochthonous cases of smallpox appear to be present in this area although some imported cases have occurred.

#### Belgian Congo and Ruanda-Urundi

An intensive vaccination campaign is continuously being carried out in the Belgian Congo and Ruanda-Urundi. It is estimated that about 50 per cent. of the population is vaccinated or revaccinated each year. The territory is divided into 300 sectors, each in the charge of a medical officer who is responsible for the vaccination of his sector. About 4 400 000 vaccinations were carried out in 1958 and a similar number in previous years.

#### Cameroons

Systematic vaccination campaigns have been carried out in the Cameroons for several years. However, some cases of smallpox still occur every year. The health authorities would be willing to initiate an eradication campaign if assistance can be provided.

There have been no smallpox epidemics starting from endemic foci in the Southern Cameroons. Mass vaccination campaigns are organized yearly by medical officers in the areas under their control and in this way the more accessible areas have been protected. There are, however, some remote areas which have not been covered, partly due to their isolated location and to shortage of health personnel. Assistance would be needed to carry out a vaccination campaign in these areas to eradicate smallpox.

#### Former French Equatorial and French West Africa

For many years mass vaccination campaigns have been systematically carried out in these areas, about 8 000 000 vaccinations being performed each year for a total population of about 28 000 000. However, in spite of these efforts, and possibly due to the dispersion of populations and the difficulty in controlling movements over the borders of these large territories, smallpox has persisted in many of them. Since 1940-1945, smallpox vaccination has been combined with yellow fever vaccination; in recent years, the tendency has been to carry out a smallpox vaccination campaign every three years and vaccination campaigns against yellow fever and smallpox every

six years. Dried smallpox vaccine prepared in France or in the Pasteur Institutes of Brazzaville, Kindia or Tananarive is being utilized in these campaigns. In addition to the regular vaccination campaigns, special efforts to carry out vaccination are made in local areas when an outbreak of smallpox occurs.

The majority of the new States of the former territories of French Equatorial and West Africa have expressed their willingness to carry out vaccination campaigns with the aim of the eradication of the disease. Several of them have also declared that in order to develop these campaigns, international assistance would be required, especially for the provision of transportation equipment for vaccination teams.

#### Gambia

Smallpox vaccination is carried out in this territory by the staff of the Health Inspectorate as a routine part of their duties. If a case of smallpox occurs, the Health Inspectorate organizes an intensive vaccination campaign in the area affected. The health authorities consider that no mass vaccination programme could be started unless international assistance is provided.

#### Ghana

There are fixed vaccination stations at frontier posts, air and sea ports, ferries and in urban areas. Mobile teams from the medical field units carry out part-time vaccination duties in the more populated regions and village vaccinators cover much of the rural areas. Most vaccinations are carried out at market places and lorry parks and there are 38 full-time vaccinators employed by the health service. Transportation difficulties are met during the rainy season. The authorities of Ghana are ready and willing to undertake a mass vaccination campaign to cover the country, in two years if possible, if funds, material and equipment can be provided.

#### Kenya

Vaccination is carried out in Kenya as part of the duties of the public health personnel; this includes medical officers, health visitors, health inspectors, lay vaccinators and health auxiliaries. The vaccinations are performed at fixed centres although mobile teams are used in the event of an outbreak. Health personnel is deeply committed with other duties and cannot dedicate more time to antismallpox activities. In order to develop an effective mass vaccination campaign, additional personnel and transport would be essential.

Liberia

Vaccinations are performed regularly at fixed centres, such as clinics and schools, and sometimes the people are requested to assemble at appointed places for mass vaccination. Lack of transport facilities creates difficulties in taking vaccination to distant regions. The health authorities have expressed their willingness to attempt a mass vaccination campaign to cover the whole country and have initiated discussions with the regional office for the preparation of a plan of operations.

Nigeria

Each region has its own administration and information is given here separately, by region.

Western Region: As a result of the considerable attention given to smallpox eradication in this region, a considerable proportion of the population has been vaccinated and smallpox has decreased in the last few years. In addition to the routine vaccination work, a special team for antismallpox measures was put into the field in 1959. This team has commenced operations along the Dahomey border and the over-all object is total vaccination or revaccination of the entire population. So far, the work is developing satisfactorily; 1 047 166 vaccinations have been carried out in 1959.

Eastern Region: There is a smallpox control programme in this region which consists mainly of mass vaccination and revaccination of the population at frequent intervals. The intensification of the control scheme has clearly brought about a substantial improvement. However, until the remaining endemic foci of smallpox are obliterated by continuous, intensive vaccination and revaccination of the population, a significant recrudescence of the disease is possible.

Northern Region: Vaccination is carried out by lay vaccinators and also by sanitary inspectors and dispensary attendants. Most of the vaccinators work in their own district under direct orders from the health department, but in several provinces there are, in addition to this, organized teams of vaccinators working through pre-arranged areas under supervision. This has been found to be a much more effective method and is being encouraged. In 1959, 2 500 000 persons were vaccinated.

A smallpox eradication programme is being prepared. The general idea is for this programme to work along the lines of the previous population census and employ a vast number of vaccinators for a very brief period - about 14 days. The region could be divided into areas corresponding to the present constituencies and supervision of the scheme would be carried out under the direction of medical and administrative staff, with the co-operation of other ministries, such as education and public works.

Federal Territory of Lagos: During 1958 and 1959 no obviously autochthonous case of smallpox occurred in Lagos. Vaccination activities are intensively pursued and the population is, as a consequence, highly protected.

Federation of Rhodesia and Nyasaland

Vaccination and revaccination campaigns are a continuous activity of the public health service. It is attempted to cover all areas of the country in a five-year period. Routine vaccination is carried out by the personnel of the public health service, including physicians, nurses, health visitors, midwives, health inspectors and lay vaccinators.

It is very difficult to conduct mass vaccination in the rainy season and, in general, mass campaigns are organized in the cold, dry season when people can be concentrated in special places. Free lymph is provided by the Government to many approved bodies, such as mining companies and industrial concerns who are required to submit returns of numbers vaccinated. If a mass campaign to cover the whole Federation were to be organized, the staff of the health services would need to be increased for this purpose; otherwise normal health work would suffer.

Sierra Leone

Vaccination is performed mostly by paramedical auxiliaries working exclusively on vaccination. Supervision and transport are the main problems as much of the country is not yet accessible by road. Difficulties have also been present due to the use of lymph vaccine that has lost its potency by the time it has arrived at the place of vaccination. The public health authorities would like to attempt a mass vaccination campaign if the necessary funds and transportation equipment are made available.



### British Somaliland

The vaccination status of the population is low, as not more than 25 per cent. has been vaccinated in the last five years. The main difficulty is found in the nomadic habits of the population which make systematic area-by-area vaccination impossible. Vaccinations are carried out at clinics, and no mobile teams are used unless an epidemic threatens. No mass vaccination campaign is envisaged owing to scarcity of financial resources.

### Tanganyika

Broad lines of policy for smallpox control are established by the Central Health Authority, but vaccination programmes are carried out on a provincial basis. Where necessary, health personnel are drawn in to affected areas from surrounding districts. A mass vaccination campaign could be organized but only if many more personnel were made available, together with a large increase in funds. Health education would be needed in the more remote areas before the mass vaccination campaign could be successful. At least five years would be needed to cover the whole country.

### Uganda

Vaccination is carried out as a regular duty of the public health service. In addition to the rural and district medical staff, 10 full-time vaccinators are employed. There would be no difficulty in recruiting and training more vaccinators if funds were available. A mass vaccination campaign could be organized and carried out without great difficulty, although financial assistance would be needed for extra staff and material.

### Zanzibar

It is estimated that about 85 per cent. of the population has been vaccinated against smallpox in the last five years. This has been done by the staff of the public health service as part of their regular duty. This will explain the lack of smallpox outbreaks in the island. The few cases reported in recent years occurred in migrant labour that comes from the mainland for agricultural purposes. Attempts are being made to vaccinate all these new arrivals.

Region of the Americas

In this Region, the smallpox eradication programme that was started in 1952 is progressing satisfactorily although at a pace slower than originally expected.

The status of smallpox activities in the countries of the Region as reported by the Regional Office is as follows:

Argentina

The Ministry of Public Health, with the collaboration of the Pan American Health Organization, is organizing a smallpox eradication programme on a nation-wide scale. PAHO provided equipment for the production of freeze-dried vaccine. The present production of glycerinated vaccine is sufficient to meet the country's requirements but dried smallpox vaccine production is still low.

Bolivia

Several outbreaks occurred in 1957 in Cochabamba and in La Paz Department as a result of which emergency vaccination campaigns were carried out, with dried vaccine obtained from Chile and Peru. Later, a nation-wide programme was undertaken with the aim of covering a minimum of 80 per cent. of the country's population. The vaccine was provided by the Institut de Vaccine of Paris and by the National Institute of Health of Peru. The house-to-house method was employed and, where appropriate, vaccination of persons not vaccinated in the home was carried out in temporary centres. By the end of 1958, a total of 2 432 186 vaccinations had been reached. The programme is now being consolidated by extending the vaccination to certain sparsely populated areas and to areas that have not yet been covered. To maintain a high level of immunity, services are being established in urban vaccination centres and rural mobile units. The International Co-operation Administration of the United States is actively collaborating in this programme. The dried vaccine production laboratory, for which equipment was provided by PAHO, entered the production stage and has turned out 363 000 doses of vaccine during the first half of 1959.

Brazil

A national plan for smallpox eradication has been drawn up and activities have been started in several States. PAHO has sent equipment for two dried vaccine production laboratories, and an offer was made also of additional equipment to expand

the laboratory at the Oswaldo Cruz Institute. A fellowship was awarded to a laboratory expert for visits to scientific centres that produce dried vaccines. A total of 4 139 872 persons was vaccinated in 1958, and 2 129 232 during the first half of 1959. The production of glycerinated vaccine during the same periods was 8 196 555 and 6 219 622 doses respectively.

#### Chile

The regular vaccination programme is the responsibility of the local public health services, which work to maintain the protection level of the population, particularly in rural areas, where smallpox vaccination is applied jointly with BCG immunization. As a consequence of one smallpox case reported in 1959, the authorities have undertaken an intensive vaccination programme. Measures are also being taken to increase the national production of dried smallpox vaccine and PAHO provided additional equipment in 1958 for that purpose.

#### Colombia

The national campaign was started in October 1955 with the aim of vaccinating 80 per cent. of the population over a period of five years. PAHO has been providing the services of a consultant to assist the national authorities in the development of the programme. It also furnished the services of a consultant specialized in dried vaccine production, as well as fellowships for the study abroad of vaccine production and the organization and operation of vaccination campaigns. UNICEF provided equipment for the production of dried vaccine. A systematic house-to-house vaccination campaign is being carried out. As of 31 March 1959, 5 645 851 vaccinations had been administered, 39.7 per cent. of which were primary. The Samper Martinez Institute began producing dried vaccine in 1958 in sufficient quantities to meet the needs of the campaign, manufacturing 2 125 800 doses of glycerinated vaccine and 4 087 980 of dried vaccine. In the first six months of 1959 the Institute produced 3 199 550 doses of lyophilized vaccine.

#### Ecuador

The programme was started with the goal of vaccinating at least 80 per cent. of the country's population over a period of five years. A total of 301 112 vaccinations were applied in 1958, and 160 845 were given in the first half of 1959. PAHO provided

the services of a consultant for a three-month period during 1958, and in 1959 designate a permanent consultant to assist the Government in this programme. The National Institute of Health produced 161 830 doses of glycerinated vaccine and 337 900 of dried vaccine in 1958, and 540 010 doses of dried vaccine in the first half of 1959. Equipment for the production of freeze-dried smallpox vaccine was provided by PAHO.

#### Paraguay

The vaccination campaign was started in September 1957 with the co-operation of PAHO, and as of 30 June 1959 a total of 976 617 persons, or about 60 per cent. of the country's population, had been vaccinated. By the end of the year it is expected that 80 per cent. of the population will have been immunized. Glycerinated vaccine produced in Uruguay has been utilized during the entire campaign.

#### Uruguay

A vaccination campaign was organized in the area bordering on Brazil and plans are being made to extend the campaign to the entire country. The laboratory of the Municipality of Montevideo produced 2 100 000 doses of glycerinated vaccine. Equipment for the production of dried vaccine was provided by PAHO. In 1958, 102 054 persons were vaccinated, and in the first half of 1959, 34 553 persons.

#### Eastern Mediterranean Region

In 1958, this Region set up a team consisting of an epidemiologist and a laboratory expert to carry out a smallpox survey of the countries in the Region. The survey team had covered eight countries up to the end of 1959 - Sudan, Saudi Arabia, Ethiopia, Yemen, Lebanon, the Syrian Province of the UAR, Jordan and Libya. The Regional Office is discussing with some of these countries ways and means of implementing mass vaccination campaigns in their territories. Other countries of the Region will be surveyed in 1960 and it is hoped that by the end of the year a complete analysis of the smallpox conditions in the Region will be available and a co-ordinated plan of action made ready. Requests for WHO assistance received from amongst the countries visited by the survey team are now being taken into consideration by the Regional Office. A summary of the position concerning the countries in the Region is given below:

### Aden Colony

A permanent staff of 12 trained vaccinators is maintained in the Colony and they work under the direction of the medical officers of health and the Port Health Officer. A high number of vaccinations is performed every year and it is estimated that the population is well protected. The smallpox cases reported in recent years occurred mainly in immigrants to the Colony, and secondary cases occurred in the local population, but no large outbreaks have taken place.

### Aden Protectorate

It is estimated that 40 per cent. of the population has been vaccinated. The health authorities try to vaccinate infants, scholars, state personnel and the adult general public at maternal and child health units, hospitals and health units, at conventional ages and intervals, as well as on the occurrence of local cases. The assistance of the Organization in the form of 100 000 doses of vaccine has been requested.

### Bahrain

There has been no case of smallpox in Bahrain since the last week of March 1957. Eradication has been achieved by maintaining the vaccinal status of the population at a very high level and by strict quarantine control at places of entry into the island.

### Ethiopia

Smallpox is endemic in the whole country, with certain districts showing a higher degree of endemicity than others. The main problem in this country is the lack of health personnel. The scarce medical staff of the public health service are too busy with their present duties and have not much spare time for additional duties. Physicians, nurses and dressers, where available, perform routine vaccination, together with other duties. Some parts of the country are inaccessible during large parts of the year and when they are accessible it is only by foot or mule. In large cities and bigger towns with hospitals or clinics, between 80 and 90 per cent. of the population has been vaccinated, but in the rural regions this percentage rapidly diminishes to 10 or five per cent. Lacking the financial means to improve this situation, the health authorities estimate that an eradication campaign for the whole

country cannot be foreseen in the near future. They are eager, however, to do something to improve this situation and have suggested the possibility of carrying out partial mass vaccination campaigns, although implementation of even this partial control programme will require international financial and technical assistance. As a first step, the Government of Ethiopia requested in 1959 the assistance of the Organization in obtaining some laboratory equipment for the production of freeze-dried vaccine. The Regional Office has agreed to provide this equipment.

#### French Somaliland

This territory has been free from smallpox for a number of years. However, in 1959 an outbreak occurred following the introduction of a case from outside. No new cases have occurred since a vaccination campaign was carried out following this outbreak.

#### Iran

An eradication campaign is under way and more than 80 per cent. of the population has already been covered. Some endemic foci still remain in mountainous areas of difficult access, but plans have been made to reach them in the near future. The campaign is in the charge of the smallpox service. The Organization provided in 1958 a freeze-drying apparatus for the production of dried smallpox vaccine. Glycerinated vaccine has been produced in large quantities for a long time and production of dried vaccine will start at any moment.

#### Iraq

In 1957, the Organization provided a freeze-drying apparatus for the production of dried smallpox vaccine. The laboratory expert of the regional team visited Iraq in 1959 and assisted in putting this apparatus into operation. A request for additional equipment for the production of dried smallpox vaccine has recently been received from the Government of Iraq, together with a request for the award of a fellowship to one of the bacteriologists of the vaccine production laboratory to familiarize himself with the Lister method of dried vaccine production. A smallpox eradication campaign was carried out during 1959 in Iraq with the aid of the USSR;

Jordan

Smallpox has not been reported in Jordan in the last two years. Only two cases occurred in 1957, when an outbreak took place in Lebanon and Syria. On that occasion, the health authorities carried out an intensive vaccination campaign in the exposed areas, in co-operation with UNRWA health services. The vaccination of infants is carried out regularly in almost all districts. Inhabitants in the urban areas with health centres available have their vaccination performed at these clinics. For the inhabitants of localities which are distant from the health centres, vaccinators are sent out at regular intervals. In remote rural areas, especially in the desert zone where nomadic tribes keep moving from one area to another, the task of vaccinating the population is very difficult.

Kuwait

Vaccination is performed for children under the age of five years at the maternal and child health centres, and by the school health authorities for children of school age. In addition, on the occasions when smallpox cases are reported, a house-to-house campaign has been undertaken to vaccinate everybody. The quarantine service undertakes the supervision of incoming passenger traffic.

Lebanon

This country has not reported smallpox cases in the last two years. In December 1956 and January 1957 an outbreak of smallpox took place and an intensive vaccination campaign was carried out. Since then, a plan for the systematic vaccination of infants was instituted. In order to consolidate the results achieved, and to ensure the full protection of the population against smallpox, the health authorities are planning to start a mass vaccination campaign during the current year, according to a plan of operations prepared with the co-operation of the regional smallpox team.

Libya

No serious outbreaks of smallpox have occurred in Libya in recent years and no cases have been reported in the last two years. Vaccinations are performed by the health authorities at hospitals, health centres and dispensaries. Mass vaccination campaigns have been carried out in cities and large towns. However, there is a large

proportion of the population in the rural areas that has escaped vaccination in recent years. In order to ensure the protection of the whole population of the country, the health authorities would like to start, as soon as possible, a mass vaccination campaign and have requested the assistance of WHO to obtain transportation equipment for the vaccination teams as well as a certain amount of dried vaccine.

#### Pakistan

Smallpox is endemic and deeply entrenched in East and West Pakistan. In 1958, a severe smallpox epidemic occurred in East Pakistan when more than 48 000 cases were reported. WHO and several national and voluntary agencies provided assistance during the emergency in the form of vaccine and epidemiological and vaccination teams. An intensive vaccination campaign was organized but, although the epidemic was controlled, complete coverage of the whole population was not achieved. Plans for an eradication programme have recently been under study and it is expected that a final plan of operations will be drawn up and put into effect in the near future. Dried vaccine production has been started. The Organization has provided the services of an accredited laboratory for testing the vaccine produced locally.

The health authorities of West Pakistan are also very much interested in developing an eradication programme and are preparing a detailed plan of operations. The Regional Office will consider the possibilities for assistance in the implementation of this plan of operations.

#### Qatar

In 1956, a mass smallpox vaccination campaign was carried out and more than 80 per cent. of the total population was vaccinated. Since then, vaccination centres have been established at air and sea ports. In addition, vaccinations are performed at the public health centre, general hospital and maternity hospital. Routine vaccinations are also performed at the schools, labour camps and in the outlying villages.

#### Saudi Arabia

Smallpox is a serious public health problem in this country. Many cases seem to occur unreported especially in the distant and isolated areas. The regions which show the lowest incidence of smallpox cases are those which have the population



protected by vaccination during the annual pilgrimage season. The central, eastern and south-western parts of the country are, on the other hand, the areas of highest incidence. For health administration purposes, the country is divided into several areas, each under the supervision of a senior medical officer responsible for both the curative and the preventive sides of the health problems. In large villages, dispensaries are often available, and the medical officer usually in charge of dispensaries is assisted in his duties by a dresser. Vaccination indexes are low. Mass vaccination of the inhabitants of Mecca and Medina, and of the ports of entry like Jeddah, is carried out every year before the arrival of the pilgrims. The Government has expressed its great interest in co-operating with WHO in eradicating smallpox. In order to develop an eradication programme, it is estimated that technical assistance will be required.

#### Sudan

The smallpox vaccination activities are carried out by the provincial health authorities with the co-operation of the Central Ministry of Health. During 1958, 2 678 223 vaccinations were carried out and although the figures are not complete for 1959, a similar number have been done. In 1957, the Organization provided freeze-drying apparatus to the smallpox vaccine-producing laboratory. In 1959 a fellowship was granted to the Director of the Stack Laboratories, where smallpox vaccine is produced, to study the preparation of dried smallpox vaccine at the Lister Institute. The health authorities of Sudan are very much interested in starting an eradication programme and have requested the assistance of the Organization. This assistance is especially needed in the provision of transportation equipment, some initial amount of dried vaccine and vaccination equipment. The Regional Office is studying the possibilities for assistance.

#### United Arab Republic Province of Egypt

In 1959 a small outbreak occurred in Cairo, Egypt, following the introduction of cases from outside. This outbreak was followed by an intensive vaccination campaign and no further cases have been reported.

United Arab Republic  
Province of Syria

Syria has not reported smallpox cases since 1957, when an outbreak occurred following the introduction of smallpox from outside. A mass vaccination campaign took place on that occasion. Vaccination is at present carried out as a regular activity of the public health service. It is estimated that all the population of the country is well protected. However, in order to maintain the high level of protection in the population, a programme of permanent antismallpox measures is being prepared in co-operation with the Regional Office. In 1956 the Organization provided a freeze-drying apparatus for the production of dried smallpox vaccine. Additional equipment for the production of this type of vaccine has been requested recently and the Regional Office is considering this request.

Yemen

Smallpox is endemic in Yemen. The country suffered a severe epidemic in 1958 and a vaccination campaign was carried out on this occasion. No special smallpox control programme has yet been established in Yemen. When an outbreak occurs, vaccinators are sent to the stricken area. The regional smallpox team visited Yemen in 1959 and prepared recommendations for a mass vaccination campaign. However, it is recognized that with the present available personnel and facilities, a successful mass vaccination campaign will be difficult to achieve.

European Region

Smallpox is not a public health problem in Europe. The disease is not present in any country although occasionally small outbreaks occur following the introduction of cases from outside. These outbreaks are usually controlled by vaccination.

South-East Asia Region

Countries in this Region constitute the most important endemic focus of smallpox in the world and it can be regarded as the most likely source from which smallpox may be re-introduced into other Regions. Most of the countries, however, have expressed great interest in developing programmes for the control or eradication of the disease. In 1960 a smallpox conference is being organized in New Delhi for the

improvement and co-ordination of smallpox control and eradication programmes in the countries of this Region, in those parts of the Eastern Mediterranean Region where the epidemiological situation is similar, and in those areas of the Western Pacific Region which lie in the Indo-Chinese and Malayan peninsulas. The present position regarding smallpox eradication planning in the Region is as follows:

#### Afghanistan

A WHO-sponsored seminar on smallpox eradication took place in Kabul in July 1959. Stress was laid upon the importance of ensuring effective vaccination by commencing the campaign only after thorough planning in all areas. Chief medical officers were instructed to submit detailed plans to the Ministry of Public Health for each of their provinces. The Government has approached the Regional Office requesting the assistance of the Organization in obtaining transportation equipment and freeze-dried vaccine. As soon as a definite plan of operation has been prepared, this request will be considered.

#### Burma

This country has expressed its interest in developing a programme for the eradication of smallpox. In February 1959, at a meeting held at the Public Health Institute, Rangoon, a smallpox eradication scheme for Burma was discussed and submitted to the National Health Council for its consideration. The Regional Office will co-operate with the Government in implementing this plan as soon as it is definitely agreed upon.

#### Ceylon

Smallpox is under control in Ceylon, with only sporadic outbreaks due to the introduction of the disease from outside the island. Over 80 per cent. of the population is reported to be protected by vaccination or revaccination, although this percentage may be lower in some remote villages. Constant vigilance and a vaccination campaign are maintained to prevent the re-introduction of the disease.

#### India

Following the resolution of the Eleventh World Health Assembly calling for a world-wide effort for smallpox eradication, in February 1959 a joint Indian Council for Medical Research/Government, Central Expert Committee met in New Delhi to study

the factors responsible for the persistence of a high endemicity of smallpox and cholera in India and to recommend to the Government a plan of action for their speedy control.

The Central Expert Committee recommended that steps should be taken to launch, with the least possible delay, a national smallpox eradication programme with the object of vaccinating the entire population as far as practicable, within a period of three years. The Central Expert Committee also recommended that suitable administrative machinery should be created at the district and state levels as well as at the central Ministry of Health, with adequate powers to deal effectively with all matters concerning the campaign, and that anti-epidemic committees at district level and epidemiological units at the state level should be established.

The report of the Central Expert Committee has been approved by the Government, who has recently sanctioned a total of Rs 3 300 000 for launching 16 smallpox pilot projects in all the States of India, as from 1 April 1960. Each pilot project should cover the population of one district - approximately 1 000 000 people in each State - and the first of such pilot projects has already been started in Bijapur, Mysore State.

A plan of operations for WHO/UNICEF assistance for the establishment of production units for freeze-dried vaccine at two vaccine production institutes was presented to the UNICEF Executive Board in March 1960.

#### Indonesia

Smallpox was virtually eradicated from Indonesia before the Second World War by intensive vaccination. The disease was, however, re-introduced during the war, when vaccination was interrupted, and it has been endemic since. The health authorities have expressed their interest in achieving eradication again. A meeting of representatives from the epidemiological unit of the Ministry of Health, the provincial health authorities, universities and national laboratories took place in May 1959 to review the smallpox situation in the country and to plan and recommend measures to cope with it. The following important partial steps for the control of smallpox have been taken during the year:

- (1) the Ministry of Health has assumed responsibility for smallpox control and eradication in the country;
- (2) a project was started in March 1959 to study the problems of diagnosis and control of smallpox in Djakarta;
- (3) control work in the coastal population in Bali was started in September, and a plan for covering the remainder of the population of Bali has been prepared;
- (4) a plan is being prepared to initiate control work in a fishing port in the north-east of Java and whenever possible in Macassar, which is an area of continuous epidemics and a major exit port from Sulawesi.

A plan of operations for WHO/UNICEF assistance for the establishment of a production unit for freeze-dried smallpox vaccine at the Pasteur Institute, Bandung, was prepared and presented to the UNICEF Executive Board in March 1960.

#### Nepal

Smallpox is a major public health problem in this country. Vaccination is being carried out at health centres and dispensaries, but not a large proportion of the population is yet covered. A pilot project for smallpox control, to begin in 1960, is being prepared.

#### Portuguese India

The health authorities have stated that smallpox is not a major public health problem in this country. An effective organization is maintained for vaccination and revaccination.

#### Thailand

Smallpox had not been a major public health problem in this country for some years but in 1959 several outbreaks occurred, particularly in the southern provinces, and an intensified vaccination programme has been put into operation. A production unit for freeze-dried smallpox vaccine has been set up in Bangkok with the assistance of WHO and UNICEF.

## Western Pacific Region

Smallpox is not at present an important problem in this Region although a few countries still report cases every year. In many of the island territories of this Region, smallpox was eradicated through vaccination before the war and the disease has not re-established itself since then.

### Cambodia

During 1957, the health authorities of this country prepared, with the assistance of personnel from the Regional Office, a plan of operation for an eradication campaign, which has been submitted to the Government for its consideration, and it is expected that the campaign will be started during the current year.

### Republic of Korea

A mass vaccination campaign was started in 1959. More than three million persons were vaccinated that year and it is expected that another four million will be vaccinated in 1960. As a result of this vaccination campaign, no smallpox cases occurred in 1959.

### Federation of Malaya

Vaccination is actively carried on as a regular activity of the public health service. It is estimated that about 60-70 per cent. of the population is protected, with a higher percentage in the cities than in the rural areas.

### Singapore

An outbreak of smallpox occurred in Singapore in 1959. One imported case produced nine secondary local cases. A mass vaccination campaign was organized and no new cases were reported.

### Republic of Viet Nam

Since 1954, annual vaccination campaigns have been carried out from January to April. These campaigns have succeeded in vaccinating more than 80 per cent. of the population. As a consequence of these campaigns, the number of cases of smallpox has been reduced from 3564 in 1954 to 12 in 1959. It is expected that eradication will be achieved in the immediate future.

#### IV. CONCLUSIONS

Progress towards the eradication of smallpox has been made during 1959, although at a slow pace. Some countries where the disease used to be endemic have been able, through effective vaccination campaigns, to reduce the number of cases to figures that suggest that eradication will be achieved in the near future. Other countries have been active in planning and organizing eradication programmes that are expected to start during the current year. Many have not gone further than the planning stage and still others have not taken any effective steps for the eradication or control of the disease.

Great difficulties are found in many areas - usually those where the problem is more serious - in organizing and developing an effective eradication programme. These difficulties, although varying from country to country, are mainly of financial and administrative character. Areas where the disease is endemic are frequently isolated and of difficult access, or accessible only during short periods of the year. Communications are generally poor and transportation lacking. In some countries, health services are not sufficiently developed to carry out an effective vaccination campaign and there is a shortage of adequate personnel at the vaccinator level and - more important - at the medical and supervisory level. Finally, some countries lack funds to cover the necessary expenditure incurred by an eradication campaign, as the available funds are already committed for other important health programmes that cannot be interrupted without serious consequences.

There are, undoubtedly, serious obstacles in the path of eradication. It must be remembered, however, that smallpox can be, and should be, eradicated. Expenditure for the completion of an eradication programme, although considerable, is small compared with the cost in money and, especially, in human lives and suffering caused by the continuous presence of the disease. The eradication of smallpox is of extreme importance to all countries, both to protect their own population and to safeguard other countries already free from the disease. It is, therefore, important to urge all countries to exert all efforts necessary to surmount the administrative and financial difficulties that may exist and to give the smallpox eradication programme the priority it deserves for securing national and international health.

The Organization will continue to offer the necessary technical guidance and advice for the study of the problem, for the preparation of detailed plans of operations for an eradication programme and for the production of a stable, potent, freeze-dried vaccine able to withstand the climatic conditions of the tropics. In developing eradication programmes, co-operation between neighbouring countries with similar problems is essential. The regional offices are ready to assist countries in their regions in planning and carrying out co-ordinated activities for regional eradication programmes.

The generous offer of vaccine by some Member States is an important asset to the programme.

The smallpox eradication programme will continue to receive high priority in the future activities of the Organization. However, it is emphasized that eradication of smallpox is a national responsibility and can only be achieved by national effort. Such an effort implies sacrifices which fall most heavily on those countries least able to afford them. It is thus clearly in the interest of wealthier countries to assist others towards the eradication of the disease.



TABLE 1

SMALLPOX, 1957-1959

(Some countries distinguish in their reports variola major, variola minor or alastrim. In this Table no distinction is made.)

	1957	1958	1959
<u>African Region</u>			
Angola . . . . .	11	a) 135	*7
Basutoland . . . . .	-	-	*1
Bechuanaland . . . . .	154	a) 96	*3
Belgian Congo . . . . .	1 950	1 196	*2 471
Cameroons . . . . .	4	2	*17
former French Equatorial Africa . . . . .	57	14	16
former French West Africa . . . . .	12 866	*6 680	*5 608
Gambia . . . . .	*33	b) *21	*3
Ghana . . . . .	a) 184	b) *166	*99
Kenya . . . . .	806	734	314
Liberia . . . . .	...	a) 5 862	a) 591
Mozambique . . . . .	32	*-	*1
Nigeria . . . . .	9 763	b)*1 874	*1 604
Portuguese Guinea . . . . .	154	*41	*24
Rhodesia and Nyasaland . . . . .	813	b) *512	*732
Ruanda-Urundi . . . . .	34	29	*77
Sierra Leone . . . . .	4 846	b) *514	a) 96
Somaliland (Brit. Prot.) . . . . .	c) 3	-	*96
Tanganyika . . . . .	856	1 176	1 399
Togoland . . . . .	9	29	*64
Uganda . . . . .	477	360	*367
Zanzibar . . . . .	1	2	-
<u>American Region</u>			
Argentina . . . . .	335	*27	a) *13
Bolivia . . . . .	*1 301	*193	a) *19
Brazil (F.D. and State capitals) . . . . .	*1 014	*1 200	about 900
Chile . . . . .	-	-	*1
Colombia . . . . .	2 145	2 009	*867
Ecuador . . . . .	908	b) *891	*1 186
Panama . . . . .	-	4	*-
Paraguay . . . . .	103	*21	*4
Uruguay . . . . .	2	-	a) -

TABLE 1 (continued)

	1957	1958	1959
<u>Eastern Mediterranean Region</u>			
Aden, Col. and Prot. . . . .	d) *70	b,d) *164	d) *64
Bahrain . . . . .	4	b) *-	*-
Ethiopia . . . . .	1 778	b) *573	*352
French Somaliland . . . . .	6	*-	*110
Iran . . . . .	*1 008	*318	*297
Iraq . . . . .	1 924	6	*23
Jordan . . . . .	2	*-	*-
Kuwait . . . . .	*23	*-	*8
Lebanon . . . . .	108	-	*-
Libya . . . . .	*2	*-	*-
Muscat and Oman . . . . .	4	9	c) 8
Pakistan . . . . .	25 770	b) 49 884	*7 840
of which:			
East Pakistan . . . . .	24 746	b) 48 043	*6 292
West Pakistan . . . . .	1 024	b) 1 841	*1 548
Qatar . . . . .	*2	i *1	*1
Saudi Arabia . . . . .	*65	*143	*111
Sudan . . . . .	*285	b) *49	*517
United Arab Republic			
Province of Egypt . . . . .	1	i 3	a) 31
Province of Syria . . . . .	41	*-	*-
Yemen . . . . .	-	*20	...
<u>European Region</u>			
France (Algeria) . . . . .	8	*15	*11
Germany, Federal Republic . . . . .	i 1	10	9
Italy . . . . .	8	-	-
Morocco . . . . .	2	-	-
Turkey . . . . .	128	-	-
United Kingdom: England and Wales	4	5	1
USSR: Uzbekistan SSR . . . . .	-	-	1
<u>South-East Asia Region</u>			
Afghanistan . . . . .	226	*306	*438
Burma . . . . .	*2 739	b) *1 965	*1 486
Ceylon . . . . .	19	b) *29	*-
India . . . . .	78 896	b) 168 325	*45 022
Indonesia . . . . .	1 550	b) *3 051	*576
Portuguese India . . . . .	*42	b) *98	*3
Thailand . . . . .	3	b) *28	*1 548

TABLE 1 (continued)

	1957	1958	1959
<u>Western Pacific Region</u>			
Cambodia . . . . .	125	*18	*4
Korea, Republic of . . . . .	10	*9	*-
Malaya, Federation of . . . . .	-	c) *2	e) *42
Singapore . . . . .	-	b) *-	*10
Viet Nam, Republic of . . . . .	83	30	12

- \* Preliminary, approximate or estimated data
- ... Data not available
- i Imported case
  
- a) Incomplete data
- b) 53 weeks
- c) Including 1 imported case
- d) Including 28 imported cases in 1957, 25 in 1958 and 12 in 1959
- e) Including 4 imported cases

FIG. 1  
 NOTIFICATION OF SMALLPOX CASES IN PORTS AND AIRPORTS. 1959  
 NOTIFICATION DE CAS DE VARIOLE DANS LES PORTS ET AEROPORTS, 1959

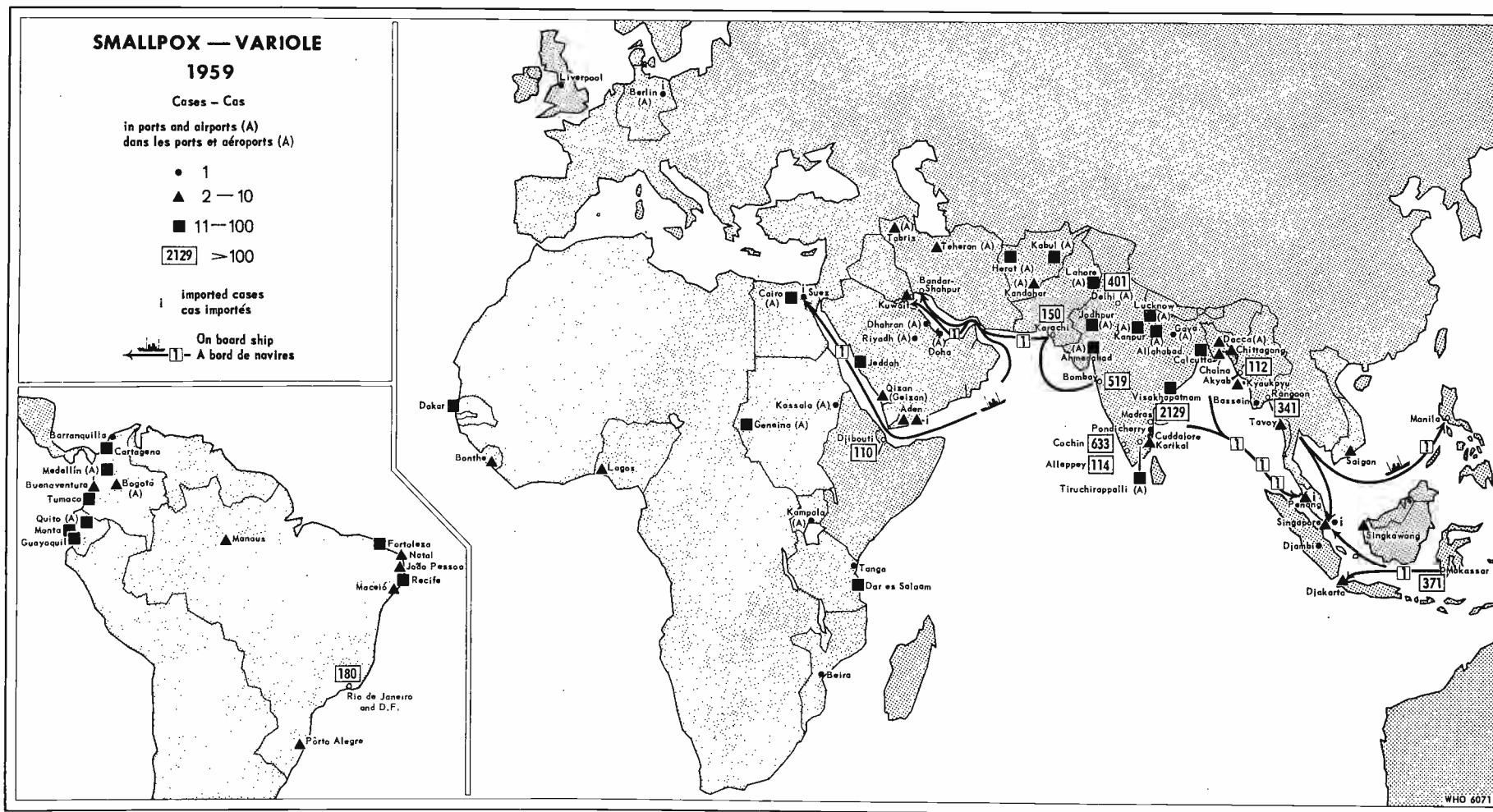


FIG. 2  
 NOTIFICATION OF CASES OF SMALLPOX IN 1959  
 NOTIFICATION DE CAS DE VARIOLE EN 1959

