

**OFFICIAL RECORDS
OF THE
WORLD HEALTH ORGANIZATION**

No. 135



**SEVENTEENTH
WORLD HEALTH ASSEMBLY**

GENEVA, 3 - 20 MARCH 1964

PART I

RESOLUTIONS AND DECISIONS

ANNEXES

WORLD HEALTH ORGANIZATION

GENEVA

July 1964

Annex 11

SMALLPOX ERADICATION PROGRAMME ¹

[A17/P&B/11 — 20 Feb. 1964]

REPORT BY THE DIRECTOR-GENERAL

CONTENTS

	Page
1. Introduction	120
2. World Incidence and Mortality	121
3. Progress towards Smallpox Eradication	127
4. Expert Committee on Smallpox	130
5. Contributions of Smallpox Vaccine to WHO	131

1. Introduction

Though no perceptible decrease in the number of cases of smallpox in epidemic areas was seen in 1963, tangible progress was made during the year in the global programme of smallpox eradication. A development of especial importance is the effort made by India—the country that reports the largest number of cases—in launching an intensive country-wide smallpox eradication programme in which nearly 140 million

persons were vaccinated by 30 September 1963. It is planned to cover the total population of the country by the end of March 1966. The careful work by appraisal teams who assessed the results of the vaccination campaigns in different parts of India has confirmed the importance of independent evaluation, and their findings will be of great value to other countries developing eradication programmes.

Pakistan, a country that has also reported many cases in the past, is also developing an intensive vaccination campaign, especially in East Pakistan.

¹ See resolution WHA17.43.

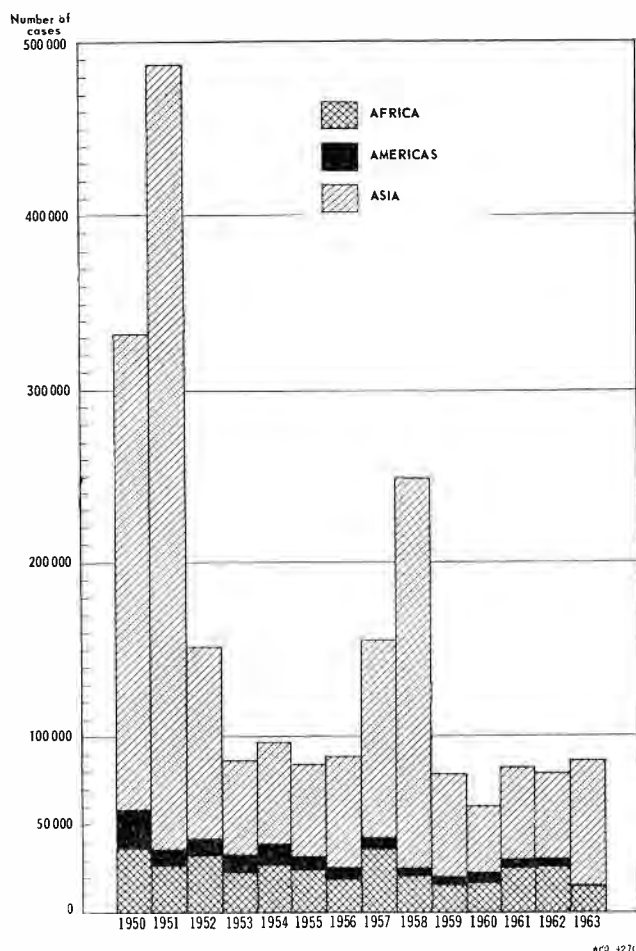
In the Americas, where intensive vaccination campaigns have been in progress for several years in countries where the disease used to be endemic, a great reduction in cases has been reported for 1963.

During 1963 two serious outbreaks occurred in Europe, one in Sweden and one in Poland. Both followed the introduction of smallpox from abroad. Apart from the deaths and suffering that resulted, emergency organization of vaccination and surveillance activities cost these two countries sums far in excess of those available to WHO for the support of the smallpox eradication programme.

An Expert Committee on Smallpox met in Geneva in January 1964 and the recommendations of this group,¹ a summary of which is given in section 4 of this report, will contribute to the better organization

CHART 1

SMALLPOX INCIDENCE IN AFRICA, THE AMERICAS AND ASIA, 1950-1963



and implementation of existing and future control or eradication programmes.

The most discouraging aspect of the programme is failure to obtain the necessary amounts of donated freeze-dried vaccine. If not immediately overcome, the lack of this vaccine for the continuation of eradication campaigns in progress in countries where the disease is endemic will jeopardize the success of the campaigns, seriously discourage the countries concerned, and postpone the final achievement of global eradication.

2. World Incidence and Mortality

Chart 1 shows by continents the world incidence of smallpox as reported by national authorities for the period 1950-1963. During this period two peaks of high incidence occurred—in 1950-1951 and 1957-1958—affecting mainly Asia. The second peak was much lower than the first, with about half the number of cases. Since then numbers of cases have always remained under 100 000.

Table I gives the world incidence (cases and deaths) by continents for the last five years (1959-1963).

TABLE I. SMALLPOX MORBIDITY AND MORTALITY, 1959-1963, BY CONTINENT *

Continent	1959	1960	1961	1962	1963 **
Africa . . C	13 950	15 851	24 025	24 188	15 078
D	1 071	1 017	1 798	2 423	1 484
Americas . C	4 889	3 090	1 939	3 029	241
D	—	—	—	—	16
Asia . . . C	58 085	39 221	53 549	46 374	72 973
D	15 781	9 639	13 081	12 287	24 033
Europe . . C	13	47	24	137	145
D	1	—	4	27	11
TOTALS: C	76 937	58 209	79 537	73 728	88 437
D	16 853	10 656	14 883	14 737	25 544

* C = Cases; D = Deaths.

** Cases and deaths notified to WHO up to 29 November 1963.

From the data in Table II it is possible to compare the number of cases and deaths notified by each country during the last five years.

In the first eleven months of 1963, 88 437 cases and 25 544 deaths were recorded throughout the world. Most of these—72 973 cases and 24 033 deaths—occurred in Asia, where India continued to report the largest numbers—58 649 cases and 18 806 deaths. Second place was occupied by Pakistan, which notified 7691 cases and 4967 deaths in the same period. Immediately following was Indonesia, where 5937

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1964, 283.

TABLE II. SMALLPOX MORBIDITY AND MORTALITY, 1959-1963, BY COUNTRY

Country or territory		1959	1960	1961	1962	1963 *
Africa						
Algeria	C	11	7	8	—	—
	D	—	—	—	—	—
Angola	C	7	—	—	23	38
	D	—	—	—	3	1
Basutoland	C	1	—	83	52	1
	D	—	—	—	—	—
Bechuanaland	C	3	21	16	4	—
	D	1	—	—	—	—
Burundi	C	—	—	—	—	4
	D	—	—	—	—	—
Cameroon	C	17	—	1 345	792	127
	D	—	—	204	108	18
Central African Republic	C	—	1	—	57	3
	D	—	1	—	21	—
Chad	C	15	4	273	769	—
	D	—	—	39	150	—
Congo (Brazzaville)	C	—	—	22	1 254	1 402
	D	—	—	—	159	117
Congo (Leopoldville)	C	2 471	605	2 251	3 785	4 873
	D	64	26	149	540	654
Dahomey	C	1 708	768	119	132	268
	D	212	119	21	21	32
Ethiopia	C	352	293	761	360	224
	D	17	11	7	8	—
Gabon	C	—	—	—	1	107
	D	—	—	—	—	17
Gambia	C	3	7	12	4	52
	D	—	—	—	—	1
Ghana	C	99	139	70	135	23
	D	13	22	8	8	—
Guinea	C	439	176	—	2 948	218
	D	5	1	—	335	17
Ivory Coast	C	788	1 634	4 656	2 061	214
	D	35	62	237	102	8
Kenya	C	314	151	289	96	220
	D	3	5	2	—	1
Liberia	C	—	...	1 119	323	34
	D	—	...	27	10	—
Mali	C	772	1 212	1 706	1 520	1 099
	D	27	47	89	165	86
Mauritania	C	12	44	8	40	—
	D	1	—	—	—	—
Mozambique	C	1	81	51	58	80
	D	—	1	1	4	11
Niger	C	1 149	2 408	1 740	1 038	444
	D	108	127	91	107	26
Nigeria	C	1 604	4 140	3 519	3 863	1 726
	D	213	388	347	437	156

* Cases and deaths notified to WHO up to 29 November 1963.

— None.

... No information.

SMALLPOX MORBIDITY AND MORTALITY, 1959-1963, BY COUNTRY (continued)

Country or territory		1959	1960	1961	1962	1963 *
Africa (continued)						
Nyasaland	C	554	795	1 465	634	393
	D	14	64	161	69	60
Portuguese Guinea	C	24	1	—	1	—
	D	—	1	—	—	—
Northern Rhodesia	C	47	350	233	210	1 549
	D	8	31	8	4	201
Southern Rhodesia	C	131	12	3	15	37
	D	—	—	—	—	4
Rio Muni	C	—	1	—	—	—
	D	—	—	—	—	—
Ruanda Urundi **	C	77	19	10	—	—
	D	—	—	—	—	—
Senegal	C	487	6	201	231	88
	D	94	—	3	3	2
Sierra Leone	C	96	12	6	78	14
	D	—	1	1	—	—
South Africa	C	—	65	8	103	159
	D	—	—	—	—	—
Sudan	C	517	135	104	70	—
	D	86	2	—	—	—
Tanganyika	C	1 442	1 584	908	973	747
	D	158	83	45	49	37
Togo	C	64	347	281	595	166
	D	5	24	22	18	9
Uganda	C	363	707	398	628	—
	D	—	1	1	3	—
Upper Volta	C	382	126	2 360	1 335	276
	D	7	—	335	99	22
TOTALS — AFRICA						
	C	13 950	15 851	24 025	24 188	15 078
	D	1 071	1 017	1 798	2 423	1 484
Americas						
Argentina	C	34	65	6	2	—
	D	—	—	—	—	—
Brazil	C	2 804	650	1 420	2 759	192
	D	—	—	—	—	16
Canada	C	—	—	—	1	—
	D	—	—	—	—	—
Colombia	C	867	171	16	41	4
	D	—	—	—	—	—
Ecuador	C	1 184	2 185	496	205	45
	D	—	—	—	—	—
Uruguay	C	—	19	1	10	—
	D	—	—	—	—	—
Venezuela	C	—	—	—	11	—
	D	—	—	—	—	—
TOTALS — AMERICAS						
	C	4 889	3 090	1 939	3 029	241
	D	—	—	—	—	16

* Cases and deaths notified to WHO up to 29 November 1963.

** Since July 1962 the independent States of Burundi and Rwanda.

— None.

SMALLPOX MORBIDITY AND MORTALITY, 1959-1963, BY COUNTRY (continued)

Country or territory		1959	1960	1961	1962	1963 *
Asia						
Aden						
Colony	C	8	8	1	—	—
	D	—	3	—	—	—
Protectorate	C	62	5	—	—	—
	D	24	2	—	—	—
Afghanistan	C	438	111	174	303	383
	D	1	—	—	—	1
Burma	C	1 533	392	88	21	10
	D	329	53	5	—	—
Cambodia	C	4	—	1	—	—
	D	—	—	—	—	—
Ceylon	C	—	—	34	12	1
	D	—	—	8	4	—
India	C	45 115	31 052	45 204	42 478	58 649
	D	11 595	7 876	12 341	11 402	18 806
Indonesia	C	1 129	5 196	4 894	...	5 937
	D	478	1 000	—	...	132
Iran	C	288	378	123	28	5
	D	32	40	—	—	—
Korea, Republic of	C	—	2	1	—	—
	D	—	—	—	—	—
Malaya	C	42	15	—	—	—
	D	5	7	—	—	—
Muscat and Oman	C	8	—	—	8	—
	D	—	—	—	—	—
Nepal	C	5	...	282
	D	2	...	126
Pakistan						
East	C	6 292	1 086	456	482	6 318
	D	2 737	489	197	200	4 693
West	C	1 511	912	2 518	3 030	1 373
	D	308	157	524	675	274
Saudi Arabia	C	111	32	17	1	—
	D	—	1	—	—	—
Thailand	C	1 548	32	33	2	—
	D	272	11	4	2	—
Trucial States	C	—	—	—	17	—
	D	—	—	—	4	—
TOTALS — ASIA		58 085	39 221	53 549	46 374	72 973
	D	15 781	9 639	13 081	12 287	24 033
Europe						
Belgium	C	—	—	1	—	—
	D	—	—	—	—	—
Germany, Eastern	C	—	—	—	—	1
	D	—	—	—	—	—
Germany, Federal Republic	C	13	—	4	37	—
	D	1	—	—	3	—
Hungary	C	—	—	—	—	1
	D	—	—	—	—	—

* Cases and deaths notified to WHO up to 29 November 1963.

— None.

... No information.

SMALLPOX MORBIDITY AND MORTALITY, 1959-1963, BY COUNTRY (continued)

Country or territory		1959	1960	1961	1962	1963 *
Europe (continued)						
Poland	C	—	—	—	32	117
	D	—	—	—	—	7
Spain	C	—	—	17	—	—
	D	—	—	3	—	—
Sweden	C	—	—	—	—	25
	D	—	—	—	—	4
Switzerland	C	—	—	—	1	1
	D	—	—	—	—	—
United Kingdom of Great Britain and Northern Ireland	C	—	1	1	67	—
	D	—	—	1	24	—
Union of Soviet Socialist Republics	C	—	46	1	—	—
	D	—	—	—	—	—
TOTALS — EUROPE	C	13	47	24	137	145
	D	1	—	4	27	11

* Cases and deaths notified to WHO up to 29 November 1963.
— None.

cases—but only 132 deaths—were reported. No cases have been notified in the first eleven months of 1963 from Saudi Arabia and Thailand, where relatively large numbers were notified in 1959, and a few in 1960, 1961 and 1962. This decrease in the number of cases has occurred following intensive vaccination campaigns.

In Africa fewer cases and deaths were notified in the first eleven months of 1963 than in the years 1961-1962. Congo (Leopoldville) reported the highest number—4873 cases and 654 deaths. Congo (Brazzaville), Mali, Nigeria, Northern Rhodesia and Tanganyika each reported more than 500 cases in 1963.

The case-mortality appears to be much higher in Asia than in Africa. Even allowing for unreliable reporting and the inclusion, in some countries, of cases of chicken-pox, this difference is important. It may be explained by differences in the virulence of variola strains prevalent in Asia and in Africa. The question requires more study before it can be fully elucidated.

In the Americas, where extensive national control programmes have been carried out, the reported incidence has decreased in recent years. Brazil, where reporting is only partial, continues to occupy the first place but reported only 192 cases in 1963 against 2759 in 1962 and 1420 in 1961. Ecuador reported 45 cases and Colombia only 4. Argentina, which had reported a few cases every year, did not report any in 1963.

In Europe, 5 cases were imported and a total of 140 secondary cases and 11 deaths occurred following two of these importations.

In spite of the efforts made by some countries in endemic areas, the global eradication campaign has not yet reached a point where its impact can be reflected in the global incidence. It is expected that, if the national eradication campaigns continue as planned, their success will be shown in a decrease in the global incidence in the coming years.

2.1 Recent Epidemics

In Africa, there was a serious epidemic at Leopoldville in the closing months of 1961 and in the first month of 1962. The disease was introduced into Brazzaville, which was free at that time, and from there it spread to the rest of the Republic of the Congo (Brazzaville).

In 1963 the number of cases increased substantially in Northern Rhodesia.

In Asia, India (58 649 cases) recorded a substantial increase as compared to 1962. The same is true of East Pakistan (6318 cases against 482 cases in 1962). This is due to an epidemic which affected the eastern parts of India and East Pakistan during the first half of 1963. In Afghanistan an outbreak occurred in July in the interior of the country. The outbreak was widely spread but it has been impossible to determine the number of cases. An intensive vaccination campaign has been carried out in the area.

In the town of Thimi and surrounding villages five miles south of Kathmandu, Nepal, an epidemic of smallpox started in November 1963. It is estimated that this epidemic has caused between 200 and 600

deaths in an area with a population of about 25 000. An intensive vaccination campaign is being carried out in the affected area.

In Europe, temporary foci arising from cases imported by air were observed in Sweden and Poland in 1963. Twenty-four secondary cases and 4 deaths occurred in Sweden following the importation of a case. In Poland 116 cases and 7 deaths followed one imported case. Eastern Germany, Hungary and

Switzerland each had one imported case, none of which gave rise to secondary cases.

2.2 Importations of Smallpox

In Table III are given details, as reported to the Organization, for 1962 and 1963 of cases of smallpox imported into countries where the disease was not present or where there was only a temporary focus the year before the importation.

TABLE III. IMPORTED CASES OF SMALLPOX

A. In 1962

	Imported cases	Secondary cases	Imported from	Other information
Africa				
Angola	3	12+	Congo-Leopoldville	12 secondary cases in local area of importation. Country no longer free from infection subsequently.
Central African Republic Congo-Brazzaville . . .	2 yes	55 yes	Chad Congo-Leopoldville (Leopoldville)	By land. Country again free from infection. By land. Country no longer free from infection subsequently.
Gabon	1	—	Congo-Brazzaville (Pointe-Noire)	By sea.
United Arab Republic .	4	—	India (Bombay) India (Kakinada) Unknown	By sea. By sea. By sea. (All cases disembarked at Suez).
Americas				
Canada	1	—	Brazil (São Paulo)	By air and train.
Uruguay	2	9 (1 focus)	Brazil for second imported case	By land.
Asia				
Kuwait	1	—	India (Bombay)	By sea.
Muscat and Oman . . .	1	7	Trucial Oman (Dubai)	By land.
Trucial Oman	1	16	West Pakistan	By sea (Pakistani pilgrims on their way to Mecca).
Europe				
Federal Republic of Germany	2	36 (2 foci)	Liberia (Monrovia) India (Bombay)	By air. By air.
Poland	29	3	India (Calcutta)	By sea.
United Kingdom of Great Britain and Northern Ireland	7	62 (4 foci)	Pakistan (Karachi) India (Bombay)	5 imported by air. 2 imported by sea.
B. In 1963				
Africa				
Central African Republic Gabon	3 several	— yes	Congo-Brazzaville Probably Congo-Brazzaville	By land. By land. Focus of 12 cases in local area of importation. Country no longer free from infection subsequently.
United Arab Republic .	2	—	India (Calcutta)	By sea.

IMPORTED CASES OF SMALLPOX (*continued*)

	Imported cases	Secondary cases	Imported from	Other information
Europe				
Eastern Germany	1	—		By air.
Hungary	1	—	Unknown	
Poland	1	116	India (Delhi)	By air.
Sweden	1	24	South-East Asia	By air.
Switzerland	1	—	Gabon	By air.

The risk of importation of smallpox into countries free of the disease will continue in spite of all quarantine measures until the disease has been eradicated from the world.

3. Progress towards Smallpox Eradication

Progress towards smallpox eradication is shown below by WHO Regions.

The further implementation of the campaigns mentioned will depend to a large extent on the success of the Organization in procuring the supplies of vaccine mentioned in section 5.

Progress towards eradication has been made but, as mentioned in previous reports, inadequate health services and the lack of sufficient funds, vaccine, equipment, transport and personnel have prevented the rapid development of effective programmes. In Europe and in the Western Pacific Region there is no smallpox, but the possibility of importing the disease is always present and countries in these regions should maintain a high level of immunity in the population, especially in certain groups at risk, to prevent its being introduced or disseminated.

In Europe two outbreaks occurred after importation of smallpox (see Introduction). The Regional Committee for Europe, during its thirteenth session, in 1963, drew attention to the vulnerable position of hospital and health service staff and to the need to ensure that these personnel are well protected by routine vaccination.

AFRICAN REGION

The Regional Office has continued to give advice to countries on the preparation of their programmes for eradication. In accordance with resolution WHA15.53 of the Fifteenth World Health Assembly, paragraph 5 (c), the countries were asked what their requirements would be for assistance in the eradication of smallpox. There was a very good response and requests from countries will be considered in detail for the development of the regional campaign.

An inter-country project, AFRO 143, has been established to give assistance to countries in West Africa which have not yet begun their campaigns and to help them to establish a list of their needs and cost estimates for their programmes. One WHO medical officer has already been appointed for this project.

Steps are being taken to assist countries in the development of the production of freeze-dried smallpox vaccine in the Region.

In some countries of the Region, where development of the basic health service is reasonably satisfactory and there is sufficient personnel, efforts are being made to establish epidemiological units. Priority will be given to smallpox programmes among the activities to be developed by these units.

Bechuanaland

It was reported that an eradication campaign was unnecessary because of the lower incidence of the disease in recent years (no cases in 1963), but the Government intends to maintain sufficient vaccination to protect the population.

Ghana

The annual incidence of smallpox in Ghana is low compared with that in the neighbouring territories. The only guarantee against reintroduction after eradication is continuous vigilance and the maintenance of a high level of immunity among the public through regular vaccination. The policy of the Ministry of Health is to integrate vaccination into the general public health services.

As a contribution to the WHO global smallpox eradication programme, Ghana plans to achieve a total vaccination coverage in less than five years. The programme does not envisage an *ad hoc* vaccination campaign. The aim is to intensify vaccination by the public health services in a manner that will satisfy all WHO requirements. The main obstacle to success is expected to be shortage of vaccine.

Guinea

The organization of a freeze-dried vaccine production centre in Kindia is the principal request of the Government and a WHO short-term consultant is to be sent there early in 1964.

Ivory Coast

WHO is providing vaccine for the national eradication campaign. The attack phase is considered to be finished, and consolidation has already been planned. The localities which had insufficient vaccine should be covered in this phase. As the campaign progresses arrangements will be made to co-ordinate similar vaccination campaigns in neighbouring countries.

Kenya

As in Guinea, the organization of a vaccine production centre is being considered and a WHO consultant will be appointed to advise the health authorities in planning it.

Liberia

WHO has provided vaccine and a medical officer for the programme. In 1962 Liberia carried out a mass vaccination campaign in collaboration with a private organization. The results of this campaign were evaluated in the first half of 1963 by the national public health service and a WHO medical officer. It was found that 39 per cent. of the population in the Monrovia area and 80 per cent. in rural areas near the city were still susceptible to smallpox.

Difficulties have been encountered in the WHO-assisted programme owing to lack of transportation and funds. The prospects of merging smallpox programmes with a multipurpose campaign (Liberia 3) are being studied.

Mali

In Mali, WHO is providing vaccine and advice. Efforts are being made to recruit a full-time WHO officer for the campaign. Local authorities have found transportation difficulties.

Nigeria

Nigeria plans to start an eradication campaign in October 1964 and WHO has offered its assistance in planning and implementing this programme. A WHO consultant will be appointed in the near future to advise the public health authorities on the development of the existing smallpox vaccine production centre.

Togo

Togo is developing a smallpox campaign within the framework of a proposed multipurpose disease-control

campaign, to include treponematoses, leprosy and smallpox.

Upper Volta

WHO has entered into an agreement with the Government for the supply of 4 550 000 doses of freeze-dried vaccine in two years, for technical advice during the campaign, and for the evaluation of the project of smallpox eradication. This campaign is expected to begin soon and last for two years.

REGION OF THE AMERICAS

In the Region of the Americas most countries have freed themselves from smallpox. Eradication campaigns are at present in progress in Ecuador and Brazil. The campaign in Ecuador is expected to be completed in 1964. Other countries have continued vaccination campaigns and mopping-up operations after completing the attack phase of the eradication programmes.

SOUTH-EAST ASIA REGION

This region has the greatest number of cases—approximately three-quarters of the world total—and this is due to the large incidence in India and Indonesia. Two other countries—Afghanistan and Nepal—have shown an increase in incidence during the last year.

In general, governments in this region have elected to proceed by means of pilot projects to establish methodology and enable estimates of costs to be determined before embarking on eradication programmes.

The Regional Committee at its sixteenth session adopted a resolution (SEA/RC16/R4) drawing the attention of the World Health Assembly to the urgent need for supplies of freeze-dried smallpox vaccine. Another resolution (SEA/R16/R8) calls for the promotion of regular meetings between the governments concerned to discuss the need for co-ordination of smallpox eradication activities in neighbouring countries. It was also decided (resolution SEA/RC16/R5) to hold technical discussions on the subject of smallpox eradication at the seventeenth session of the Regional Committee in 1964.

In the Maldives Islands and Mongolia smallpox is no longer endemic.

Afghanistan

In Afghanistan a pilot project began in Kabul at the end of 1962 to evolve practical vaccination procedures and techniques and to train the personnel required, first in Kabul and subsequently in other areas of the

country. By the end of August 1963, 300 000 vaccinations had been performed in selected areas of the province. In the Bamian province, about 50 per cent. of the estimated population were vaccinated between June and November 1963. An outbreak of smallpox occurred in October 1963 in the Logar Valley area. WHO staff members from the rural health and nursing projects were mobilized for the emergency in order to assist the national staff and the WHO medical officer for smallpox control.

Burma

In Burma, smallpox is endemic and epidemics are known to occur. In preparation for planning a country-wide eradication programme, pilot projects were started in Rangoon City and seven districts in January 1963. The whole country is expected to be covered in three years, starting in 1964, and the Government has estimated that 25 million doses of vaccine will be needed for the three years; WHO has already supplied 1.8 million doses.

Ceylon

In Ceylon, a satisfactory immunization state is maintained through the general health services.

India

In India, in 1961-62, pilot projects were carried out in all the states and in the Union Territory of Delhi. These pilot projects aided in establishing the method and the strategy for the national smallpox eradication programme which was launched towards the end of 1962. The intention of this programme was to vaccinate not less than 80 per cent. of the total population (437 500 000 according to the 1961 census) within a total period of two years. Up to 30 September 1963, 137 550 000 persons had been vaccinated, which represents 31.42 per cent. of the total population. A special technical committee assisted by WHO and the United States Agency for International Development undertook in 1963 an assessment and evaluation survey of the eradication programme so far carried out in the Union Territory of Delhi. This showed that the coverage of the population was 63 per cent. (and not the expected 80 per cent.) and the percentage of takes 86 per cent., which explains the occurrence of a smallpox epidemic with 223 cases in the Delhi area in the first quarter of 1963 although more than three million inhabitants had been vaccinated before the epidemic. The committee made recommendations for continuation of the programme.

The national programme is now being revised with the intention of achieving a coverage of 85-90 per cent. of the population by the end of the Third Five-Year Plan period, i.e. 31 March 1966. The assessment and

evaluation of the campaign has also been organized in all states under the direction of the Central Institute for Communicable Diseases, and it is planned to have a meeting of all state medical officers in charge of smallpox eradication programmes in March 1964, to review the progress of the campaign.

There are now 150 eradication units working in the national programme. Each unit comprises 72 vaccinators, 12 vaccinator supervisors and 2 health educators, along with one paramedical and one medical officer.

A donation of 250 million doses of freeze-dried vaccine was made by the USSR to India in 1962 and a further 200 million doses have been donated recently. However, as the requirements of the programme during 1964 exceed the amount to be delivered monthly by the USSR, India has requested WHO to provide additional vaccine.

WHO/UNICEF assistance has been provided principally in the establishment of facilities for refrigeration and local production of freeze-dried vaccine.

Indonesia

In Indonesia, plans leading to eradication have not yet been formulated, but large-scale vaccination is contemplated. Emergency vaccination programmes have been undertaken in controlling outbreaks of smallpox. The Government is planning to increase production of freeze-dried vaccine in a WHO/UNICEF-assisted project in Bandung. Initial batches of this vaccine have been produced and tested.

Nepal

In the pilot study in the Kathmandu Valley only 56.8 per cent. of the population was vaccinated between March 1962 and October 1963 because community resistance to vaccination has been encountered. The aim of the present project is to develop methods suitable for use in the country as a whole.

Thailand

In Thailand, a country-wide vaccination campaign was launched in 1961 and it has since been maintained; this campaign should last until 1966 (no case recorded in 1963).

EASTERN MEDITERRANEAN REGION

In the Eastern Mediterranean Region three countries, namely Pakistan, Sudan and Yemen, have launched eradication campaigns.

Ethiopia

Ethiopia has not yet developed a plan for eradication though large-scale vaccination has been carried out in some regions.

Pakistan

In East Pakistan smallpox is highly endemic. After a pilot project undertaken from January to August 1961, an eradication campaign began in November 1961 and its first phase was planned to finish in September 1963. Unfortunately, the work was dislocated by a cyclone and floods. It is now planned to have the entire population vaccinated by June 1964 and a programme of surveillance and routine vaccination will then begin.

A large epidemic with 3602 cases and 2581 deaths occurred in the Dacca area in the first half of 1963, in the midst of the eradication programme. The occurrence of this epidemic indicated that systematic vaccination of the Dacca population had not been adequately carried out and showed the necessity for a plan for evaluation and assessment of the programme. WHO is to give assistance in the evaluation and assessment of the campaign in 1964, by providing an epidemiologist and the necessary equipment and supplies.

In West Pakistan, an eradication programme is planned to begin in 1965. In the meantime, the Government has intensified vaccination programmes, particularly in susceptible age-groups such as the new-born and young children.

Saudi Arabia

The Government of Saudi Arabia has approved the plans and allocations for a smallpox eradication project and plans to start it in 1964. The mass vaccination campaigns carried out during the past three years in the pilgrimage zones proved to be effective in controlling the disease.

Sudan

Sudan has had a campaign in progress since 1962. In 1963 in the southern provinces—Upper Nile, Bahr El Gazal and the southern part of the Blue Nile—2 270 494 vaccinations were carried out, with a "take" rate of 84 per cent. However, an appreciable number of the inhabitants were not reached during the campaign. WHO has assisted Sudan in this plan and in the beginning of 1964 a short-term consultant is being provided to advise the Government.

Yemen

In Yemen, after the complete vaccination of Sana'a in 1962, vaccination of other towns followed, and was completed by October 1963. The campaign is now going on in the surrounding villages. The disease is

now absent from the vaccinated areas and no cases have been reported since January 1963 in these localities.

4. Expert Committee on Smallpox

An Expert Committee on Smallpox¹ met in Geneva from 14 to 20 January 1964 and reviewed and carefully analysed the present situation of smallpox in the world and the development of the smallpox eradication programme in the different regions. It discussed the epidemiological and immunological aspects of the disease; diagnostic procedures; available vaccines and vaccination methods; and the recently reported success of certain compounds in the chemoprophylaxis of smallpox.

The Committee stated that the global eradication of smallpox is feasible because the reservoir is man, infection is manifest, carriers do not exist, and successful Jennerian vaccination provides effective immunity. The eradication of smallpox is a matter of concern to all countries as those now free constantly run the risk of the introduction of the disease from endemic areas.

The Committee considered that smallpox eradication implied the elimination of the disease the world over. The term might be applied to continents or large regional areas, but should not be applied to individual countries, especially if they are small and contiguous with endemic areas.

Global eradication will be considered accomplished only when the disease is absent from all countries of the world. Certainty that this has been achieved will depend on adequate case-finding and reporting systems. Global eradication will not be accomplished for years. Until then each country must maintain in its health services a vaccination programme, or apply combined isolation and vaccination measures when the disease is reintroduced.

The Committee reviewed the WHO smallpox eradication programme, with special reference to the activities in India, Pakistan and Ghana, from each of which came a member of the Committee. The Committee was impressed with experience in India which showed clearly the necessity for a concurrent independent evaluation of vaccination programmes and recommended that in all vaccination programmes this requirement should be carefully implemented so as to detect deficiencies, either in population cover or in the efficacy of vaccination, as surely as possible. The need for adequate supplies of potent vaccine in the field was stressed. In this connexion the Committee stated that in hot climates and under conditions of difficult

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1964, 283.

communications freeze-dried vaccine was absolutely essential, since its stability obviated many of the difficulties associated with transport and storage. It also pointed out that recent experience has shown very strongly that for revaccination a vaccine of high potency must be provided and the reaction must be read after about a week and a reinoculation made if the result is negative. Otherwise adequate protection of the population cannot be achieved.

The Committee was of the opinion that campaigns would proceed with a greater hope of success if separated into three definite phases: preparatory, attack and control. The Committee used the term "control" to signify the maintenance of the country free from smallpox.

The preparatory phase should include epidemiological assessment of smallpox; recruitment of personnel and their training; provision for adequate supplies of potent vaccine; provision of transport; health education; preparation when necessary of special legislation; preparation of a detailed plan (which should be submitted to WHO for consideration); definition of the chain of responsibility for the programme from the centre to the periphery of the health services.

In the attack phase, efforts should first be concentrated on areas with high densities of population—whether they be urban, rural or mixed—where the disease persists and from which spread to other areas is likely to occur. After these areas are well protected the maximum effort should be transferred to the contiguous areas. The target must be to cover 100 per cent. of the population and special attention should be paid to the age-groups in which the disease most frequently occurs, as shown by analysis of age-specific attack rates, and in particular to new-born children and pregnant women, in whom the mortality is very high.

After the vaccination campaign in high density areas has been successfully carried out as planned, the control phase¹ should follow. Depending on circumstances, it may be the responsibility of the normal public health services or combined with other special control programmes, such as malaria eradication, or the control of yaws or tuberculosis. In either case an increase in staff will be necessary if this phase is to be successful. New-born children, immigrants and floating populations should be vaccinated and the normal revaccination programme continued. Epidemiological investigations of each outbreak or sporadic case should be undertaken and the spread of the disease controlled by revaccination and other control measures.

The Committee was impressed by the work accomplished so far and expressed its conviction that smallpox eradication could be achieved by this programme. It stated, however, that sustained effort would be required for years before it could be hoped to eradicate smallpox in the major endemic areas where attention must be focused. It recommended close regional co-operation in the planning and execution of national eradication programmes.

The Committee was informed of the discussions which had taken place at recent meetings of the World Health Assembly and the WHO Regional Committee for Europe on the adequacy of the present international requirements, particularly for revaccination. It expressed its opinion on the technical aspects of this problem and sent it for the consideration of the Committee on International Quarantine².

Attention was called to the importance of good reporting and the Committee recommended that all countries continue efforts to ensure prompt and accurate notification of cases and deaths. In selected areas official reporting of the vaccinal status of smallpox cases and the population at risk would be of great value. It also stated in relation to this point that valuable information on the occurrence of spread of the disease could be obtained by epidemiological investigations in affected areas, and recommended that this procedure should be utilized by health authorities as frequently as possible to supplement their notification services.

Differences in the severity of the disease and in case mortality in different areas were noted. They may be explained by differences in the strains of variola virus prevalent in these areas and it was therefore recommended that studies on the laboratory characteristics of variola virus strains from different areas should be intensified and should be combined with clinical and epidemiological observations.

The Committee also reviewed and made recommendations on many technical points relating to vaccine production, laboratory diagnostic techniques, vaccination methods, interpretation of the reaction caused by vaccination, prevention of complications following vaccination, and the organization of comparative field studies on the chemoprophylactic and chemotherapeutic action of certain drugs.

5. Contributions of Smallpox Vaccine to WHO

The Sixteenth World Health Assembly, in its resolution WHA16.37, noting that the implementation of many national eradication programmes was making slow progress owing to inadequacy of national resources, particularly in transport, equipment, and the potent

¹ Sometimes referred to as "maintenance phase".

² See p. 46.

and stable vaccine necessary for tropical and sub-tropical areas, invited Member States to make voluntary contributions to enable the Organization to provide assistance to requesting countries to meet their deficiencies of transport, equipment and vaccine. The Director-General sent, on 19 August 1963, a circular letter calling the attention of Member countries to this resolution and asking for voluntary contributions in cash or in kind.

Following this appeal only one offer was made—one million doses of freeze-dried vaccine by the Netherlands.

In December 1963 it became evident that the amounts of freeze-dried vaccine needed for continuation of the smallpox eradication campaigns in several countries—and especially in India where an intensive country-wide campaign was in full progress—were far greater than the Organization could supply.

A cable stating that 30 million doses of freeze-dried vaccine were urgently required to cover needs from mid-January to the end of April 1964 and appealing for substantial donations of this vaccine was sent to six countries where freeze-dried vaccine was assumed to be produced in large quantities. Later in January 1964 a similar request was sent to another country. To date only one gift, of 4 million doses, has been received from one country (United Kingdom). Some

countries have stated that they are giving consideration to the appeal.

Though stocks of donated vaccine are now exhausted, the following requests from governments have still to be met in 1964:

	Number of doses
Afghanistan	1 000 000
Burma	5 000 000
India	69 000 000
Ivory Coast	500 000
Liberia	200 000
Mali	500 000
Nepal	200 000
Togo	500 000
Upper Volta	1 000 000
Yemen	1 000 000
	78 900 000

To make it possible to implement the global programme approximately 100 million doses of freeze-dried vaccine will have to be made available in each of the years 1964 and 1965. Member countries of the Organization can ensure the success of the programme by donating the amount of vaccine required or by voting funds to enable the Organization to purchase it. The cost of 100 million doses of freeze-dried vaccine may be estimated at about \$1 million.