

SMALLPOX ERADICATION
SURVEILLANCE REPORT

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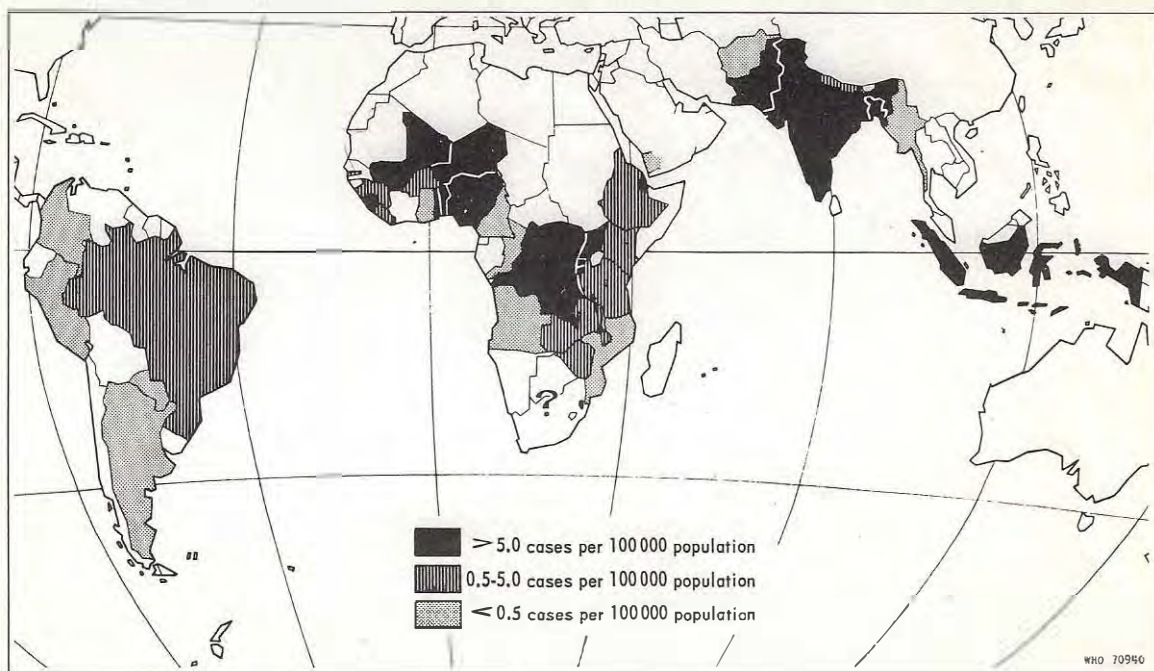
PREFACE

Summarized in this report is information received from national governments, diagnostic and vaccine production laboratories, and other pertinent sources. The report is intended to provide those with a responsibility for smallpox eradication activities a current appraisal of the progress of the global and national smallpox programmes as well as information regarding recent trends of the disease and other developments of particular interest. Information is frequently of a preliminary or provisional character and is subject to revision.

This report will be published initially on a quarterly basis and, in 1968, will be available in both English and French.

Contributions to the report are most welcome. They should be addressed to - Chief, Smallpox Eradication Unit, World Health Organization, Geneva, Switzerland.

SMALLPOX INCIDENCE IN ENDEMIC COUNTRIES CASES PER 100000 POPULATION - 1966



I SUMMARY

Through 5 October, 72,522 cases of smallpox have been reported, an increase of almost 40% over the number of cases reported during a comparable period in 1966. Four countries have recorded an increase of 500 or more cases: India (18,487); Pakistan (5,016); Sierra Leone (1,323) and Brazil (665). Increases in several of these countries are, in part, accounted for by more complete reporting coincident with the development of eradication programmes. Although several smallpox-free countries have experienced importations of disease, no additional countries have become endemic during 1967. Eradication programmes are now in progress in over half of the endemic countries.

Brief summaries of several recent assessment surveys are provided as indications of the different types of surveys which may be carried out.

A Scientific Group on Smallpox Eradication met in Geneva in October to consider the methodology and strategy of the programme. Its report will be available early in 1968. An Inter-Regional Seminar for countries in Asia will be held in Bangkok in mid-December.

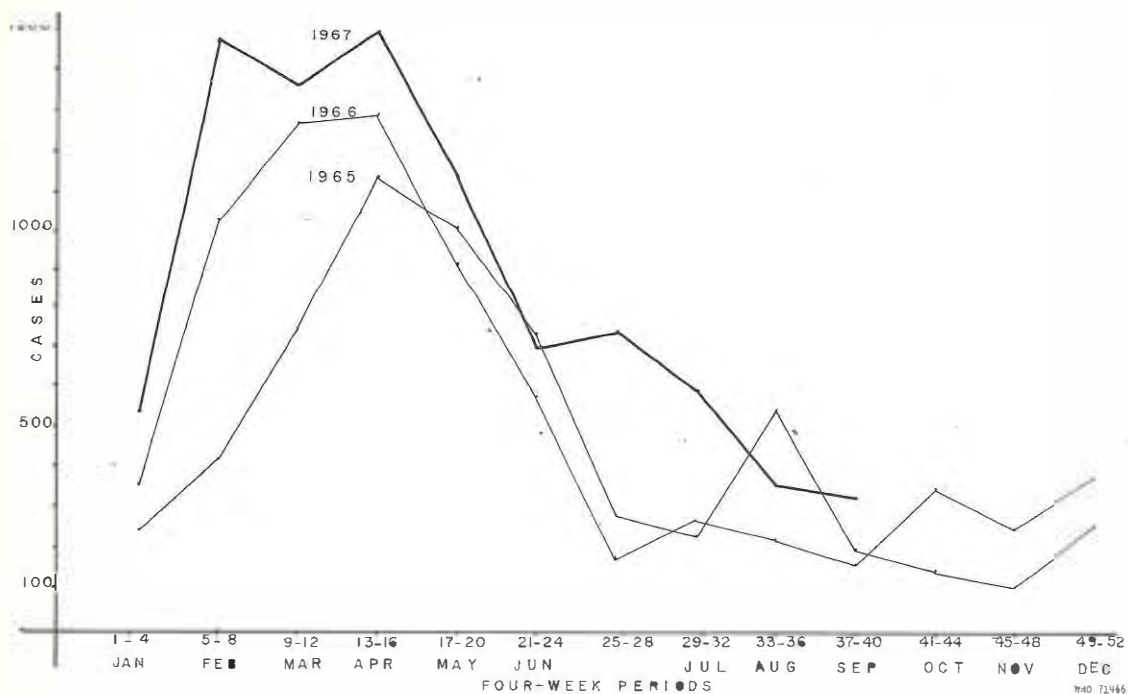
SMALLPOX CASES BY CONTINENT, 1959 - 1967 (SE Unit Data)

	1959	1960	1961	1962	1963	1964	1965	1966	1967*
AFRICA									
North	41	7	8	1	-	-	-	-	-
West - Central	9,536	11,239	18,047	17,034	6,700	3,583	6,236	7,559	8,811
South - East	6,730	5,577	8,005	7,294	10,163	8,923	10,548	6,568	3,235
AMERICA									
North & Central	-	-	-	1	-	-	-	-	-
South	5,488	8,021	9,065	9,827	7,202	3,621	3,484	3,565	2,389
ASIA	71,309	39,843	53,958	63,570	98,784	43,537	39,202	50,527	58,082
EUROPE	15	47	24	136	129	-	1	71	5
OCEANIA	-	1	-	-	-	-	-	-	-
TOTAL	93,119	64,735	89,107	97,863	122,978	59,664	59,471	68,290	72,522

* First 40 weeks - information received through 15 November

II SMALLPOX INCIDENCE BY REGION

WEST AND CENTRAL AFRICA



REPORTED CASES OF SMALLPOX (Data submitted to WHO through 15 November)

	Four-week period ending										TOTAL	Same Period 1966
	Jan. 28	Feb. 25	Mar. 25	Apr. 22	May 20	Jun. 17	Jul. 15	Aug. 12	Sept. 9	Oct. 7		
Cameroon	1	2	-	-	-	-	-	26	-	-	29	3
Cent. Afr. Rep.	-	-	-	-	-	-	-	-	-	-	-	-
Chad	-	-	1	3	-	-	38	44	-	-	86	-
Congo (Braz.)	-	-	-	-	-	-	-	-	-	-	-	2
Dahomey	45	177	55	78	78	64	79	80	81	64	801	379
Equ. Guinea	-	-	-	-	-	-	-	-	-	-	-	-
Gabon	-	-	-	-	-	-	-	-	-	-	-	-
Gambia	-	-	-	-	-	-	-	-	-	-	-	3
Ghana	1	-	-	2	15	12	1	1	11	41	84	12
Guinea	2	25	6	44	15	24	154	100	2	12	384	45
Ivory Coast	-	-	2	-	-	-	-	-	-	-	2	-
Liberia	-	3	1	-	-	-	-	1	-	-	5	25
Mali	3	3	66	31	13	-	-	19	1	28	164	266
Mauritania	-	-	-	-	-	-	-	-	-	-	-	-
Niger	99	324	212	224	40	37	88	12	17	16	1,069	883
Nigeria	370	842	940	771	858	337	153	93	86	36	4,486	4,509
Port. Guinea	-	-	-	-	-	-	-	-	-	-	-	-
Senegal	-	-	-	-	-	-	-	-	-	-	-	-
Sierra Leone	8	60	83	280	112	214	218	193	160	118	1,446	123
Togo	8	44	3	12	9	14	18	19	13	28	168	48
Upper Volta	1	-	1	52	7	8	1	16	1	-	87	68
TOTAL	538	1,480	1,370	1,497	1,147	710	750	604	372	343	8,811	6,366

During the first 40 weeks, 8,811 cases were reported from countries of West and Central Africa, an increase of 38% over the comparable period in 1966. This increase was observed despite an absence of reports from Eastern Nigeria during recent months. In most countries, however, there is believed to be more complete reporting coincident with the development of eradication programmes. The most heavily afflicted country has been Sierra Leone which has reported 1,445 cases thus far this year compared to 123 during the same period in 1966. Attack rates in Sierra Leone are currently the highest in the world.

	Population (est.1967)	Cases	Attack Rate per 100,000
Western area	212,000	28	13.2
Northern province	976,000	671	68.8
Southern province	589,000	306	52.0
Eastern province	596,000	440	73.8
TOTAL	2,373,000	1,445	60.9

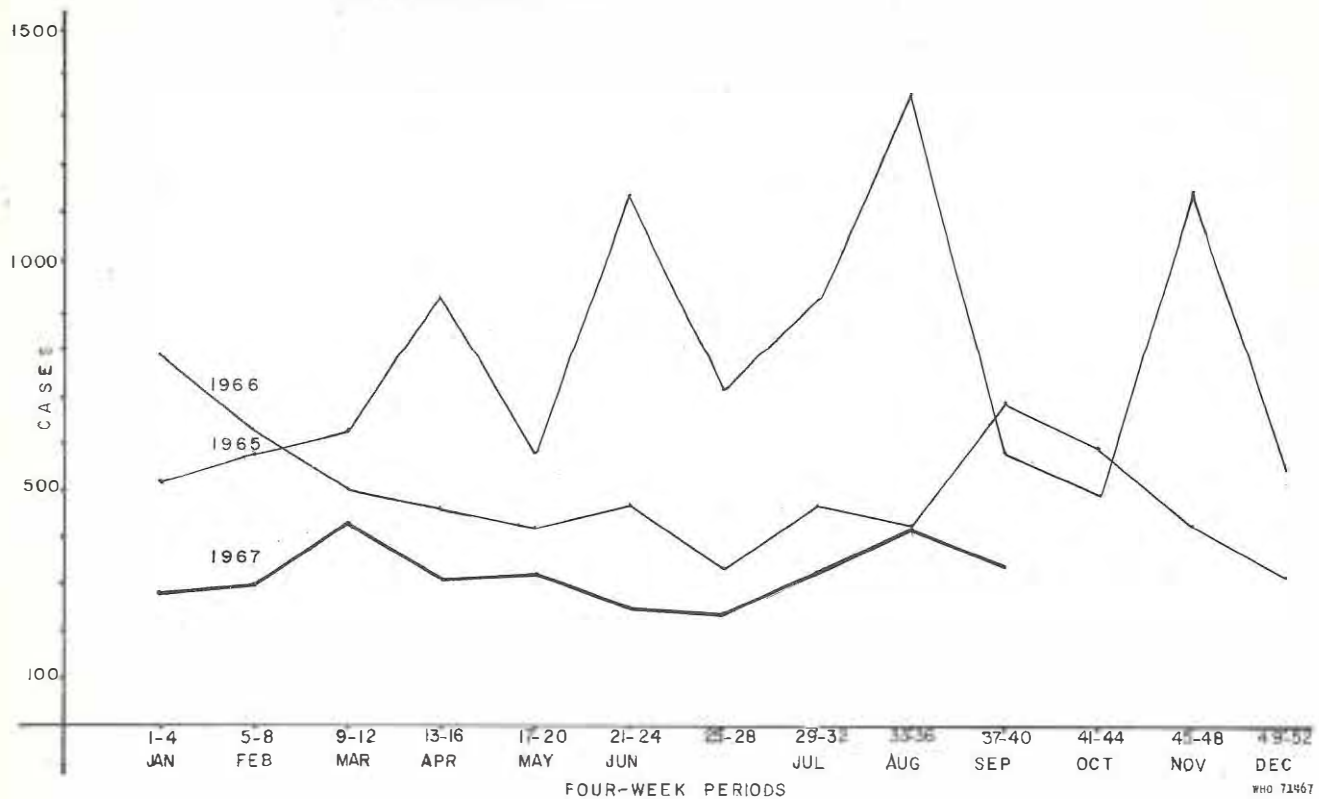
Progress in Vaccination Programmes

Smallpox Eradication Programmes were initiated early in 1967 in most countries of this Region, and are expected to be operative in all by the close of the year. Assisted by United States bilateral aid, most programmes are being carried out by mobile teams employing jet injectors; measles vaccine is being administered simultaneously. Through September, almost 15 million vaccinations were reported to have been performed.

Country	Population (in 000's) (est.1967)	Smallpox Vaccinations		Per cent relative to population
		January - August		
Cameroon	5,410	1,220,320		22.6
Cent.Afr.Rep.	1,401	227,252		16.2
Chad	3,467	874,053		25.2
Dahomey	2,475	460,006		18.6
Gabon	478	96,947		20.3
Gambia	350	105,907		30.3
Ghana	8,180	635,749		7.8
Ivory Coast	4,060	1,039,121		25.6
Mali	4,798	533,982		11.1
Niger	3,585	1,117,045		31.2
Nigeria	59,823	3,583,647		6.0
Togo	1,717	516,714		30.1
Upper Volta	5,139	1,323,531		25.8
TOTAL	100,883	11,734,274		11.6

Reports not yet available, or systematic programmes not yet begun in Congo (Brazzaville), Guinea, Liberia, Mauritania, Senegal, and Sierra Leone.

EAST AND SOUTH AFRICA



REPORTED CASES OF SMALLPOX (Data submitted to WHO through 15 November)

	Four-week period ending										TOTAL	Same Period 1966
	Jan. 28	Feb. 25	Mar. 25	Apr. 22	May 20	Jun. 17	Jul. 15	Aug. 12	Sept. 9	Oct. 7		
Angola	-	-	-	-	-	-	-	-	-	-	-	3
Botswana	-	1	-	-	-	-	-	-	-	-	1	-
Burundi	-	14	-	-	1	-	1	-	1	2	19	231
Congo (D.R.)	87	71	233	130	195	62	70	80	144	91	1,163	1,432
Ethiopia	48	46	54	23	28	27	34	16	10	46	332	134
Fr. Somaliland	-	-	-	-	-	-	-	-	-	-	-	52
Kenya	9	5	6	7	2	8	1	-	1	3	42	139
Lesotho	-	-	-	-	-	-	-	-	-	-	-	-
Malawi	2	1	-	-	3	2	1	10	3	1	23	44
Mozambique	-	1	1	-	-	-	-	7	64	3	76	19
Rwanda	-	-	-	-	-	-	-	-	-	-	-	-
Somalia	-	-	-	-	-	-	-	-	-	-	-	-
S. Rhodesia	-	2	-	-	2	-	-	6	-	3	13	32
Sudan	-	-	-	-	-	-	-	3	-	-	3	-
Swaziland	-	-	-	-	-	-	1	-	-	-	1	28
Tanzania	108	136	120	140	75	113	81	109	143	160	1,185	2,554
Uganda	31	26	16	11	15	35	52	78	48	31	343	493
U. of S. Africa	No reports received											
Zambia	-	-	2	2	-	-	2	21	7	-	34	57
TOTAL	285	303	432	313	321	247	243	330	421	340	3,235	5,218

During 1967, smallpox cases in East and South Africa during each four-week period have consistently been lower than during the comparable periods in 1965 and 1966. With the exception of Mozambique and Ethiopia, all countries have reported fewer cases than during 1966. The status of smallpox in the Union of South Africa is unknown since the last report received by WHO from this country was in 1965. Since smallpox cases were regularly reported by South Africa through 1965, it is assumed to be still endemic.

Smallpox eradication programmes, assisted by WHO, have begun in the Congo Democratic Republic and the Sudan, and are expected to begin within a few months in Zambia, Tanzania and Burundi.

Sudan

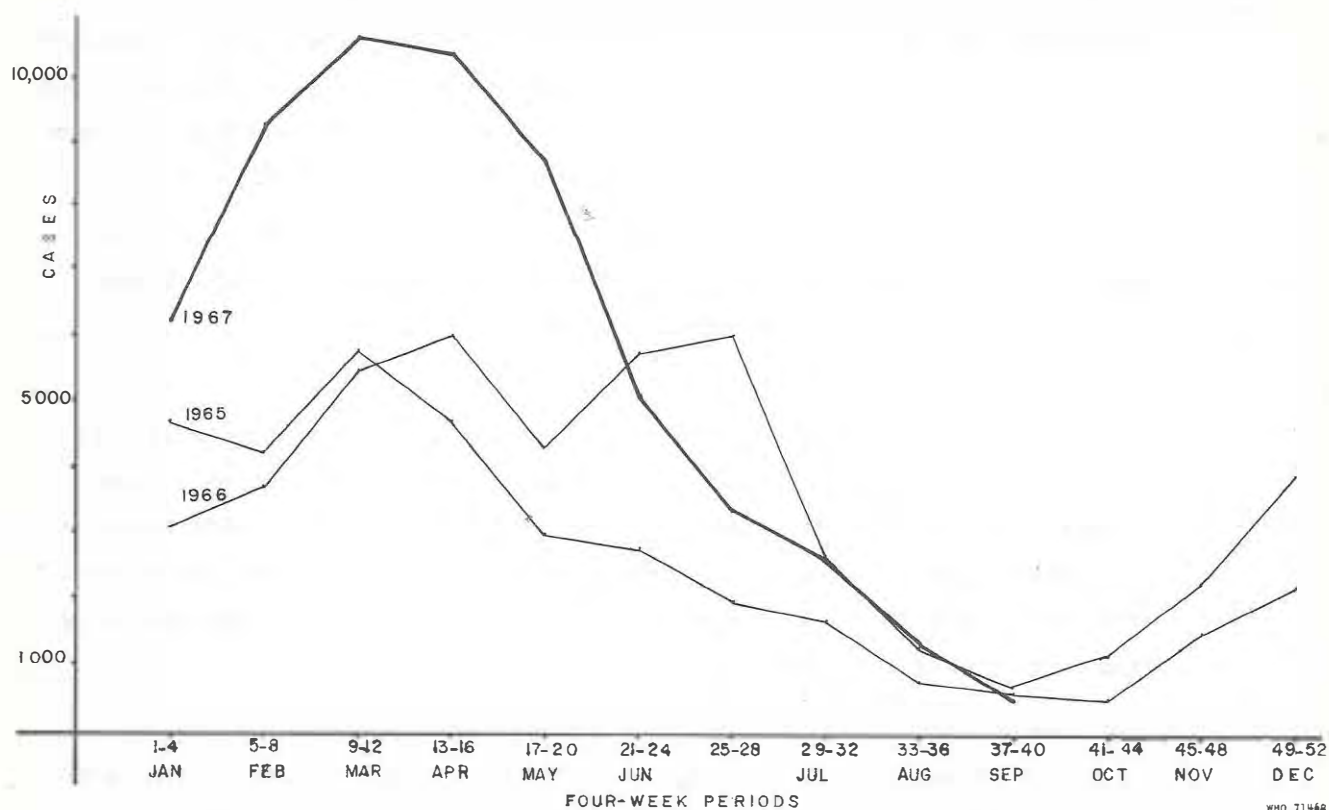
In Sudan, a systemic programme of vaccination is being initiated this year with WHO support. Although not presently endemic, it shares a common border with the smallpox endemic countries of the Congo Democratic Republic, Ethiopia, Kenya and Uganda. The continuing risk of importation was evident when on 16 July a case of smallpox was diagnosed in Khartoum followed by two additional cases resulting from family contact.

The occurrence of these cases stimulated the initiation of a mass programme of vaccination throughout Khartoum Province. During just 20 working days, 19 August to 10 September, 717,904 in an estimated population of 792,600 (90.6%) were vaccinated. In all, 270 vaccination teams and 30 public transport lorries were employed. Each team consisted of two vaccinators and one recorder. Among those under the age of 5, over three-fourths received primary vaccinations attesting to the low level of immunity in this group. Overall, 37% of vaccinations performed were primary vaccinations.

Freeze-dried vaccine, donated to WHO by the USSR, was employed in the programme. Despite limited time to train vaccinators, assessment of 7% of all vaccinations performed revealed that 85.7% of children under 5 years had successful primary takes; major reactions were observed in 75.5% of revaccinees over 20 years of age.

It is expected that, with improved training of vaccinators, the proportion of successful takes will be increased. The operational and assessment phases are being studied in an effort to increase the daily number of vaccinations performed by each vaccinator and to improve the assessment mechanism.

ASIA



REPORTED CASES OF SMALLPOX (Data submitted to WHO through 15 November)

	Four-week period ending										TOTAL	Same Period 1966
	Jan.28	Feb.25	Mar.25	Apr.22	May 20	Jun.17	Jul.15	Aug.12	Sept.9	Oct. 7		
Afghanistan	8	14	6	1	3	13	16	2	8	7	78	66
Burma	-	-	-	-	-	-	-	-	-	-	-	6
Ceylon	-	-	-	-	-	-	-	-	-	-	-	-
India	4,924	8,083	9,609	8,637	6,835	3,486	1,904	1,184	626	272	45,560	27,073
Indonesia	73	128	70	111	266	357	876	937	479	175	3,472	7,446
Iraq	-	-	-	-	-	-	-	-	-	-	-	1
Kuwait	-	-	-	12	29	-	-	-	-	-	41	-
Malaysia	-	-	-	-	-	-	-	-	-	-	-	4
Nepal	73	-	-	-	-	57	14	-	-	-	144	336
E. Pakistan	107	355	593	1,424	1,310	777	343	218	92	-	5,219	2,385
W. Pakistan	1,012	671	261	128	243	387	404	286	137	26	3,555	1,373
Trucial Oman	-	-	7	1	-	2	-	-	-	-	10	-
Yemen	-	3	-	-	-	-	-	-	-	-	3	1
TOTAL	6,197	9,254	10,546	10,314	8,686	5,079	3,557	2,627	1,342	480	58,082	38,691

During the first 40 weeks in 1967, countries in Asia reported 58,082 cases compared to 38,691 during the same period in 1966, an increase of almost 50% over last year. The final total of cases for 1967 in Asia is expected to exceed 75,000, the highest since 1963 when 98,784 cases were reported. Although it would appear from the figure that the recent incidence has declined to levels observed in the previous year, delayed reports are expected to significantly increase recent provisional four-week totals. Of nine countries having reported cases during 1967, only five are believed to be currently endemic - Afghanistan, India, Indonesia, Nepal and Pakistan. India and Pakistan have both experienced widespread major epidemics this year. The total of cases in India, in fact, represents 63% of all cases reported throughout the world.

Burma, which commenced an eradication programme 3 years ago has reported no cases during 1967, its first smallpox-free year in recorded history. Recent surveys conducted in other South East Asian countries confirm that, with the exception of Indonesia, all areas east of Burma are now smallpox-free.

Eradication programmes, assisted by WHO, are in progress in Afghanistan and Nepal; programmes will commence in Indonesia and East and West Pakistan early in 1968.

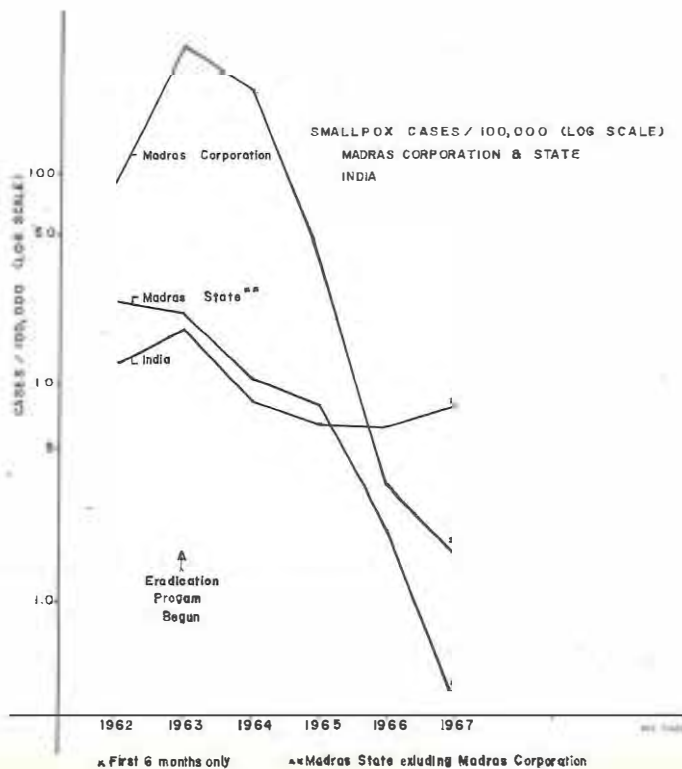
India Programme

Major epidemics of smallpox this year have swept through many of India's northern and northwestern states. To date, 45,560 cases have been reported in India, and over 60,000 cases can be expected by the end of 1967 based on past years' experience. This total represents the greatest number of cases since 1958 with the single exception of 1963 when 83,423 cases were recorded. Two-thirds of all cases have occurred in three of India's 27 states and Union Territories. These states, Maharashtra, Bihar and Uttar Pradesh, account for only one-third of the population in India.

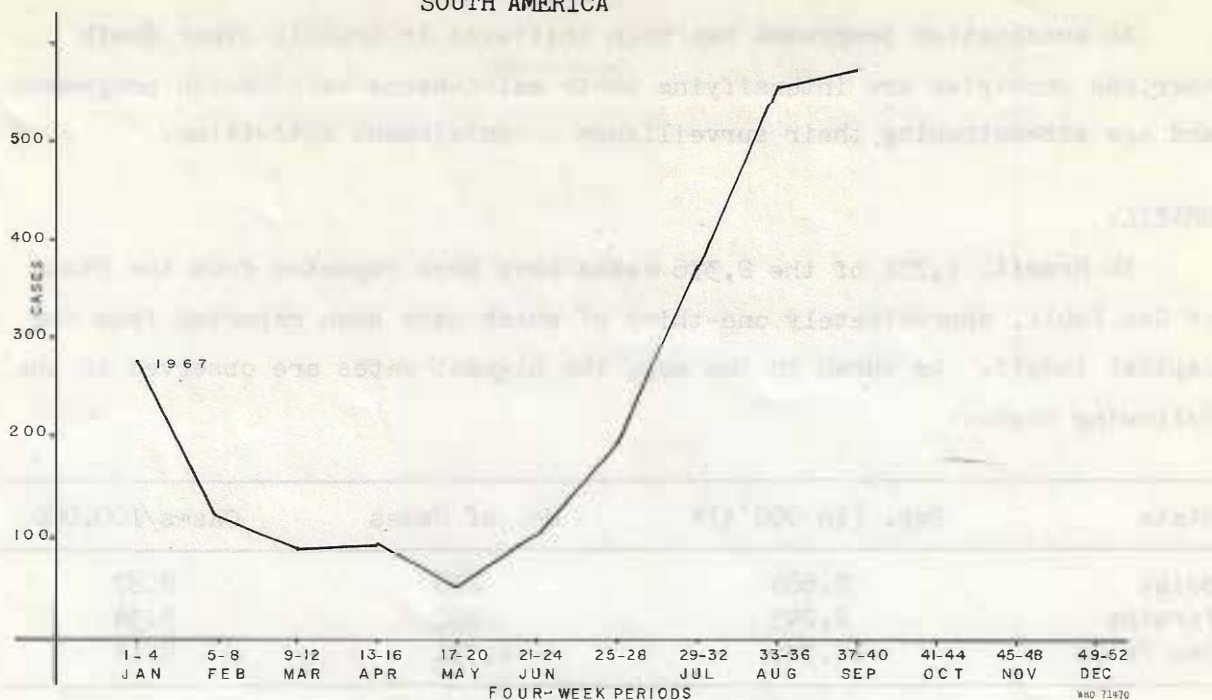
A programme of smallpox eradication commenced in India late in 1962 and was extended nation-wide early in 1963. Through August of 1967, 537 million vaccinations had been performed in a population which in 1967 numbered 511 million. Unfortunately, inadequate supervision was provided with the result that many problems have hampered the programme including frequent revaccination of readily accessible groups such as school children, with failure to vaccinate newborns and migrants. Thus, although sufficient vaccinations were performed

to have accomplished eradication, an insufficient proportion of the population has been vaccinated with fully potent vaccine.

The most successful programme to date has been carried out in Madras State. This State of 37 million persons, until 1965, experienced smallpox rates which were higher than those experienced in India as a whole. Madras Corporation (population 2 million) consistently exceeded the rates observed in the State. However, an intensive, carefully supervised programme of vaccination coupled with an active case reporting and containment activity has dramatically lowered the smallpox incidence. Shown on the log-graph are rates per 100,000 population for 1962-1967 for India, Madras State (exclusive of Madras Corporation) and for Madras Corporation. In Madras Corporation, cases of smallpox decreased from 2,399 in 1963 to 67 in 1966 and 34 during the first six months of 1967. (The maximum smallpox incidence consistently occurs during the first portion of the year.) In these same periods, cases in Madras State as a whole declined from 8,901 to 789 to 162. The wards of the Madras Infectious Disease Hospital, which have always held 100 to 400 or more patients and were so frequently visited by clinicians from non-endemic countries to study smallpox, are now vacant for weeks to months at a time.



SOUTH AMERICA



REPORTED CASES OF SMALLPOX (Data submitted to WHO through 15 November)

	Four-week period ending										TOTAL	Same Period 1966
	Jan. 28	Feb. 25	Mar. 25	Apr. 22	May 20	Jun. 17	Jul. 15	Aug. 12	Sep. 9	Oct. 7		
Argentina	2	4	1	1	-	-	-	-	-	-	8	5
Bolivia	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	283	117	90	94	51	103	187	373	506	572	2,376	1,711
Chile	-	-	-	-	-	-	-	-	-	-	-	-
Colombia	-	-	-	-	-	-	5	-	-	-	5	7
Ecuador	-	-	-	-	-	-	-	-	-	-	-	-
Br. Guiana	-	-	-	-	-	-	-	-	-	-	-	-
Fr. Guiana	-	-	-	-	-	-	-	-	-	-	-	-
Paraguay	-	-	-	-	-	-	-	-	-	-	-	5
Peru	-	-	-	-	-	-	-	-	-	-	-	16
Surinam	-	-	-	-	-	-	-	-	-	-	-	-
Uruguay	-	-	-	-	-	-	-	-	-	-	-	-
Venezuela	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	285	121	91	95	51	103	192	373	506	572	2,389	1,744

Through 7 October, 2,389 cases were reported from South America of which all but 13 occurred in Brazil. This represents an increase of approximately 40% over the number of cases reported during the comparable period in 1966. The increase may, in part, result from improved reporting coincident with the development of an eradication programme. Paraguay and Peru have reported to date no cases during 1967; the 8 cases in Argentina represent discrete outbreaks in the Northern States resulting from importations from Brazil.

An eradication programme has been initiated in Brazil; other South American countries are intensifying their maintenance vaccination programmes and are strengthening their surveillance - containment activities.

BRAZIL:

In Brazil, 1,331 of the 2,376 cases have been reported from the State of Sao Paulo, approximately one-third of which have been reported from the capital itself. As shown in the map, the highest rates are observed in the following states:

State	Pop. (in 000's)*	No. of Cases	Cases/100,000
Goiás	2,684	238	8.87
Paraíba	2,245	120	5.34
Sao Paulo	16,381	1,331	8.14

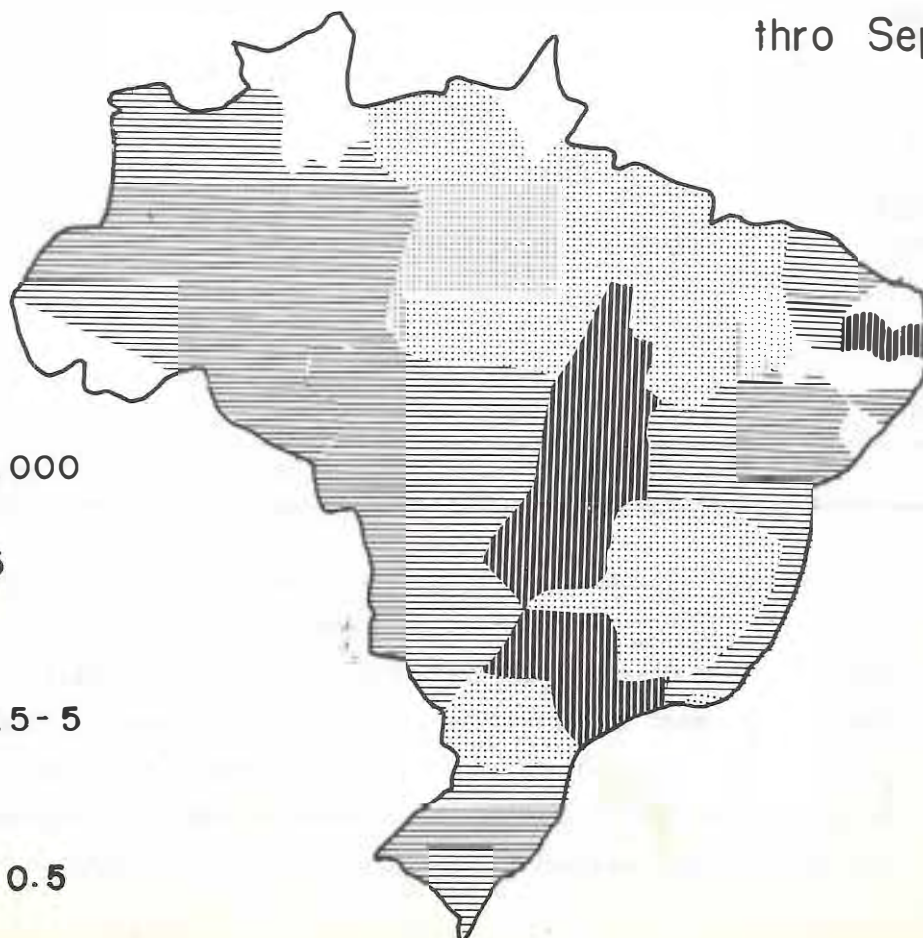
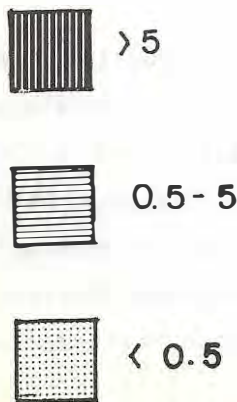
* Mid-year estimate for 1967

BRAZIL

Smallpox Incidence per 100,000

thro Sept. 1967

CASE S/ 100,000



The importance of vaccinating pre-school and school age children in the eradication programme is illustrated by the age and sex distribution of cases observed in two recent outbreaks which occurred in Northeastern Brazil (Goias and Paraiba States):

Age	Goias			Paraiba		
	Male	Female	Total	Male	Female	Total
Under 1	3	3	6	2	2	4
1 - 4	17	4	21	4	6	10
5 - 14	10	15	25	11	22	33
15 - 29	3	4	7	7	6	13
30 and over	6	4	10	6	4	10
unknown			1	2	1	3
	<u>39</u>	<u>30</u>	<u>70</u>	<u>32</u>	<u>41</u>	<u>73</u>

In both outbreaks, approximately two-thirds of all cases occurred in children below the age of 15 years. Pre-school children in Goias accounted for a much greater proportion of the total than in Paraiba (39% contrasted to 19%).

Reported by the Brazilian Ministry of Health, Campaign for the Eradication of Smallpox, in the Weekly Bulletin of Smallpox Notifications.

III SPECIAL REPORTS

A. A PILOT ASSESSMENT PROJECT - KANO, NIGERIA

Concurrent assessment surveys are designed (1) to estimate the vaccination coverage by age, and (2) to measure vaccination efficacy by an estimate of "take rates". As noted in the Manual on Smallpox Eradication, this is done most practicably among pre-school primary vaccinees.

Two pilot mass vaccination campaigns were conducted in Kano Province, Nigeria, in April; assessment surveys in urban and rural areas were conducted ten days afterwards. These surveys were designed to evaluate techniques in the Nigerian programme. Data were sought which would permit estimation of coverage rates for age groups of less than 6 months, 6 months - 3 years, 4 - 14, 15 - 44, and 45+ years. Vaccination takes were read in children under age 4.

For this pilot study, a team consisted of one interviewer, a local employee of the Nigerian programme and one observer, a member of the U.S. National Communicable Disease Center Advisory Staff.

Description of Selected Areas

Kano-Urban

To assure a reasonable estimate of the coverage rate, a sample including at least 200 children under age 4 was felt necessary. Since preliminary estimates indicated an average of 1.3 children of this age group per household, a sample of 150 households was taken. These households were selected in 25 different segments of the city.

Using a city street map, the urban area in Kano City was divided into 5 major geographic sections of approximately equal population using paved streets as boundaries. A further subdivision was made along unpaved roads to yield 5 minor geographic sections within each major section or 25 geographic sections in all. Each minor geographic section in the city consists generally of several large compounds surrounded by a wall; within the confines of the wall are several smaller compounds. These smaller compounds were defined as households. Fifty large compounds were randomly selected (two within each minor geographic section) and three households were taken from each compound.

Kano-Rural

A portion of the Dawakin Tofa District of Kano Province was selected for the rural pilot project. This agricultural area is located approximately 30 miles southwest of Kano. Seven villages were in the assessment area and all were located within an area ten to twelve miles in diameter. The area was geographically stratified by village. In each village, interviews were conducted in all compounds as the village populations were not large enough to warrant sampling, i.e., the estimated number of households in each village was less than 200.

Results of Surveys

The interview questionnaire (Figure) was discussed in detail during an interview-training session of 3 hours held prior to each survey. Interview techniques were quickly understood and, as field experience was gained, detailed supervision was unnecessary. The assessors, however, experienced difficulty in evaluating vaccination reactions and it was apparent that special training in this phase was required for future surveys. Visual aids such as a pictorial series of clinical reactions would be helpful; special field training in evaluation of cutaneous reactions would also have value.

An average of 125 households per day per assessor could be contacted in rural areas, whereas an average of 50 households per day per assessor was obtained in the urban area. In part, this was due to an extension of the "work-day" in the rural area to 10-12 hours as compared with 7-8 hours in the urban area. In addition, effective village organization under the cooperative leadership of village chiefs permitted more rapid assembly of respondents.

In urban areas, one truck was adequate for many assessors if used to "shuttle" teams to sample points from which they could "work back" to the headquarters on foot. In the rural area, assessment teams were driven to selected villages but transportation between sampled households was by foot. In the future, one bicycle or motorbike per assessor will be necessary for transport between sampled villages, once teams are delivered to a District by truck.

The estimated overall vaccination coverage was 72.4% in the urban area and 92.5% in the rural area. Age specific differences in the percent vaccinated (Table) were observed especially in the urban area. These rates ranged from a low of 67.3% in the 15-44 age group to a high of 84.1% in the 6 months - 3 years age group. (In the 45+ age group, 27 people were queried of whom 18 were vaccinated.) In the rural area, survey results revealed a vaccination coverage rate ranging from 75.0% among those less than 6 months of age to 94.8% among those in the 4-14 year age group.

Comparison of Percent Vaccinated in
Urban and Rural Areas by Age, Kano, Nigeria

Age Group	Percent Vaccinated	
	Urban Area	Rural Area
Less than 6 months	*	75.0
6 months - 3 years	84.1	90.4
4 - 14 years	80.7	94.8
15 - 44 years	67.3	93.2
45+ years	*	92.0
TOTAL	72.4	92.5

* Number in sample too small for meaningful interpretation

Field observations showed that the training of the assessors was insufficient to obtain reliable estimates of "take rates" in the urban assessment. During the rural assessment, primary reactions were evaluated among those 6 months to 3 years of age; the overall "take rate" was 94.2%. The largest village, Yawla, had the lowest "take rate" (87.0%), while the remaining 6 villages had "take rates" ranging from 95.0% to 98.8%.

Although problems were encountered in this first assessment, the methodology seemed workable and the interviewing and sampling procedures were performed by the assessors in a satisfactory fashion. As more experience is gained, efficiency will most certainly increase.

Reported by Dr E. Ademola Smith, Director, Nigerian Smallpox-Measles Program; Dr P. O. Adeoye, Director, Smallpox-Measles Unit, Northern Region, Nigeria, and C. J. Jones, Operations Officer, U.S. National Communicable Disease Center, Officer in Smallpox Eradication Report, U.S. National Communicable Disease Center, September 1967.

B. ASSESSMENT BY MARKET SURVEYS - UPPER VOLTA, IVORY COAST

Markets, in many parts of the world and particularly in many African countries, are important socially and economically. The mixing of large numbers of persons from different areas make these potentially important also as sites for the transmission of smallpox.

Periodic assessment of the vaccination status of those attending markets is thus of value in the conduct of an eradication programme. Such surveys may be rapidly and easily performed. How the results obtained correlate with the overall vaccination status in the area will depend on the nature of the vaccination programme, the characteristics of people attending markets, season of the year, and other factors which must be examined in each different area.

During July, market surveys were undertaken in six areas in the Ivory Coast and Upper Volta. The techniques, problems and findings in these surveys are described.

As a first step, the structure and internal organization of the market were determined and an estimate made of the size of the market population. A sampling interval was selected based on the total population of the market which would yield a sample of approximately 500 persons. The sampling unit was defined as the individual stall or seller and all those engaged in business or conversation at this site.

The sample population was classified by age and sex and presence or absence of a vaccination scar. Two of the surveys obtained information as to residence of each of the persons according to the following classification: (1) "Local" - living in the market town; (2) "Environs" - those living outside the town but within 20 kilometres and (3) "De Passage" - those living more than 20 kilometres distant.

Using two interviewing teams, it was possible to survey a market in two to three hours. Each team consisted of two persons.

Two particular problems occurred which deserve mention. First, sampling of children between 5 and 14 years was difficult. These children roamed widely through the market and were rarely included in the sample population as either buyers or sellers at a stall. Many clustered around the assessment team out of curiosity. In addition to the probable bias introduced by

selecting children who clustered around the survey team, it was difficult to be certain that the same children were not included on several occasions. The second problem related to the identification of scars. In some instances, it was difficult to determine whether or not certain scars might have been introduced by trauma or burns or by BCG vaccination. Fortunately, from the standpoint of the survey, BCG vaccination was uncommon in the areas surveyed, so that the errors introduced due to misreading were probably minimal.

The combined results of three surveys in each of the two countries are shown below:

Age	Ivory Coast		Upper Volta	
	No. Surveyed	% with vaccination scars	No. Surveyed	% with vaccination scars
< 1	62	36	59	34
1-4	132	73	92	62
5-14	192	91	149	90
15-44	843	89	1,121	89
45+	42	81	165	62
TOTAL	1,271	85	1,586	83

Vaccination rates for those 5 to 44 years of age are observed to be satisfactory; the rates for those under 5 and for older adults in the Upper Volta surveys are lower than desirable. As may be observed, the number of adults included in the survey is disproportionate to the age distribution of the population.

In summary, it was clear that market surveys could be conducted rapidly and easily. Further refinements in methodology are required. Plans are being developed to conduct simultaneous market surveys and cluster sample surveys throughout communities to compare results obtained.

Reported in U.S. National Communicable Disease Center
Smallpox Eradication Program Report, November 1967.

C. ASSESSMENT SURVEY - LAOS

In September, the Ministry of Health of Laos, in cooperation with WHO, undertook a survey of selected village populations in Northern Laos to determine the status of immunity induced by vaccination and to ascertain, through observation for pock marks and interviews of medical and village authorities, whether or not smallpox might have been occurring in recent years in these areas. Villages in three provinces were surveyed, principally by house-to-house visits. Surveys were conducted in Houa Khong Province, proximate to the borders of Thailand and Burma; Luang Prabang Province in which there is a large number of refugees; and Vientiane Province which is best serviced by dispensaries and other health facilities.

Recent Smallpox in Laos

No smallpox has been recorded in Laos since 1953. In the course of the survey, during which 15,000 persons were examined, only two individuals with pock marks were observed. Both had experienced smallpox in 1946, and one had been partially blinded by the disease. Discussions with medical authorities and village leaders and examination of hospital records revealed no evidence of smallpox in Laos since 1953.

Vaccination Status of Population

Results of the vaccination scar surveys in each of the provinces are shown below:

Age	<u>Province</u>								
	<u>Houa Khong</u>			<u>Vientiane</u>			<u>Luang Prabang</u>		
	No. exam.	No. with vac.scar	%	No. exam.	No. with vac.scar	%	No. exam.	No. with vac.scar	%
0-4	913	37	4	1,170	126	11	2,826	257	9
5-14	1,757	1,037	59	2,682	1,984	74	2,894	2,340	81
15+	1,438	1,117	78	710	662	93	796	654	82

Although the proportion with scars of vaccination is higher in Vientiane and Luang Prabang, in no area was a sufficient proportion of the population vaccinated. The very large reservoir of highly susceptible pre-school age children in all areas would suggest that successful revaccination had been

relatively rare in recent years or had been unsuccessful. Thus, many in the older groups with a vaccination scar could be assumed to be susceptible as a result of waning immunity. The use of liquid vaccine in recent years undoubtedly accounted for some of these results.

Conclusion

The absence of scars of smallpox in this highly susceptible population suggests that smallpox has not been endemic in Laos for some years. In view of the proximity of Laos to endemic smallpox areas, a higher level of immunity in the population is necessary.

With support from WHO, a systematic programme of vaccination will be undertaken in 1968, employing freeze-dried vaccine; surveillance measures will be strengthened.

Reported by Dr Thongphet Phetsiriseng, Director of Hygiene, Ministry of Health, Laos, and Dr Stephen Falkland, Smallpox Eradication Unit, WHO.

D. FIELD STUDIES WITH THE BIFURCATED NEEDLE

Dr Ataur Rahman, Institute of Public Health, Dacca, has reported the results of a limited trial employing the bifurcated needle and freeze-dried vaccine in multiple puncture vaccination. A comparison was made between 15 and 30 strokes with the needle:

Years since previous vaccination	<u>30 strokes</u>			<u>15 strokes</u>		
	No.	Major reactions	%	No.	Major reactions	%
1	36	7	19	30	3	10
1-2	12	7	52	21	5	24
2-3	18	12	66	17	7	41
3-4	17	12	76	12	8	67
4-5	7	6	86	8	7	87
5	2	2	-	4	4	-

The proportion of major reactions among those vaccinated four or more years previously was approximately the same whether 15 or 30 strokes were used. For those vaccinated less than 4 years before, a somewhat higher proportion of takes was observed among those receiving 30 strokes.

This study suggests that the bifurcated needle employed for multiple puncture vaccination produces excellent take rates in recent revaccinees, the group in whom it is most difficult to obtain satisfactory takes. If these results are borne out in subsequent larger scale studies, the use of the recommended 15 strokes for vaccination in the field would seem quite reasonable bearing in mind that those previously vaccinated during the preceding 3 to 4 years are already highly immune and the fact that the use of 15 strokes is operationally more practical.

E. IMMUNITY FOLLOWING VACCINATION OF THE NEWBORN

Newborn vaccination, which is increasingly being practised in the endemic countries, has been shown in several studies to be a safe procedure. Espmark,* further, has shown that the neutralizing antibody level induced does not differ from that observed when vaccination is delayed until the child attains 3 or 4 months of age. Studies are now in progress to determine the persistence of serological immunity so induced.

Dr A. R. Rao, Health Officer, Corporation of Madras, India, reports that in his carefully documented studies of family contacts of smallpox patients, he has now observed, over a two-year period, 36 children who were vaccinated in infancy and subsequently exposed to smallpox in the family. Of the 36, 4 did not develop a primary take. Three of these 4 children contracted smallpox and died. Of the 32 in whom a take was observed, 3 developed smallpox but all were modified, discrete cases.

* Espmark, J. A. and Rabo, E. (1965) Smallpox vaccination studies with serial dilution of vaccine. III Comparison of take rates in two age groups of infants. Acta paediat. scand., 54, 149-154

IV MEETINGS

A. SCIENTIFIC GROUP ON SMALLPOX ERADICATION

A Scientific Group on Smallpox Eradication met in Geneva on 17 - 24 October. Members of the Group were as follows:

Professor A. W. Downie, Emeritus Professor of Bacteriology,
University of Liverpool, England. (Chairman)

Dr J. A. Espmark, Head, Department of Virology, National
Bacteriological Laboratory, Stockholm.

Dr F. C. Grant, Director of Operations, Ministry of Health,
Ghana.

Dr Colin Kaplan, Head, Virus Vaccine Department, The Lister
Institute, England.

Dr S. S. Marennikova, Chief, Laboratory of Smallpox Prophylaxis,
Moscow. (Vice-Chairman)

Dr J. D. Millar, Chief, Smallpox Eradication Program,
U.S. National Communicable Disease Center.

Dr David Palais, Chief, Smallpox Eradication Programme,
Ministry of Health, Argentina.

Dr M. F. Polak, Chief, Epidemiological Service, Rijks Instituut,
Netherlands. (Rapporteur)

Dr Md. Aatur Rahman, Deputy Director for Biological Production,
Institute of Public Health, East Pakistan.

Dr A. Ramachandra Rao, Health Officer, Corporation of Madras,
India.

Dr A. S. Benenson, Professor of Epidemiology, Jefferson Medical
College, USA, and Dr H. M. Gelfand, Smallpox Eradication Program,
U.S. National Communicable Disease Center, served as consultants.

The Group discussed the technical and practical aspects of smallpox and smallpox eradication as well as the methodology and strategy of the programme. The Report of the Group will be available early in 1968.

B. INTER-REGIONAL SEMINAR ON SMALLPOX ERADICATION

National authorities and WHO staff assisting smallpox eradication activities in eleven countries of Asia will take part in a Seminar in Bangkok from 11 - 16 December. Technical and operational problems related to the eradication programme will be discussed as well as individual country problems; laboratory and field demonstrations are also planned. Participants are expected from Afghanistan, Burma, India, Indonesia, Laos, Malaysia, Nepal, Pakistan, Philippines, Thailand, and Vietnam.

V SMALLPOX CASES BY COUNTRY, 1959 - 1966
(SE Unit Data)

	1959	1960	1961	1962	1963	1964	1965	1966
<u>NORTH AFRICA</u>								
Algeria	11	7	8	1	-	-	-	-
Libya	-	-	-	-	-	-	-	-
Morocco	-	-	-	-	-	-	-	-
Tunisia	-	-	-	-	-	-	-	-
United Arab Rep.	30	-	-	-	-	-	-	-
TOTAL	41	7	8	1	-	-	-	-
<u>WEST-CENTRAL AFRICA</u>								
Cameroon	17	-	1,445	743	135	72	-	3
Cent. Afr. Rep.	-	1	-	57	3	-	-	-
Chad	17	2	502	769	10	5	73	-
Congo (Braz.)	-	-	23	1,254	1,476	198	89	2
Dahomey	1,708	768	119	132	249	718	168	530
Equ. Guinea	-	1	-	-	-	-	-	-
Gabon	-	-	-	1	111	49	1	-
Gambia	3	7	12	4	52	6	6	3
Ghana	104	139	70	145	23	9	7	13
Guinea	441	176	96	2,948	224	320	69	56
Ivory Coast	784	1,634	4,656	2,141	282	11	8	-
Liberia	1,869	136	1,116	325	88	258	40	32
Mali	772	1,212	1,706	1,521	1,096	343	659	281
Mauritania	32	123	12	40	1	-	-	-
Niger	1,149	2,408	1,740	887	445	30	463	1,147
Nigeria	1,599	4,140	3,600	3,864	1,778	1,430	4,566	4,924
Port. Guinea	24	1	11	2	2	-	-	-
Senegal	487	6	201	231	87	2	-	-
Sierra Leone	96	12	6	78	14	90	60	293
Togo	66	347	281	571	285	34	13	199
Upper Volta	368	126	2,451	1,321	339	8	14	76
TOTAL	9,536	11,239	18,047	17,034	6,700	3,583	6,236	7,559
<u>SOUTH-EAST AFRICA</u>								
Angola	7	-	-	23	50	1	-	3
Botswana	5	31	36	8	2	175	-	-
Burundi	-	-	8	26	3	-	1,213	363
Congo (D.R.)	2,471	1,408	3,624	3,775	5,525	2,191	3,783	1,913
Ethiopia	367	293	761	360	232	104	58	228

	1959	1960	1961	1962	1963	1964	1965	1966
SOUTH-EAST AFRICA (Contd.)								
Pr. Somaliland	110	-	-	-	-	-	-	52
Kenya	572	347	336	218	249	273	276	159
Lesotho	1	-	84	52	-	-	-	-
Malawi	559	795	1,465	634	359	720	228	88
Mozambique	44	14	91	69	102	243	115	19
Ruanda Urundi	77	12	-	-	-	-	-	-
Rwanda	-	-	10	30	-	-	5	-
Somalia	94	2	-	-	-	-	-	-
S. Rhodesia	133	12	3	15	38	200	40	33
Sudan	336	162	8	95	-	-	64	-
Swaziland	-	-	-	-	182	517	85	29
Tanzania	1,442	1,584	915	1,048	867	1,461	2,743	3,027
Uganda	334	502	423	628	419	523	1,338	591
U. of S. Africa	-	65	8	103	254	301	72	-
Zambia	178	350	233	210	1,881	2,214	528	63
TOTAL	6,730	5,577	8,005	7,294	10,163	8,923	10,548	6,568

ASIA

Afghanistan	441	111	176	303	571	178	71	75
Burma	1,533	392	91*	32	193	112	53*	6*
Cambodia	4	-	-	-	-	-	-	-
Ceylon	-	-	44	66	1	-	1	-
India	47,693	31,091	45,380	55,595	83,423	40,265	33,402	32,616
Indonesia	1,129	5,193	5,045	3,435	7,882	1,870	3,990	11,296
Iran	253	341	96	16	6	1	-	-
Iraq	23	-	-	-	-	-	-	1
Korea	-	3	1	-	-	-	-	-
Kuwait	10	-	-	1	-	-	-	-
Malaysia	38	15	-	-	-	-	-	5
Muscat and Oman	8	-	-	8	-	-	-	-
Nepal	...	...	5	...	779	99	84	385
E. Pakistan	15,048	1,805	660	610*	3,995	72	316*	3,207*
W. Pakistan	3,373	815	2,408	3,484	1,929	935	1,285	2,935
Quatar	1	-	1	-	-	-	-	-
Saudi Arabia	115	32	17	1	-	-	-	-
Singapore	10	-	-	-	-	-	-	-
South Arabia	70	13	1	-	-	-	-	-
Thailand	1,548	32	33	2	-	-	-	-
Trucial Oman	...	...	...	17	-	-	-	-
Vietnam	12	-	-	-	-	-	-	-
Yemen	...	...	...	...	5	5	-	1
TOTAL	71,309	39,843	53,958*	63,570*	98,784	43,537	39,202*	50,527*

	1959	1960	1961	1962	1963	1964	1965	1966
<u>EUROPE</u>								
TOTAL	15	47	24	136	129	-	1	71
<u>NORTH & CENTRAL AMERICA</u>								
TOTAL	-	-	-	1	-	-	-	-
<u>SOUTH AMERICA</u>								
Argentina	36	65	6	2	-	13	15	21
Bolivia	7	1	-	-	-	5	-	-
Brazil	3,354*	5,507*	8,546*	9,559*	6,287*	3,076*	3,269*	3,518*
Chile	1	-	-	-	-	-	-	-
Colombia	950	209	16	41	4	21	149*	8
Ecuador	1,140	2,185	496	204	45	42	-	-
Paraguay	-	35	-	-	-	7	32	5
Peru	-	-	-	-	865	454	18	13*
Uruguay	-	19	1	10	1	3	1*	-
Venezuela	-	-	-	11	-	-	-	-
TOTAL	5,488*	8,021*	9,065*	9,827*	7,202*	3,621*	3,484*	3,565*
<u>OCEANIA</u>								
TOTAL		1						

... Data not available

- No cases

* Figures revised since last report