WORLD HEALTH ORGANIZATION

ORGANISATION MONDIALE DE LA SANTE

SOUTH-EAST ASIA REGION

SEA/Smallpox/84
30 December 1977
RESTRICTED

ERADICATION OF SMALLPOX IN BANGLADESH

Report of the International Smallpox Assessment Commission

1-14 December 1977

INDIA
Dinajpur
Rangpur
INDIA
Bogra
Mymensingh
Sylhet
Rajshahi
Tangail
Pabna
Dacca
INDIA
Kushtia
Jessore
Faridpur
Comilla
INDIA
Noakhali
Chitta-gong Hill Tracts
Barisal
Khulna
Chitta-gong
Patua-Khali
BAY OF BENGAL
BURMA

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1 INTRODUCTION

Criteria for establishing the success of smallpox eradication programmes were set by the WHO Expert Committee on Smallpox Eradication*. It was stipulated that following the occurrence of the last endemic case of smallpox, a two-year period of continued intensive surveillance was necessary. Then a specially constituted international commission was to visit the country to conduct both intensive and extensive investigations to determine the continued absence of the disease.

In Bangladesh, the last case of smallpox occurred on Bhola Island, Barisal District, with the onset of the disease on 16 October 1975. This was and continues to be the last known case of variola major in the world. WHO established an international commission for the assessment of smallpox eradication, which met in Bangladesh from 1 to 14 December 1977, two years and two months following the onset of the last case.

This document constitutes the final report of the Commission.

2 CONCLUSIONS

On the basis of a full review of the extensive documentation made available, as well as discussions and field visits, the Commission finds that:

(1) there has been no evidence of transmission of smallpox since the last known case, and

(2) the surveillance system during the last two years has been adequate to detect any case of smallpox had it occurred.

The Commission concludes that since the criteria set by the WHO Expert Committee have been fully met, eradication of smallpox has been achieved in Bangladesh.

3 RECOMMENDATIONS

(1) The Commission recognizes the implications of this historic occasion on which the eradication of variola major has been certified in the last of the countries in which this disease has recently been endemic. The experienced health personnel as well as the efficient organizational structure developed during the National Smallpox Eradication Programme should be recognized as a valuable national resource. Considering that smallpox vaccination will soon be redundant, the Commission strongly recommends that this cadre of health workers be used for such activities as disease surveillance and control, the expanded programme on immunization, and primary health care.

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*WHO *Tech. Rep. Ser.* No. 493, (1972)

(2) The excellent report "Smallpox Eradication in Bangladesh" should be updated in accordance with the most recent data available, and should be published and distributed by WHO in a manner that will ensure its availability throughout the world.

4 COMMISSION'S MEMBERSHIP AND PROGRAMME

The membership of the Commission, together with the names of the Bangladesh health officials and WHO staff from Bangladesh, the WHO South-East Asia Regional Office and Headquarters, are given in Annex 1.

The inaugural meeting was held in New Delhi on 17 November 1977, with opening remarks by Dr V.T.H. Gunaratne, WHO Regional Director, and with a general background introduction by Dr I. Arita, Chief, Smallpox Eradication Unit, WHO Headquarters, Geneva.

The Commission unanimously elected Dr A.D. Langmuir to serve as Chairman and Dr H. von Magnus as Rapporteur.

During the inaugural meeting, a report was presented by Dr Joarder A. Kashem, Assistant Director of Health Services (Smallpox Eradication Programme), Government of Bangladesh, based on the document "Smallpox Eradication in Bangladesh" (SEA/Smallpox/82), and this was followed by a general discussion. The areas for field visits and assessment by individual Commission members in Bangladesh were decided upon.

The Commission arrived in Bangladesh on 1 December 1977, having first undertaken a two-week assessment of the Smallpox Eradication Programme in Burma. The inaugural session of the Commission in Dacca on 2 December was addressed by Professor Md. Ibrahim, Member of the President's Advisory Council in charge of the Ministry of Health and Population Control, and by other senior health officials. Further briefing and discussions followed on 2 and 3 December, together with briefing for individual Commission members on the areas which they were to visit and assess.

Field assessment of the programme was carried out by the Commission members between 4 and 10 December and final discussions and preparation of their report took place in Dacca on 11, 12 and 13 December.

The report of the Commission was presented to the President of the People's Republic of Bangladesh on 14 December 1977.

5 HISTORY OF SMALLPOX IN BANGLADESH*

The history of smallpox in Bangladesh has been marked by periodic epidemics, the worst recorded having taken place in 1957-1958. In these two years, over 100 000 cases with 80 000 deaths were reported. Gross under-reporting was known to occur during that period.

*Source: "Smallpox Eradication in Bangladesh", SEA/Smallpox/81.

A Smallpox Eradication Scheme in Bangladesh was launched in 1961 following the resolution of the World Health Assembly in 1959. The basic strategy was mass vaccination with the objective of attaining full coverage of the population within a two-year period. The assessment, however, was based only on the analysis of the numbers of vaccinations reported. Cases of smallpox continued to be reported, although at a relatively low incidence compared with the epidemic of 1958. Eradication was not in sight.

Following the decision of the World Health Assembly in 1966 to undertake an intensified programme for the global eradication of smallpox, a new programme was undertaken in Bangladesh. This campaign stressed mass vaccination and concurrent assessment of the coverage. The use of freeze-dried vaccine of consistently high potency and the introduction of the bifurcated needle enhanced the effectiveness of the mass vaccination programme. In October 1969, the strategy of surveillance and containment was introduced and, by August 1970, transmission of smallpox appeared to have been interrupted. The absence of reported cases continued through 1971, the year of the war of liberation (Annex 2).

Following liberation, smallpox epidemics developed in many districts of the country. To deal with this new situation, the intensified surveillance and containment strategy that had been tried and proved in several countries was more fully integrated into the Bangladesh programme. The emphasis was shifted from mass vaccination to early detection of active smallpox cases and immediate focal containment measures, stressing ring vaccination, contact tracing and cross-notification.

This new strategy involved a considerably increased commitment on the part of the national and local health authorities and the establishment of increasing numbers of surveillance teams to search out information about cases in markets, at ferry ghats (boat landing stations), railway stations and among other high-risk groups of population. The strategy proved so successful that by October 1974, although 308 cases were reported, there were only 90 known active cases at the end of the month. Eradication seemed to be within sight.

Unfortunately, the devastating floods of the late summer of 1974 and the ensuing famine in large areas of north Bangladesh led to mass migrations of villagers and inevitably resulted in the rapid spread of infection to many parts of the country, particularly in crowded bastees (slum areas) in urban areas.

In February 1975, the programme was intensified with the declaration of a national smallpox emergency and with the addition of a number of WHO personnel to assist in co-ordinating the field activities. All field health workers in the country were mobilized for house-to-house searches, intensified surveillance and containment activities. A reward for reporting cases facilitated discovery of outbreaks. Additional funds were made available through international contributions to facilitate this expanded emergency effort. The incidence of smallpox peaked in April 1975 and then rapidly declined and reached zero by October of that year, as shown in Annex 2 and Annex 3.

Since that time, surveillance has been maintained through eight periodic house-to-house searches, the continuous activity of the surveillance teams, and routine reporting by field health workers. The reward for reporting smallpox and information on where to report a case have continued to be widely publicized. Special searches have been conducted in remote areas and municipalities, an extensive pock-mark survey has been carried out, and the last 119 outbreaks have been reinvestigated. Special emphasis was placed on the training of health staff at all levels. Over 225 000 rash with fever and rash death cases have been investigated and more than 2000 laboratory specimens examined in the Dacca Diagnostic Laboratory. In September 1976 all the variola strains in the Laboratory were destroyed.

All activities have been carefully documented and the programme was assessed by a National Commission in August 1977.

During the two-year surveillance period, no evidence was found of smallpox transmission. All cases reported after 1 July 1975 were investigated. None had onset after 16 October 1975.

6 ACTIVITIES AND OBSERVATIONS OF THE COMMISSION

The primary objective of the visit of the International Commission to Bangladesh was to ascertain whether or not any smallpox transmission had occurred since the last known case on 16 October 1975. Therefore, all the activities of the Commission members were directed to eliciting concrete information from all possible sources to substantiate the claim of the national health authorities that the country has been free from smallpox since October 1975.

The detailed outline of the programme given in two basic documents "National Smallpox Assessment Commission" and "Smallpox Eradication in Bangladesh" (SEA/Smallpox/82) was thoroughly studied by the Commission and subjected to confirmation by investigation of the documents presented by health officials at district (19), municipal (5), sub-divisional (52) and thana (135) levels (Annex 4), and by field visits.

For the above purpose, nine teams (Annex 5), each consisting of a Commission Member, a WHO Area Co-ordinator, a National Epidemiologist and the local officers concerned, made thorough investigations, particularly in vulnerable areas where the transmission of the disease could possibly still be continuing.

The places for field observations were selected according to one or more of the following guidelines:

- Area with no reported smallpox in 1975

- Areas repeatedly affected

- Thanas least efficient in the submission of regular reports

- Slum areas (bastees) of big cities; floating populations, e.g., railway stations, ghats (boat landing stations)

- Places where children below two years of age were reported by family welfare workers as having "facial pock marks" during the September-October 1977 search*
- Places with suspected smallpox cases or with death due to chickenpox or rash with fever during 1977
- Areas poorly searched during 1977
- Border areas
- Minority groups

Places visited by the Commission (Annex 6)

Thanas	138
Villages	127
Markets	73
Schools	75
Hospitals	40
Railway Stations/Ghats	11
Camps	7

The district-wise breakdown of the above places is given in Annex 7.

In the places visited, people were questioned about:

(1) occurrence of any smallpox cases during the last two years;
(2) any current cases of rash with fever;
(3) knowledge about reward;
(4) knowledge about where to report;
(5) last visit of the searcher, and
(6) whether they had seen the case recognition card

From the answers received no evidence was elicited that any smallpox case had occurred during the last two years. The people's knowledge of the reward and where to report was very good. Most of them had seen the recognition card and confirmed the visit of the family welfare worker during the past two months. This was also verified by checking the family health cards.

In some areas reports of rash with fever cases and rash deaths obtained through the rumour register and from the public were investigated, and none was smallpox.

In certain areas, children under 15 years of age were examined for the vaccination scar, and the coverage was found to be similar to that revealed in a recent scar survey (document SEA/Smallpox/82).

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*The family welfare worker is a multi-purpose health worker at the village level. All of these "facial pock marks" were investigated by national and WHO epidemiologists and none was found to be due to smallpox, as shown in Annex 10.

Discussions with senior medical officers and paramedical and nursing staff of the hospitals indicated that only a few had seen a case of smallpox in recent years and none after October 1975.

Health workers, particularly those actively involved in the smallpox programme, were questioned about their training and experience and their knowledge about the differential diagnosis of smallpox. They were also asked how they worked in the field. Their answers were found to be satisfactory,

In the pock-mark survey, about 50 000 persons under 20 years of age, of whom about 2000 were below two years of age, were examined. Of the total, 575 under 20 years of age were found with pock marks, indicating that they had suffered from the disease in the past. No child below two years of age was found with pock marks. The year of occurrence of the disease and the number of persons with pock marks are given below, and by district in Annex 8.

Year of Smallpox Infection

	1957-68	1969	1970	1971	1972	1973	1974	1975	1976	1977
Number found with pock marks	309	41	47	16	60	40	22	40	0	0

As in the national pock-mark survey of 465 892 children (0-11 years) (Annex 9), no pock-marked individuals were found with a date of attack after October 1975.

From a careful scrutiny of the documentation books and supporting records, it was found that, with few exceptions, a high quality of surveillance had been maintained by the national authorities through eight special house-to-house searches, routine surveillance and surveillance teams for over two years.

All suspected cases of smallpox, and deaths due to chickenpox or rash with fever, were investigated by experienced workers. No case of smallpox was detected during this period. It was felt that since the last reported case a sufficient number of specimens had been taken for laboratory examination and found negative for smallpox.

7 ACKNOWLEDGEMENTS

The International Commission expresses its sincere appreciation to the People's Republic of Bangladesh, the Ministry of Health, the Directorate of Health Services, and the district sub-divisional and thana health staffs for their technical briefing, administrative support, and warm hospitality. Appreciation is also extended to the support staff, seen and unseen, who have contributed significantly to the smooth operation of the Commission. The interest, support and hospitality of the WHO Representative and his staff is gratefully acknowledged.

The full commitment of the Government, the participation of the people, and the effective programme implementation by national and WHO staff in eradicating a major cause of human suffering is acknowledged with great respect and admiration.

INTERNATIONAL COMMISSION PARTICIPANTS

1. MEMBERS

Dr A.M. Mustaqul Huq	Director of Health Services (Preventive), Government of Bangladesh, Dacca
Dr S. Jatanasen	Director, Division of Epidemiology, Ministry of Public Health, Bangkok (Thailand)
Dr A.D. Langmuir (Chairman)	Visiting Professor (retired), Harvard University Medical School, Department of Preventive and Social Medicine, Boston, Massachusetts (USA)
Dr C. Lerche	Director, National Institute of Public Health, Oslo (Norway)
Dr H. von Magnus (Rapporteur)	Head, Department of Epidemiology, Statens Serum Institute, Copenhagen (Denmark)
Dr U. Thein Nyunt	Director, Disease Control, Department of Health, Rangoon (Burma)
Dr I.F. Setiady	Director, Epidemiology and Quarantine, Ministry of Health, Jakarta (Indonesia)
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Dr P.N. Shrestha	Chief, Smallpox Eradication Project, Department of Health Services, Kathmandu (Nepal)

2. GOVERNMENT OF BANGLADESH

A. Smallpox Eradication Programme

Assistant Director of Health Services (SEP)

Dr Joarder A. Kashem

Medical Officers

Dr Aftabuddin Khan
Dr Md. Matiur Rahman
Dr A.K. Nayeb Ali

Statistician

Mr M.A. Sattar

B. Institute of Public Health

Director

Dr M.A. Latif Miah

Chief of Microbiology

Dr Farida Huq

C. Field Staff

Civil Surgeons
Additional Civil Surgeons
Deputy Civil Surgeons
District Health Education Officers
Municipal Health Officers
National Epidemiologists
District Epidemiologists
Surveillance Teams
Thana Health Administrators
Thana Smallpox Officers
Inspectors and Assistant Inspectors
Family Welfare Workers

3. BANGLADESH WHO SMALLPOX STAFF

Dr H. Mehta	Team Leader
Mr A. Wylie	Administrative Officer
Mr J. Larsen	Transport/Supply Officer

Area Coordinators	Area
Dr J. Tulloch	Rangpur, Dinajpur, Bogra
Dr N.M.P. Mendis	Pabna, Rajshahi
Dr A. Stroganov	Barisal, Patuakhali, Faridpur
Dr V. Zikmund	Jessore, Kushtia, Khulna
Dr P. Claquin	Mymensingh, Tangail
Dr V. Fedenev	Noakhali, Chittagong, Chittagong HT
Mr G. Taylor	Comilla, Sylhet
Dr K. Hughes	Dacca

4. WHO SECRETARIAT

Headquarters, Geneva

Dr I. Arita	Chief, Smallpox Eradication Unit
Dr A. Gromyko	Medical Officer, Smallpox Eradication Unit

SEARO

Dr L.N. Khodakevich	Medical Officer, Smallpox Eradication Unit
Dr L. Brilliant	Medical Officer, Smallpox Eradication Unit

Temporary Advisers

Dr R.N. Basu	Dr S.O. Foster
Dr D.A. Henderson	Dr D. Tarantola

Chief Secretary

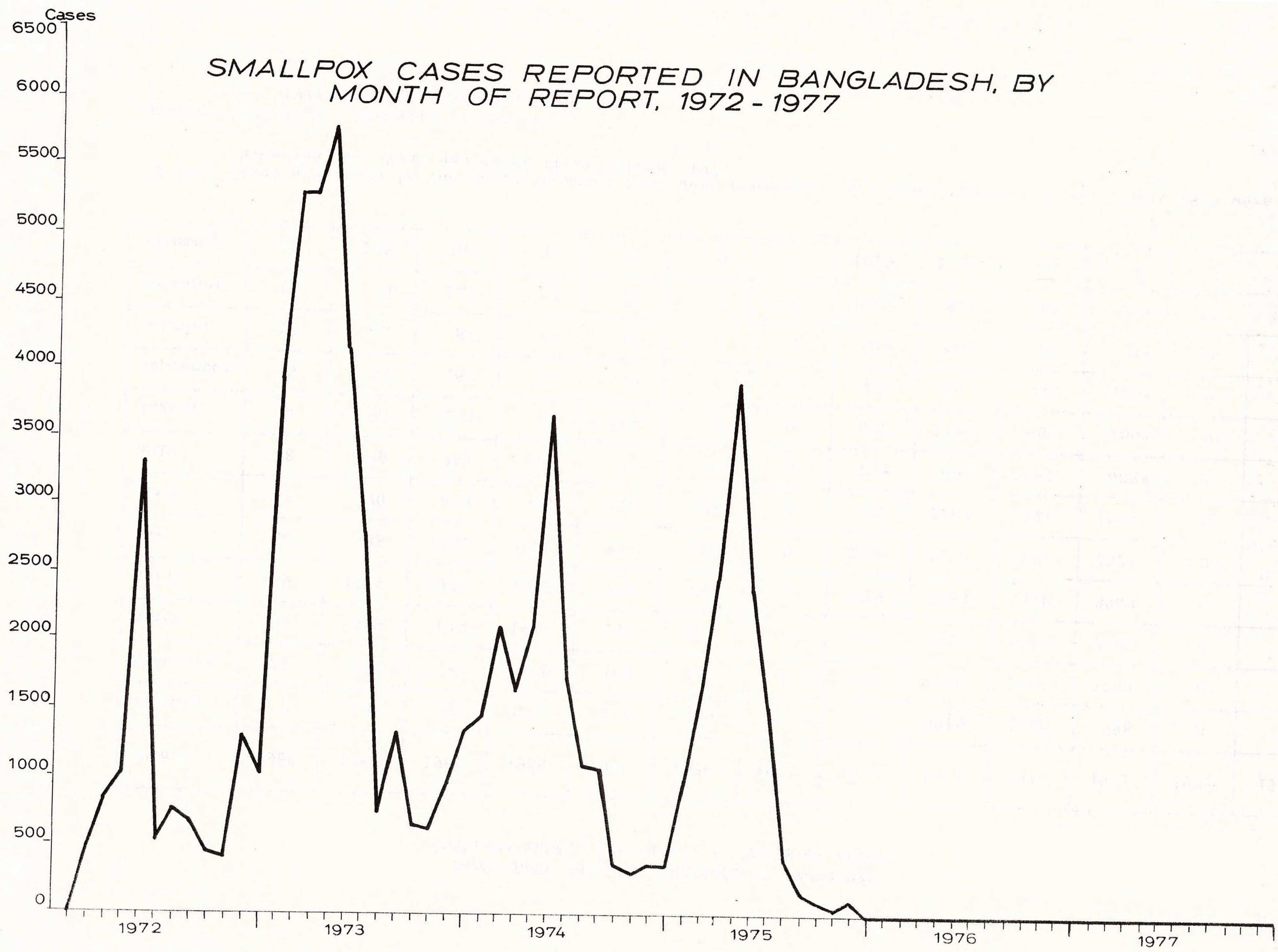
Mr A.B. Siddiq

BANGLADESH SMALLPOX ERADICATION PROGRAMME
SMALLPOX CASES, 1965-1977, BY MONTH OF REPORT

Month	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
January	1	207	155	2225	276	189	0	0	3919	1432	988	0	0
February	22	400	487	1691	106	163	0	472	5282	2107	1703	0	0
March	65	450	612	1932	137	672	0	826	5279	1642	2467	0	0
April	59	1079	1799	1695	249	263	0	1019	5753	2110	3948	0	0
May	34	388	1201	1067	577	116	0	3299	4177	3937	2371	0	0
June	41	220	683	304	114	38	0	528	2783	1721	1504	0	0
July	18	76	343	172	35	23	0	750	609	1081	408*	0	0
August	4	95	150	63	293	9	0	677	1320	1069	186*	0	0
September	3	95	165	17	42	0	0	439	663	361	105*	0	0
October	13	42	81	7	42	0	0	408	646	308	31*	0	0
November	15	30	182	23	22	0	0	1317	943	363	87*	0	0
December	49	135	783	33	32	0	0	1019	1337	354	0	0	0

*Note: Cases are shown in the month in which they were reported. All cases reported after 1 July 1975 were investigated. None had onset after October 1975.

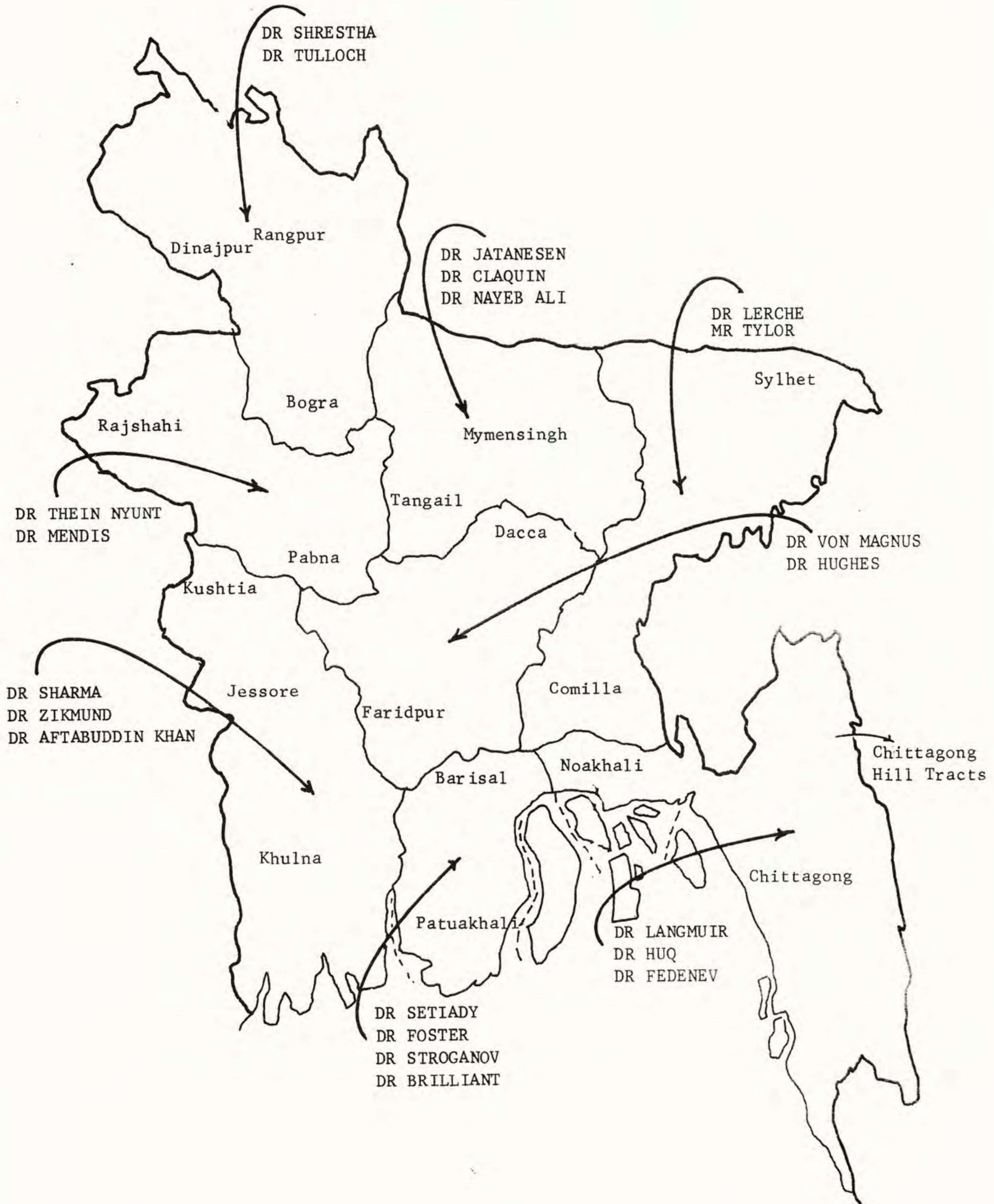
Source: 1965-1970 - Ministry of Health
1971-1977 - Weekly Epidemiological Record


SMALLPOX CASES REPORTED IN BANGLADESH, BY MONTH OF REPORT, 1972 - 1977
Cases
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1972
1973
1974
1975
1976
1977

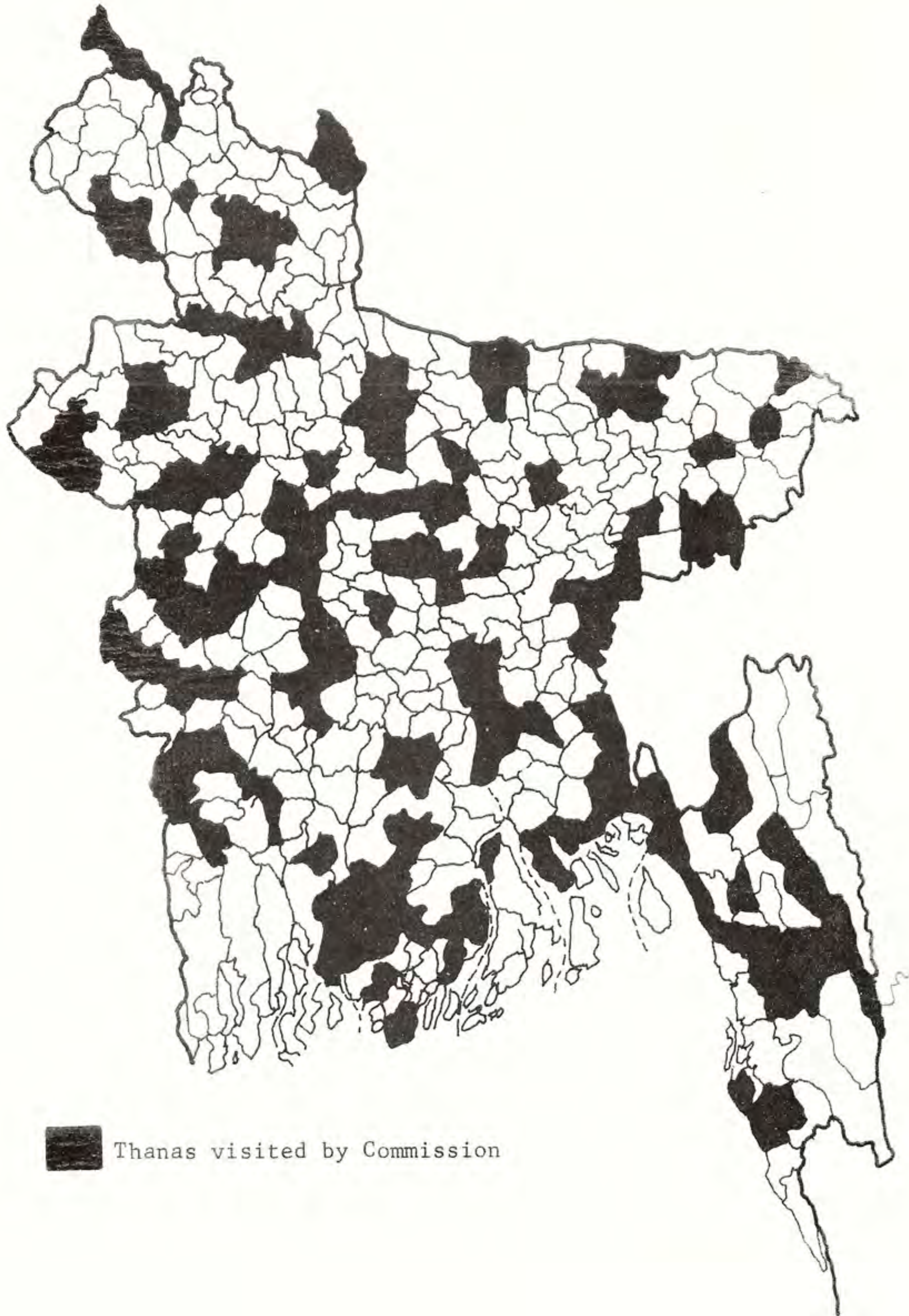
PROGRAMME DOCUMENTS REVIEWED BY COMMISSION MEMBERS

District	District	Municipality	Sub-division	Thana
Dinajpur	+		2	5
Rangpur	+		4	9
Bogra	+			2
Rajshahi	+	1	4	10
Pabna	+		2	8
Kushtia	+		3	8
Jessore	+		2	6
Khulna	+	1	3	7
Barisal	+		4	14
Patuakhali	+		2	8
Faridpur	+		3	7
Dacca	+	2	4	7
Tangail	+			3
Mymensingh	+		4	8
Sylhet	+		4	9
Comilla	+		3	7
Noakhali	+		2	6
Chittagong	+	1	3	7
Chittagong HT	+		3	4
TOTAL	19	5	52	135

INTERNATIONAL COMMISSION FIELD TEAMS - 4-11 DECEMBER 1977



THANAS VISITED BY THE COMMISSION,
4-11 DECEMBER 1977



PLACES VISITED BY INTERNATIONAL COMMISSION

District	Thanas	Villages	Markets	Schools	Hospitals	Railway Stations & Ghats	Camps
Dinajpur	5	9	3	3			
Rangpur	9	20	3	2	2		2
Bogra	2	6					
Rajshahi	10	5	4	7	4	3	
Pabna	8	3	1	4	2	1	
Kushtia	8	10	11	6	5		
Jessore	6	7	4	3	4		
Khulna	7	8	4	5	4		
Barisal	14	10	6	9	6		2
Patuakhali	8	3	4	3	2		
Faridpur	7	5	2	2		3	
Dacca	9	4	4	1	2	1	2
Tangail	3	3	4	3		1	
Mymensingh	8	8	3	6	1	2	
Sylhet	9	7	4	1	1		
Comilla	7	3	2		1		
Noakhali	6	4	3	5	2		
Chittagong	8	4	4	8	1		1
Chittagong HT	4	8	7	7	3		
TOTAL	138	127	73	75	40	11	7

NUMBER OF PERSONS WITH POCK MARKS FOUND BY THE COMMISSION, BY YEAR OF DISEASE OCCURRENCE

District	1957–1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Dinajpur	51	2	2		2		1	2		
Rangpur	6	2		1	9	2	6	10		
Bogra						1		4		
Rajshahi	6	1	1	1	4		1			
Pabna	5	2	5	2	1					
Kushtia	111	2			4	4		13		
Jessore	13	3			5	6	3			
Khulna	31	1			14	10	1	1		
Barisal	17	1			5	3	1			
Patuakhali	9	5	2		2	3				
Faridpur	6	1			1			1		
Dacca	2	2	2	1	1		1			
Tangail	11	2	12		4	3		2		
Mymensingh	4		2		3	1	1	7		
Sylhet		1								
Comilla	9	2	2	1	1	2				
Noakhali		1		1	3		7			
Chittagong	26	11	18	9	1	5				
Chittagong HT	2	2	1							
TOTAL	309	41	47	16	60	40	22	40	0	0

Persons are identified by District in which pock marked individuals were detected. All 1975 cases occurred prior to October.

1976 SMALLPOX FACIAL POCK-MARK SURVEY

Target Population	0 - 19 years
Sample	1% Random Cluster Sample
Number examined	465 892

Persons with Pock Marks, by year of attack

Prior to 1972	4 392
1972	266
1973	250
1974	101
1975	48
1976	0

A pock mark is defined as a concentric depressed scar one mm. or more in diameter. Five or more such pock marks are presumptive evidence of previous smallpox infection. All 1975 cases were investigated epidemiologically. All cases had a date of onset prior to 16 October 1975.

OCTOBER 1977 SURVEY FOR FACIAL SCARRING

Estimated population	0 - 2 years old	6.4 million
Estimated population surveyed	0 - 2 years old	4.0 million
Number of children reported by FWWs as having suspicious facial scarring		124

Results of Investigation by Epidemiologists:

Pock marks in children >2 years old (smallpox prior to October 1975)	9
Pock marks in children <2 years old	0
Chickenpox	28
Summer Boils	30
Scabies	20
Measles	18
Others (Allergy, Impetigo, etc.)	10
No scarring	8
Child not found	1
Total	124