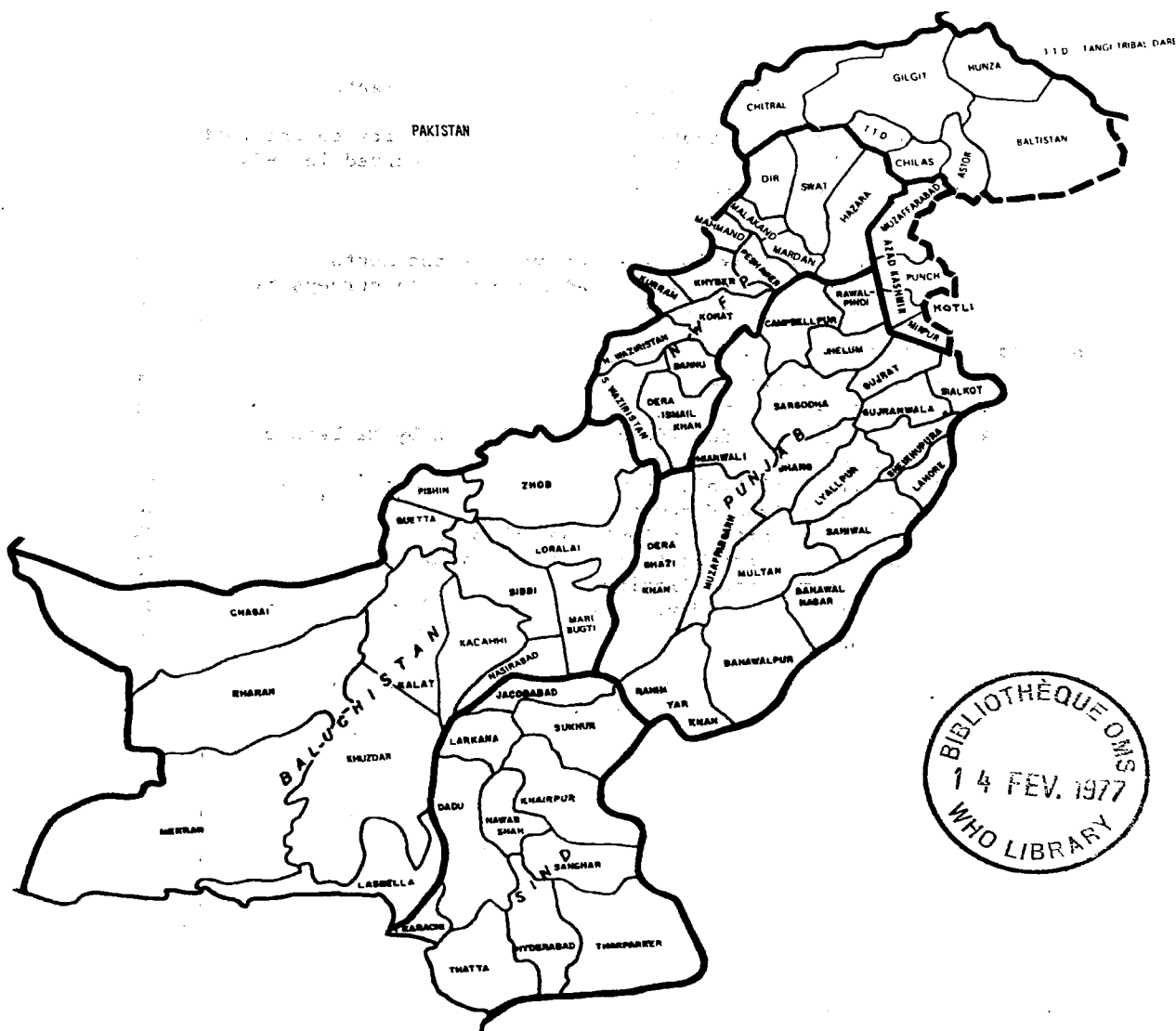




INDEXED

INTERNATIONAL COMMISSION FOR THE ASSESSMENT
OF SMALLPOX ERADICATION IN PAKISTAN

Islamabad, Pakistan, 6-18 December 1976



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1. Conclusions

The Commission first reviewed and discussed all aspects of the Pakistan smallpox eradication programme, including the surveillance activities which have been conducted since transmission was stopped, with representatives of the programmes from Baluchistan, North West Frontier Province (NWFP), Punjab and Sind and from Azad Kashmir. Following this, teams consisting of one Commission member, a member of the programme from the provinces or from Azad Kashmir and, with one exception, a representative of WHO, made field visits to each province and Azad Kashmir. Information was obtained from provincial, district and local personnel and visits were made to a number of urban and rural areas searching for any evidence of continuing transmission. Based on the observations made in the field in many parts of Pakistan and on a thorough study of the documents and working papers, the Commission concluded that:

1.1 All available evidence indicates that the smallpox eradication programme which began in 1969 achieved its goal in October 1974 and that there has been no smallpox transmission since that time.

1.2 The requirements for smallpox eradication, established by the WHO Expert Committee on Smallpox Eradication (1971) have been fully met; thus the eradication of smallpox in Pakistan is considered to have been achieved.

2. Recommendations

Although there is no evidence of smallpox transmission anywhere in Asia, it is the opinion of the Commission that certain activities should be continued. Accordingly, it is recommended that:

2.1 Primary vaccination should continue to be provided by the various health services at least until the whole Asian continent has been certified to be smallpox-free.

2.2 That an effective surveillance mechanism be maintained within the public health structure by each province and by Azad Kashmir to investigate those suspect cases which cause difficulty in diagnosis or outbreaks of chickenpox associated with death, and to collect specimens from such cases for laboratory confirmation.

2.3 That the experienced personnel who have been developed during the smallpox eradication programme be recognized as an important national resource for immunization and surveillance as programmes are implemented for the control of other diseases of public health importance.

3. Commission Membership and Activities

The membership of the Commission is recorded in Annex 1.

The Inauguration Meeting, held in Islamabad on 6 December 1976, was officially opened by Mr. Ch. Jehangir Ali, Minister of State for Health and Population Planning. Following this, on 6, 7 and 8 December, the Commission reviewed the working papers listed in Annex 2 and additional reports with the National Committee, composed of members of the Federal Ministry of Health, representatives of the smallpox eradication programmes from the provinces of Baluchistan, NWFP, Punjab and Sind and of Azad Kashmir, WHO epidemiologists assigned to Pakistan and representatives of the WHO Secretariat. Between 9 and 15 December each member of the Commission conducted a field survey in one of the four provinces or in Azad Kashmir. In the case of Baluchistan, two Commission members made field visits. They were accompanied on these trips by members of the provincial smallpox eradication programme and a representative of WHO, except in NWFP, where the visit was made without accompanying

WHO staff. The members visited 37 of the 71 districts or agencies in the country (Figure 2). The Commission then reassembled in Rawalpindi/Islamabad for final discussions with the National Committee on 17 December and for the declaration by the Commission that smallpox had been eradicated in Pakistan.

4. Smallpox Eradication Programme in Pakistan

The Plan of Operation for Pakistan Smallpox Eradication Programme was signed in 1968 by the Government of Pakistan and the World Health Organization. A number of factors led to delays in implementing activities. However, from 1970 onward, programmes were developed at the provincial level in Punjab, NWFP, Sind and Baluchistan and in Azad Kashmir. Great differences existed between these areas, resulting from variations in climate, terrain, population density, nomadic and tribal groups, local customs, languages and attitudes and in the stage of development of their health services. Each province and Azad Kashmir consequently developed a programme suited to its own situation and resources. Liaison between the programmes was maintained by means of frequent interchange of information by regular meetings and by the WHO epidemiologists.

The original Plan called for an attack phase during which a high percentage of the population would receive primary vaccination or revaccination within the shortest possible time. This phase moved forward rapidly in some areas, but, before it had reached completion in other parts of the country, a change in strategy resulted in shift of emphasis away from mass vaccination and toward a programme based on surveillance and containment. Primary vaccination was continued. Each province and Azad Kashmir developed their own mechanisms to ensure the prompt discovery and reporting of outbreaks and of rapid and complete containment.

As surveillance and reporting operations improved, the number of reported cases increased steadily, rising from 3 160 in 1970 to a peak of 9 258 in 1973 (Table 1). Following a seasonal drop during the autumn of 1973, the number of detected cases again rose sharply to a peak in April 1974 and then fell precipitously to the zero level in October of that year (Figure 1). The number of reported outbreaks in 1974 was 1 642 (Table 2).

Many difficult problems were encountered and overcome. Urban areas such as Karachi, Lahore, Peshawar, Hyderabad and Multan were cleared only after great efforts and, until cleared, continued to spread infection both to surrounding rural areas and to distant parts of the country. Remote rural areas, mountainous regions, nomadic populations, resistance to vaccination by some groups and a shortage of health personnel in some areas were further sources of difficulty. Time was required to improve the speed and efficiency of containment operations. An outline of the containment procedures followed in one province is shown in Table 3. Gradually these obstacles were surmounted, and the effectiveness of the programmes during the latter phase as target zero was approached is clearly shown in Figure 1. Azad Kashmir reached target zero on 11 June 1974 and the four provinces followed soon afterward, with the last case in the whole country occurring in Punjab on 16 October 1974.

During the ensuing two years repeated searches have been carried out in an attempt to find smallpox outbreaks. These have included searches in areas with special problems and in inaccessible areas. An intensive educational campaign has been carried to the remotest villages, encouraging people to report suspected cases. A reward has been offered to anyone who reports a case which subsequently can be verified as smallpox and the amount of the reward has been increased stepwise from Rs. 5 to its present level of Rs. 5 000. The number of suspect cases reported by November 1976 totalled 49 974 (Table 4). The reporting of chickenpox during search periods was encouraged on the assumption that a surveillance system sensitive enough to detect chickenpox would almost certainly detect smallpox outbreaks. To date the number of chickenpox cases reported is 27 703. Laboratory

specimens have been collected from 157 cases when the diagnosis was in doubt and tested for the presence of variola virus (PAK/WP/76.5). Pockmark surveys have been carried out on a large scale, particularly in the age group under two years, in an effort to find undisclosed cases (Table 5). Districts where variolation was practised received special attention. The areas where outbreaks occurred in late 1973 and in 1974 have been repeatedly searched in an effort to uncover continuing transmission. Not a single case of smallpox has been found.

5. Field Surveys

Field visits to the four provinces and to Azad Kashmir were made in the period 9-15 December. Each team consisted of one member of the International Commission, a WHO adviser (with the exception of NWFP*), and members of the provincial smallpox eradication programme staff. Details of the field teams are set out in Annex 4.

Each team met those responsible for the provision of basic health services and visited the offices of the Smallpox Eradication Programme to review the records and discuss the smallpox activities with the programme staff. Selected urban and rural communities were visited and any evidence of smallpox within the last two years was sought by means of pockmark surveys, especially in children, by enquiries among people and by checks on recent suspect cases. Areas selected included some of those infected late in 1974, others which had given problems either in containment or in subsequent surveillance and some taken on a random basis. Scar surveys were made to assess vaccination coverage and the extent of variolation. Where possible known variolators were traced and interviewed and sites of outbreaks due to variolation were revisited. Enquiries were made among different sections of the population to determine the extent of knowledge about smallpox and the reward offered for its detection.

The teams found that the relationship between the basic health services and the Smallpox Eradication Programme differed among the provinces and Azad Kashmir, but that all areas had units with well-defined responsibility for smallpox activities. Satisfactory records had been kept of the smallpox outbreaks and the actions taken for their containment. Records of subsequent surveillance activities were also well-maintained. The quality of the eradication programme staff showed some variation but the general level of competence and knowledge about smallpox was good and in places extremely so. A number of recent suspect cases were reinvestigated and confirmed not to be smallpox. In over 7 000 children under the age of 15, pockmarks were observed in 99 (1.4%). Only five children under five years of age were observed with pockmarks and all were recorded cases from outbreaks which occurred before October 1974. No undisclosed outbreaks were discovered in these surveys. A substantial number of recent outbreaks were reinvestigated and details of the cases verified in the records. No missed cases were discovered. The checks for vaccination scars showed that a very high coverage had been achieved in adults and older children, with somewhat less satisfactory levels in children under five years of age in some areas. From the evidence of variolation scars in adults, it was confirmed that this practice had been common many years ago in parts of Baluchistan, in certain of the tribal areas of NWFP and in a few communities in other provinces. Variolation scars were seen in children in two of the areas associated with documented episodes of 1974, but despite search, they were not seen in children elsewhere. Some ten former variolators were interviewed. They stated that variolation material did not remain potent for more than a year at most and that the practice had been abandoned. The teams found that the general level of knowledge about smallpox was good. Signs advertizing the reward for reporting smallpox were seen in many of the places visited and although their distribution was uneven, knowledge of the reward was widespread.

These findings were presented and discussed during the final meeting in Islamabad and the individual team reports are given in Annexes 5, 6, 7, 8 and 9.

* due to the unavoidable absence of one of the WHO Secretariat

TABLE 1

SMALLPOX CASES REPORTED

Before Eradication Programme		After Eradication Programme started	
Year	No. of Cases	Year	No. of Cases
1960	815	1968	1 836
1961	2 408	1969	3 520
1962	3 484	1970	3 160
1963	1 929	1971	5 802
1964	935	1972	7 053
1965	1 285	1973	9 258
1966	2 936	1974	7 850
1967	6 084	1975	-
		1976	-
Total	19 876	Total	38 479

TABLE 2

NUMBER OF OUTBREAKS AND CASES 1974

Province	No. of outbreaks	No. of cases
Azad Kashmir	6	14
Baluchistan	40	202
NWFP	35	163
Punjab	289	1 503
Sind	1 272	5 982
Total	1 642	7 864

TABLE 3

METHODS OF CONTAINMENT

1. Reliable vaccine - titration
2. Best workers - briefed
3. Written instructions
4. Supervisor + vaccinator per outbreak - camping for three weeks after cure of last case
5. Vaccination Register - Census + ring vaccination
6. Intensive Health Education and utilization of local leaders
7. Six lists to be made by Containment Team:
 - a) Patients
 - b) Contacts
 - c) Potential contacts - relatives, associates, visitors, etc.
 - d) Fever cases
 - e) Primary Vaccinations
 - f) Absentees

+ 100% vaccination coverage
8. Identification and supervision and cross-notification of risk groups, e.g. Private practitioners, street vendors, nomads, beggars, local hospital and health workers
9. Treating Infectious Disease Hospital as outbreak
10. Locking house - compensate family
11. Collect and burn scabs
12. Check death register - attend funerals

THE WHOLE OPERATION UNDER CLOSE EFFECTIVE SUPERVISION

TABLE 4

NUMBER OF SUSPECT CASES OF SMALLPOX INVESTIGATED
OCTOBER 1974-SEPTEMBER 1976

Province	Total No. of suspect cases	No. of chickenpox cases
Azad Kashmir and Northern areas	608	524
Baluchistan	242	184
NWFP	6 878	3 196
Punjab	31 267	16 658
Sind	10 979	7 141
Total	49 974	27 703

Percentage deliberately not calculated

TABLE 5

SUMMARY OF THE INVESTIGATION AND FOLLOW-UP VISITS TO THE LAST 20 OUTBREAKS IN EACH DISTRICT WHICH
OCCURRED IN 1974 IN THE PROVINCES OF PAKISTAN

No.	Number of	Punjab	Sind	NWFP	Baluchistan	Azad Kashmir	Total
1.	Outbreaks visited	208	181	28	99	6	522
2.	Cases in outbreaks	1 027	728	135	455	14	2 359
3.	Infected houses in outbreak area	661	445	75	270	7	1 458
4.	Residents in infected houses	3 910	2 723	472	1 540	52	8 697
5.	Infected houses visited	574	373	73	221	7	1 248
6.	Persons detected without vaccination scar in infected houses	250	235	50	117	4	656
7.	Persons visited with facial pockmarks in infected houses	515	521	66	266	7	1 375
8.	Children under two years with facial pockmarks	-	-	-	-	-	-

FIGURE 1

CASES OF SMALLPOX IN PAKISTAN BY YEAR AND MONTH

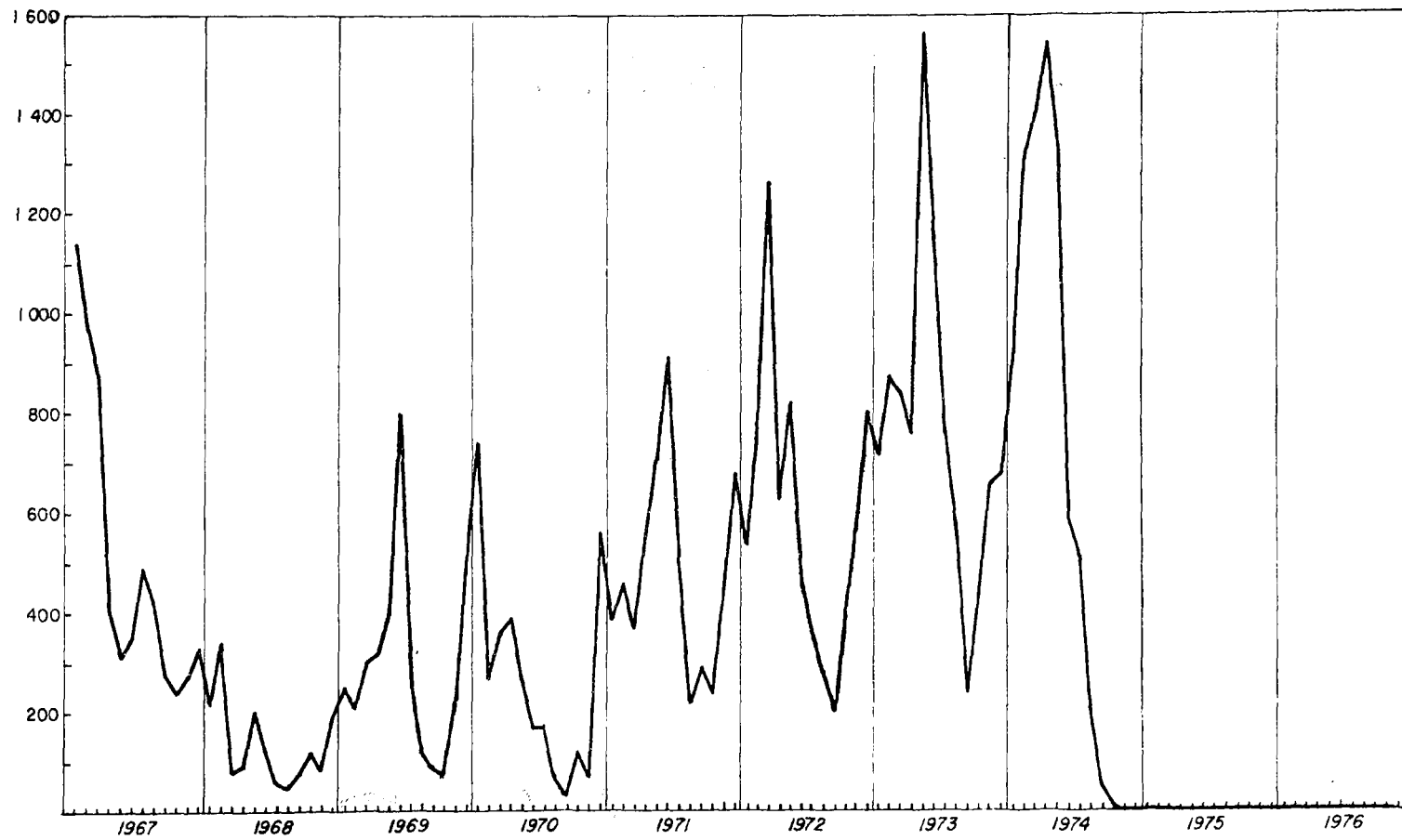
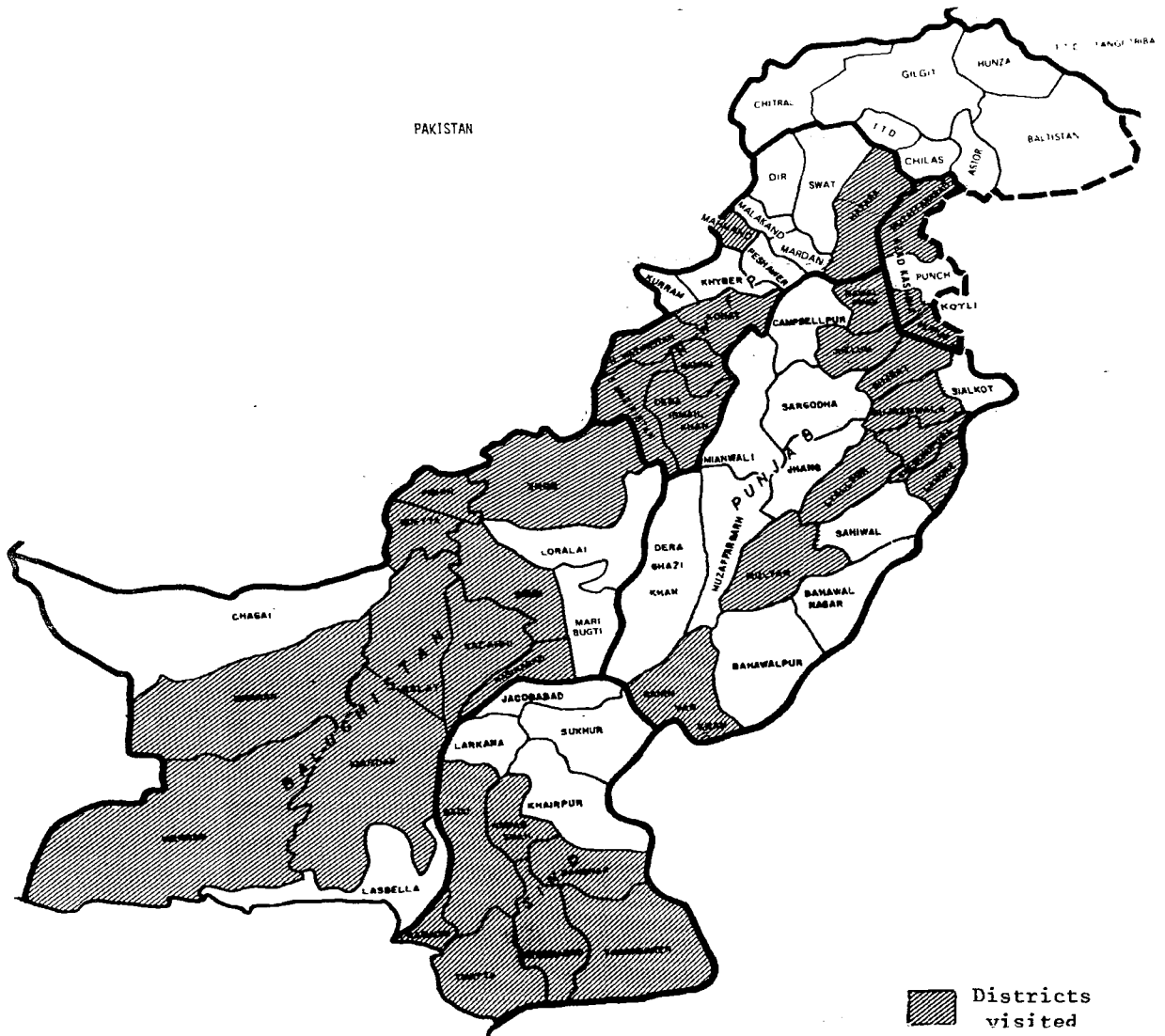


FIGURE 2

MAP SHOWING DISTRICTS VISITED DURING FIELD SURVEYS BY MEMBERS OF COMMISSION



LIST OF PARTICIPANTS

1. Members of the International Commission

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* final meeting only

LIST OF WORKING PAPERS (By subject area)

AREA 1 - LAND AND PEOPLE

<u>Azad Kashmir</u>	Azad Kashmir	PAK/AK/WP/76.1
<u>Baluchistan</u>	Topography and history of the programme Nomadic movement in Baluchistan	PAK/BAL/WP/76.1 PAK/BAL/WP/76.9
<u>NWFP</u>	North West Frontier Province	PAK/NWFP/WP/76.1
<u>Punjab</u>	Punjab	PAK/PUN/WP/76.1
<u>Sind</u>	Topography of the province and background of the programme Demographic data for Sind	PAK/SIND/WP/76.1 PAK/SIND/WP/76.6

AREA 2 - ERADICATION PROGRAMME 1968-1974

<u>Azad Kashmir</u>	History of Smallpox in Jammu and Kashmir	PAK/AK/WP/76.3
<u>Baluchistan</u>	Khuzdar outbreaks - the last episode in Baluchistan Epidemiology of smallpox in Baluchistan	PAK/BAL/WP/76.3 PAK/BAL/WP/76.8
<u>NWFP</u>	North West Frontier Province Epidemiological trends of surveillance in NWFP and methods of containment adopted	PAK/NWFP/WP/76.1 PAK/NWFP/WP/76.7
<u>Punjab</u>	Historical background of smallpox in Punjab Epidemiological trends and containment activities 1974 Strategical approaches	PAK/PUN/WP/76.2 PAK/PUN/WP/76.3 PAK/PUN/WP/76.5
<u>Sind</u>	Implementation of containment and surveillance Methodology of surveillance Achievement of a sample district - Khairpur District Last three outbreaks of Sind Epidemiology of smallpox in Sind Smallpox in Karachi	PAK/SIND/WP/76.2 PAK/SIND/WP/76.3 PAK/SIND/WP/76.4 PAK/SIND/WP/76.5 PAK/SIND/WP/76.12 PAK/SIND/WP/76.18

AREA 3 - HEALTH EDUCATION AND PUBLICITY

<u>Sind</u>	Publicity and the smallpox eradication programme in Sind	PAK/SIND/WP/76.8
<u>Combined</u>	Special programme for health education - Punjab, NWFP and Azad Kashmir	PAK/WP/76.1

AREA 4 - SEARCHES

<u>Baluchistan</u>	Active Case Search Active Case Search 1976	PAK/BAL/WP/76.2 PAK/BAL/WP/76.4
<u>NWFP</u>	First Round of Active Case Search and its assessment Second Round of Active Case Search and its assessment Active Case Search Town Search and its assessment Third Round of Active Case Search and its assessment	PAK/NWFP/WP/76.2 PAK/NWFP/WP/76.4 PAK/NWFP/WP/76.6 PAK/NWFP/WP/76.8 PAK/NWFP/WP/76.10
<u>Punjab</u>	Active Case Search First Round of Active Case Search and its assessment Second Round of Active Case Search and its assessment Town Search	PAK/PUN/WP/76.4 PAK/PUN/WP/76.6 PAK/PUN/WP/76.10 PAK/PUN/WP/76.14

<u>Sind</u>	Continuous survey of villages using the "Field Book", March-October 1975	PAK/SIND/WP/76.11
	Active search in 1976 and its assessment	PAK/SIND/WP/76.13
	Active case search of towns and assessment	PAK/SIND/WP/76.14

AREA 5 - OTHER METHODS ADOPTED FOR SEARCH

<u>Punjab</u>	Awareness among private practitioners and schools about smallpox eradication programme	PAK/PUN/WP/76.8
<u>Sind</u>	Village search through postcards Special school survey in Sind	PAK/SIND/WP/76.17 PAK/SIND/WP/76.19
<u>Combined</u>	Awareness among village leaders about smallpox Awareness among school teachers about smallpox Medical practitioners and the smallpox eradication programme in Pakistan	PAK/WP/76.4 PAK/WP/76.3 PAK/WP/76.2

AREA 6 - SUSPECT INVESTIGATIONS

<u>NWFP</u>	Rumour Register	PAK/NWFP/WP/76.9
<u>Punjab</u>	Rumour Register	PAK/PUN/WP/76.13
<u>Sind</u>	Suspected cases of smallpox-chickenpox survey	PAK/SIND/WP/76.7
<u>Combined</u>	Laboratory diagnosis of suspect specimens	PAK/WP/76.5

AREA 7 - VARIOLIATION

<u>NWFP</u>	Variolation in Mohmand Agency	PAK/NWFP/WP/76.3
<u>Punjab</u>	Variolation in Punjab	PAK/PUN/WP/76.12
<u>Sind</u>	Variolation in Sind	PAK/SIND/WP/76.9

AREA 8 - VULNERABLE AREAS

<u>Baluchistan</u>	Revisit of last 99 outbreaks in Baluchistan	PAK/BAL/WP/76.5
<u>NWFP</u>	Special investigations and follow-up visits to the last 20 outbreaks	PAK/NWFP/WP/76.5
<u>Punjab</u>	Revisit of last 20 outbreaks	PAK/PUN/WP/76.11
<u>Sind</u>	Revisits and assessment of the last 20 outbreaks	PAK/SIND/WP/76.10

AREA 9 - PROBLEM AREAS

<u>Azad Kashmir</u>	Review of smallpox eradication activities and their results in Azad Kashmir	PAK/AK/WP/76.4
	Review of smallpox eradication activities and their results in Northern Areas	PAK/AK/WP/76.5
<u>Baluchistan</u>	Pockmark survey in remote areas of Baluchistan Panjgur and fishing ports of Mekran Special survey along the roads/survey of nomads	PAK/BAL/WP/76.10 PAK/BAL/WP/76.6 PAK/BAL/WP/76.11
<u>Punjab</u>	Special survey of inaccessible areas - Cholistan desert Special investigation for problem areas - Dera Ghazi Khan	PAK/PUN/WP/76.7 PAK/PUN/WP/76.9

ANNEX 2
continued

Sind

Dadu Mountains, Tharparkar Deserts and remote areas
of Thatta

PAK/SIND/WP/76.15

Search for smallpox in flooded and remote areas
of Sind

PAK/SIND/WP/76.16

Information Documents

Operational Guidelines

PAK/INF/1 and
Addendum 1

Smallpox Eradication Project, Punjab

PAK/INF/2

Operations in 1976 - Baluchistan Province

PAK/BAL/WP/76.7

SUGGESTED STEPS FOR FIELD INVESTIGATIONS BY
MEMBERS OF THE COMMISSION

1. At Provincial level*

- 1.1 Meeting with Minister, Secretary and Director of Health Services
- 1.2 Visit Provincial Smallpox Eradication Office
- 1.3 Examination of records, reports, as desired
- 1.4 Review of the smallpox eradication programme as conducted in the Province
- 1.5 Review of outbreak forms, case forms, weekly reports, etc.
- 1.6 Review of Provincial Surveillance Team activities
- 1.7 More detailed review of 1976 provincial activities for documentation of smallpox-free status
- 1.8 Evaluation of supervisory capacity at Headquarters level
- 1.9 Selection of districts to be visited for closer observation
- 1.10 Visit provincial capital municipality health department and examine extent of their smallpox activities in the main provincial towns

2. At District level

- 2.1 Meeting with District Health Officer and his staff
- 2.2 Discussion on health facilities, their distribution and their strength at district level
- 2.3 Review of smallpox eradication activities as conducted at district level
- 2.4 Examination of district reports, records, epidemiological maps, vaccination figures, etc.
- 2.5 Review of outbreak reports, case forms, etc.
- 2.6 Examination of reports regarding active case search and its assessment
- 2.7 Review of any other special programme at district level
- 2.8 Selection of villages - old outbreak sites for field visits and closer observation
- 2.9 Interviews of supervisors and vaccinators as desired

3. At Village level (field work)

- 3.1 Visiting key people, village elders, religious leaders, tea shop owners and private practitioners to examine their knowledge of the reward
- 3.2 Visiting schools, interviewing school headmasters, teachers and students about their knowledge of smallpox and the reward
- 3.3 Visiting a few randomly selected households, nomad camps, etc., to evaluate their knowledge of the reward
(Note the number questioned and the number who knew about the reward for calculating the percentage)
- 3.4 Looking for wall writing, posters and signs re the smallpox reward
- 3.5 Survey for pockmarks amongst children under five years of age (under 2 and 2-5 years), if desired
(Diagnostic criteria for identification of pockmarks related to smallpox as defined by the project is the presence of at least five facial pockmarks with a diameter of at least 2 mm.)
- 3.6 Survey for vaccination scars in any sector of the community
- 3.7 Revisit of an outbreak and comparison of information with district and provincial records
- 3.8 Identification of a suspect case recently investigated and verification as to speed, promptness, diagnosis and quality of investigation.

* The programme in Pakistan was decentralized and operations were carried out from Provincial Headquarters level.

COMPOSITION OF FIELD TEAMS

Team	Province	International	WHO	National Officer	Sanitarian	Car No.	Driver
Ia	Azad Kashmir	Dr. Shrestha	Dr. Hajian	Brigadier Ali Colonel Alizai Dr. Rafique Ahmed	-	X-68-479	Mr. Mohd. Hussain
Ib	Karachi Town	Dr. Shrestha	Dr. Hajian	Dr. Khaled	Miss Shameam	X-68-165	Mr. Sartaj
II	Baluchistan (North)	Dr. Idris	Mr. Urquhart	Dr. Ajmal Latif	Mr. Panah Mr. Afzalbux	X-68-308 X-68-306	Mr. Haji Khan Mr. Mohd. Ali
III	Baluchistan (South)	Dr. Meiklejohn	Dr. Shafa	Dr. A. Qadeer Khan Dr. Khaled (Lasbella)	Mr. Sarvar Mr. Riaz	X-68-322 X-68-165	Mr. Jhangir Mr. Sartaj
IV	NWFP	Dr. Kumara Rai	-	Dr. M. Ayaz Khan Dr. Qayyum Dr. Nisar	Mr. Badezaman Mr. Haji Nawab	X-68-385 X-68-384	Mr. Iqbal Mr. Ghulam Mohd.
V	Punjab	Dr. Bennett	Dr. Omer Sulieman	Dr. Khawaja Dr. Latif Mr. Ismatullah	Mr. Siddique Mr. Salim	X-68-383 X-68-382	Mr. Ghulam Mohd. Mr. Ashraf
VI	Sind	Dr. Bedson	Dr. Chamsa	Dr. Ghumro Dr. Rajput Dr. Khaled	Mr. Sadoro Mr. Shamsuddin	UN-68-184 UN-68-449	Mr. Fazil Mr. Vasiq

REPORT FROM AZAD KASHMIR

Azad Kashmir is a small state comprising four districts. It has an area of 4 494 square miles and a population of a little over 1.5 million. Smallpox has never been a problem in the state and vaccination coverage is reported to have been very good. There were 17 cases in 1973 and 1974, with the last case in June 1974. All outbreaks were due to importation from various provinces of Pakistan.

At Muzaffarabad, the team met the Deputy Director and the Chief Health Planner cum District Health Officer. The team met the village leaders and the school headmasters wherever it went. The team was also granted audience by the Honourable President, Sardar Mohammad Ibrahim Khan.

The records were well-maintained at the state level and also at the district level. The team visited the districts of Muzaffarabad, Mirpur and Kotli. In all, the team visited eleven schools and eight villages and made enquiry about suspect cases. A scar survey was done and enquiries made about knowledge of the reward for reporting smallpox.

All those contacted denied having seen any smallpox patient during the last five years. Variolation has not been known for a long time. No evidence was found of variolation during the last 50 years.

A total of 3 164 children under 15 years were examined for scars (pockmarks and vaccination) and 3 015 (95%) were found to have vaccination scars (Table A). Eight had pockmarks, the latest year of infection being more than five years ago.

Publicity about the reward, including wall writing and posters, was found to be widespread and the knowledge of the people was good. Out of 221 questioned, 214 (97%) knew of the reward (Table B) and 186 (84%) had seen the photograph of the smallpox patient.

Rumour registers were maintained at the District Health Offices. Reports about suspect cases were being sent to the state level monthly, and weekly from one district (Mirpur). Nil reports were also being sent. There has been no entry in the register for the last three months. This was confirmed by enquiry in the villages.

Conclusion

The team was satisfied that the state has been free of smallpox for at least two years and surveillance has been adequate to detect any possible case.

RESULTS OF SCAR SURVEY

TABLE A

District	Number surveyed		0-1 year				1-4 years				5-14 years				All ages			
	Schools	Villages	E	V	P	N	E	V	P	N	E	V	P	N	E	V	P	N
Muzaffarabad	3	3	8	2	-	6	48	39	-	9	732	694	-	38	788	735	-	53
Mirpur	3	3	3	-	-	3	32	27	-	5	1 148	1 116	4	28	1 183	1 143	4	36
Kotli	5	2	-	-	-	-	-	-	-	-	1 193	1 137	4	52	1 193	1 137	4	52
Total	11	8	11	2	-	9	80	66	-	14	3 073	2 947	8	118	3 164	3 015 (95%)	8	141

E = Examined

V = Vaccinated

P = Pockmarks

N = No Scar

KNOWLEDGE OF REWARD

TABLE B

District	No. Questioned	No. who saw photo	No. who knew of reward
Muzaffarabad	130	106	127
Mirpur	22	19	19
Kotli	69	61	68
Total	221	186 (84%)	214 (97%)

REPORT FROM NORTH AND SOUTH BALUCHISTAN PROVINCE

1. General

Baluchistan is the largest province in Pakistan and covers nearly half of the country (132 909 square miles). The population is approximately 2½ million. It is also remarkable in that some of the population are nomads moving from north to south and vice versa along certain corridors and have been one of the problems for the smallpox eradication programme in the province. The people are of different ethnic groups and several languages are spoken. It has a very difficult terrain with mountains and deserts; many parts of the province remain inaccessible by road. The smallpox eradication programme in this province, unlike other provinces, was centrally administered. Two teams from the International Commission visited the province.

2. Administrative set-up

The smallpox eradication programme in the province was centrally administered under a Provincial Smallpox Eradication Officer.

3. Records and Staff

The records of smallpox activities were kept in a fairly good manner at the Provincial Smallpox Eradication Office. The case search records were kept in an excellent way and the records of outbreaks were of high standard. Recent pockmark and scar surveys which have been carried out showed good coverage and revealed no pockmarks in the age group 0-5 years. This was also confirmed during the teams' visits. The vaccination coverage of the age group 0-5 years was found to be moderate.

The staff of the smallpox eradication programme were very knowledgeable about smallpox and in certain instances excellent records were kept at district level. The workers in the basic health units were also aware of smallpox and were conscious of the activities of the smallpox programme.

4. Knowledge of Smallpox

The population was aware of smallpox and knew where to report. They could recognize the smallpox card. In general, they had not seen smallpox for the last 5-6 years, except in areas where reported outbreaks occurred in 1972-1974. They were convinced of the Protective value of the vaccine and were of the opinion that smallpox had been controlled or almost eradicated.

5. Knowledge of the reward

The knowledge of the people about the reward was between 30% and 50%. It was noteworthy that very few wall writings, stencils and marks of the visits of smallpox teams were seen. School children, however, were more aware of the reward than others.

6. Places visited and persons interviewed

<u>Places visited</u>	<u>No.</u>	<u>Persons visited</u>	<u>No.</u>
Districts	10	Government officials	6
Cities	6	District Health Officers	10
Villages	41	Medical Officers	4
Nomadic camps	6	Dispensers and compounders	15
Outbreak areas	9	Sanitary Inspectors	7
Schools	8	Vaccinators	5
Health Centres	15	Army Officers	4
Hospitals	7		

The number of schools visited was very small, but this was due to the fact that some schools were closed for winter holidays. Even some of those visited were seen at their examination time. The nomadic camps were scattered along the main road. Most adult nomads were vaccinated but the children up to five years of age were not well covered.

7. Pockmark survey

District	0-4 years		5-14 years		15+ years		All Ages	
	No. Examined	No. with Pockmark	No. Examined	No. with Pockmark	No. Examined	No. with Pockmark	No. Examined	No. with Pockmark
Kachhi	9	-	41	3	99	6	149	9
Kalat	-	-	24	-	23	2	47	2
Kharan	-	-	27	-	82	-	109	-
Khuzdar	19	2*	124	1	222	5	365	8
Mekran	25	-	212	3	606	5	843	8
Nasirabad	38	-	245	8	92	5	375	13
Pishin	41	-	124	1	27	3	192	4
Quetta	7	-	-	-	-	-	7	-
Sibi	7	-	18	-	21	-	46	-
Zhob	17	-	52	-	89	5	158	5
Total	163	2	867	16	1 261	31	2 291	49

* Known smallpox cases from outbreak No. 357 (Khuzdar)

8. Recent Outbreaks

The teams visited nine recent outbreak areas and other villages and carried out scar and pockmark surveys, the results of which are given above. No pockmarks were found in children under five years of age, except in two children (4 years old) in Khuzdar, and these were known as smallpox cases from Khuzdar outbreak two years ago. No false reports about disease were found and so none have been investigated.

9. Variolation

The teams sought and made contact with former variolators or members of variolator families. In general the material used for variolation has consisted of finely ground scabs to which various additions might be made. This material was placed in a cut above the wrist. Variolation was done only when smallpox occurred and variolators were called to the infected village. Even then only children were variolated. The practice had been abandoned when vaccine became available and no scabs could be found. In general, the impression given was that the material was useless after six months. When asked whether there was any smallpox in the province, the former variolators stated that if they could find any, they would claim the Rs. 5 000 reward rather than engage in variolation.

It was the impression of the team that variolation had been prevalent 30-40 years ago, but had virtually ceased thereafter.

Conclusion

As a result of the activities carried out by the teams, the teams are convinced that smallpox transmission has been stopped for the last two years.

REPORT FROM NORTH WEST FRONTIER PROVINCE

The team visited four districts (Kohat, Bannu, Dera Ismail Khan and Hazara) and four agencies (Bajaur, Mohmand, North and South Waziristan). Particular attention was given to these four agencies because:

- (a) They have a common border with Afghanistan where a lot of movement from both sides was reported to have occurred.
- (b) One of the last smallpox outbreaks in 1973 in Afghanistan occurred in Ghazni province which adjoins North and South Waziristan.
- (c) Variolation was observed as recently as 1973-1974 in Mohmand Agency.
- (d) The Provincial Smallpox Eradication Officer (PSEO) and his staff could not visit them as frequently as the other agencies, mainly for safety reasons.

Of the four districts visited, Hazara is the most important because the last outbreak occurred there in August 1974.

The results of the visit are summarized below.

1. All District Health Officers (Assistant District Health Officer in Bannu) were visited as well as the three Agency Surgeons (Mohmand Agency is being taken care of by the District Health Officer, Peshawar). They were quite aware of the programme and seem to be quite active as well. Some hospital physicians were also met. Several schools, markets, dispensaries and drugstores were also visited. The Political Agent (PA) of South Waziristan and the Assistant Political Agent of North Waziristan and Mohmand were also visited. The District Health Officer of Dera Ismail Khan (Dr. Sandullah) joined the team during its visits to North and South Waziristan.
2. Record keeping at the provincial level and all areas visited was well-maintained. Emphasis was given to a rumour/suspect register. This did not exist in South Waziristan (because no rumour was received), and in North Waziristan, only the record of December 1976 was observed.
3. Visits to recent smallpox outbreaks were made only in Hazara district (last outbreak in August 1974). No pockmarks were observed in children under the age of two years. In this village a man reported two suspected cases which the team confirmed as chickenpox. They were sisters aged 13 and 15 years and both had vaccination scars. The man had sent the report a few hours before the team arrived, but it had not reached the District Health Officer.
4. Scar survey and pockmark survey. A very small sample was taken in a village of Bannu district and in the city of Bannu. Of the 15 children under 15 years examined in that village, 50% did not have vaccination scars. Similar results were observed in the city of Bannu (12 children examined). It was quite difficult to conduct a scar survey and, since the record of primary vaccination performed in all areas almost persistently showed that it could only cope with 50%-80% of the newborn, the team placed emphasis rather on pockmark surveys, especially in the four agencies. Only one child, aged 14 years, was observed in a school in Bajaur agency (out of 75 children). He had suffered from smallpox ten years ago. No pockmarks were observed in the other three agencies.

In the four districts visited, two school children in Kohat (aged 12 and 15 years), out of a total of 625, were found with pockmarks. They had both suffered from the disease at least five years ago. Two adults were found with pockmarks in a market in Dera Ismail Khan district and they had contracted the disease about 15-20 years ago. The last two children with pockmarks were detected in the city of Bannu (aged 9 and 12 years). Again here, they had the disease at least five years ago.

Variolation scars were mainly observed in adults over 40 years. The youngest person was found in North Waziristan (22 years old). They admitted having been variolated some 10-20 years ago. The place where variolation was reported to have occurred some 2-3 years ago in Mohmand was not visited.

5. Variolation. As mentioned in item 4, the practice of variolation seems to have been stopped some 10-20 years ago, except in Mohmand Agency. Four variolators were met and interviewed there. They were all over 45 years old. Two brothers who were reported to have performed variolation 2-3 years ago have now become vaccinators, while the two others stated that they had stopped the practice 4-6 years ago.

One variolator was met in Bajaur Agency and he stopped the practice six years ago. His son and daughter contracted the disease in 1970 (they were not variolated).

All variolators interviewed said that they kept the material usually for less than one year. Only in very rare instances did they keep it for more than one year (they think that after one year the material loses its potency). Further, they said that variolation was usually done upon request of the population if there was an outbreak or fear of an outbreak and that they had stopped the practice because there was no more demand after the government made vaccination available at no charge.

6. Suspect reports. A total of four reports were investigated from Bannu and Hazara districts; two were reconfirmations of diagnoses made by the District Health Officer/ Assistant District Health Officer.

	<u>No. of reports</u>	<u>Reconfirmation</u>	<u>Other</u>
Bannu	2	1 (measles)	1 (chickenpox)
Hazara	2	1 (chickenpox)	1 (2 chickenpox)*

* see item 3.

All reported suspects had vaccination scars, and all were aged over 10 years. Overall, about 80-90% of incoming reports were checked by the District Health Officer and where necessary specimens were collected for laboratory confirmation.

7. Health Education. In general, slogans concerning the reward of Rs. 5 000 were well-posted. However, when asked individually, the percentage of people who knew about it ranged from 50%-80%. It is encouraging to note that in every gathering of people visited, at least one knew about the reward.

8. Nomads. Only one semi-nomad group was observed in Dera Ismail Khan and this consisted of six adults and nine children (four vaccinated). The team was informed that December was not the season of nomadic movement and that movement across the border with Afghanistan is becoming less and less every year.

9. Summary of places visited

<u>District</u>	<u>School (students)</u>	<u>Tea Shop</u>	<u>Dispensary/ Hospital</u>	<u>Drugstore</u>
Kohat	2 (625)*	2	1	2
Bannu	-	6	1	-
Dera Ismail Khan	-	2**	1	-
Hazara	2 (300)	1	1	-
North Waziristan	-	2	-	-
South Waziristan	3 (325)	2	1	-
Mohmand	4 (550)	3	1	-
Bajaur	1 (200)	2	1	-

* Two children with pockmarks (aged 12 and 15 years)(See item 4)

** Two adults with pockmarks

Pockmark surveys were also done from the car along the road leading to South Waziristan, between South and North Waziristan and whenever the car was driven slowly. None could be detected.

REPORT FROM PUNJAB PROVINCE

This province is divided into 21 districts, two of which were created by further subdivisions of Multan and Lahore districts in 1976. For the purpose of this report, only the 19 original districts which participated in the smallpox eradication programme are considered.

The Punjab is the most densely populated province in Pakistan and has a population of approximately 41 million (58% of the total population). Because of this, it has always had a high incidence of smallpox including the two years (1973-1974) immediately preceding eradication of the disease. Moreover, Lahore, being the commercial, communication and cultural centre of the province is subject to a great traffic of people, not only with the surrounding districts of the Punjab, but also with the whole of Pakistan. It has a population of 2.8 million and it has been estimated that 500 000 people commute to and from it daily. Lahore City was therefore a focus for persisting smallpox infection and also a hub for dissemination of the disease throughout the Punjab. For this reason the Commission paid particular attention to Lahore City, its surrounding districts (Lyallpur, Sheikhpura, Sialkot and Lahore) and districts through which the main road to Rawalpindi runs (Gujranwala, Gujrat, Jhelum and Rawalpindi). The first two are also close to Lahore.

After Lahore City was free of smallpox, other foci persisted for a period in the districts and other large cities of the Punjab (Multan, Lyallpur and the district of Rawalpindi). These cities and districts were also visited. The last patient with smallpox in the Punjab (and in Pakistan) had the onset of her disease on 16 October 1974 in Multan City.

In 1972 it was first learnt that variolation had been practised in the southern part of the Punjab, in a district called Rahimyar Khan, which adjoins the province of Sind. Although surveys of variolation scars and interviews with variolators in 1975-1976 indicated that variolation had not been practised in the area for two years (see PAK/PUN/WP/76.12), it was decided to visit this area. No outbreaks of smallpox in the Punjab had ever been ascribed to variolation and this was the only area in the province in which variolation had been detected.

The results of field trips are summarized as follows.

1. Records relating to smallpox

Interviews were held with both the Secretary of Health and the Director of Health Services of Punjab Province. A special meeting was arranged in Lahore City with the District Health Officers of Lyallpur, Sheikhpura, Sialkot and Lahore districts. At this meeting these officers presented data (augmented by graphs and written submissions) relating to the smallpox eradication programme in their respective districts. In addition, visits were made to the offices of the District Health Officers of Jhelum, Gujrat, Gujranwala, Lyallpur, Sheikhpura, Lahore, Rawalpindi, Multan and Rahimyar Khan districts. The offices of the Municipal Health Officers of the four largest Corporations (cities), Lahore, Multan, Lyallpur and Rawalpindi, were also visited. At all of these offices records relating to smallpox cases, searches, suspect cases and rumour cases, usually presented in graphic or tabular form, were of a high standard. The Commission made spot checks in some cities (Lahore, Lyallpur and Multan) to confirm that the documentation of searches made in 1976 was accurate. A suspect case diagnosed as chickenpox in Taraghri village (Gujranwala district) was sought out and confirmed. Questioning in cities and country villages also indicated that the active searches for smallpox cases had been carried out. The markers (crosses) of the active searches were clearly visible on doorways in all villages.

2. Public Education

Knowledge of the smallpox eradication programme and, in particular, knowledge of the reward for notifying a fresh case of smallpox, was widespread in all districts visited. The only people not familiar with these were illiterate persons, particularly from country areas. The various methods used to advertize the reward, such as picture slides, posters, etc., were examined in each district and painted signs advertizing the reward were in evidence everywhere.

3. Search for active smallpox

In all the villages and cities visited people were asked about recent smallpox and shown the colour card of a patient, but none were able to recall any disease in the last two years. Pockmarks were most uncommon and only seen in people who had had the disease many years previously or in those who had acquired the disease during the last outbreaks and were already recorded. As examples, the following areas were selected for visits by the Commission.

(i) Village of Kot Basira (Jhelum District)

No cases of smallpox had been recorded in this village in recent years. Thirty-one boys in a school, aged less than eight years were examined - none had pockmarks. The headmaster knew about the reward.

(ii) Village of Sanghoi (Jhelum District)

No cases of smallpox had also been recorded in this adjacent village in recent years. Of 233 girls in a school, aged less than 14 years, only one aged 13 years had pockmarks. She had acquired the disease as a child. A spot check of 16 of these girls aged less than eight years showed that they were all vaccinated.

(iii) Village of Chah Waraichanwala (Gujrat District)

The last outbreak (one case) in the district occurred in this village on 28 January 1974. A boys' school with 42 children aged 3-12 years in the village was surveyed; they had all been vaccinated and none had pockmarks.

(iv) Shalimar (Lahore City)

This was an area of one of the outbreaks in 1974. Twelve children aged less than 12 years were seen in the street and only two (aged 8 and 12 years) had pockmarks. Both were known cases of the previous outbreak.

(v) Village of Dahaban Singh (Sheikhupura District)

This village, on a railway line, had the maximum number of cases recorded in the district in 1974. Forty-five children, aged 1-12 years, were examined on the railway station; three young children were unvaccinated and no pockmarks were seen.

(vi) Multan City

The area where the two last cases occurred in Pakistan was visited. These two siblings, a girl aged six years and her brother aged four years, were the only children noticed in the neighbourhood with pockmarks.

(vii) Cotton factory, Multan City

Of about 15 employees questioned, none knew of recent cases of smallpox.

4. Nomads

Groups of nomads had been infected with smallpox in Lyallpur district in 1974. Three different tribes of nomads were selected on the outskirts of Lyallpur City. Groups of children aged 1-12 years in each were examined for vaccination scars and pockmarks.

Tribe I	16 out of 20 were vaccinated
Tribe II	11 out of 11 were vaccinated
Tribe III	16 out of 16 were vaccinated

No pockmarks were observed in any children.

5. Variolation

Three of the variolators, in particular, Dadun (see PAK/PUN/WP/76.12) were interviewed in Rahimyar Khan district. The details related in this paper were confirmed, in particular that this family had ceased variolation (Dadun being the last active member) in early 1975. Prior to this they had variolated 500-700 people annually, the semi-nomads living in the nearby riverine areas of Sind and the Punjab. Details of their technique, passed down through their family, are of interest.

Scabs were collected by the variolator or sometimes by others, from mild cases and stored in any sort of container anywhere in their house. They were only kept for one year, after which time they were discarded because they said they were of no use. (In this context it is significant that Rahimyar Khan is one of the hottest areas in the Punjab). Prior to variolation, the scabs were ground to a powder and made into a paste with human milk. A cluster of needles was dipped into the paste and then used to puncture the skin just proximal to the anatomical snuff-box at the wrist, so as to cause some oozing of blood. The site was covered with a mulberry leaf and bandaged for three days and then kept dry for a total of fifteen days. Within three days fever occurred which lasted 2-3 days and, on about the sixth day, three or four pocks occurred on the same arm. They all denied ever having seen more pocks than this following their variolation technique. Variolation was performed only on healthy children.

These variolators did not know of anyone else who had performed variolation.

A boys' high school, 12 miles north of Sadiqabad (village of Bahadarpur) was visited. Of approximately 600 boys aged 5-18 years, none had variolation scars and none of the boys or teachers had heard of variolation being performed in the area. Only two boys aged 12-14 years had pockmarks and they had both acquired the disease some 7-9 years previously.

Repeated questioning in other districts in the Punjab failed to reveal any evidence of past or present variolation practice.

REPORT FROM SIND PROVINCE AND KARACHI CITY

The province of Sind has an area of 60 000 square miles and a population of 15 million, 3.6 million of which live in Karachi city, the provincial capital. The main geographical feature is the alluvial plain watered by the Indus River, bordered on the west by mountains and Baluchistan and on the east by the Thar desert of India.

The last case of smallpox in Sind was in September 1974, but the province was heavily infected in both 1973 (7 848 cases) and 1974 (5 982 cases). Of the 11 administrative districts, the worst affected in 1974 were Hyderabad, Tharparkar and Sanghar in the south. The problem areas in surveillance were the relatively inaccessible mountain and desert regions and the flood-affected areas of 1976.

The field visits outside Karachi City were made by Team No. VI (see Annex 4) but, because of its importance as the biggest city in Pakistan, and as a major industrial centre and sea port, a second two-day visit was paid to Karachi City by Team No. 1 (see Annex 4). Its findings are dealt with in a separate section of this report.

1. Health Services

The provincial health services are administered from Karachi. The Minister of Health and Population Planning, the Acting Secretary for Health and members of their staff were visited in Karachi and the Director of Health Services in Hyderabad. District Health Officers were interviewed in six of the seven districts visited. Although the Smallpox Eradication Programme is a 'vertical' programme and its staff are independent of the basic health services, the vaccination staff of the latter were used for the eradication programme and in two of the districts visited, the duties of District Smallpox Eradication Officer were being performed by the District Health Officer. All those interviewed expressed their appreciation of the importance of the smallpox programme, the valuable contribution of all those concerned with it and the need for some form of continuing surveillance after eradication has been pronounced.

2. The Smallpox Eradication Programme

Visits were made to the Provincial Smallpox Eradication Programme office at Hyderabad and to the District Smallpox Eradication Programme offices in each of the seven districts included in the field trip. The assistance of the officers concerned and the various members of their staff was of great value in the field work. The records of the smallpox outbreaks and the subsequent surveillance activities were in general well maintained and the overall level of competence was satisfactory.

3. The transmission of smallpox

In each district visited, one or more of the 1974 outbreaks were selected for reinvestigation. In all, 13 of these outbreaks were revisited and, although it was usually possible to trace many of the recorded cases, no missed cases were detected and there was no evidence of continuing transmission in these sites. Small vaccination scar surveys in some of these areas and in 19 other villages selected at random showed a high level of protection, with vaccination scars present in 85% of 296 children under 15 years of age without pockmarks (Table A).

Pockmark surveys were made in 33 different localities (Table B). Only three children with pockmarks were seen in 622 children under five years, all being known cases of previous outbreaks. In 1 330 children aged 5 to 15 years, there were 63 with pockmarks. These included eight known cases of 1974 and the available evidence suggested that the rest were all attributable to earlier infections.

4. Variolation

Although 13 outbreaks in Sind have been recorded as due to variolation (PAK/SIND/WP/76.9), nine of these were in the Sukkur district and associated with variolators resident in the Punjab. Three of the other outbreaks were revisited. In one, in Sanghar, two of the three recorded cases were seen and neither had a variolation scar. The history obtained on this occasion was that variolation had been attempted a year or more before the outbreak but without success, and re-examination of the records suggested that the probable source of infection in this outbreak was a neighbouring village of the same caste. Neither of the patients in the second outbreak in Sanghar could be seen, but interrogation of the villagers and the local staff involved in containment suggested that this outbreak too was probably not due to variolation. By contrast, the outbreak in Chappar Khan Khoso in 1974, detected retrospectively in 1975, was confirmed as due to variolation. Scars of variolation were seen in four of the children variolated in 1974 and in three others variolated on an earlier occasion. Many adults in this community were examined and nearly all had scars of variolation. It was explained that the practice was a tradition in this community and that the services of the variolator were requested only when smallpox occurred in the locality.

Although enquiries were made throughout the course of the field trip and a careful watch was maintained for scars of variolation both in children and adults, there was no evidence that variolation had been practised in any other locality visited.

5. Problem Areas

In Tharparkar district visits were made to Umarkot, to New Chor and the desert to the south of it, but there was nothing to suggest that these places were in any way unusual in respect of vaccination coverage, incidence of pockmarks, health education and knowledge of the reward for reporting smallpox. Further penetration of the desert of Tharparkar was not possible. Attention was also paid to 'riverine' villages in flood-affected areas of Dadu district. The vaccination coverage in these was extremely high and there was no evidence of any recent occurrence of smallpox. The mountainous areas of Dadu were not visited.

6. Suspect cases

Examination of the records of suspect cases revealed that they were well kept and that in general these had received prompt investigation. Five of the most recent suspect cases were reinvestigated and the diagnoses confirmed. A number of other suspect cases came to notice during the field trip and in each the diagnosis of smallpox was excluded.

7. Health Education

Numerous village leaders, school teachers and school pupils were questioned about their knowledge of smallpox, the reward for reporting it and the method of doing so. The responses were in general satisfactory, but school children under the age of seven years were usually not well informed and occasional village leaders also appeared ignorant of these matters. Wall signs and posters advertizing the reward were seen in many of the localities visited, but their distribution was uneven, both between and within the different districts.

8. Karachi City

Although the annual incidence of smallpox in Karachi did not exceed 400 cases throughout the years of the eradication programme, the city has a lot of slum areas and, as a result, some outbreaks were detected late and a few took a very long time before they were contained.

Visits were made to the Municipal Corporation health office, District Health office,

District Smallpox Eradication Programme office, Civil Hospital, Port Health Authority, one dispensary, two outbreak areas and four schools.

Records at the District Smallpox Eradication Programme office, including the Rumour Register, were maintained properly. Reports of suspect cases were still being received and verified by the district staff.

The smallpox ward at the Civil Hospital had already been demolished. The team checked about 100 children under five years at the children's Outpatients' Department and found no pockmarks.

In the two outbreak areas visited, Malir and Ibrahim Hyderi, the team enquired about suspect cases and verified a few cases of measles. There was no evidence of any smallpox cases during the last two years nor of any missed case in the previous outbreaks. No pockmarks were found in children under five years.

There was a general awareness of the reward although knowledge about the amount was variable from person to person.

Conclusion

At the end of the field visits, the teams concluded that there was no evidence that smallpox had occurred in Sind province since the recorded outbreaks of 1974, and that a satisfactory level of surveillance had been maintained.

TABLE A

RESULTS OF SCAR SURVEY

District	No. of villages sampled	0-1 year		2-4 years		5-15 years	
		Vaccinated	Unvaccinated	Vaccinated	Unvaccinated	Vaccinated	Unvaccinated
Hyderabad	6	2	9	19	1	38	2
Tharparkar	4	1	6	4	-	11	3
Sanghar	4	4	2	9	-	25	1
Nawabshah	2	-	1	1	1	11	1
Dadu	8	23	13	41	2	54	3
Thatta	1	-	-	3	-	5	-
Total	25	30	31	77	4	144	10

TABLE B

RESULTS OF POCKMARK SURVEY

District	No. of localities sampled	0-1 year		2-4 years		5-15 years	
		No. Seen	No. with Pockmarks	No. Seen	No. with Pockmarks	No. Seen	No. with Pockmarks
Karachi	1	2	-	10	-	181	3
Hyderabad	2	52	-	57	1*	23	-
Tharparkar	5	15	-	16	-	290	5
Sanghar	6	13	-	21	-	52	4
Nawabshah	4	-	-	-	-	564	23
Dadu	11	106	-	120	1**	126	16
Thatta	3	108	-	102	1**	94	12
Total	32	296	-	326	3	1 330	63

* known case of December 1972

** known cases of 1974 outbreaks