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THE NEPAL SMALLPOX ERADICATION PROGRAMME

Description and analysis

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1. BACKGROUND INFORMATION

Nepal is a land-locked kingdom situated between India and the Tibetan region of China. It has a population of about 12.5 million who live in an area of 54 136 square miles, formed in a rough rectangle 100 miles by 500 miles, which extends in a north-west to south-east direction along the Himalayas. Fig. 1 shows population projections for Nepal.

For administrative purposes the country is divided into four development regions together comprising 14 zones. The zones are subdivided into a total of 75 districts whose population ranges from 7000 to 350 000. As such, the district in Nepal is a much smaller unit than its namesake in India or Bangladesh, where a district may contain several million people. The 75 districts are further divided into about 4000 panchayats, the range of panchayats per district being 5 to 108. Each panchayat is made up of nine wards, each containing one or more villages.

There is virtually no restriction on movement across the Nepal-India border but very little interchange takes place across the border with Tibet.

Geography (see Fig. 2)

Nepal can be roughly divided geographically into three horizontal belts.

The flat "Terai" area, which is an extension of the Gangetic plain of north India 10-35 miles deep, contains 17% of the total area of Nepal and 36.5% of its population. Two-thirds of the population of the Terai is concentrated in its eastern half which adjoins the Indian State of Bihar. The population density of this area varies from 350 to 750 persons per square mile. The western part of the Terai, which adjoins the Indian State of Uttar Pradesh, has a population density of less than 200 per square mile (see Fig. 3).

At several points along the east-west axis of the country there are flat valleys behind the first range of hills above the Terai. These form an intermediate region collectively known as the "Inner Terai". At two points, in the Chitwan valley and the Dang Deokhuri valley, the southern rim of the Inner Terai valleys extend to the Indian border. This effectively divides the Terai into three parts.

FIG. 1. POPULATION PROJECTIONS (ASSUMING NO CHANGE IN FERTILITY) 1975-2000

	1975	1980	1985	1990	1995	2000
Total population (in thousands)	12 574	14 230	16 267	18 747	21 746	25 408
Males	6 264	7 098	8 122	9 370	10 878	12 684
Females	6 310	7 132	8 144	9 377	10 868	12 684
Crude birth rate (per thousand)	44.0	44.7	44.9	44.3	43.7	43.5
Crude death rate (per thousand)	20.4	18.9	17.3	15.3	13.4	11.5
Growth rate (% per annum)	2.36	2.58	2.76	2.90	3.03	3.19
Life expectancy at birth (years)						
Males	42.1	44.1	46.3	48.8	51.5	54.5
Females	45.2	47.7	50.2	53.2	56.2	59.2

Based on estimates of the Mission to Nepal of the International Bank for Reconstruction and Development, 1973.

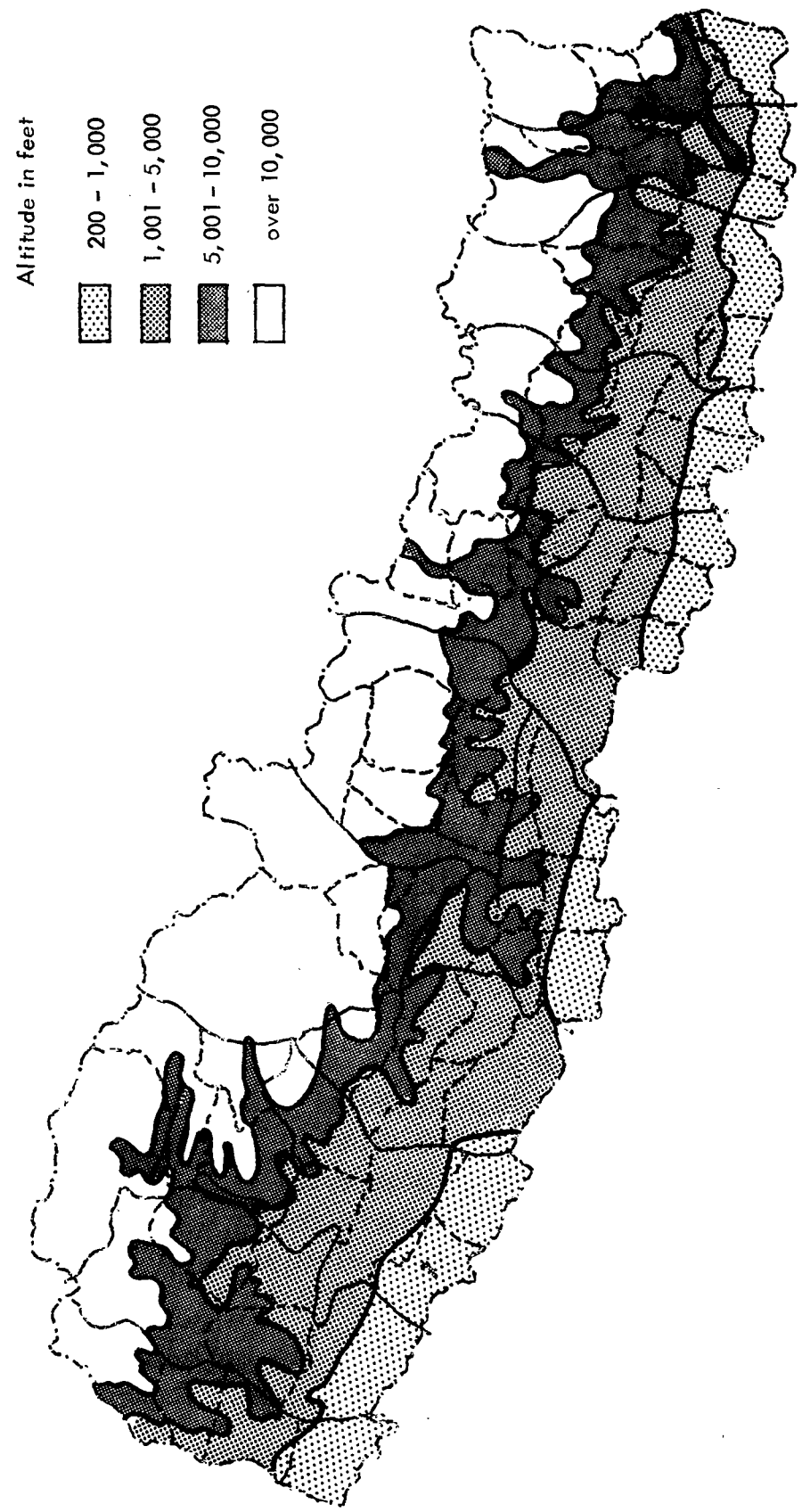
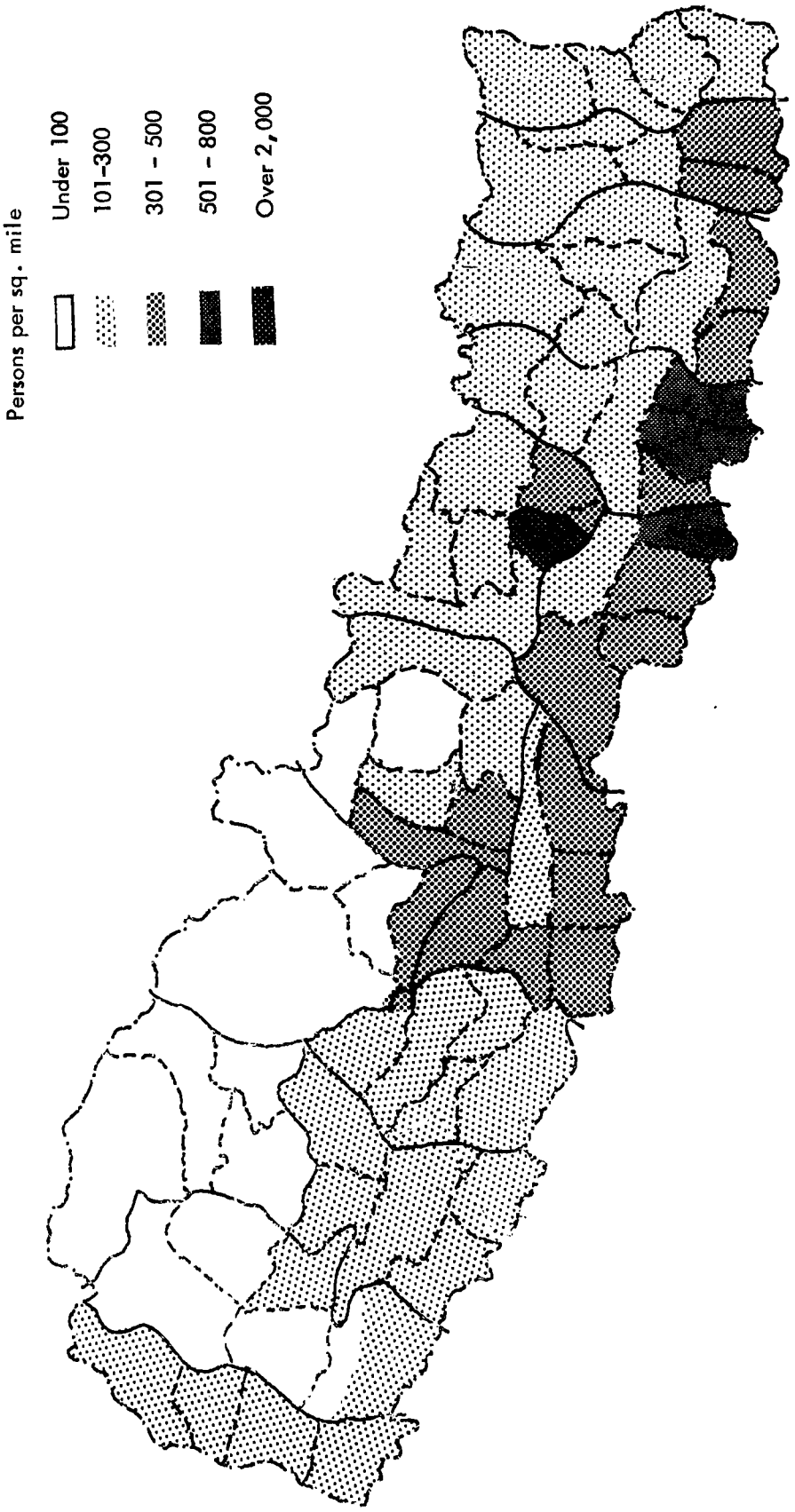


FIG. 2. PHYSICAL TOPOGRAPHY

FIG. 3. APPROXIMATE POPULATION DISTRIBUTION



The "Mid-Hill" area contains 53.5% of the total area of Nepal and 57% of its population. This belt is 20-30 miles deep and contains terrain rising to 10 000 feet. Within the Mid-Hill area are a few large, approximately circular, flat valleys, such as at Kathmandu, Pokhara and Surkhet. As in the Terai the population gradient is from east to west. The densest populations are to be found in the valleys. The inhabitants of the Kathmandu valley comprise 5% of the country's population and live at a density of 2000 per square mile.

The mountainous "Himalayan" area contains 29.5% of the total land surface of Nepal and 6.5% of its population. Altitudes here range up to that of Mount Everest. The highest peaks lie along the Chinese border, except at certain points where the Tibetan plateau extends into Nepal, as it does north of the Annapurna range.

Climate

There are marked variations in climate among the three geographic regions.

The climate of the Terai can best be described as semi-tropical. There are three seasons. The summer, from March to June, is hot and dry with temperatures ranging up to 47°C in the west. The monsoon follows from June to October, with an annual rainfall averaging 200 cm in the east falling to around 100 cm in the west. The winter season from November to the end of February is cool with minimum temperatures as low as 5°C.

The climate and vegetation of the Mid-Hills is temperate, although the cycle of the seasons and the amount of rainfall is similar to that in the Terai. At Kathmandu, for example, which lies at an altitude of 4500 feet, the maximum temperature in the summer rarely exceeds 30°C while in winter it may fall to freezing at night.

The climate of the Himalayan area is alpine. The seasonal pattern is similar to that in other areas but with lower temperatures which lead to snow formation. There are certain Himalayan areas which are relatively arid. They lie to the north of the main Himalayan range and are thus effectively screened from the monsoons.

In general the climate becomes hotter and drier the further west one travels. As a result of this the agricultural yield, population density and standards of living are generally lower in the west.

Communications

Fig. 4 shows the main communicating links inside Nepal. Metalled roads are largely limited to the Terai. The major exception is the network of roads that joins Kathmandu to Pokhara in the west, China in the north and the Terai in the south. Travel in the rest of the country is on foot, although the east-west highway that spans the country at present is still under construction, and will undoubtedly reduce the isolation of the western districts very considerably when it is completed.

The country is well-endowed with airfields and there is an efficient internal airline which runs regular or charter flights to all the airfields marked on Fig. 4.

Every district has a wireless telegraph office through which it can communicate with Kathmandu.

Ethnic composition, economic activity and their effect on smallpox

Hinduism is the State religion of Nepal, the only country in the world where this is so. According to the 1971 census the religious affiliations of the population are as follows: Hindu - 89.4%; Buddhist - 7.5%; Muslim - 3%; other 0.1%.

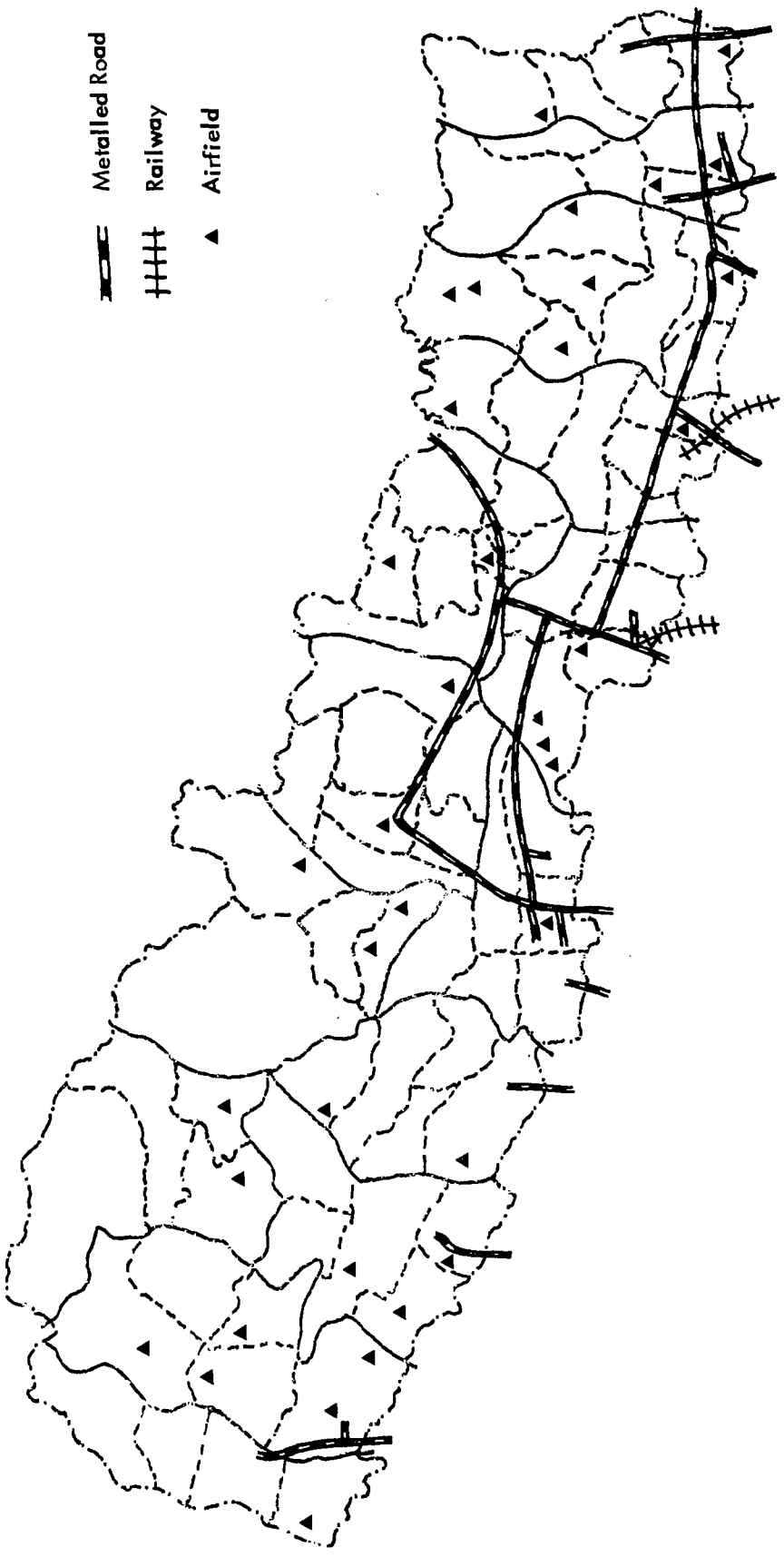


FIG. 4. INTERNAL COMMUNICATIONS

Broadly speaking each of the three geographic belts has its own ethnic and cultural composition. The pattern of migration, which is essentially north-south in axis, varies between the east and the west because of the differing levels of economic activity. These demographic and socioeconomic differences contributed greatly to the pattern of importation and transmission of smallpox in Nepal. A general ecological/epidemiological review may therefore prove useful.

The Terai

The Eastern Terai is a relatively rich agricultural and industrial area. In addition to rice and other food crops important cash crops, such as jute and tobacco, are cultivated. The town of Biratnagar, with an urban area population estimated at 50 000, is an important centre for jute processing, fruit canning and the manufacture of "bidi" (local cigarettes) and matches. A sizeable proportion of the labour force of this area, both agricultural and industrial, is composed of seasonal migrants from India.

Many of the seasonal migrants from India into the extreme south-eastern districts of Jhapa and Morang are Santhali (Satar in Nepali) "tribals". These people, who are among those who worship Shitala Mai, the Goddess of Smallpox, were responsible for a number of importations from their home area in Dumka District, Bihar, which was highly endemic for smallpox during 1973 and 1974.

Bengalis make up the majority of the bidi workers in the Biratnagar while other industrial work is undertaken by Biharis, some of whom commute daily across the open border.

Agricultural workers come annually to the Eastern Terai during the post-monsoon harvest season and some remain behind afterwards to construct and repair earthworks, such as canals and roads. Industrial workers sometimes stay in Nepal for longer periods, up to a year. The traffic between India and the Eastern Terai is therefore very considerable. As a result the number of smallpox importations in this area from the highly endemic districts of north-eastern Bihar was very high.

The Western Terai is generally poorer than the East. There are few industrial centres and the level of agricultural activity is lower. Seasonal migration across the border is less extensive, particularly by Indians, and migration among Nepalese is largely confined to family visits over short distances. Therefore, when Uttar Pradesh was heavily infected during the early part of 1973 the level of importations to the Western Terai never rose very far and the sources of what importations there were usually lay within a few miles of the frontier.

The Nepalese of the Terai are, in the main, ethnically similar to the inhabitants of neighbouring areas of India, and many have family connexions there. The cultural response to smallpox found in the Terai is similar to that seen among Indians living in the border areas and frequently includes religious objections to vaccination. The Terai, therefore, was not only vulnerable to importations from across the border but was also the scene of many problems of containment.

The Middle-Hill

The inhabitants of the Middle-Hills are primarily Hindus, although their religion contains some elements of Buddhism. There are also many more orthodox Buddhists. Passing through this area is the linguistic-ethnic frontier dividing the peoples of the Indian subcontinent from those of North Asia. Although there are many dialects and linguistic subgroups the basic language of this area is Nepali, the national language. Like Hindi, Nepali is a Sanskrit based, Indo-European language.

With some exceptions, such as certain sections of the Newar ethnic group, who inhabit the Kathmandu valley and other hill market towns, the people of this area do not have strong religious beliefs concerning smallpox which might prohibit them from accepting vaccination. Consequently the herd immunity to smallpox, in those areas of the Eastern Hills where the smallpox eradication programme has been working for some years, is reasonably high. Despite

regular migration between the Eastern Hills and Assam, where Nepalis work as tea estate and forest labourers, no smallpox has been reported in these areas since 1967, although an Indian pock mark survey in 1976 indicated that there may have been an outbreak in Bhojpur district in 1968, one year before the smallpox eradication programme began operations in that district. It should also be mentioned that another of the traditional occupations of the inhabitants of the Eastern Hills is military service, for which vaccination is a prerequisite. In Kathmandu where the religious attitude to smallpox is different, outbreaks occurred every year up to and including 1967 and from 1972 to 1974, despite the continuous presence of the smallpox eradication programme from 1962.

The Western Hills

In the Western Hills the smallpox eradication programme began operation much later, the last districts in this area being taken into the programme in 1972. Vaccination prior to this was unknown and the herd immunity was therefore very low until well into 1973. These hills are classified in Nepal as food deficient and there is a scarcity of salt. Consequently there is considerable post-harvest movement by Nepalis to and from India where they work as Chowkidars (watchmen) and trade Nepali products for salt, cloth and food. For example, villagers from Jumla district, Nepal, traditionally travel to Mussoorie and Nainital, Uttar Pradesh, while many of those from Doti, Dandeldhura and Accham districts in Nepal migrate to Mombay, Ahmadabad and other cities of western India. The result of this is that the Western Hills are vulnerable to importations from Uttar Pradesh and western India. Fifteen such importations occurred between July 1972 and July 1974.

The mountainous area

The majority of the Nepalis of the mountainous Himalayan areas are Buddhists whose language and culture are Tibeto-Burman. In general they have no particular cultural response to smallpox and they readily accept vaccination.

The population density is low in most of the Himalayan areas, and not only is there little movement to and from India but most of the mountainous districts are more than one incubation period's trek away from any of the previously endemic areas of India.

There are anecdotal references to smallpox in the mountains. An outbreak of smallpox among the Sherpas of Solukhumbu district was reported by an American mountaineering expedition in 1963. There is some evidence for an outbreak in Dolpa district in 1964 amounting to four cases, three of whom died. The one documented outbreak was in Mugu district in 1973. The source of this outbreak was Nainital district in Uttar Pradesh, 13 days walk away. There have been no other reported outbreaks anywhere in the Himalayan districts, but there is some evidence from pock mark surveys that cases did occur in the 1950s and 1960s.

The role of these socioeconomic and demographic factors in the maintenance of endemic smallpox in Nepal can only be surmised, as the surveillance of the disease was not sufficiently developed until the early 1970s to provide the data necessary for such an analysis, and by that time smallpox was no longer endemic. The fate of imported cases, however, was very much determined by these factors. Experience since Nepal was declared a non-endemic area for smallpox in 1973 has shown that under the conditions then prevailing in the country, and this includes the presence of an effective surveillance-containment system, it was unusual for imported cases to result in more than limited local spread. The only three areas where extensive spread occurred were:

(1) Around Kailali district in the Western Terai. Here the Tharu ethnic group, who resisted vaccination for religious reasons, had a custom of granting any wish to a child with smallpox on the grounds that the presence of the disease indicated that the child was in some way possessed by the Goddess, and therefore could not be denied anything. This wish was frequently to be taken to see relatives or friends in other villages, with the result that short distance spread became common.

(2) In the Kathmandu valley and surrounding areas, where there live certain subgroups of the Newar ethnic group who strongly object to vaccination.

(3) In Morang district, where an unusually heavy influx of very poor beggars from India created a large infector pool from which arose many outbreaks within a small area.

It is interesting that most of the anecdotal reports of major outbreaks of smallpox have also been from these three areas.

Fig. 5 shows the broad geographical distribution of the smallpox importations to Nepal from July 1972 to January 1975.

FIG. 5. SOURCE AND SITE OF IMPORTATIONS

TO	Western Terai		Western Hills		Eastern Terai		Others		Total	
FROM	72-73	74-75	72-73	74-75	72-73	74-75	72-73	74-75	72-73	74-75
Bihar	1	2	0	1	12	85	0	2	24	90
Uttar Pradesh	13	13	7	6	2	0	2	1	13	20
Other	1	3	1	0	0	0	1	2	3	5
Total	15	18	8	7	14	85	3	5	40	115

2. ORGANIZATION OF THE HEALTH SERVICES AND THE SMALLPOX ERADICATION PROGRAMME

Fig. 6 shows the structure of the Ministry of Health and Department of Health Services.

The smallpox eradication programme (SEP) is a special development project within the Department of Health Services. It is a "vertical" programme in two senses. First, all funding and staffing arrangements within the programme are carried out independently of other programmes under the Department of Health Services. Second, all smallpox work in Nepal is carried out by SEP personnel, who do no other work. The exceptions to this are:

(1) In the six districts of the Integrated Health Service (IHS) all primary smallpox surveillance is carried out by field workers of that programme.

(2) Since July 1975 primary surveillance for smallpox in areas of endemic malaria has been carried out by field workers of the malaria eradication programme.

It is important to realize that the basic health services - district medical officers, hospitals, etc. - have no responsibility to smallpox eradication beyond reporting any cases of which they happen to be informed.

Although this arrangement may have had the effect of limiting resources of manpower, the degree of independence it has bestowed has allowed the programme to be far more flexible than it might otherwise have been. In an economically poor country of great geographical and cultural extremes this has proved invaluable.

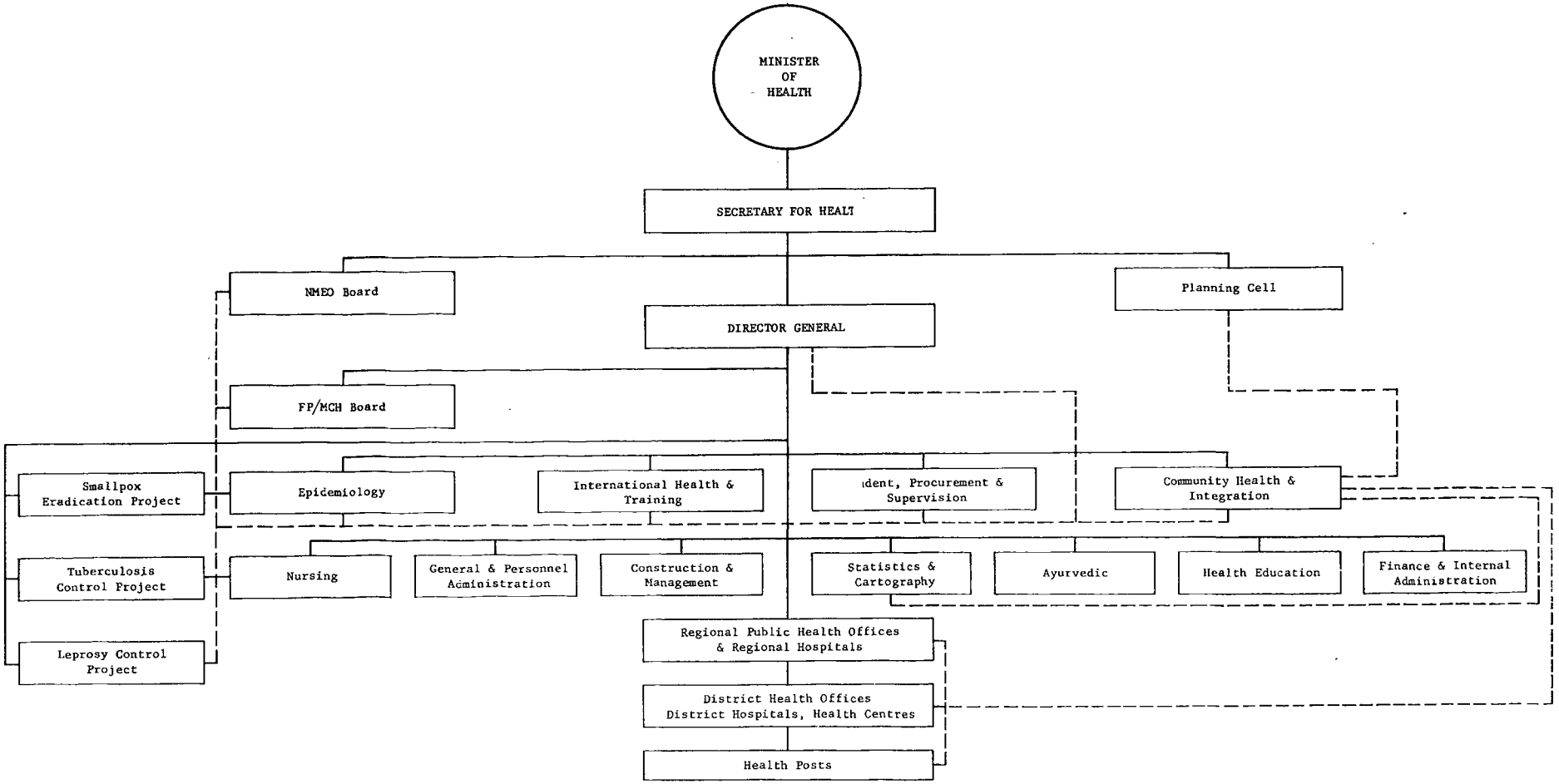
Headquarters

The programme is directed by the project chief, a medical officer, who is stationed at SEP headquarters in Kathmandu. Headquarters staff also includes two medical officers (one post is vacant) and four senior supervisors. Attached to headquarters are two national assessment teams and two national surveillance teams. There is also a large administrative staff.

FIG. 6. ORGANOGRAM OF MINISTRY OF HEALTH AND DEPARTMENT OF HEALTH SERVICES

ORGANIZATIONAL CHART

DEPARTMENT OF HEALTH SERVICES



The WHO staff at present consists of one technical/operations officer who is stationed in Kathmandu. Until April 1976 there was also a WHO medical officer stationed in Kathmandu. (For staffing since 1962 see page 88).

Zonal offices

From 1968 to 1976 there were seven zonal public health offices with zonal supervisors. Three of the supervisors were SEP staff members and the other four posts were filled by three "senior sanitarians" and one health educator, whose responsibilities were largely to smallpox although they were employed directly by the Department of Health.

A major reorganization was made in 1976 to conform with the general government policy of upgrading the development regions. As a result of this the SEP now has four regional supervisors with the zonal supervisors moving to headquarters or, in the case of the senior sanitarians, being transferred elsewhere.

District offices

Each district has a SEP office. In 45 of these offices there is a district supervisor, one or more assistant supervisors, 4-13 senior vaccinators and various administrative staff. Seventeen offices have no district supervisor and are headed by an assistant supervisor. Seven offices are under the control of senior vaccinators. Six districts are controlled by integrated health services. Those 24 offices with no district supervisor are directed by the district supervisors from neighbouring districts. All these "suboffices" are in Mid-Hill or Himalayan districts where very little or no smallpox transmission has occurred (see Fig. 7).

The organogram (Fig. 8) shows the chain of command in the SEP but it does not indicate the problems inherent in implementing this command. Communication in much of Nepal is slow and difficult, but the nature of smallpox transmission is such that decisions need to be made and acted upon quickly. The responsibility for the everyday running of the programme has therefore always rested on the district supervisors. It has often proved impossible to move more senior staff into a district for up to a week after their presence has been requested, and the burden of all the decisions during this time has had to be taken by the district supervisors.

The district supervisors have always been seen as the keystones of the surveillance-containment programme and responsibility has been largely decentralized to them. Special annual retraining was instituted in 1971 to keep them up to date with technical matters and administration. The data on the quality of surveillance and containment described later are justification for this policy. Where the figures are poor so is the district supervision, and the most efficiently run districts are those with the best district supervisors.

Temporary staff

Besides the permanent staff in the SEP there are seasonal workers, hired once a year, known as "temporary vaccinators". The evolution of their role in the programme is described in the section on "Evolution of strategy". These workers are recruited at panchayat level for a period of three months on a monthly basis during the winter, in order to carry out surveillance and administer primary vaccinations.

Staffing

The total number of permanent staff varies around 650. Fig. 7 indicates the distribution of field staff.

FIG. 7. STAFFING OF SEP DISTRICT OFFICES

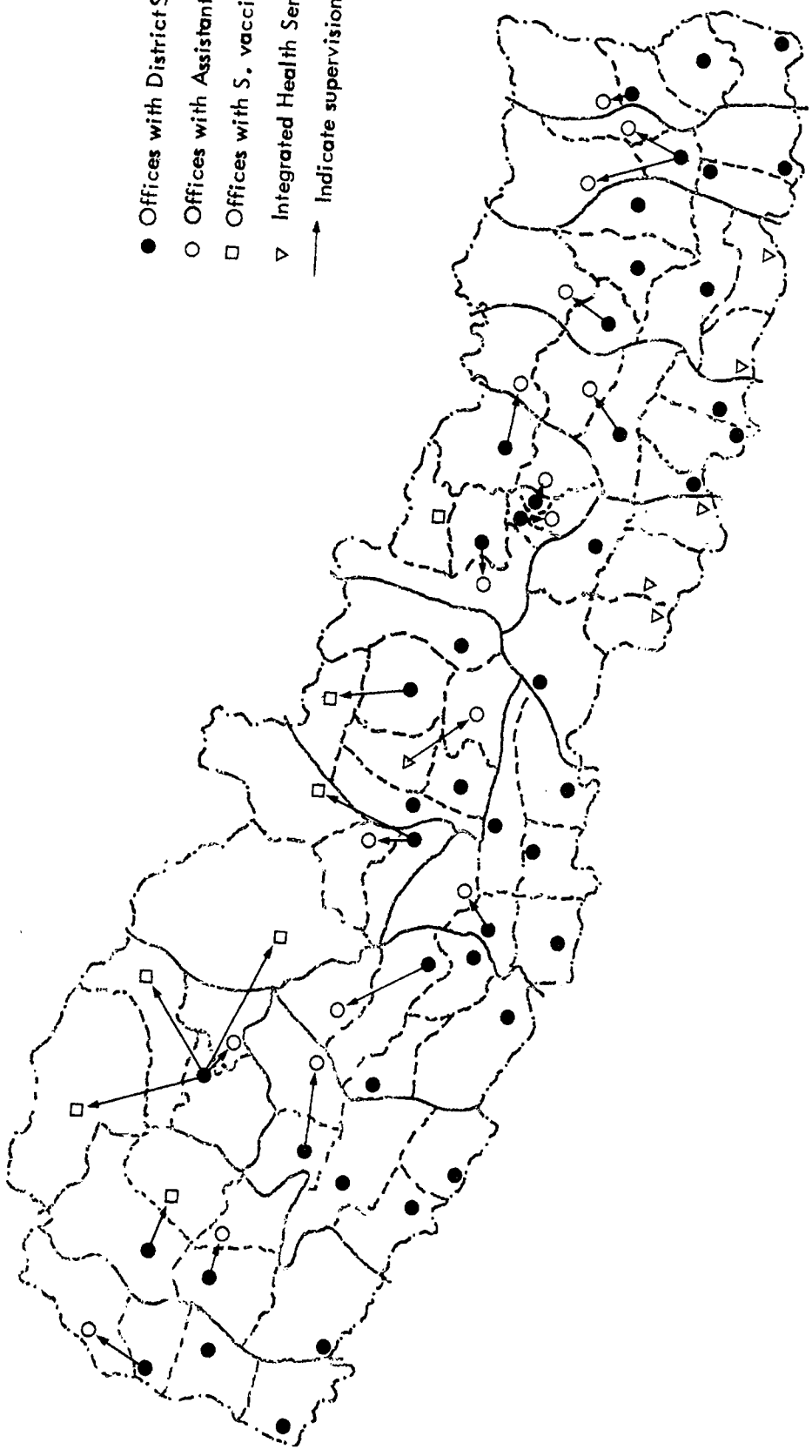
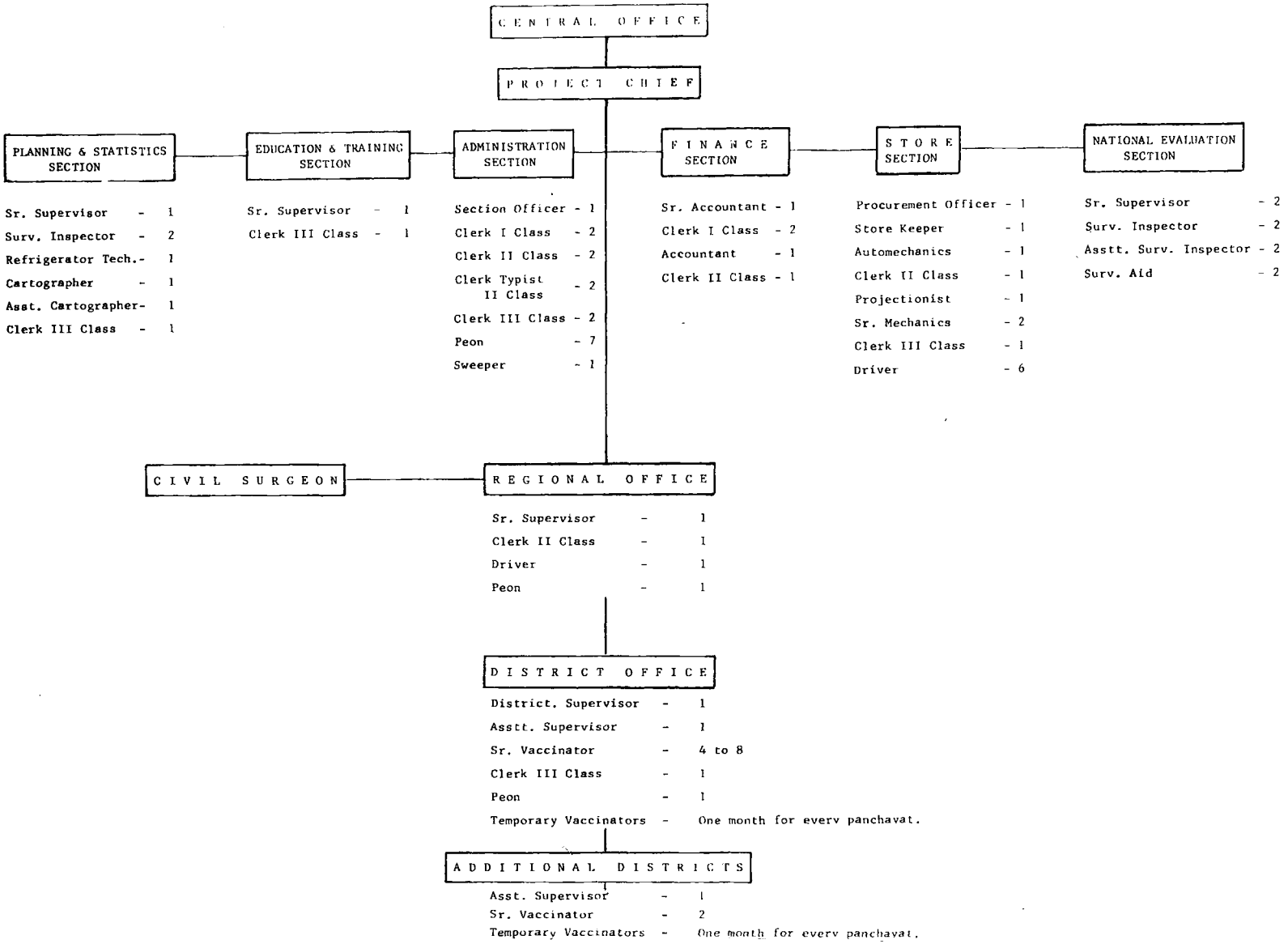


FIG. 8. ORGANOGRAM OF THE SMALLPOX ERADICATION PROGRAMME



3. EVOLUTION OF STRATEGY

When the smallpox pilot control project commenced operation in 1962 it was with the object of vaccinating 80-90% of the population of the Kathmandu valley. It was felt that a sufficiently high herd immunity would thereby be created in the population of the densely populated valley, to reduce smallpox incidence to a level where it was no longer a public health problem. Detailed records of those vaccinated were to be kept in "family registers" filled out by the vaccinators. The area of operation of the project was expected to include gradually other areas of the country.

Freeze-dried vaccine and a multiple-pressure technique were used from the beginning of the programme.

Even if the reasoning was sound, achievement of the target immunity level was found to be difficult because of administrative problems and the religious and mundane objections of some sections of the population to vaccination. A sample survey carried out in late 1964 in the district of Kathmandu and the neighbouring district of Bhaktapur showed that only 30.9% of the sample examined were protected after two-and-a-half years of project operations. Even where vaccinations had been carried out in large numbers the immunity level of the population had remained low because a large percentage of the vaccinations were "repeats" - no emphasis having been placed on primary vaccination. Field operations were modified in the light of these findings.

In 1965 a further agreement was signed between His Majesty's Government and WHO to extend the project to the end of 1966. For the first time improvement of the system of reporting cases and deaths was a stated objective of the programme. It was, however, stated almost as an afterthought to the other project aims, which were:

(a) To successfully vaccinate/revaccinate over 90% of all segments of the population of the Kathmandu valley.

(b) To maintain the communal immunity at a high level by subsequent successful vaccination of newborn children and immigrants, revaccination of children at 3, 5, 8, 11, and 14 years of age, and of the whole population of an area where warranted by epidemiological circumstances, as in an outbreak. The family registers were to provide the data necessary for the identification of revaccinees and immigrants.

In 1966 discussions were held between His Majesty's Government and WHO on the possibility of eradicating rather than controlling smallpox. This was in line with the decision of the World Health Assembly of that year to prepare a global strategy for the eradication of smallpox. The project that developed out of the talks was officially titled "A project of eradication of smallpox and control of other communicable diseases" and it was to cover "the total area of Nepal".

The methodology had now evolved to a point where three objectives were set out on equal footing:

"(a) To introduce immunization programmes for the population groups most exposed to the risk, against some of the communicable diseases for which potent vaccines are available.

(b) To develop routine early detection, isolation, prompt treatment and rehabilitation of those attacked by infectious diseases.

(c) To develop an organization for routine and prompt focal preventive measures to protect the people exposed to the diseases through direct or indirect contact."

In practice there was little, if any, change in operational procedures in the programme until the following year, 1967, when a definitive plan of operation for a "smallpox eradication project" was signed by HMG and WHO. This plan provided for a phased, systematic eradication of smallpox as part of the global programme.

The basic strategy was to cover the entire population with a systematic programme of vaccination. The programme was to follow the classic pattern of preparation, attack and maintenance phases covering the country on a zone-by-zone basis, radiating from Kathmandu. The last zone, Mahakali, in the far west of the country, would enter the attack phase in 1972. In addition epidemiological surveillance was to be initiated "as early as possible".

Staff was now to be trained and posted to zonal and district offices. The methodology was for vaccinators to go house-to-house all the year round, even though it was recognized that it was during the cold winter months that vaccination was most acceptable to the population. The vaccinators were to record their daily work on family cards and "submit weekly returns indicating the volume of work done and the amount of vaccine used". When a district was first incorporated into the programme temporary vaccinators were hired for three months to vaccinate the population. Thereafter, all vaccination activity was the responsibility of the permanent district vaccinators, now known as "senior vaccinators".

Community leaders and all zonal health workers were to be stimulated to report cases. Investigation of cases and appropriate containment measures were to be taken by smallpox supervisory staff. Although the value of good surveillance and containment was increasingly being recognized, the basis of strategy remained the classic method of mass vaccination with detailed recording.

In 1971, in the wake of experience in other parts of the world, the strategy of the programme underwent a complete change with the adoption of the surveillance-containment system. Previously, as described above, temporary vaccinators were employed for the first three months of the attack phase, and all subsequent vaccination as well as surveillance was the responsibility of the senior vaccinators. A new approach was now adopted. Temporary vaccinators were employed every year in all districts. They were hired at the local panchayat level for a period of one month during the winter. After a three-day training session run by permanent staff, each was responsible for administering all the primary vaccinations required in his panchayat (3000-5000 total population) during that one-month period. The only vaccination record kept was a simple tally sheet stating the number of primary and revaccinations performed. The family registers were abbreviated. Revaccinations were given to those that requested them. It was estimated that 6-8% of the population of each panchayat would be given primary vaccinations each year. This included the newborn and those missed on previous occasions. The temporary vaccinators, who numbered 7-130 per district, would also be carrying out what amounted to an annual house-to-house search. Supervision was to be carried out by the permanent district staff.

The senior vaccinators were thus freed from all routine vaccination duties and could concentrate on surveillance by carrying out a continuous, year-round village-to-village search. They did not go house-to-house but obtained their information at panchayat and village level from panchayat leaders, schoolteachers, and similar people. When outbreaks were detected they were responsible for their containment, along with the district supervisor, assistant district supervisor, and one of the four newly formed "containment teams". These teams were established to assist in containment measures in whatever district they were needed, but administrative and financial problems severely hampered their usefulness and they were disbanded in 1972.

One major advantage of this approach was that while the potential for good surveillance was greatly increased, the level of vaccination activity did not suffer. The number of vaccinations recorded each year from the beginning of the programme is shown in Fig. 9.

An emphasis on containment was also initiated in 1971. The basic strategy was for containment workers to vaccinate the entire population of infected villages, visiting the village daily for as long as was necessary to complete this. The tracing of the source of infection became an important part of the containment procedure and in the period 1973-1975 the source of infection was discovered in 96.5% of all outbreaks that occurred. All outbreaks were visited by headquarters and/or WHO staff, who provided a top level of supervision to ensure that containment was complete and to carry out a full epidemiological investigation of the outbreaks. All outbreaks detected since 1971 have been fully investigated and documented.

FIG. 9. VACCINATIONS BY YEAR 1962-76

Year	Total	Primary vaccination	% primary
1962-63	218 025	N.A.	-
1963-64	69 107	N.A.	-
1964-65	160 796	N.A.	-
1965-66	201 243	N.A.	-
1966-67	643 699	N.A.	-
1967-68	1 246 033	13 698	1.1
1968-69	2 195 942	282 613	12.87
1969-70	2 136 468	521 571	24.4
1970-71	2 823 098	503 462	17.8
1971-72	6 162 478	598 958	9.7
1972-73	6 516 395	992 860	15.2
1973-74	6 418 402	1 049 405	16.3
1974-75	6 187 076	367 470	5.9
1975-76	5 694 195	604 240	10.6

From 1971 regular annual refresher training has been given to all supervisory staff. This training was initially given to re-educate them in the surveillance-containment method, and since then has been used to bring them up to date on new operational developments and as a management review. The extra funds necessary for this operation have been met by WHO.

In 1975, for reasons that are discussed later (see "Smallpox transmission in 1975") a large amount of village-to-village transmission occurred in Morang district. Because of this is was decided to adopt the "watchguard" system which had been developed in India a few months previously. This involved posting temporary staff to ensure that infectious patients did not leave their houses and unvaccinated people did not enter. This required special funding from WHO. Seven weeks after the appointment of the first house guards the last cases in Nepal occurred. It is possible that transmission would have been interrupted earlier if the watchguard system had been adopted during 1974.

In conjunction with the last few outbreaks, and for some months thereafter, a series of special searches were instituted. These are described on page 67.

A reward of Rs 100 was introduced in March 1975 for information leading to the discovery of previously unknown outbreaks. This was increased to Rs 1000 in July 1975. The lower reward was given to the staff responsible for the detection of the last two outbreaks.

In 1972 four national surveillance teams were formed. For administrative reasons this number was later reduced to two. They were stationed at headquarters in Kathmandu and were responsible for independent active surveillance in designated districts, and for additional support for containment activity where this was needed. They are described in more detail on page 60.

In July 1975 a new operational guideline was written for the "post-zeropox period". It outlines the arrangement for surveillance in the districts, which for this purpose are classified into three categories:

(1) The Terai region, which is most susceptible to smallpox importation and spread. Here the field workers of the malaria eradication programme would carry out the routine primary surveillance. In those districts that were under the Integrated Health Services the field workers of that programme would undertake the primary surveillance. SEP staff would be responsible for secondary surveillance and supervision and assessment.

(2) The Mid-Hill districts, which are less vulnerable to smallpox. Here SEP staff would be responsible for house-to-house surveillance in a two monthly cycle, except in those areas in which the malaria eradication programme is operating. These would be covered by the malaria field workers as in the Terai.

(3) In the Himalayan districts, which are least at risk, every house would be visited once every six months by SEP workers.

The "post-zeropox" surveillance system is described in detail on page 53. The final development has been the formation, in 1976, of two national assessment teams. Their purpose is to assess active surveillance in the districts and to review the sites of previous outbreaks. They have been employed in all the Terai districts and in the affected hill districts. Special funds were obtained from UNICEF for the establishment and daily allowance of these teams. The assessment teams are described in detail on page 79.

4. THE REPORTING OF SMALLPOX IN NEPAL SINCE 1962

No reliable accounts of the incidence of smallpox in Nepal prior to 1962 are available. It is known from anecdote that 1958 was an epidemic year, but the number and distribution of the cases was never recorded. In 1962, with the start of the smallpox control pilot project in the Kathmandu valley, records were kept of some of the cases occurring in that area with an indication of when and where they had occurred. Throughout the 1960s, as the programme spread to other parts of the country and as the interest in surveillance with a view to containment grew, the frequency and reliability of the reports increased.

In 1965 a pock mark survey carried out in the Kathmandu valley suggested that between 12 and 14% of the total population had been infected with smallpox at some time in their lives. 2.4% of infants were seen, in this survey, to have pock marks. These figures led the investigator to comment, "Nepal must be considered as one of the areas most highly endemic for smallpox in South East Asia".

Much of the evidence up to 1970 is anecdotal or deductive. The admissions register of the Infectious Diseases Hospital in Kathmandu shows 84 admissions for smallpox in 1963 and 62 in the following year. One district supervisor, Mr Vijay Tandikar, on tour in Morang district in February 1967, gave a conservative estimate of "a few hundred cases of smallpox" in the preceding three to four months. A press report in 1967 spoke of eight deaths from smallpox in Narayani zone but these were not confirmed. Another tour report speaks of four cases in Biratnagar in mid-November 1966. A pock mark survey in India in 1976 suggests that there was an outbreak in Bhojpur district, in the eastern hills, in 1968.

By 1970 over half (41) of the 75 districts in the country were involved in what was now called the smallpox eradication programme and reporting was becoming more complete. However, the programme was still based on mass vaccination and the number vaccinated was considered more worthy of report than the number infected. It was not until surveillance-containment became the cornerstone of the eradication effort in 1971 that vigorous surveillance and full reporting of all outbreaks occurring in the districts covered by the programme became the rule. From the end of 1972 reports of cases, deaths, new outbreaks and their source of infection, were being received on a weekly basis from all 75 districts, even when there was no smallpox to report. This practice is known as "nil reporting".

Fig. 10 shows the cases officially reported from 1963 to the end of 1975. It also indicates the number of districts involved in the eradication/control programme in each year. Only those figures pertaining to 1973, 1974 and 1975 are sufficiently complete to form the basis of valid conclusions. Detailed analysis will therefore be confined to those years.

5. SMALLPOX TRANSMISSION DURING 1973

Note: It is often both more convenient and more rational to consider smallpox transmission in terms of "outbreaks" rather than cases. An outbreak is here taken as the occurrence of one or more cases of smallpox in a place where there have been no new cases of smallpox for at least six weeks. Thus an outbreak starts with the onset of the first case and finishes six weeks after the date of onset of the last case. During this period an outbreak is said to be "pending". Difficulties of definition may arise when two or more cases with separate sources of infection occur in the same village. These problems can only be solved by a decision taken on the spot. Hard and fast rules cannot always apply.

Forty-three outbreaks started during 1973, four of them being detected and reported during 1974. The distribution of outbreaks by month of onset and district can be seen in Fig. 11. As in other years, and in accordance with the experience of other countries in South-East Asia, transmission reached a peak during April and May and thereafter fell off rapidly as the monsoon increased relative humidity and hampered population movement.

Eighteen districts in Nepal were affected, the pattern of outbreaks being determined almost entirely by importations from the states of Uttar Pradesh and Bihar in India. Thirty-five (81%) of all outbreaks originated in India, 21 from Uttar Pradesh, 13 from Bihar and one from Maharastra (see Fig. 12), which may have actually been infected in Uttar Pradesh.

During 1973 northern India was heavily infected with smallpox. Uttar Pradesh suffered its worst epidemic wave for many years. From surveillance systems that were less than perfect, Uttar Pradesh reported 34 444 cases (an incidence for the year of 36/100 000), and Bihar reported 24 237 cases (39/100 000). It is probable that there was little difference between the states in intensity of transmission and that the higher frequency of importation from Uttar Pradesh is more a product of its longer border with Nepal than of anything else. It would be reasonable to expect that a threshold level of transmission in India would need to be reached before the regular export of cases to Nepal occurred. This may have been the case but the surveillance and reporting systems for both Uttar Pradesh and Bihar were insufficiently developed to detect such a phenomenon. Workers in both states are only too willing to admit that their methods left something to be desired, as was clearly demonstrated by the remarkable artificial rise in reported cases during October 1973 following the first state search programmes (Fig. 13).

About half of the overspill into Nepal from India was into neighbouring or very close districts (see Fig. 14). The majority of outbreaks, however, resulted from direct movement to and from Nepal rather than lateral movement inside either country. All but one of the outbreaks imported to western Nepal originated in Uttar Pradesh and all but one of those imported in to eastern Nepal originated in Bihar.

It is interesting to note the absence of a predominant source of infection. Outbreaks originated in 12 districts in Uttar Pradesh and nine in Bihar, but only three districts - Bahraich and Nainital in Uttar Pradesh and Dumka in Bihar, with three each - were the origin of more than two outbreaks in Nepal (see Fig. 15). This does not reflect any particular homogeneity of transmission in the two states. The mean number of cases per infected district in Uttar Pradesh in 1973 was 662 with a range of 594. For Bihar the mean and range were 1244 and 1318 respectively.

The diffuseness of site of origin is in powerful contrast to the situation obtaining in the middle of 1974 when north-eastern Bihar was markedly more infected than other parts of the state, and was predominantly responsible for the export of cases to Nepal.

FIG. 10. NEPAL SMALLPOX ERADICATION PROJECT, KALIMATI

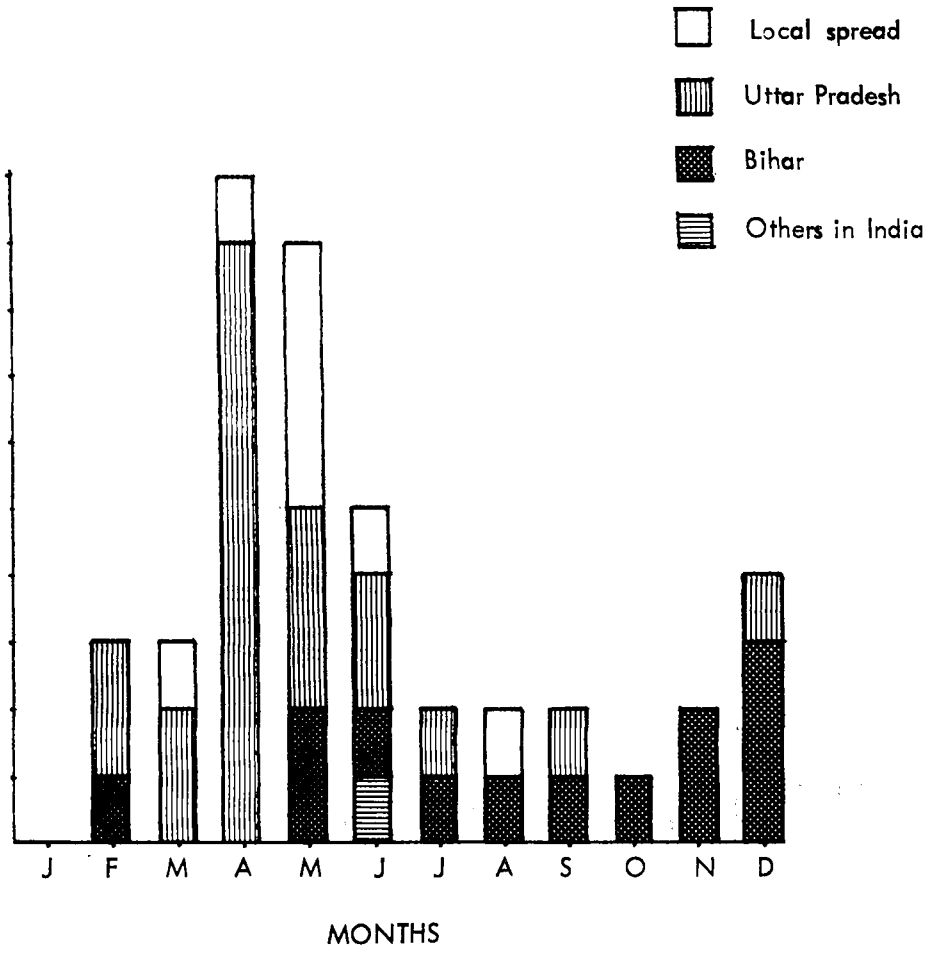
Smallpox cases reported by month and year 1963-1975

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	No. of Dist. in SEP	No. of Dist. reporting cases	REMARKS
1963	-	-	-	18	52	76	146	124	134	74	137	344	1105	3	3	
1964	94	12	23	6	-	-	-	-	-	-	-	-	135	3	3	
1965	6	6	6	5	6	6	6	5	6	6	6	6	70	3	3	
1966	122	-	-	-	-	-	5	8	7	7	8	7	164	3	N.A.	
1967	-	-	22	-	4	84	-	-	-	-	-	-	110	3	N.A.	
1968	-	-	31	5	14	92	-	-	94	-	12	1	249	15	8	
1969	21	24	7	6	21	-	-	29	-	-	47	8	163	29	7	
1970	-	23	5	18	15	15	-	-	-	-	-	-	76	41	1	
1971	1	5	27	34	19	70	-	-	-	-	26	33	215	50	6	
1972	46	236	28	20	19	16	-	-	8	-	21	5	399	58	9	
1973	3	2	8	13	52	31	42	41	55	8	22	0	277	75	18	
1974	34	49	157	219	379	215	231	51	53	44	97	21	1549	75	28	
1975	68	8	17	2	0	0	0	0	0	0	0	0	95	75	2	

FIG. 11. ONSET OF FIRST CASES IN OUTBREAKS BY MONTH AND DISTRICT - 1973

District	J	F	M	A	M	J	J	A	S	O	N	D	Total
Doti		1											1
Banke		1	2	3	2	1							9
Rolpa		1											1
Bardiya			1										1
Dang				1									1
Morang				1								1	2
Kailali				2	1				1				4
Mugu				2									2
Dandeldhura				1		2							3
Kanchanpur					2								2
Parsa					1	1				1			3
Rupandehi					1	1	1						3
Kapilvastu					1							1	2
Jhapa					1			2				1	4
Dhanusa							1						1
Saptari									1				1
Mahotari											1	1	2
Sunsari											1		1
Total		3	3	10	9	5	2	2	2	1	2	4	43

FIG. 12. OUTBREAKS BY MONTH OF ONSET AND SOURCE - 1973



	J	F	M	A	M	J	J	A	S	O	N	D	Total
Local spread			1	1	4	1		1					8
Uttar Pradesh		2	2	9	3	2	1		1			1	21
Bihar		1			2	1	1	1	1	1	2	3	13
Others in India						1							1
Total	0	3	3	10	9	5	2	2	2	1	2	4	43

FIG. 13. REPORTED CASES PER MONTH - UTTAR PRADESH AND BIHAR - 1973

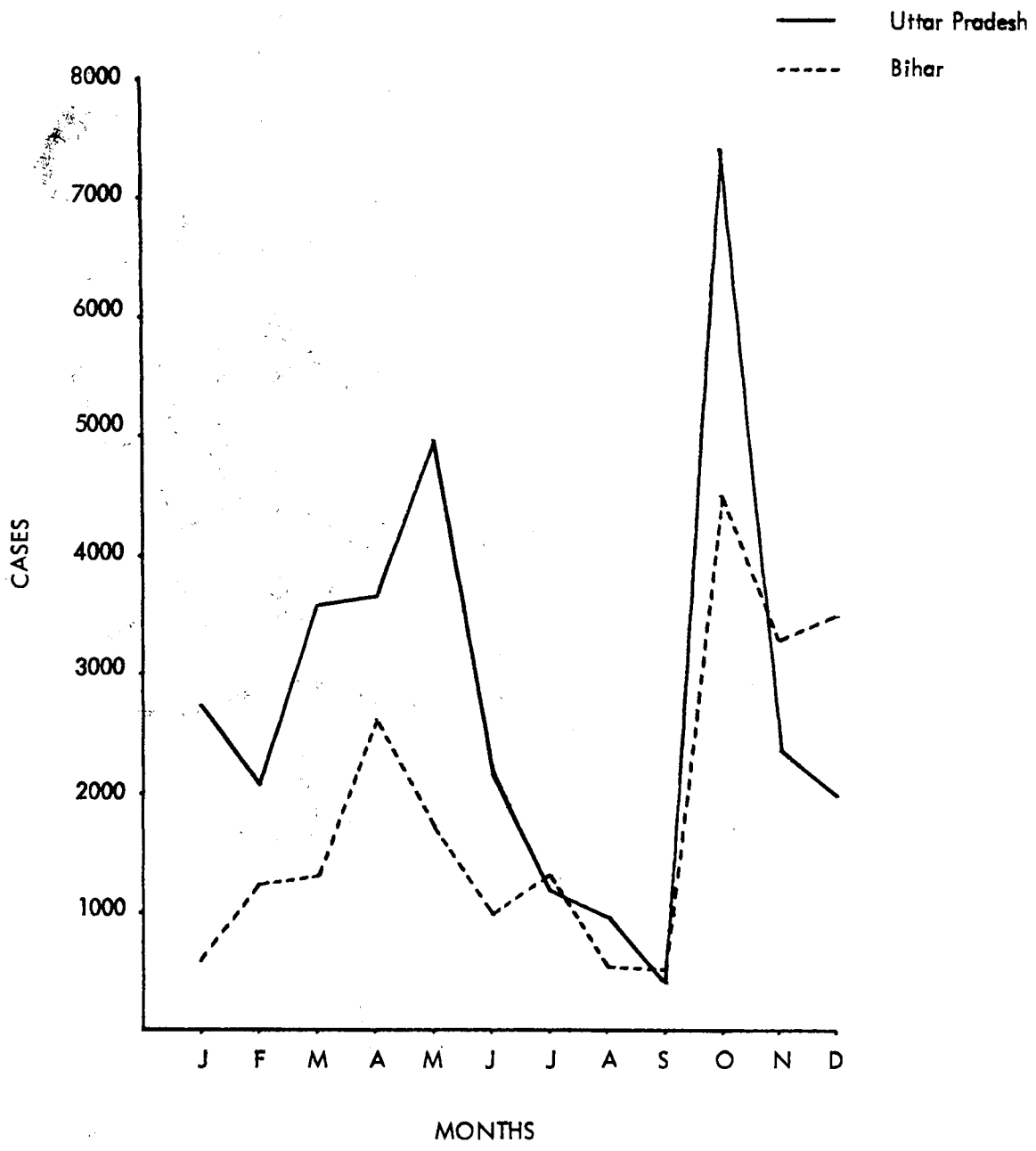


FIG. 14. DIRECT TRANSMISSION TO NEPAL FROM NEIGHBOURING DISTRICTS IN INDIA - 1973

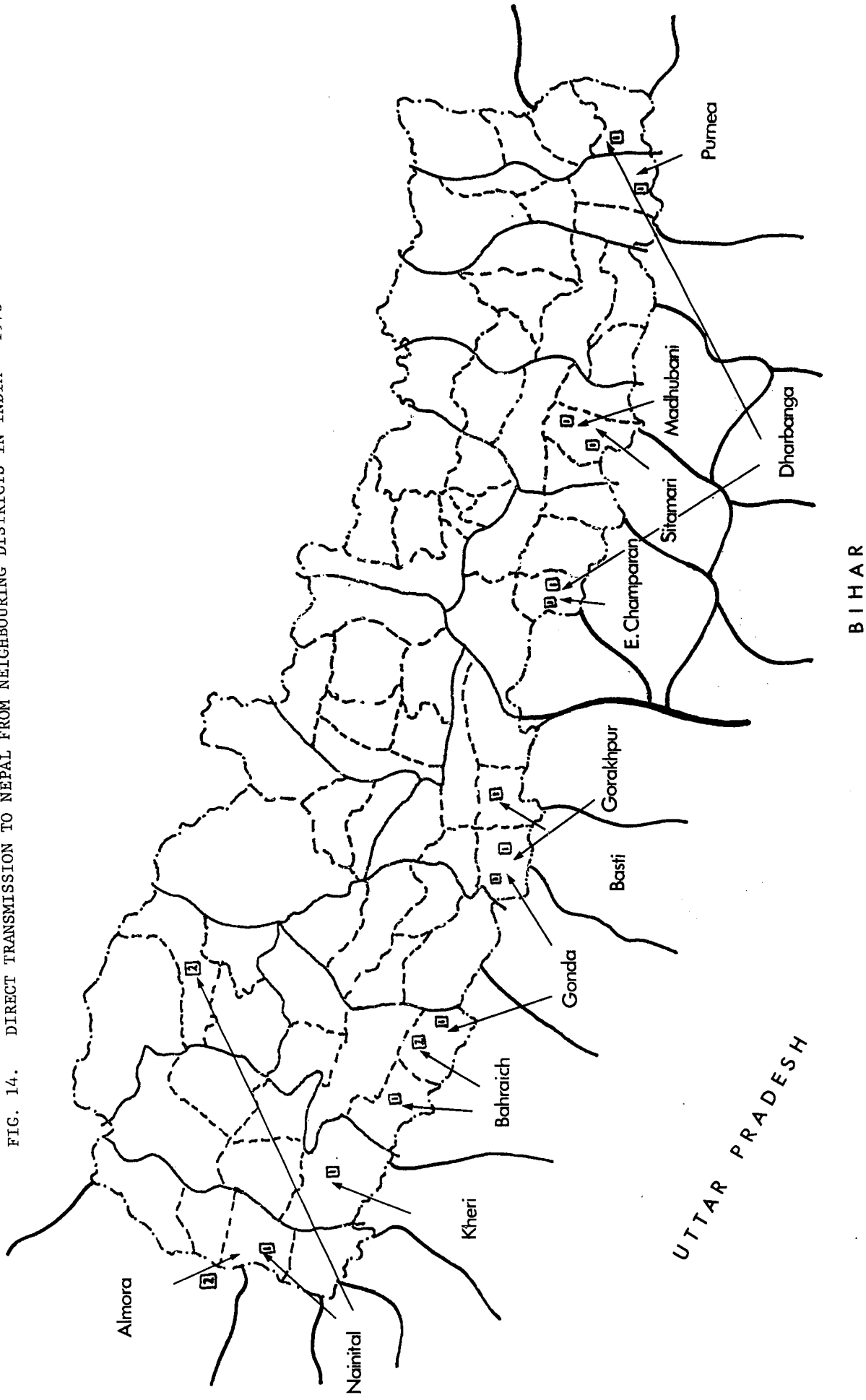


FIG. 15. SOURCE OF IMPORTATIONS - 1973

From district	Week of onset	To district
Uttar Pradesh		
Bareilly	6	Doti
	21	Kanchanpur
Bahraich	10	Bardiya
	12	Banke
	15	Banke
Kanpur	7	Rolpa
Ballia	15	Morang
	16	Kailali
Gonda	15	Banke
	19	Kapilvastu
Saharanpur	15	Kailali
Nainital	16	Mugu
	16	Dandeldhura
	17	Mugu
Basti	19	Rupandehi
Almora	24	Dandeldhura
	24	Dandeldhura
Azamgarh	29	Rupandehi
Kheri	36	Kailali
Gorakhpur	51	Kapilvastu
Unspecified	14	Dang
Bihar		
Saran	7	Banke
Champaran	19	Parsa
Samastipur	26	Parsa
Mongayr	32	Jhapa
Dumka	21	Jhapa
	39	Saptari
	47	Sunsari
Darbhanga	44	Parsa
	51	Jhapa
Sitmari	46	Mahotari
Madhubani	50	Mahotari
Purnea	52	Morang
Unspecified	29	Dhanusha
Maharashtra State		
Unspecified	23	Rupandehi

One of the reasons for the limitation of imported cases to southern Nepal is that the time taken to travel on foot to the more northern hill areas is often more than one incubation period. The exceptions to this rule were two cases imported from Nainital district, Uttar Pradesh, into Mugu district. On this occasion two men travelled together directly through the hill districts instead of by the more usual route through the Terai.

Secondary spread from the outbreaks caused by the original importations to other locations was rare in 1973, occurring on only eight occasions; five in Banke district and one each in Kailali, Kanchanpur and Jhapa. Strictly speaking the secondary outbreaks in Kailali and Kanchanpur were local extension of an outbreak on the border between the two districts with a source in Saharanpur district, Uttar Pradesh. The five outbreaks in Banke arose during the peak transmission period from an outbreak whose source was traced to Bahraich, Uttar Pradesh (outbreak 5 in the line listing). The index outbreak was not detected for 58 days, by which time 15 cases had occurred and four other outbreaks had already been seeded. One of these secondaries later produced a tertiary outbreak (outbreak 29). The whole episode lasted from 21 March to 10 September 1973, and was responsible for 51 cases.

With importation established as the rule for new outbreaks in Nepal the country was declared a non-endemic area for smallpox in July 1973.

The characteristic pattern of 1973 - diffuse importation from all areas of Uttar Pradesh and Bihar - came to an end in October and was replaced by a more intense transmission into eastern Nepal from northern Bihar. This was to be the pattern for most of the epidemic season of 1974. The first sign of the new development was an increase in importations in late November and December 1973, and the year ended with active outbreaks in six districts, five infected from Bihar and one from Uttar Pradesh.

A total of 305 cases occurred during 1973. An incidence for the year of .024/1000. Two hundred and seventy-seven cases were reported in that year, the remainder being detected and reported during 1974. The distribution of cases reported by month and district in 1973 is shown in Fig. 16.

The mean number of cases per outbreak for those outbreaks starting in 1973 was 8.3 with a range of 1 to 38 cases. The distribution is shown in Fig. 17. Ten (23%) of these outbreaks consisted of more than 14 cases, 6 (14%) had over 25 cases.

The age and sex distribution of the cases is shown in Fig. 18.

The mean duration of the "pending" status was 80.2 days with a range of 42 to 215 days. This can be taken as the period for which a district is a potential source of infection. The distribution of pending times is shown in Fig. 19. Forty-two days is the minimum acceptable surveillance period after the occurrence of a single case. Fig. 20 shows the number of districts reporting active and pending outbreaks in each week and Fig. 21 shows the size of the infector pool in terms of outbreaks in the same weeks. Fig. 22 shows the periods during which each district was reporting outbreaks.

Inquiry into the vaccination status of those cases reported in 1973 shows that six (2.2%) had been vaccinated before exposure.

Fifty-eight deaths were recorded, a case fatality rate of 20.9%. This is in broad agreement with case fatality rates from variola major recorded from other Asian countries.

FIG. 16. CASES REPORTED BY MONTH AND DISTRICT - 1973

District	J	F	M	A	M	J	J	A	S	O	N	D	Total
Salyan	1												1
Kathmandu	2												2
Banke		1		3	18	28		5					55
Doti		1	8										9
Bardiya				1									1
Rolpa				7									7
Morang				1									1
Kailali				1	4	1			1				7
Dang					4								4
Mugu					15								15
Dandeldhura					9	1	13	13					36
Kanchanpur					2								2
Parsa						1	1				4		6
Rupandehi							28	1	34		4		67
Dhanusa								3					3
Jhapa								6	11		10		27
Kapilvastu								13	9	8			30
Saptari											4		4
Total	3	2	8	13	52	31	42	41	55	8	22		277

FIG. 17. CASES PER OUTBREAK
(OUTBREAKS WITH ONSET IN 1973)

Cases

Age	1	2-4	5-8	9-14	15-24	25+	Total
No.	13	8	7	5	4	6	43
%	30	19	16	11	9	14	100

FIG. 18. AGE AND SEX DISTRIBUTION OF CASES REPORTED IN 1973
(DATA INCOMPLETE ON 50 CASES)

Age-years	0-1	2-4	5-14	15+	Total
M	7	30	43	44	124
F	9	21	44	29	103
Total	16	51	87	73	227

FIG. 19. DISTRIBUTION OF DURATION OF PENDING STATUS - 1973

Days	42	43-56	57-70	71-84	85-98	99-112	113+	Total
No.	13	1	7	9	2	3	8	43
%	30	2	16	22	5	7	18	100

FIG. 20. NUMBER OF DISTRICTS REPORTING PENDING OUTBREAKS BY WEEK, 1972-1975

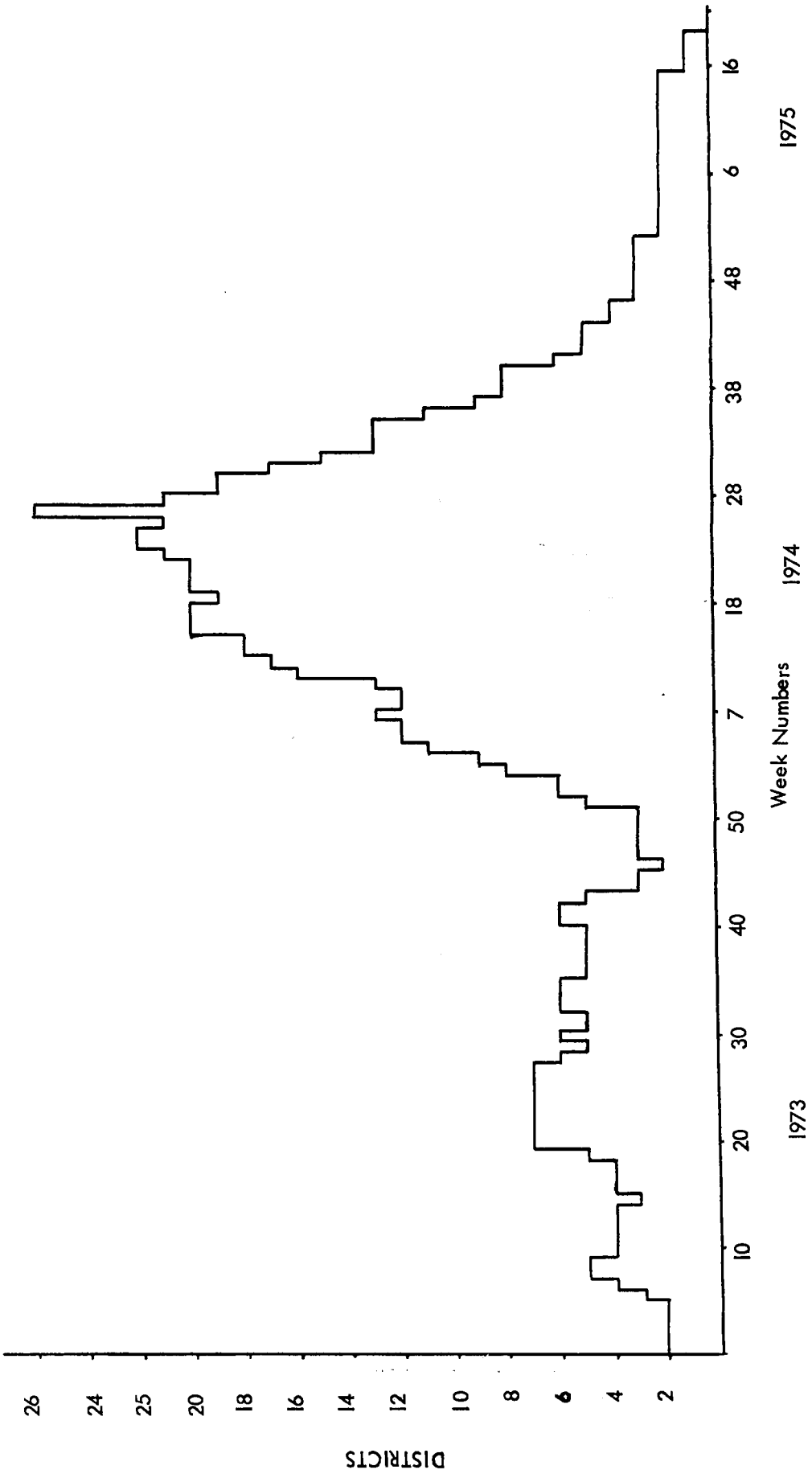


FIG. 21. PENDING OUTBREAKS BY WEEK, NEPAL 1973-1975

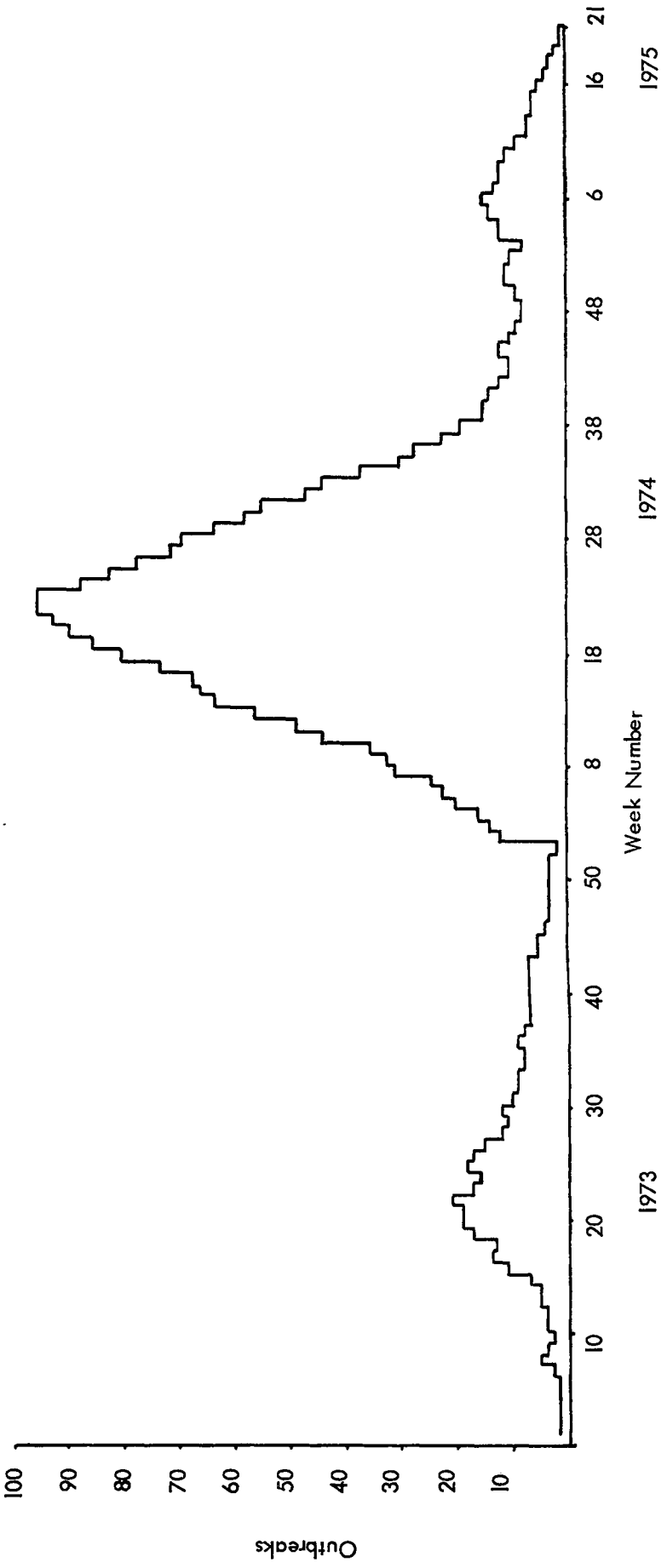
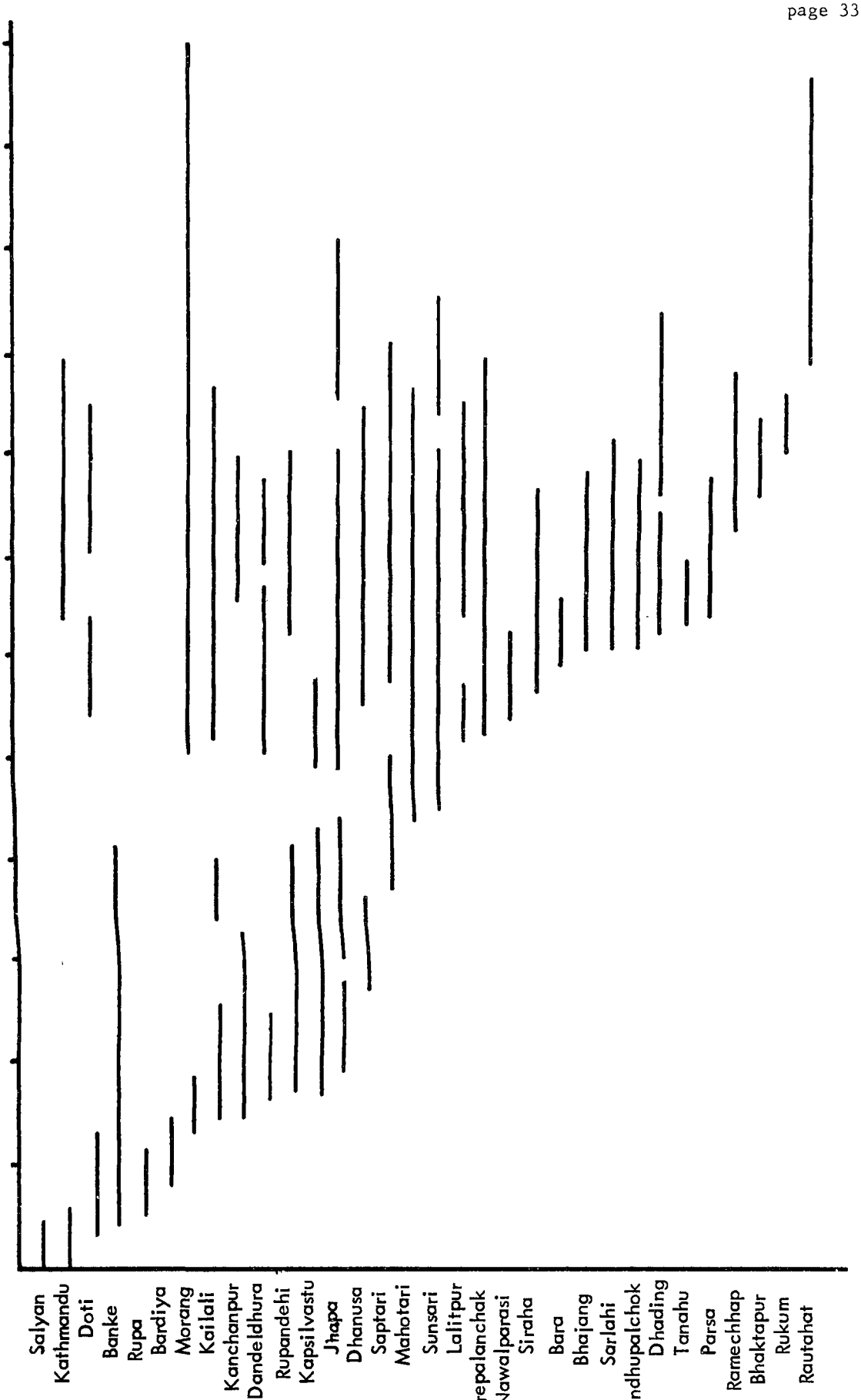


FIG. 22. PERIODS DURING WHICH DISTRICTS REPORTED PENDING OUTBREAKS, 1973-1975



6. SMALLPOX TRANSMISSION DURING 1974

One hundred and eighty outbreaks started in 28 districts in 1974. One hundred and seventy-nine outbreaks were reported during the year. The pattern of outbreaks occurring by week and district is shown in Fig. 23. The predominant pattern for the first half of the year was repeated importations from Bihar state and the far north-eastern districts of Uttar Pradesh into eastern Nepal, and from western Uttar Pradesh into western Nepal. This pattern was later replaced by sporadic local spread (see Fig. 24).

One hundred and fifteen outbreaks (63.8%) resulted directly from importations. These are presented by site of origin and month in Fig. 25. Eighty-nine cases were traced to known infected areas in Bihar, 21 to known infected areas in Uttar Pradesh and five to less well-defined sites in Uttar Pradesh and Bihar (see Fig. 26). Unlike the even distribution of infective sites in 1973 the origin of transmission for Bihar in 1974 was largely confined to five districts in Bihar state: Purnea, Saharsa, Sitamari, Dharbanga and Madhubani, which between them accounted for 88% of all the transmission from Bihar to Nepal and 68% of the total transmission to Nepal. Similarly, the districts receiving importations were less evenly affected than in 1973. Although 23 districts in Nepal were involved with importations, 12 in the east and 11 in the west, which was five more than in 1973, three of them, Morang, Jhapa and Mahotari were the site of 50% of all imported outbreaks (see Fig. 27).

Bihar reported 126 872 cases of smallpox during 1974, an incidence rate of 204/100 000, while Uttar Pradesh reported 36 959 (38/100 000). The distribution of cases by month in the two states is shown in Fig. 28. The intensity of transmission in some of the northern districts of Bihar, particularly Purnea, was such that every development block was reporting large numbers of outbreaks. To make the situation worse, an untimely monsoon led to severe food shortages throughout the state, thus increasing the already brisk annual flow of migrants across the border with Nepal.

The three most heavily infected Nepalese districts, Morang, Jhapa and Mahotari were infected in the last weeks of 1973 and continued to report cases almost throughout the year. Morang reported pending outbreaks from week 52 of 1973 until week 18 of 1975 without a break. Similarly Jhapa became infected in week 51 of 1973 and thereafter was not clear of outbreaks except for a four-week period in August until the last week of 1974. Mahotari, having been infected from Bihar in week 46 of 1973, reported pending outbreaks for the following 42 weeks (see Fig. 22).

The pattern of importation to western Nepal from Uttar Pradesh was very similar to that experienced during 1973. Nine districts in Nepal were infected by a total of 21 importations from seven districts in Uttar Pradesh, the most frequent importers being Kailali with five outbreaks and Rupandehi with four. No district in Uttar Pradesh infected more than three districts in Nepal; the transmission, as in 1973, being essentially over a short distance directly over the border. The last importations from Uttar Pradesh were in June 1974.

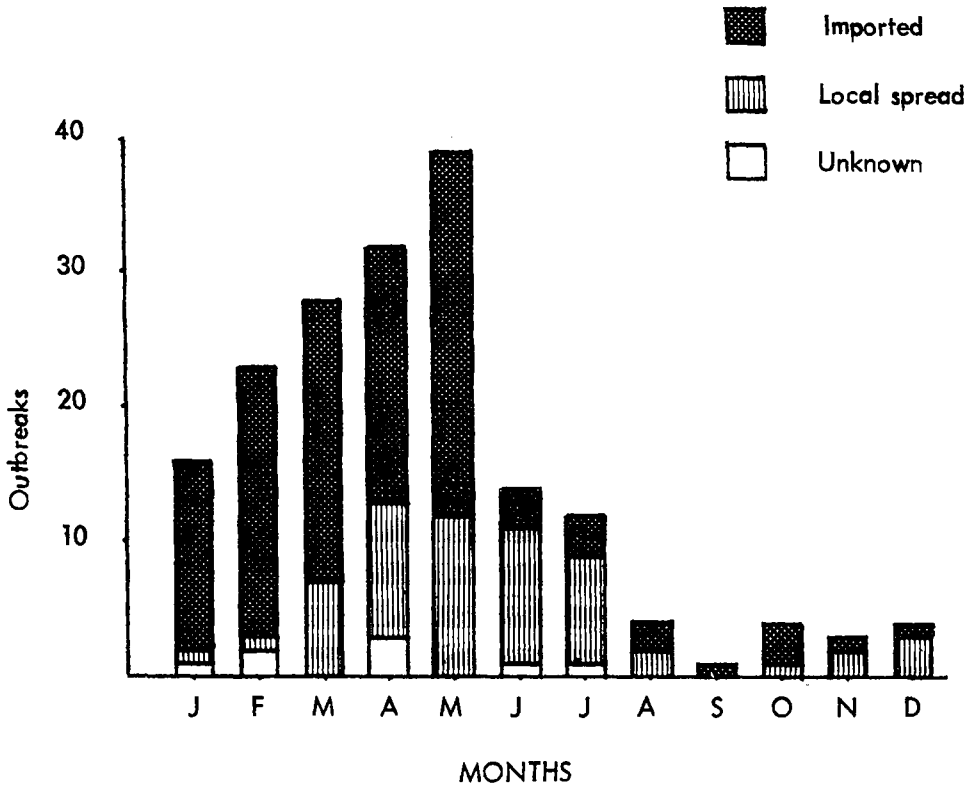
As can be seen from Fig. 24, the rate of importation fell off rapidly at the start of the monsoon and a new feature made its appearance. Up to the end of the first quarter of 1974 13.6% (9) of the outbreaks had been caused by local spread. In the three following quarters local spread accounted for 37.2% (32), 58.8% (10) and 63.6% (7) of all outbreaks. Although the increase after the second quarter was only relative, the total numbers actually falling, the character of the spread changed. Whereas in the early months of the year locally generated outbreaks had occurred widely throughout the infected districts and had rarely spread beyond one generation, later in the year the local spread became focal in two areas, Bagmati zone and Morang district, and outbreaks were generated at fourth and fifth remove. Bagmati was cleared by the end of the third quarter from the original importation, leaving Morang to carry on into 1975.

FIG. 23. ONSET OF OUTBREAKS BY WEEK AND DISTRICT, 1974

WEEK NUMBERS

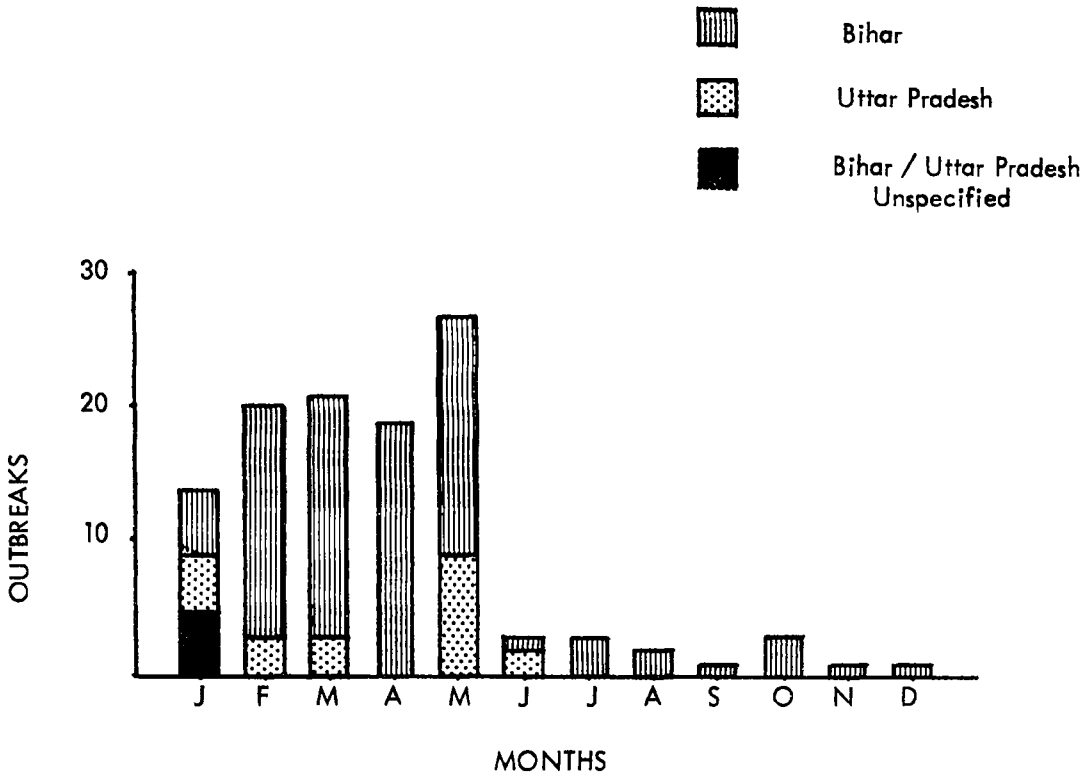
Districts	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	Total
Morang	1		1			1	1	1	1	1		2	1	4	1	3		2	2		2	1			2		1		2	1	2	1								1	1			1		2		1	1	1	1		43
Lalitpur													1																																								1
Kanchanpur	3			1															1	2																																	7
Kabrepalan			1			1					1										1	1					3	1																									10
Kailali		1		1		1	2				1												1																														7
Mahotarri			1	1					2	1	1		1	2	2		1	3	1	1	1	1																																19
Nawalparasi				1																																																	1
Saptari								1						1			4			1		1		1																														9
Siraha							1				1	1				1				1																																		5
Doti					1															1																																		2
Jhapa		1				1	1	2		3	1	1				1		1	1			1															1							1									16
Sunsari							2		1											1														1																			5
Dhanusha					1	1	2		1				2	1		2		1	1	1				2																														15
Bajhang											1							1																																				2
Bara										1																																											1
Dhading													1													1				1			1																				4
Tanahu												1																																									1
Kathmandu		1													1	1	1									1																												5
Sarlahi											1	1			1		2				1																																	6
Dandeldhura																1			1																																			2
Parsa															1					1																																			2
Rupandehi												1		1					1	1	1																																	5
Sindhupalchok											1									1																																		2
Kapilvastu																						2	2		1																													5
Rukum																														1																									1
Bhaktapur																										1																													1
Ramechhap																							1																																	1
Rautahat																																						1																		2
Total	4	3	3	4	2	5	9	4	5	6	8	6	7	9	6	9	8	8	8	11	6	7	4	3	4	3	5	1	2	2	3	1	0	2	1	0	0	0	1	1	1	0	0	2	0	2	0	1	1	2	1	0	

FIG. 24. OUTBREAKS BY MONTH AND SOURCE - 1974



	J	F	M	A	M	J	J	A	S	O	N	D	Total
Imported	14	20	21	19	27	3	3	2	1	3	1	1	115
Local spread	1	1	7	10	12	10	8	2	0	1	2	3	57
Unknown	1	2	0	3	0	1	1	0	0	0	0	0	8
Total	16	23	28	32	39	14	12	4	1	4	3	4	180

FIG. 25. IMPORTED OUTBREAKS BY MONTH AND SOURCE - 1974



	J	F	M	A	M	J	J	A	S	O	N	D	Total
Bihar	5	17	18	19	18	1	3	2	1	3	1	1	89
Uttar Pradesh	4	3	3		9	2							21
Unspecified U.P. / Bihar	5												5
Total	14	20	21	19	27	3	3	2	1	3	1	1	115

FIG. 26. SOURCE OF IMPORTATIONS - 1974

BIHAR

FROM District	Week of Onset	TO District
Purnea	1	Morang
	2	Jhapa
	7	Morang
	8	Jhapa
	9	Sunsari
	9	Morang
	10	Jhapa
	10	Jhapa
	10	Jhapa
	12	Morang
	12	Jhapa
	14	Morang
	14	Saptari
	14	Morang
	16	Morang
	17	Saptari
	18	Jhapa
	18	Morang
	19	Morang
	19	Jhapa
	22	Jhapa
	22	Morang
	29	Morang
	30	Morang
	31	Morang
	32	Morang
	41	Morang
	44	Morang
	44	Jhapa
	50	Morang
Dumka	6	Jhapa
	12	Morang
	13	Morang
	15	Morang
Madhubani	4	Mahotari
	6	Morang
	6 + 7	Dhanusha
	10	Morang
	11	Siraha
	12	Siraha
	14	Mahotari
	14	Dhanusha
	16	Siraha
	17	Mahotari
	18	Dhanusha
	24	Dhanusha
Bhagalpur	7	Jhapa
Gaya	6	Kavrepalanchok
Singbuum	13	Tanahu
Saharsa	7	Sunsari
	8	Morang
	13	Morang
	14	Morang
	16	Morang
	17	Saptari
	20	Sunsari
	22	Saptari
	34	Sunsari
Dharbanga	3	Morang
	8	Saptari
	8	Jhapa
	11	Kavrepal
	13	Dhanusha
	20	Parsa
	20	Siraha

BIHAR (continued)

FROM District	Week of Onset	TO District
Sitamari	3	Mahotari
	7	Siraha
	9	Mahotari
	9	Mahotari
	10	Mahotari
	11	Sarlahi
	12	Sarlahi
	14	Mahotari
	15	Mahotari
	15	Mahotari
	17	Sarlahi
	17	Sarlahi
	18	Mahotari
	18	Mahotari
	20	Mahotari
	21	Sarlahi
	21	Mahotari
	22	Mahotari
	39	Rauthat
Samastipur	13	Dhanusha
Muzzafarpur	15	Parsa
Rhotas	21	Morang
Champaran	48	Morang

UTTAR PRADESH

Gorakhpur	4	Nawalparasi
	20	Rupandehi
	23	Kapilvastu
Kheri	2	Kailali
	4	Kailali
	5	Doti
	6	Kailali
	7	Kailali
	7	Kailali
	19	Kanchanpur
	20	Kanchanpur
Azangard	10	Bara
Varanasi	13	Dhading
Nainital	20	Doti
Basti	12	Rupandehi
	19	Rupandehi
	21	Rupandehi
	25	Kapilvastu
Pilibit	18	Bahjang
	19	Dandeldhura
	20	Kanchanpur
Uttar Pradesh or Bihar (unspecified)	2	Kathmandu
	1	Kanchanpur
	1	Kanchanpur
	1	Kanchanpur
	3	Kavrepalanchok

FIG. 27. DIRECT TRANSMISSION TO NEPAL FROM NEIGHBOURING DISTRICTS IN INDIA - 1974

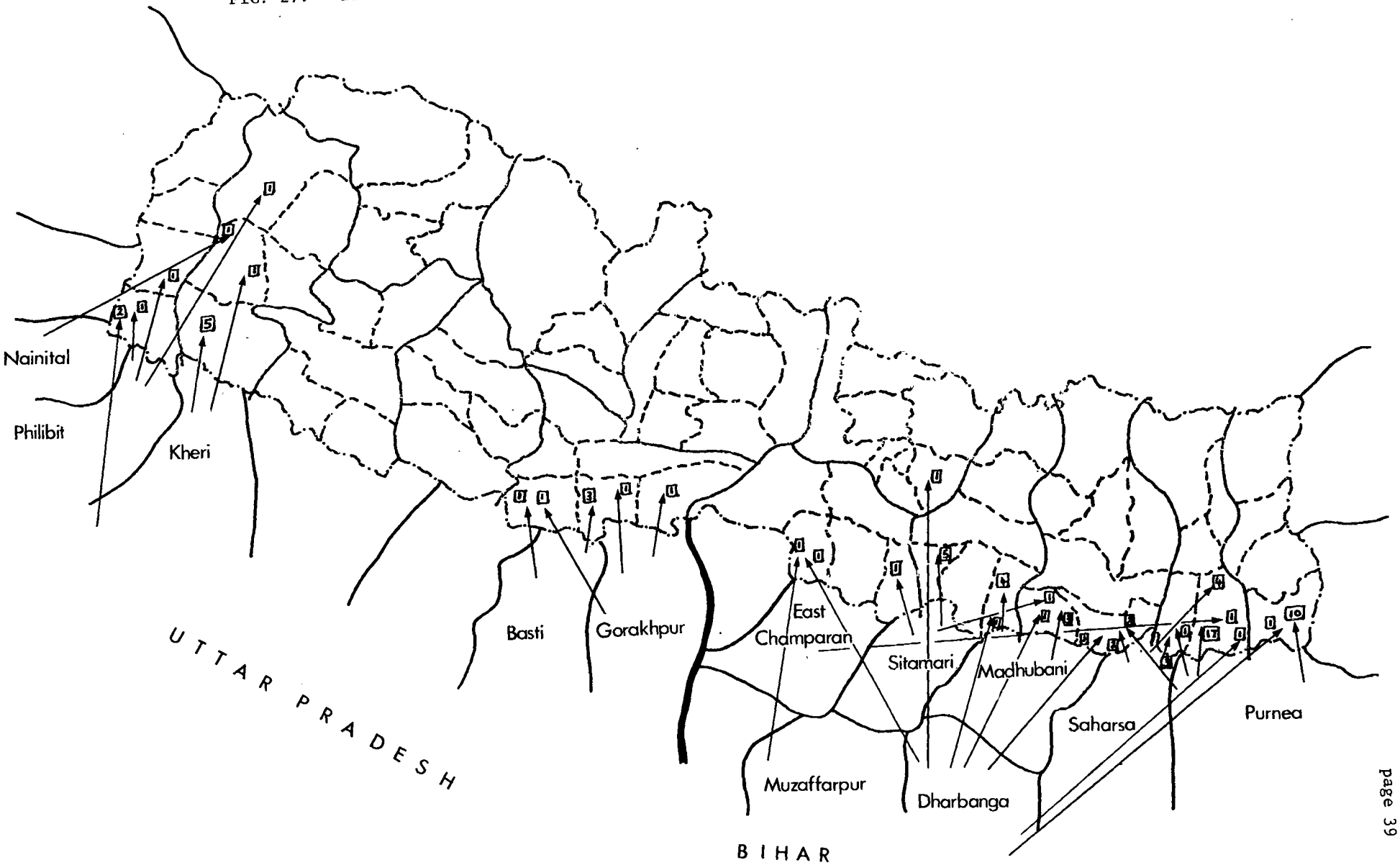
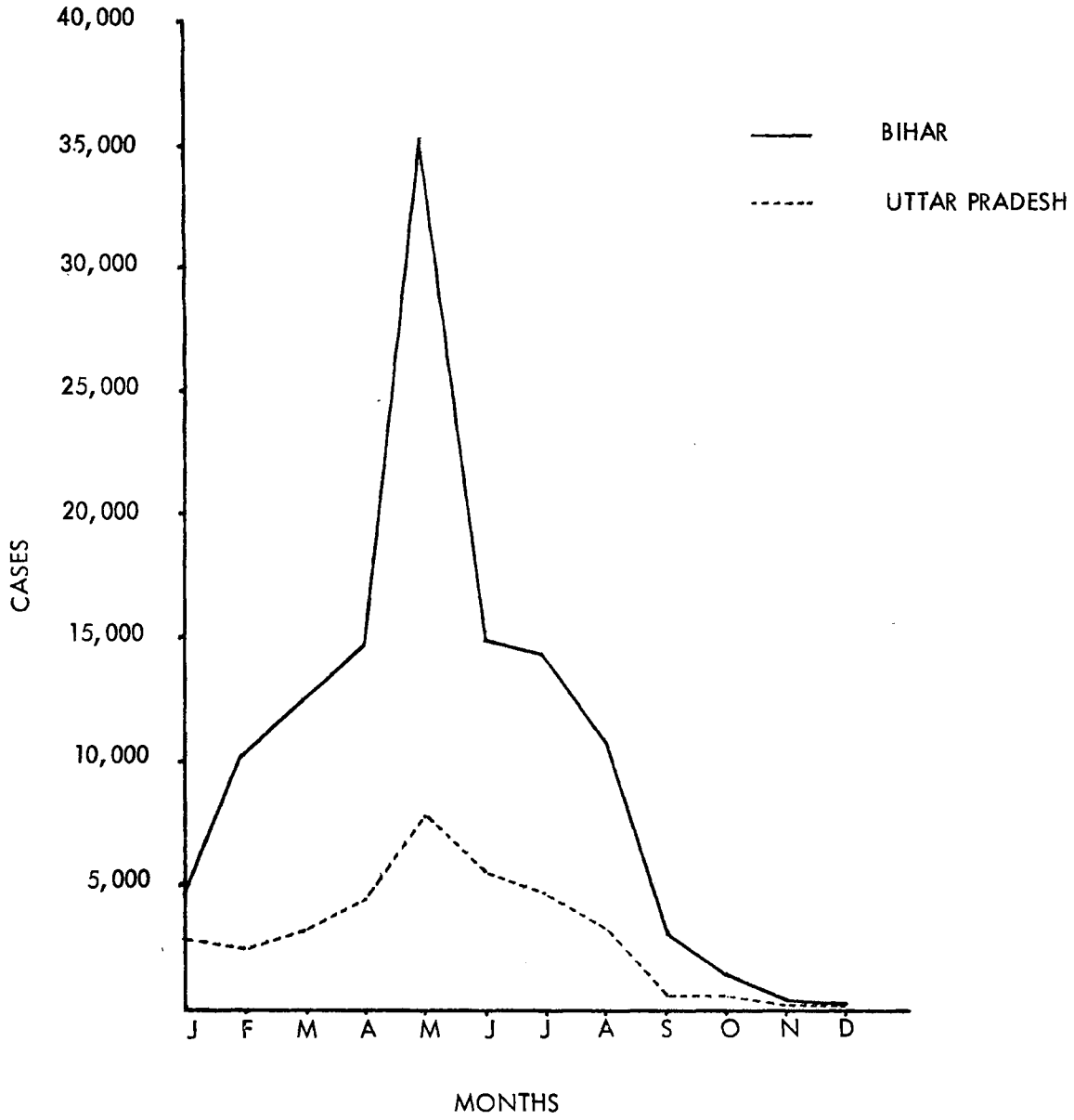


FIG. 28. SMALLPOX CASES REPORTED BY MONTH - 1974

States of Bihar and Uttar Pradesh, India



One thousand five hundred and fifty-three cases occurred during 1974, an incidence for the year of 220/100 000. The distribution of the 1543 cases reported during the year by month and district is shown in Fig. 29.

The mean cases per outbreak was 8.6 with a range of 1 to 62 cases. The distribution of cases per outbreak for those outbreaks starting in 1974 was as shown in Fig. 30.

The age/sex distribution of 980 cases for which this information was recorded were as shown in Fig. 31.

Three hundred and forty-one deaths occurred, a case fatality rate of 22%.

The mean duration of the pending status of outbreaks in 1974 was 75.5 days. The distribution is shown in Fig. 32. The effect on the infector pool of this distribution can be seen in Fig. 21.

The incidence of cases through 1974 and 1975 by date of onset is shown in Fig. 33.

Outbreaks in Bagmati zone - 1974

With the exception of two isolated outbreaks at the beginning of the year all the smallpox outbreaks in Bagmati zone were part of two lengthy chains, both starting in Kabrepalanchok district. The first chain extended from early February to mid-September and involved panchayats in five districts. The other started in mid-March and extended to early September, spreading to panchayats in three districts. Only two of the districts in Bagmati zone were unaffected by these two chains.

Chain 1 (see Fig. 34)

The index case in Naldum Balwa panchayat gave a vague history of contact with a case in Gaya district, Bihar state. He developed his rash on 4 February and was the first of seven cases in this outbreak. In this panchayat great difficulty was experienced in completing containment. The majority of cases were from the Newar ethnic group who have a strong religious objection to vaccination. The same problem was encountered in Sankhu panchayat, Kathmandu district and in Kathmandu City. In each case difficulty of containment was associated with spread to new localities, a phenomenon described elsewhere in this document.

A total of 106 cases occurred in 12 outbreaks over 207 days. An analysis of these outbreaks shows the following:

Mean cases per outbreak - 10.5 - Range of 1 to 34 cases

Mean duration of pending status - 96.3 days - Range of 42 to 166
5 (41%) were pending for over 99 days

Mean discovery delay - 54.6 days - Range of 3 to 110 days

Mean containment delay - 24.8 days - Range of 0 to 120 days

The difference between the mean containment delays of these outbreaks that led to further transmission (51.2 days) and those that did not (5.9 days) was striking but not statistically significant. The problem throughout this chain was vaccination resistance with a consequent difficulty in completing containment.

FIG. 29. REPORTED CASES BY MONTH AND DISTRICT - 1974

	J	F	M	A	M	J	J	A	S	O	N	D	TOTAL
JHAPA			44	40	14	29	4		2	3	8		144
MORANG	1	3	5	2	65	28	50	7	38	21	74	16	310
SUNSARI		17	7	40		10				4			78
SAPTARI		1	1	1	29		25	3					60
SIRAHA		1		4	34	2							41
DHANUSA			28	36	42	13	26						145
MAHOTARI	23	8	15	7	117	74	26	18					288
RAUTHAT											15	5	20
SARLAHI				7			24						31
BARA				1									1
PARSA					7								7
TANAHU				1									1
NAWALPARASI			2										2
RUPANDEHI					11	18	1						30
KAPILVASTU	4					1	9						14
RUKUM							1						1
DOTI		2				4	3						9
BAJAANG			1	8	2								11
KAILALI	1	13	36	54	6		3						113
KANCHANPUR		1	16		6		9						32
DANDELDHURA					9	5							14
DHADING				9						16			25
SINDUPALCHOK					4	5		1					10
KABRE	1		4	2	12	1	16	14	6				56
LALITPUR							11						11
BHAKTAPUR							3						3
KATHMANDU	1	1		7	21	23	9	3	1				66
RAMECHHAP							11	4	5				20
TOTAL	31	47	159	219	379	213	231	50	52	44	97	21	1543

FIG. 30. DISTRIBUTION OF CASES/OUTBREAKS - 1974

Cases

Age	1	2-4	5-8	9-15	16-20	21+	Total
No.	42	54	27	24	15	18	180
%	23	31	14	13	8	11	100

FIG. 31. AGE/SEX DISTRIBUTION OF CASES - 1974

Age	M (%)	F (%)	Total (%)
0-1	62 (12.4)	57 (11.9)	119 (12.0)
2-4	114 (22.8)	100 (20.8)	214 (22.0)
5-14	187 (37.5)	187 (38.9)	374 (38.0)
15+	136 (27.3)	137 (28.5)	273 (28.0)
Total	499 (100)	481 (100)	980 (100)

FIG. 32. DISTRIBUTION OF DURATION OF PENDING STATUS - 1974

Days	42-56	57-70	71-84	85-98	99+	Total
No. (%)	57 (31.7)	37 (20.6)	26 (14.4)	24 (13.3)	36 (20.0)	180 (100)

FIG. 33. CASES AT ONSET OF RASH BY WEEK - 1974, 1975

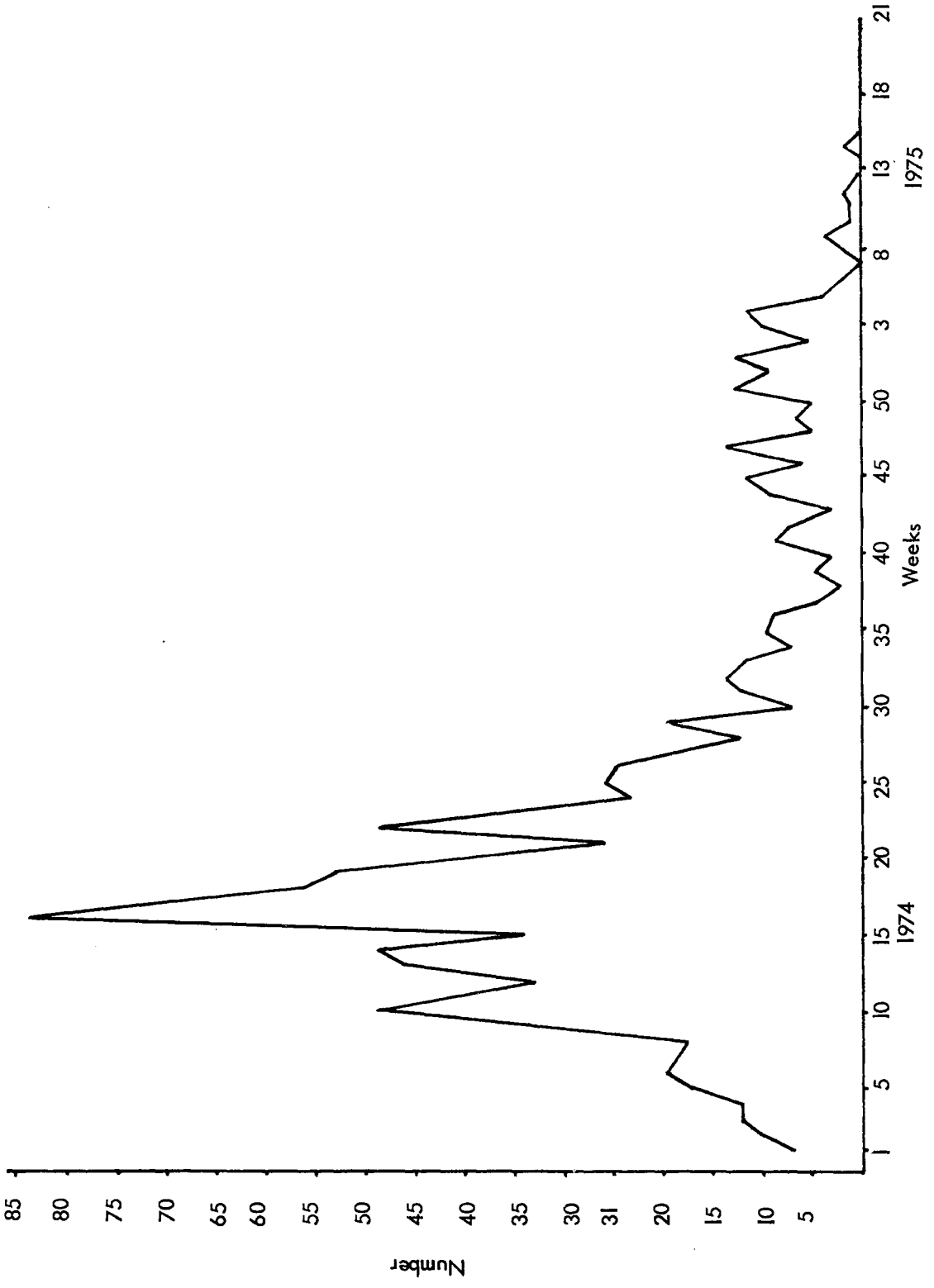


FIG. 34. OUTBREAK DIAGRAM, BAGMATI ZONE 1974

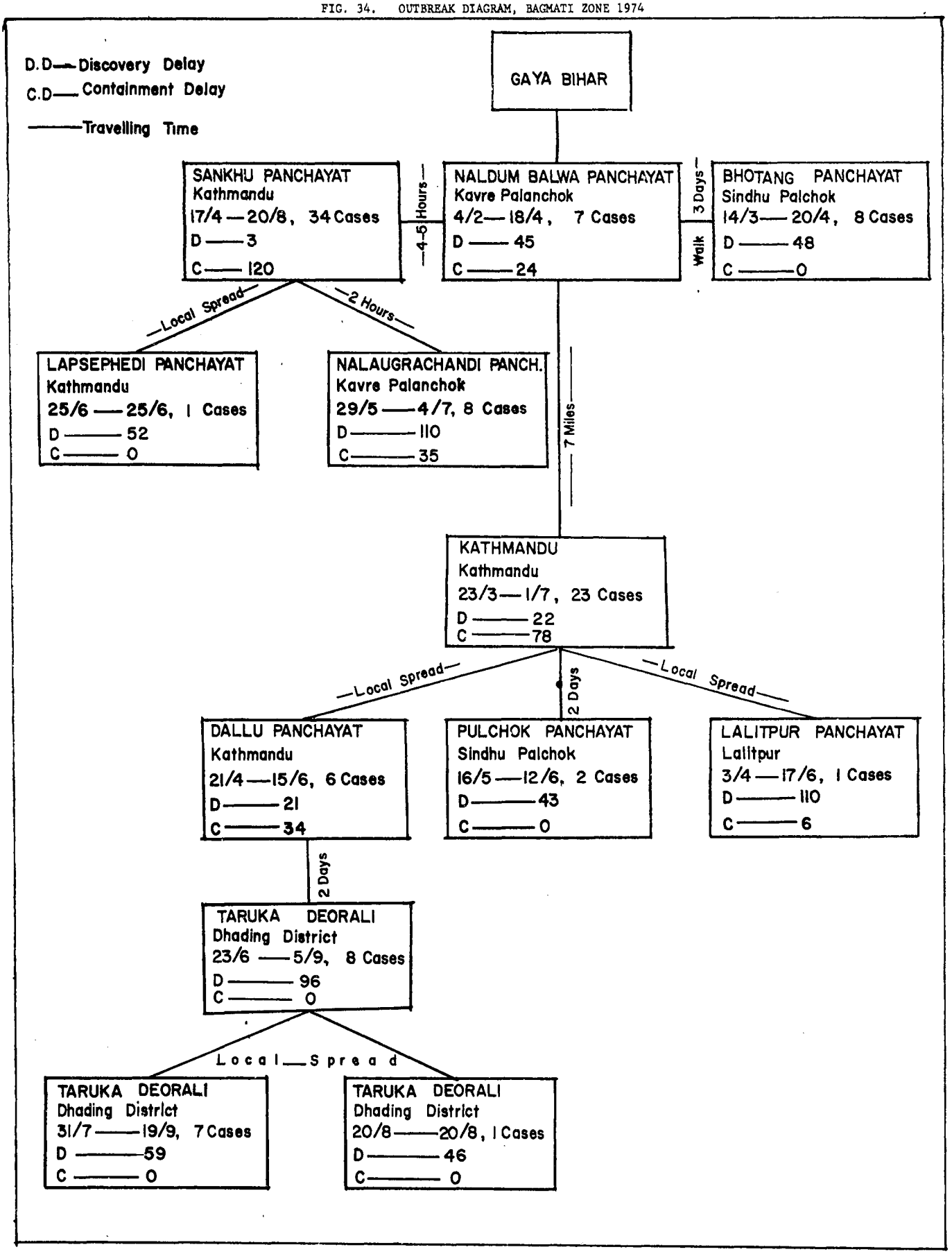
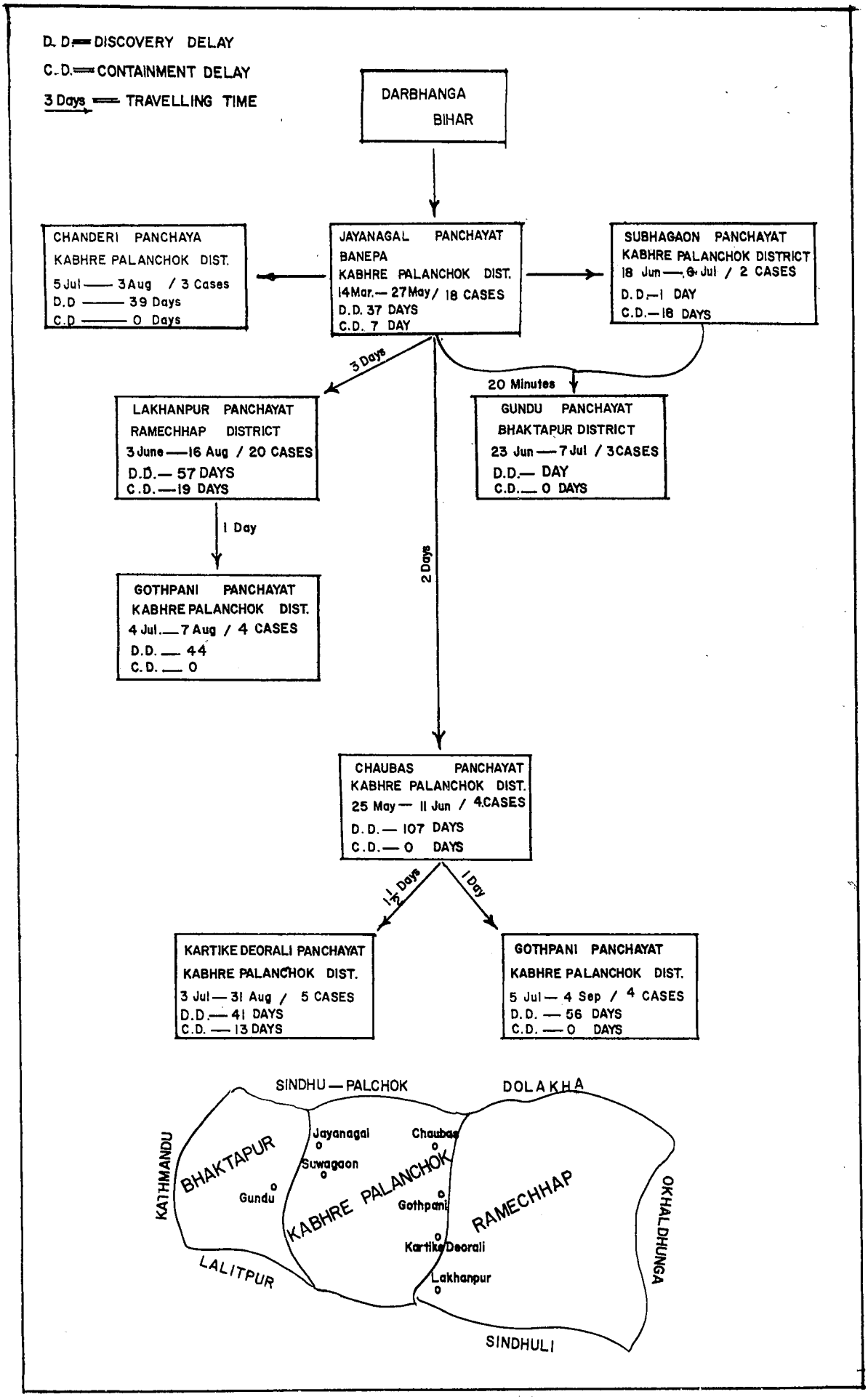


FIG. 35. OUTBREAK DIAGRAM, BAGMATI ZONE 1974



Chain 2 (see Fig. 35)

This chain began in Jayanagal panchayat, Kabrepalanchok district on 14 March, the index case having been infected in Darbhanga district, Bihar state. None of the eight outbreaks that followed was in any way remarkable. Surveillance was generally no less efficient here than elsewhere, although the outbreak in Chaubas panchayat remained undetected for 107 days. This outbreak burnt itself out after four cases had occurred in 17 days, and was undetected for a further 90 days, only coming to light when its two seeded outbreaks in Kartike Deorali and Gothpani villages were under investigation in early September. Field workers met some resistance to their vaccination efforts, particularly among Newar families.

Here, as in other Newar areas, the practice of friends and relatives visiting affected households played a major part in the transmission that occurred. The last case in the chain occurred 174 days after the first, a total of 63 cases occurring in the nine outbreaks in the chain.

7. SMALLPOX TRANSMISSION DURING 1975

Sixteen outbreaks were reported during 1975. Five of these had actually started during November and December 1974. Only two districts were involved; Morang with 15 of the reported outbreaks and Rautahat with one. Apart from an outbreak in Majhare panchayat, Morang district, whose source was traced to Purnea district, Bihar, and a one case outbreak in Morang whose source was Saharsa, Bihar, all the outbreaks resulted from local spread. This is described in detail below.

A total of 95 cases were reported during 1975. Twenty-three occurred in that year.

The age/sex distribution of the cases reported during the year was as shown in Fig. 36.

FIG. 36. AGE/SEX DISTRIBUTION OF THE 79 CASES FOR WHOM FULL INFORMATION IS AVAILABLE, 1975

Age-Years	M	F	Total
0-1	0	4	4
2-4	3	9	12
5-14	22	16	38
15+ over	14	11	25
Total	39	40	79

All cases but two were unvaccinated prior to exposure.

Mean cases per outbreak was 2.1 with a range of 1 to 5 cases. Six of the outbreaks comprised only a single case.

The mean duration of the pending status of outbreaks with their onset in 1975 was 53.8 days with a range of 42 to 83 days - six outbreaks were pending for the minimum time of 42 days. Two outbreaks were pending for more than 80 days.

Mean discovery delay for outbreaks with their onset in 1975 was 18.0 days. Four outbreaks remained undetected for four weeks or over. The longest delay undetected was 47 days.

Mean containment delay for outbreaks with their onset in 1975 was 3.5 days. Full details of these outbreaks can be seen in the line list in Annex 5.

1975 was the last year in which smallpox was reported in Nepal. Fig. 37 shows the dates of the last cases in all those districts whose last cases have occurred since 1971.

FIG. 37. DATE OF ONSET OF LAST REPORTED CASES IN EACH DISTRICT, 1972-1975

District	Date of onset of last case
Kaski	18th November 1972
Salyan	6th January 1973
Bardia	9th March 1973
Rolpa	23rd March 1973
Dang	10th May 1973
Mugu	14th May 1973
Banke	10th September 1973
Nawalparasi	11th February 1974
Bara	8th March 1974
Tanahu	24th March 1974
Parsa	17th May 1974
Sirha	22nd May 1974
Kanchanpur	27th May 1974
Bahjang	28th May 1974
Rupandehi	9th June 1974
Dandeldhura	10th June 1974
Sindhupalchok	12th June 1974
Doti	19th June 1974
Kapilvastu	25th June 1974
Kailali	29th June 1974
Sarlahi	3rd July 1974
Lalitpur	5th July 1974
Bhaktapur	7th July 1974
Dhanusa	20th July 1974
Rukum	22nd July 1974
Mahotari	30th July 1974
Saptari	9th August 1974
Ramechhap	16th August 1974
Kathmandu	20th August 1974
Kabrepalanchok	31st August 1974
Dhading	19th September 1974
Sunsari	29th September 1974
Jhapa	16th November 1974
Rautahat	23rd February 1975
Morang	6th April 1975

Transmission in Morang district - 1975

Morang district, the scene of the last outbreak in Nepal, was the site of more outbreaks and cases over a longer period than any other district.

Morang is a rich, agricultural and industrial area. Although its overall population density is marginally lower than that of several of its close neighbours, it is the centre for jute production in the Eastern Terai and contains the large industrial town of Biratnagar. Both of these sources of employment create a large annual influx of migrant labour from India.

The chain of transmission which ended in Belahi village in April 1975 began in Sugahat and Khabasi villages, Amardaha panchayat (outbreak 118)[1] on 24 December 1973, with a case imported from Purnea district, Bihar. This outbreak persisted undetected until 12 June 1974, 163 days, and accounted for 26 cases. This unusually slow rate of transmission is not easy to explain. Another village in Armadaha panchayat, Surat, was infected on 15 April (outbreak 177) and this too remained undetected for a long time, finally coming to light in mid-November, after 209 days. The outbreak in Surat comprised 62 cases and spread in turn to ward 9, Gobindpur panchayat, on 11 November. This fast moving epidemic, with 12 cases in 34 days, was the common origin of two outbreaks (see Fig. 38) which were the foundations of two separate chains of transmission.

1. Sugahat village, Armadaha panchayat (outbreak 4)

Probably because of the food shortage in Bihar at the end of 1974 Sugahat contained a large number of Indian beggars of the Sattar tribal group. A female member of this group was infected with smallpox in Gobindpur 9, became ill on 2 December, and passed the disease on to her brother before dying herself 14 days later. When her brother developed a rash the group was forcibly evacuated from their accommodation and went to live in three shelters adjacent to the roads leading into and out of the market. Eleven of these beggars developed smallpox between 2 December and 17 January, two of them, including the index case, dying from the disease. Nepali householders in Sugahat were inevitably infected. These were mainly members of the Raj Bhansi family/caste group. A total of 21 cases developed before 5 February, creating a large and very dangerous reservoir of infection. Four outbreaks arose directly from this reservoir.

Hasanda village, Armadaha panchayat, ward 4 (outbreak 7)

A single case who was a trader in Sugahat market. He developed his rash on 4 January and died.

Dodhara village, Rajghat panchayat, ward 6 (outbreak 13)

The index case, a regular visitor to Sugahat market, developed a rash on 24 January. Four further cases occurred in his family, the last on 2 March.

Babun Dov village, Gobindpur panchayat, ward 2 (outbreak 11)

The single case in this outbreak had a history of contact with a beggar in Sugahat market. He developed a smallpox rash on 27 January.

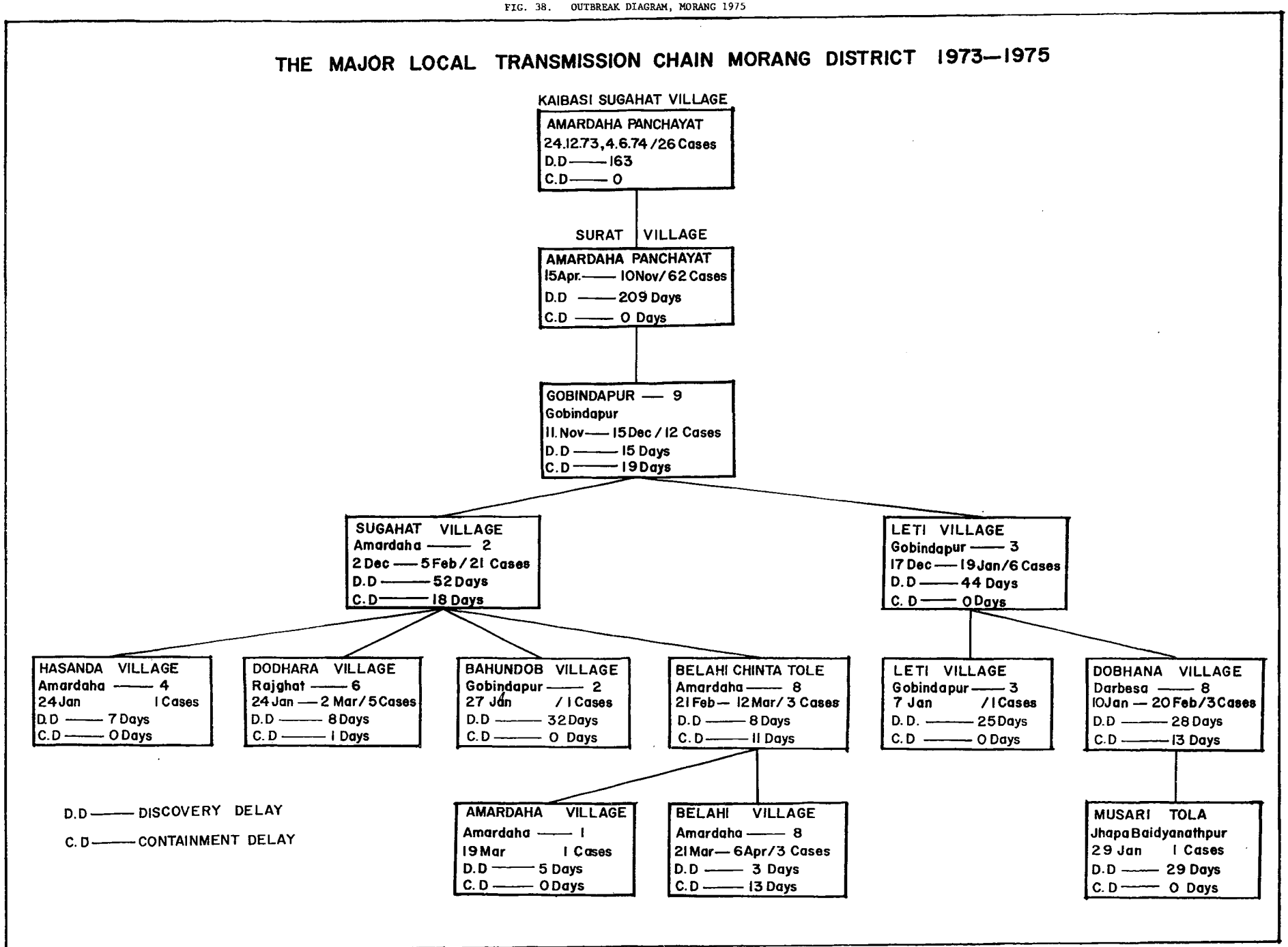
Chinta Tole, Armadaha panchayat, ward 8 (outbreak 14)

The index case had been staying in Sugahat at the house of case 21 in the Sugahat outbreak, Hapilal Raj Bhansi, at the time that Hapilal was suffering from smallpox. The index case, having developed his rash on 21 February, infected two members of his household and two other sections of his family who were living in the villages of Armadaha and Belahi (outbreaks 15 and 16).

The last two cases in Belahi, and in Nepal, developed their rashes on 6 April.

[1] Outbreak numbers refer to the line lists in Annex 5.

FIG. 38. OUTBREAK DIAGRAM, MORANG 1975



2. Leti village, Gobindpur panchayat, ward 3 (outbreak 5)

The index case in this outbreak was infected in Gobindpur panchayat, ward 9, and was the origin of six cases in his immediate circle. Three outbreaks, at Leti (outbreak 8), which was really no more than an extension of the original outbreak, Domana (outbreak 9) and Jhapa Baidyanathpur (outbreak 12), arose from this outbreak; all of them were in Musari caste families directly associated with the index case in Leti village.

Another short chain of transmission also occurred. An outbreak of 21 cases among Sattar tribals in Shorabag (outbreak 1) seeded a single secondary outbreak of three members of a Raj Bhansi family in Kalabanjar village, Babia Birta panchayat, ward 3 (outbreak 10), a week after the onset of its last case on 4 January.

Discussion

Up to the end of 1974 the pattern of smallpox transmission in Nepal had been of frequent importations giving rise to occasional secondary spread. The proportion of outbreaks occurring as a result of such spread had been rising relative to the falling number of importations but, with the exception of a complex chain of transmission in Bagmati zone there had been no single major focus. When the spread described above become apparent, it at first seemed as if a new pattern of transmission was developing.

Those outbreaks are best analysed in four groups.

(a) Those outbreaks leading up to and including Gobindpur panchayat, ward 9 (outbreaks 118, 177 and 180)

The two outbreaks in Armadaha panchayat persisted solely because of poor surveillance activity. They cannot be explained in any other way. They effectively maintained the virus in the panchayat from the time it was imported to the time in late 1974 when the abnormal conditions in Sugahat market permitted rapid dissemination. The fact that the first of these outbreaks was actually in Sugahat but showed no inclination to become widespread is an indication that the presence of the unusually high beggar population in late 1974 and early 1975 was probably required for the local explosion that was seen at that time.

(b) The outbreak in Sugahat market

This outbreak behaved in a perfectly normal way by the standards of 1973 and 1974. Its rate of growth fits the regression line for the outbreaks in those years very closely and, like 67% of those 1973-1974 outbreaks with more than 20 cases, it produced secondary spread. An outbreak will spread according to its position, and the Sugahat outbreak was in a large and popular market which made widespread dissemination almost inevitable once the infector pool had reached a high enough level. It must be noted, however, that outbreaks of 21 cases should not occur in markets in the presence of good surveillance and containment. Twelve cases had occurred in this outbreak by the time of its detection, a further five cases developing a rash within 10 days of the start of containment. The containment delay was 25 days but market outbreaks are notoriously difficult to contain.

(c) The spread after Sugahat

The infector pool in the beggar population of Sugahat market was at its height between 10 and 15 January. During this time there were between eight and nine infectious cases of smallpox in the market area, and between these dates the index case of the three dead-end outbreaks in Hasanda, Dodhara and Babun Dov were infected. It is only remarkable that there were no more. The unvaccinated index case of the outbreak in Chinta Tole was infected in the house of a patient in Sugahat, and his illness requires no explanation. The short chain of spread from Chinta Tole was all among family members. The presence of a large population of closely knit, low caste families in the district undoubtedly helped the short distance transmission of smallpox. All the outbreaks arising from Sugahat, with the exception of Jhapa Baidhianathpur (outbreak 12), were within a three-mile radius of the market.

(d) The chain from Gobindpur

It is only its association with the other major chain, that from Sugahat, that makes this smaller chain appear unusual. However, the mean duration and number of cases per outbreak were significantly lower than that for all the other outbreaks in 1973-1975. The mean number of outbreak days/case was marginally but not significantly higher than that for all other outbreaks, and both the mean discovery delays and mean containment delays were significantly shorter than the mean for 1973 and 1974. All this spread occurred within a family group, the close ties presumably negating the usual requirement of a large number of cases in a source outbreak.

In conclusion, the evidence suggests that the apparent increase in local spread that occurred in Morang did not reflect any change in the underlying factors that determined the pattern of spread in 1974 and 1975, such as a worsening of surveillance or containment efficiency, or an increase in local migration, but that these factors were now acting on a novel situation - the presence of a large reservoir of infection in a highly sensitive area, namely a major market. The incidence of a large number of outbreaks in a very confined area compounded the impression of massive spread. Looking at it in the cold light of day this series of outbreaks, although regrettable in that it was preventable, was not in any way unusual.

The final outbreak

The final outbreak of smallpox in Nepal occurred in Armadaha panchayat, Morang district, Kosi zone. This Terai area had proved to be a severe problem in the latter half of 1974 and early 1975. Armadaha panchayat was the source for two outbreaks which together comprised 90 cases in 1974 and five outbreaks which together comprised 28 cases in 1975. Most of these cases in 1974 occurred among the Sathar tribal group, who originate from India, and among the Raj Bhansi, a Nepalese caste group, in 1975.

The index case of the outbreak, Choba Lal Raj Bhansi, a man of 26, had visited the household infected in an earlier outbreak in Chinta Tole village in the same panchayat on 6 March 1975. He was accompanied on this visit by a relative, Sundar Lal Raj Bhansi, who became the only case in an outbreak in another village on 19 March.

On 21 March Choba Lal developed a smallpox rash. He was discovered by the watchguards from the Chinta Tole outbreak on 24 March and containment was started immediately, using (Indian) containment books for the first time. Choba Lal's illness was severe and by the tenth day of rash he was in danger of dying. He had lesions in his throat and had great difficulty in taking even fluids. His family was instructed in the technique of patiently spoon-feeding him with water, and he finally made a good recovery.

On 6 April, Choba Lal's wife, Jahaje, 26, and his daughter Champawatti, one year, developed a smallpox rash. They had both been vaccinated on 24 March and their illnesses were extremely mild. Both mother and daughter, however, had rather tragic sequelae to their attacks of smallpox.

Jahaje, the mother, was seven months pregnant at the time of her attack. On 7 April she complained of severe abdominal pain and two days later she gave birth to a premature son who only lived for a few days. The premature onset of labour was, in all probability, caused by her illness, despite its mildness.

Champawatti, the daughter, made an uneventful recovery from her smallpox but her vaccination site became infected and formed an inch wide ulcer on her arm. Possibly as a result of an accompanying septicaemia she developed osteomyelitis in one leg. In December 1975 she was treated surgically in Biratnagar hospital and she only began to walk at the age of 18 months.

When last seen in April 1976 the family was happily recovered although Champawatti's leg is slightly deformed.

8. SURVEILLANCE FROM 1970-1975

During the period up to zeropox, and on to July 1975, surveillance was carried out in all those districts not under the control of the Integrated Health Service by personnel of the smallpox eradication programme.

Surveillance was carried out on a regular basis by senior vaccinators. Working to a timetable prepared by the district supervisors they made a circuit of all the panchayats in their areas in a regular monthly or two monthly cycle. At the panchayat they made contact with the Pradhan Panch (the panchayat leader) and ward members, and made inquiries of them concerning any cases of rash. They also visited schools, fairs, markets and other gathering places in a planned rota, collecting information from each. Information collected was always of the positive type, no negative reporting system was used or found to be necessary at this time.

All suspect case reports were followed up immediately by the senior vaccinator and the district staff.

No house-to-house surveillance was carried out by the senior vaccinators, who were too few in number in each district to make this possible, but each house in each district was visited once a year by temporary vaccinators for the purpose of primary or revaccination. The temporary vaccinators had training in, and were instructed to do, smallpox surveillance at the same time.

Information on outbreaks came from SEP staff, other health workers, local officials, businessmen and many others. All health units were under instructions to report any outbreaks that came to their notice to the SEP, and other organizations not involved in health also acted as secondary surveillance agents. The source of information, where this was recorded, is summarized in Fig. 39.

FIG. 39. SOURCE OF INFORMATION ON OUTBREAKS 1973-1974

	SEP staff	Other health staff	Others	Total
1973	16 (41.0%)	9 (23.1%)	14 (35.9%)	39
1974	83 (72.8%)	14 (12.3%)	17 (14.9%)	114

No financial inducement was offered to either the public or health workers up to March 1975 when a reward of Rs 100 was offered. By this time zeropox had nearly been achieved. Whether the flow of information would have been eased by a reward at an earlier stage is open to conjecture, but, as described later this surveillance system appears to have functioned quite adequately without it.

Surveillance since July 1975

For the "post-zeropox" period a surveillance system has been established in all districts of Nepal to a standard that ensures that any cases of smallpox will come to the attention of the SEP staff. The nature of the organization has been adapted to suit the terrain, the population density, the risk of importation and the nature and number of available staff.

In July 1975 a new operational guideline was produced which described the surveillance organization (see Annex 7). Each district was assigned to one of three categories on the basis of the criteria listed above. The distribution of the districts of each category is shown in Fig. 40. These categories are organized as follows.

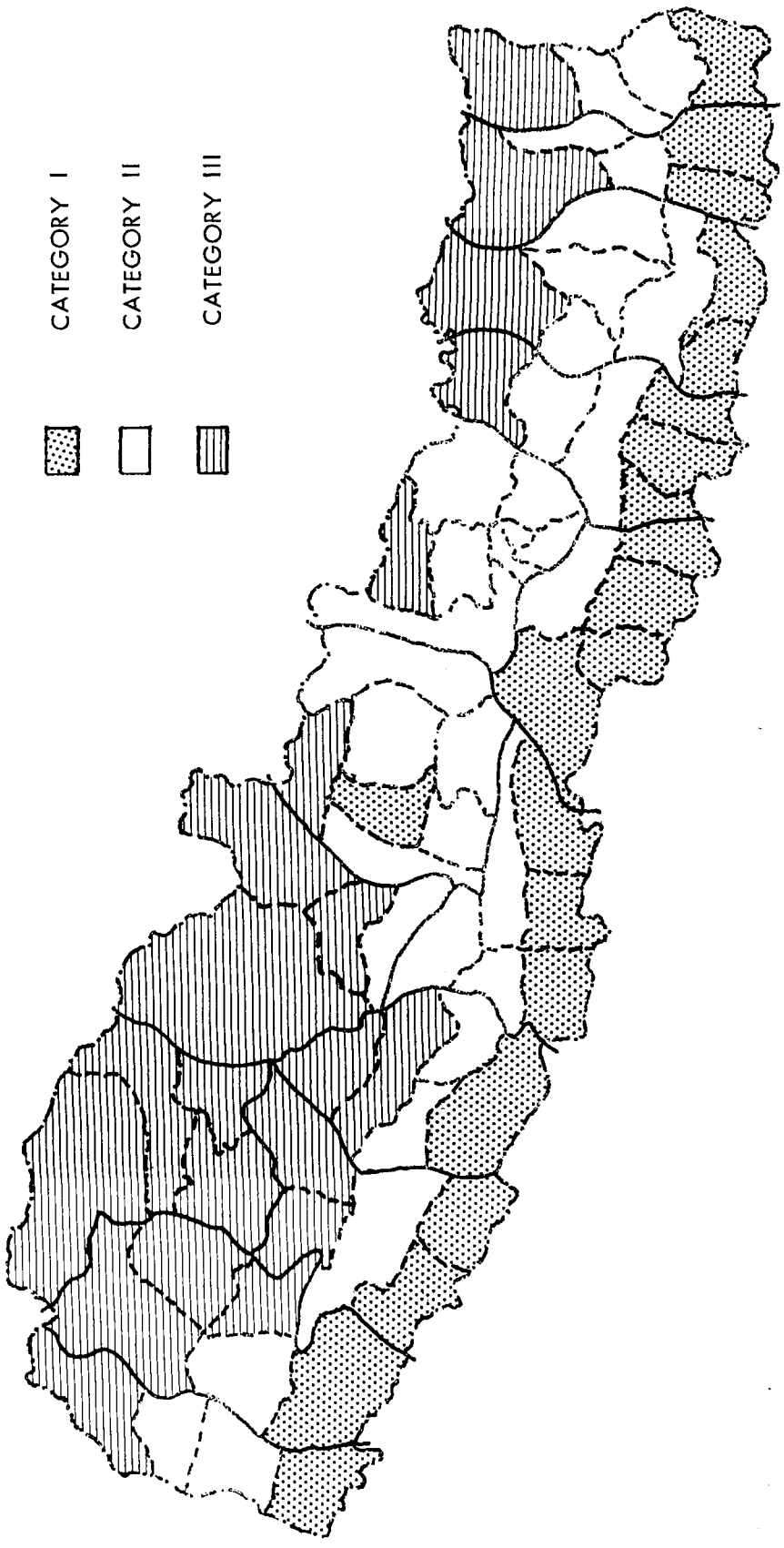


FIG. 40. CLASSIFICATION OF DISTRICTS FOR ACTIVE SURVEILLANCE SINCE JUNE 1975

Category I. This includes the areas most vulnerable to importation - 88% of outbreaks from January 1973 to April 1975 occurred in these districts. This category comprises all the districts completely covered by the malaria eradication programme plus the six districts fully under the Integrated Health Service pilot project. The districts served by each of these organizations can be seen from Fig. 41.

Every house in these districts is visited once a month by either a malaria house visitor in the non-integrated districts or a junior auxiliary health worker (JAHW) in the integrated districts. The exceptions to this are those houses in the non-integrated districts that lie within the zone of high malaria transmission. These are visited twice a month by the malaria house visitors.

The interest of malaria workers is primarily in cases of fever, but they have been instructed to inquire also about cases of rash of any sort, with or without fever. They carry smallpox identification picture cards to show to householders. Any suspect cases found during their visits are reported immediately to their supervisors, who inform the district smallpox personnel so that appropriate investigations can be made.

The system of supervision and assessment of malaria workers is described on page 58.

The JAHW's are specifically trained to look for smallpox as part of the Integrated Health Services programme. They carry smallpox identification cards and ask specifically for information on cases of rash and fever. They report all such information to their field supervisors for appropriate action. They are also required to ensure that householders are aware of the Rs 1000 reward offered for information and of what action they should take if they should encounter a case. The structure and the supervision system of the Integrated Health Service is described on page 58.

In non-integrated category I districts, secondary surveillance of schools, markets and other gatherings is carried out on a routine basis by the smallpox senior vaccinator, or temporary vaccinators if any have been employed. They work to a timetable prepared by the district and assistant supervisors. This timetable is also used for assessment (see page 71).

Surveillance assessment in non-integrated category I districts is carried out routinely by district and assistant supervisors. All category I districts have also been assessed by national assessment teams. The methods and results are described and analysed in detail on page 71.

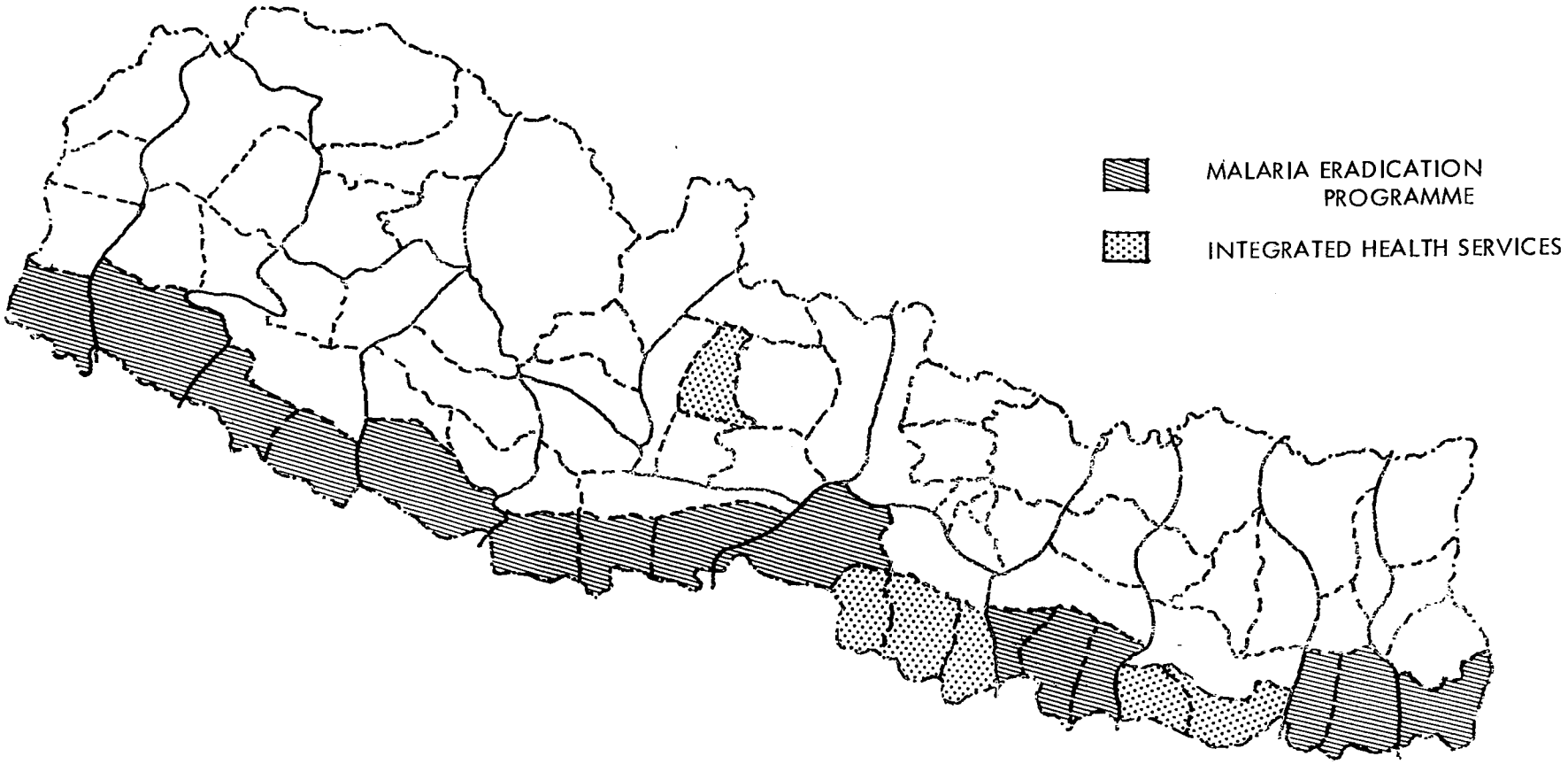
Category II (see Fig. 40). This category includes the districts of Bagmati zone which were the site of considerable secondary spread during 1974 and three other districts which experienced importations during that year. Parts of some of these districts are within the malarial zone and personnel of the malaria eradication programme are working there.

The houses in those areas served by the malaria eradication programme or the Integrated Health Service are visisted once a month by malaria house visitors or JAHW's in the same way as are the houses in category I districts. Where there are no malaria or integration workers the houses are visisted in a routine two-monthly cycle by smallpox senior vaccinators. They search house-to-house, marking each house with a dated stencil as they go. Information on cases of rash and fever is sought from the occupants of each house. They are shown the identification card and they are reminded about the reward and of what they should do in the event of encountering a case of smallpox. In each ward it is also the duty of the surveillance workers to paint reward slogans in conspicuous positions.

The vaccinators also carry out secondary surveillance in schools, markets and other gathering places in a routine, planned cycle of approximately two months.

Supervision of the vaccinators and assessment of their work is performed by the district and assistant smallpox supervisors (see page 57).

FIG. 41. DISTRICTS IN WHICH ALL PRIMARY SMALLPOX SURVEILLANCE IS CARRIED OUT BY ORGANIZATIONS OTHER THAN THE SEP



Category III (see Fig. 40). This category includes those districts with the least accessible areas. Few of them have roads (see Fig. 4) and almost all travel is therefore on foot, making surveillance slow and arduous. Outbreaks in these districts were limited to one imported case in Rukum in 1974 that was detected in 28 days, two imported outbreaks in Bahjang, also in 1974, detected in 28 and 16 days respectively, and two imported cases in Mugu in 1973 that were detected in 22 and 11 days respectively. All these discovery times are well below the national average.

Except in those areas where integrated health services or the national malaria eradication programme is in operation, both primary and indirect surveillance is carried out by smallpox senior and/or temporary vaccinators working from house-to-house and in markets, schools and other gathering places. The cycle of surveillance varies from two to six months with the district and the terrain.

Supervision and assessment are carried out as in districts of categories I and II.

In 1975 SEP staffing in 28 Mid-Hill districts in categories II and III was strengthened by the addition of between one and 10 extra senior vaccinators in order to improve surveillance efficiency.

Supervision of surveillance

Supervision of smallpox surveillance is carried out by workers from three organizations.

1. Smallpox eradication programme
2. Integrated health services
3. National Malaria Eradication Organization (NMEO)

1. Smallpox eradication programme

The organization of the SEP has already been described. Routine surveillance work is carried out by the lowest cadre of permanent worker, the senior vaccinator, and by temporary vaccinators where these are employed. In category II and III districts, except where the integrated health services are working, they are responsible for primary house-to-house surveillance and secondary surveillance in schools, factories, markets, fairs and other places where there are concentrations of people.

At the beginning of each month each district supervisor prepares detailed itineraries for the next month for each vaccinator in the district or districts under his control, as well as supervision programmes for himself and the assistant supervisor. Where temporary vaccinators are employed the senior vaccinators act as additional supervisors.

The programme for the vaccinators covers all the panchayats over a period of two months in category II districts and over four to six months in category III districts, and specifies the villages, markets, etc., to be visited on each day of the month. The programmes for category I districts list only markets and schools.

The programme for the supervisors is so designed as to enable them to check the work of the surveillance workers in two ways:

(a) by direct observation in markets, schools and sometimes in villages at the scheduled time of the worker's visit;

(b) by indirect assessment of the house-to-house surveillance carried out in previous months or earlier in the same month.

The schedule for supervision is not disclosed to the vaccinators so as to make the assessment more valid.

A record of all surveillance work by SEP staff is kept on form SEP2a. The results of supervisory visits are recorded on form SEP3a. A summary of these forms is prepared by the district supervisor on form SEP6a. (See Annex 6 for English translation of these and other forms.)

2. Integrated Health Service

In those districts and parts of districts served by the Integrated Health Service (see Fig. 41) house-to-house smallpox surveillance is carried out by junior auxiliary health workers (JAHW) on a monthly basis. One JAHW is responsible for a population of approximately 5000 people and works from a health post. He makes a regular report of all cases of rash and/or fever and arranges for their referral to the nearest curative unit. Investigations of any rash report made by a JAHW is the responsibility of his field supervisor.

Supervision of surveillance by JAHWs is carried out:

(a) By direct supervision of the JAHW by the field supervisor at the time of his visit to a village. The field supervisor is involved in the planning of the programme of work for each of the JAHWs under his supervision and may arrange with them a time when they can visit a village together. Alternatively he may spring surprise visits.

(b) Direct or indirect supervision by district level staff, also working from the JAHW's field programme.

(c) Indirect checking of the monthly returns by reference to the referral figures, blood films, etc., produced during the month by the JAHW.

Independent assessment of surveillance in integrated districts has been made by the SEP national assessment teams.

Although the surveillance work in these districts is not under the control of the smallpox eradication programme, and despite the fact that smallpox is only part of the work of the JAHW, the regular visiting gives the JAHW a considerable knowledge of his small target population and makes it very unlikely that cases of smallpox would escape his attention.

3. National Malaria Eradication Organization

The malaria eradication programme is in operation in the whole of 15 districts and parts of others (see Fig. 42). The organization is structured into regions, districts, units and localities. The units and localities do not correspond with the administrative divisions of the country.

Surveillance in all houses in each locality is made every two or four weeks depending on the intensity of malaria transmission (see Fig. 42) by malaria house visitors. Inquiry is made for any occupant with fever and/or rash. Blood slides are taken and an appropriate report is made. The visits are made to a fixed timetable prepared at unit level by a malaria inspector.

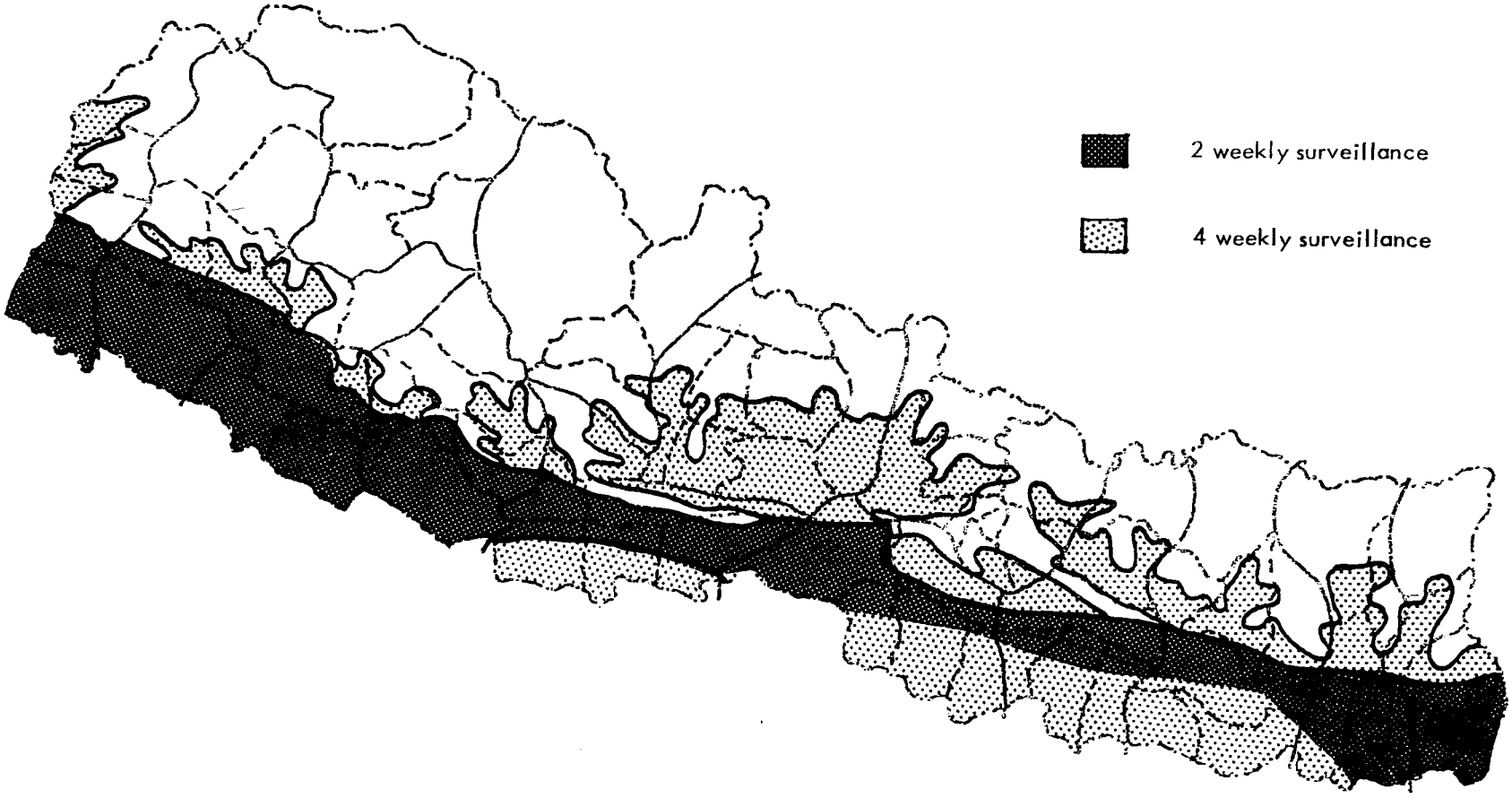
Supervision of the house visitors is by malaria inspectors as follows:

(a) Direct, on-the-spot visits to ensure that workers are in the villages assigned to them for the day. This is carried out both by arrangement with the house visitors and as surprise checks.

(b) Indirect supervision A. Houses are visited to check that blood slides were taken from all house occupants suffering from fever at the scheduled time of the malaria house visitors' call.

(c) Indirect supervision B. A check is made that the number of slides taken from each locality does not fall below a nationally acceptable level.

FIG. 42. AREA COVERED BY MALARIA ERADICATION PROGRAMME AND LENGTH OF SURVEILLANCE CYCLES



At present house visitors are expected to produce slides from 1% of the population of their localities every month.

Responsibility is delegated well to the end of the chain of authority in this programme and a very short time elapses between the discovery of faulty surveillance activity and action being taken to correct it. The requirement to take blood slides and the ease of checking their origin makes dereliction of duty very hard for malaria house visitors. As in the integrated districts there is a large number of workers in the field, and although their prime duty is not smallpox surveillance it is most improbable that they would not come to hear of any cases of smallpox that did occur.

Fig. 43 shows for each of the districts wholely covered by the MEP the percentage of the population recorded as having suffered from fever during each month of 1975 and the annual blood examination ratio. The standards for these two parameters are 1% and 12% respectively. Figures lower than this are taken as indicating substandard surveillance.

Surveillance in the absence of smallpox can also be evaluated in terms of suspect case reporting. Fig. 44 shows the incidence of such reports by district in 1975-1976. The difference between the overall rates for the integrated districts and the SEP districts is not significant but the rate for those districts under surveillance by the NMEO is significantly higher than the rates for districts covered by either of the other two organizations. Fig. 45 shows the distribution of suspect case reports by months for April 1975 onwards. Fig. 46 shows the origin of the information on suspect cases received by the district offices.

Surveillance teams

In 1972 four surveillance teams were established. These consisted of one surveillance inspector (equivalent to a district supervisor), one assistant inspector (equivalent to an assistant supervisor) and one or two surveillance aides (equivalent to senior vaccinators). They superseded the containment teams which had been established earlier but which had failed to be as effective as had been hoped, mainly for administrative and financial reasons.

The purpose of the teams was to support and supplement the district personnel in either surveillance or containment activities in relation to outbreaks. For a number of reasons it was found that a reduction to two teams would be an advantage and this was duly carried out in 1973.

The teams have been used since "zeropox" to carry out special searches. Working with the assessment teams and on their own they have carried out detailed house-to-house searches of all 18 Terai districts and the districts of Kathmandu, Lalitpur and Bhaktapur in the Kathmandu valley. No cases of smallpox, either new or old, were found during this search, although a number of suspect cases have been reported by the teams during the search.

The teams are now employed in a search of the Hill districts that were infected during 1972-1975.

The districts in which the surveillance teams have worked since 1973 are shown on page 66.

FIG. 43. INCIDENCE PERCENTAGE OF FEVER REPORTED BY MONTH, 1975-1976

DISTRICT	J	F	M	A	M	J	J	A	S	O	N	D	*ABER
KANCHANPUR	0.8	1.1	1.3	1.2	1.1	0.7	1.0	1.3	1.5	0.9	1.1	0.8	13.0
KAILALI	0.8	0.7	1.3	1.3	1.2	1.0	1.0	1.1	1.2	0.7	1.0	0.7	12.5
BARDIYA	1.1	1.2	1.4	1.5	1.5	1.4	1.1	1.4	1.4	0.8	1.0	0.9	14.7
BANKE	1.0	1.1	1.3	1.3	1.2	1.3	1.1	1.4	1.2	0.6	1.2	1.0	13.7
DANG	0.8	0.9	1.3	1.4	1.3	1.1	0.9	0.9	1.2	0.8	0.9	0.9	12.5
KAPILVASTU	1.5	2.0	3.3	2.7	2.2	2.2	2.0	2.6	3.1	2.7	2.5	1.7	28.8
RUPANDEHI	1.2	1.6	1.7	1.5	1.4	1.7	1.2	1.2	1.6	1.7	1.6	0.9	17.3
NAWALPARASI	1.3	1.8	2.6	2.3	1.8	1.7	1.8	2.3	2.3	1.9	1.7	1.3	23.0
CHITWAN	0.9	1.0	1.4	1.6	1.4	1.5	1.5	1.5	1.6	1.4	1.2	1.0	16.4
SARLAHI	1.1	1.2	1.4	1.3	1.2	1.2	1.2	1.6	2.1	1.8	1.3	1.1	16.9
MAHUTARI	0.6	0.7	0.7	0.9	0.8	0.8	0.8	1.0	1.1	1.2	1.0	0.8	10.7
DHANUSA	0.8	0.9	1.0	1.0	1.0	0.9	0.1	1.1	1.2	1.3	1.1	0.8	12.4
SUNSARI	0.8	0.7	0.9	0.9	1.0	1.0	1.1	1.1	1.1	0.9	1.0	0.8	11.8
MORANG	0.9	1.0	1.2	1.1	1.0	1.1	1.1	1.1	1.3	1.0	1.1	0.8	13.0
JHAPA	1.3	1.5	1.7	1.7	1.6	1.4	1.4	1.6	2.0	2.0	1.9	1.8	19.5

* ABER = Abnormal Blood Examination Rates.

FIG. 44. SUSPECT CASES REPORTED, BY DISTRICT, 1975-1976 (TO JULY)

S.E.P.

	Cases/1000
TAPLEJUNG	0.13
PANCHTHAR	0.09
ILAM	0.36
SANKHUWASABA	0.88
TERATUM	0.49
DHANKUTA	0.76
SOLAKHUMBU	0.61
BHOJPUR	0.12
OKHALDUNGA	0.52
KOTANG	0.23
UDAYPUR	0.20
DOLAKHA	0.27
RAMECHHAP	0.06
SINDHULI	1.05
MAKWANPUR	0.31
RASUWA	0.06
NUWAKOT	0.05
DHADING	0.26
KATHMANDU	0.06
BHAKTAPUR	0.06
LALITPUR	0.03
SINDUPALCHOK	0.39
KABREPALANCHOK	0.05
MANANG	-
LAMJUNG	0.02
GORKHA	0.51
PARBAT	0.20
SYANJA	0.02
TANAHU	0.23
GULMI	0.04
ARGAKANCHI	0.06
PALPA	0.16

S.E.P.

	Cases/1000
MUSTANG	-
DOLPA	0.99
MYAGDI	0.02
BAGLUNG	0.36
ROLPA	0.14
RUKUM	0.08
PYUTHAN	0.09
SALYAN	0.13
JAJARKOT	0.02
DAILEKH	0.19
SURKET	0.12
HUMLA	0.20
TIBRIKOT	1.69
JUMLA	0.29
BAHJANG	-
BAJURA	-
DOTI	0.03
ACCHAM	0.76
DARCHULA	-
BAITADI	0.11
DANDELDHURA	0.20
MEAN	0.22

I.H.S.

	Cases/1000
KASKI	0.01
SAPTARI	0.19
SIRAHA	0.10
PARSA	0.06
BARA	0.72
RAUTAHAT	0.09
MEAN	0.19

N.M.E.O.

	Cases/1000
JHAPA	0.42
SUNSARI	0.17
MORANG	0.59
DHANUSA	0.50
MAHOTARI	0.62
SARLAHI	0.24
CHITWAN	0.51
RUPANDEHI	0.49
NAWALPARASI	0.69
KAPILVASTU	0.78
DANG	0.22
BARDIA	0.52
BANKE	0.63
KAILALI	0.29
KANCHANPUR	0.33
MEAN	0.50

FIG. 45. SUSPECT CASE REPORTS BY MONTH, APRIL 1975 - OCTOBER 1976

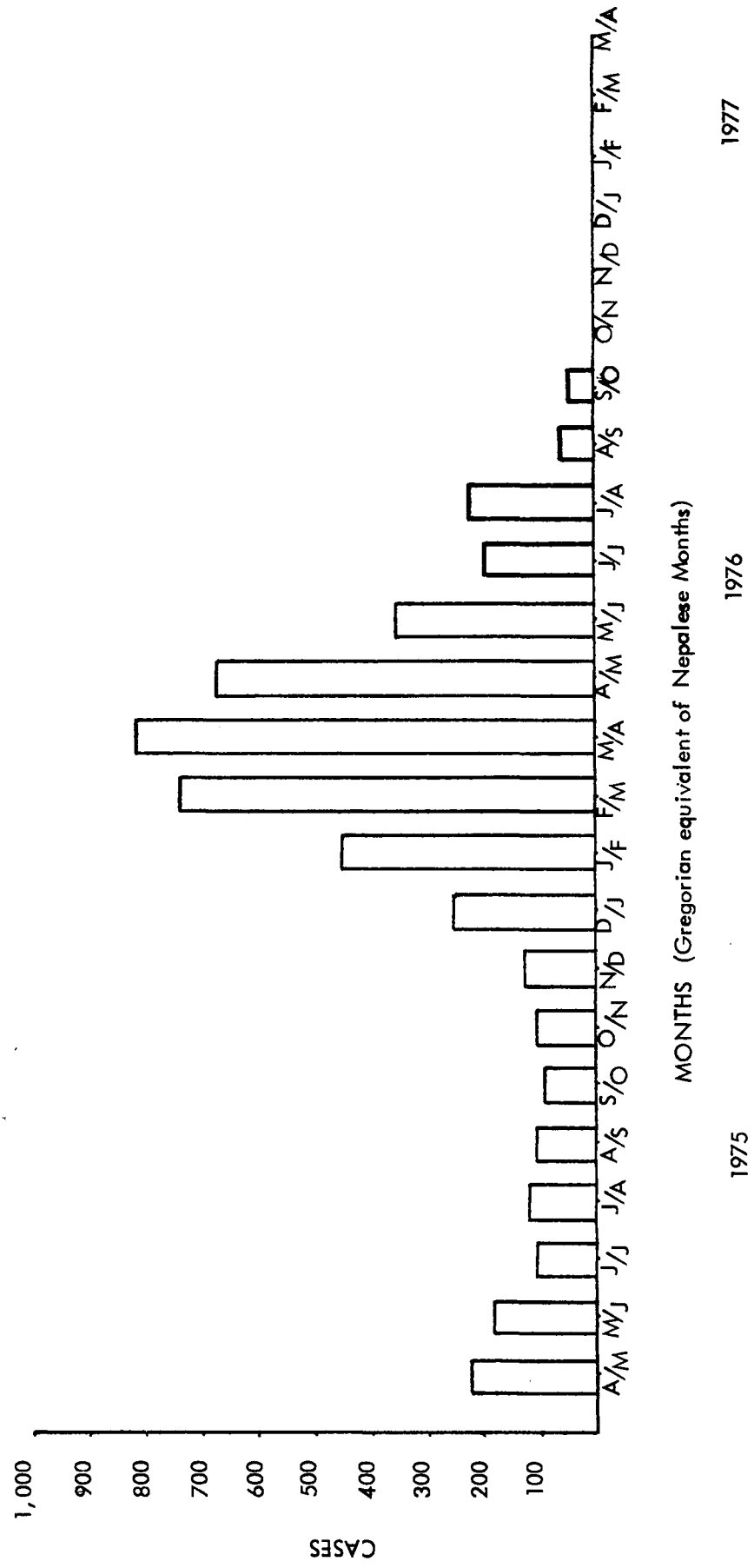


FIG. 46. SOURCE OF INFORMATION ON SUSPECT CASES BY DISTRICT, 1975-1976 (TO JULY) (%)

District	S.E.P. Staff	Malaria Staff	Other Health Workers	Public	TOTAL
ILAM	5 (9)	8 (15)	8 (15)	33 (61)	54
JHAPA	16 (14)	21 (18)	8 (7)	72 (61)	117
MORANG	57 (28)	39 (19)	14 (7)	91 (45)	201
DHANKUTA	28 (37)			48 (63)	76
TERATUM	33 (50)		2 (3)	31 (47)	66
SANKHUWASABA	70 (72)		6 (6)	21 (22)	97
SUNSARI	5 (6)	15 (17)	6 (7)	63 (70)	89
BHOJPUR	1 (2)			42 (98)	43
SAPTARI			17 (49)	18 (51)	35
OKHALDUNGA	1 (4)	2 (7)		25 (89)	28
SOLUKHUMBU	14 (25)		5 (9)	36 (66)	55
KHOTANG		1 (4)	1 (4)	24 (92)	25
UDAYPUR		19 (59)	3 (9)	10 (32)	32
MAHOTARI	26 (10)	16 (6)	7 (3)	201 (81)	250
SINDHULI		12 (40)		18 (60)	30
RAMECHHAP		1 (8)	13 (92)		14
DHANUSHA	5 (2)	7 (3)	1 (0.5)	237 (95)	250
SARLAHI	4 (3)	28 (24)	3 (3)	83 (70)	118
KATHMANDU	5 (11)	1 (2)		40 (87)	46
LALITPUR	13 (57)	1 (4)	2 (9)	7 (30)	23
BHAKTAPUR	3 (50)			3 (50)	6
NUWAKOT	1 (11)	2 (22)		6 (67)	9
DHADING		2 (50)		2 (50)	4
KABREPALANCHOK	3 (50)	2 (33)		1 (17)	6
SINDHUPALCHOK	149 (81)	1 (.05)	2 (1)	32 (17)	184
PARSA			50 (48)	54 (52)	104
RAUTAHAT			6 (27)	16 (73)	22
CHITWAN	82 (66)	10 (8)	2 (2)	30 (24)	124

FIG. 46. SOURCE OF INFORMATION ON SUSPECT CASES BY DISTRICT, 1975-1976 (TO JULY) (%) (cont'd)

District	S.E.P. Staff	Malaria staff	Other Health Workers	Public	TOTAL
MAKWANPUR	6 (13)	27 (56)	1 (2)	14 (29)	48
TANAHU	21 (48)	11 (25)		12 (27)	44
GORKHA	7 (18)	4 (11)		27 (71)	38
SYANJA	53 (79)		6 (9)	8 (12)	67
LAMJUNG		3 (60)	1 (20)	1 (20)	5
RUPANDEHI		28 (26)	4 (4)	77 (70)	109
ARGAKANCHI				36 (100)	36
GULMI	22 (100)				22
PALPA	11 (31)	13 (36)	1 (3)	11 (30)	36
NAWALPARASI	44 (35)	13 (10)	4 (3)	63 (52)	124
KAPILVASTU	119 (60)	7 (4)	2 (1)	69 (35)	197
BAGLUNG	25 (64)		1 (3)	13 (33)	39
MYAGDI				2 (100)	2
PARBAT	13 (54)			11 (46)	24
DANG		8 (36)		14 (64)	22
ROLPA	10 (38)		2 (7)	14 (54)	26
BANKE	37 (40)	3 (3)	10 (11)	43 (46)	93
KAILALI	3 (13)	2 (9)	2 (9)	16 (69)	23
DARCHULA				1 (100)	1
DANDELDHURA	30 (77)			9 (23)	39
KANCHANPUR	13 (43)	8 (27)		9 (30)	30

MOVEMENT OF SURVEILLANCE TEAMS 1973-1976

Year	Month	District
1973	January	Salyan
	February	Dhading
	March	Rauthat, Dang
	April	Jumla, Mugu
	August	Dandeldhura, Rupandehi
	September	Kapilvastu
	November	Morang, Jhapa
	December	Narayani Zone
1974	February	Siraha
	March	Jhapa
	June	Kapilvastu, Sarlahi
	August	Ramechhap
	October	Dhading
	December	Rauthat, Morang, Sunsari
1975	January	Morang
	February	Rauthat
	March	Morang
	April	Saptari, Siraha, Morang
	May	Saptari, Siraha, Jhapa
	June	Rauthat
	August	Sunsari, Morang
	November	Saptari, Kailali, Kanchanpur
	December	Parsa
1976	February	Nuwakot
	March	Gandaki Zone, Nawalparasi, Dhanusha, Mahotari, Sarlahi
	April	Morang, Jhapa, Sunsari, Banke, Bardiya, Kailali
	June	Saptari, Sunsari, Bara, Parsa, Rauthat

Special surveillance

During 1975 a number of special searches were made of vulnerable areas.

1. In Morang district - three searches were made during March, April and May 1975. Between 20 and 35 temporary workers were employed for two weeks on each occasion to search panchayats in which cases were known to have occurred, and others that were thought to be particularly vulnerable. No new outbreaks of smallpox were discovered by these teams, but it was found that information on many of the same suspect cases was obtained from several different sources, suggesting that the surveillance was of a high enough standard to have detected any extant outbreaks.

2. Siraha district - a special search was made in April 1975 because of the persistence of smallpox in Madhubani district, Bihar, whence had come 12 importations in 1974 - seven of them to Siraha and its two neighbours, Saptari and Dhanusha. Two workers made a general search of the whole district in two weeks using indirect surveillance methods. No new outbreaks were discovered.

3. Saptari district - 10 temporary workers were employed to search 10 panchayats in April 1975 after a suspect case had occurred in Agadi panchayat. No further cases were discovered, and the original case was finally diagnosed virologically as chicken pox.

4. Tibetan refugee camps - a survey of the inhabitants of nine refugee camps was made with the intention of establishing a date for the last outbreaks in Tibet. No evidence was found for any transmission more recent than 1961 in Tibet. Full details are given below. A less thorough survey was reported in 1969. Here again there was no evidence of recent transmission.

SPECIAL SURVEY ON TIBETAN REFUGEES

Age-distribution of people examined

1 yr	1-4 yrs	5-14 yrs	Over 14	Total
71	223	492	1 564	2 350

Age- and sex-distribution of individuals with pock marks

Age	15-24 yrs	25-34 yrs	35-44 yrs	45-54 yrs	55-64 yrs	Over 64	Total
M	1	6	4	7	1	4	23
F	1	7	7	2	2	1	20
Total	2	13	11	9	3	5	43

Place and year of infection with smallpox

Origin	Before 1901	1901 - 10	1911 - 20	1921 - 30	1931 - 40	1941 - 50	1951 - 60	1961 - 70	1971 to present	Total
Tibet	1	1	2	2	7	13	9	1	0	36
Nepal	0	0	0	0	1	0	2	3	0	6
Bhutan	0	0	0	0	0	0	0	1	0	1
Total	1	1	2	2	8	13	11	5	0	43

Surveillance during 1972-1975 - evaluation

The final judgement of the efficiency of a surveillance system rests on the proportion of existing outbreaks it discovers and the speed with which it discovers them. Fig. 47 shows the distribution of the duration of outbreaks from the onset of the first case to the date of discovery for the two-and-one-half years.

There is obviously a high degree of correlation between the length of time before an outbreak is discovered and the number of cases that occur in it ($r = 0.74$ for 1974). In the ideal situation all outbreaks would be discovered within one incubation period of the first case, thus making the prevention of further cases possible. However, two incubation periods can be considered very good within the constraints of Nepalese communications, and three incubation periods by no means unpraiseworthy.

In 1973, 1974 and 1975 the percentage and number of outbreaks detected within 28 days (two incubation periods) were 51.2% (22), 48.3% (87) and 72.7% (8) respectively. On the other hand, outbreaks more than eight weeks old (four incubation periods) accounted for 13.9% (6) of cases in 1973 and 16.7% (30) in 1974. These 36 outbreaks comprised 501 cases, a mean 13.9 per outbreak, 32% of the total cases in the two years. The speed of detection, taken quarter by quarter did not alter significantly throughout the three years.

The minimum level of surveillance efficiency in terms of speed of detection that is compatible with interruption of transmission is very difficult to assess. Outbreaks which led to secondary spread in Nepal were more remarkable for the excessive length of their containment period than for unduly long delays in their detection. The distribution of discovery delay times among those outbreaks known to have acted as sources for secondary or further spread in 1974 is not significantly different from the distribution for all the other outbreaks in the same year ($X^2 = 6.55$ 4df.). However, the comparative shift towards longer periods in the containment delay times of these outbreaks is more than can be attributed to chance ($X^2 = 26.78$ 3df.) $p < .001$). This would suggest, from the few outbreaks available for analysis, that the discovery delay is largely irrelevant within very wide limits provided that containment, once started, is rapidly effected. It also begs the question of whether containment, when it is carried out for any reason ineffectively, can act to spread smallpox in some more positive way than by merely allowing more time for transmission to occur. One can surmise that occupants of infected areas who resist vaccination may both delay the containment effort and, by moving to other areas to avoid vaccination, spread smallpox.

FIG. 47. DELAY IN DISCOVERY OF OUTBREAKS BY YEAR
1973, 1974, 1975

Outbreaks	Days (%)					Total %
	0-14	15-28	29-42	43-56	57 and over	
1973	18 (41.9)	4 (9.3)	4 (9.3)	11 (25.6)	6 (13.9)	43 (100)
1974						
First qtr	16 (23.5)	18 (26.5)	17 (25.0)	9 (13.2)	8 (11.8)	68 (100)
Second qtr	18 (21.4)	23 (27.4)	22 (26.2)	6 (7.1)	15 (17.9)	84 (100)
Third qtr	1 (5.9)	4 (22.5)	2 (11.8)	4 (23.5)	6 (35.3)	17 (100)
Fourth qtr	3 (27.3)	4 (36.3)	1 (9.1)	2 (18.2)	1 (9.1)	11 (100)
Total	38 (21.1)	49 (27.2)	42 (23.3)	21 (11.7)	30 (16.7)	180 (100)
1975	6 (54.5)	2 (18.2)	2 (18.2)	1 (9.1)	0	11 (100)

Too few of the districts had sufficient outbreaks to make a mean discovery delay time valuable, but the distribution of the very long outbreaks was as follows:

District	Outbreaks undetected for more than 56 days in 1974-1975	Total outbreaks in 1974-1975
Morang	13	53
Lalitpur	1	1
Kabrepalanchok	1	10
Mahotari	3	19
Saptari	1	9
Jhapa	2	16
Dhanusha	1	15
Dhading	2	4
Sarlahi	2	6
Rupandehi	2	5
Ramechhap	1	1
Rauthat	1	2

Analysis of that group of outbreaks having discovery delay times of less than 15 days shows no significant differences from the remaining outbreaks. They did not occur predominantly in any one district and no differences are apparent in the distribution of sources of information which led to their detection. Neither their sites of origin nor their containment delays are unusual. There appears to have been no common factor which predisposed to their early detection. A somewhat disappointing finding.

In the two years that have elapsed since the last case, the surveillance system has uncovered one "dead" outbreak of four cases that had escaped detection in Kailali district more than two years previously. No other information has ever suggested that all other outbreaks had not sooner or later been discovered. This being the case, the list of known outbreaks can be used for retrospective analysis of surveillance efficiency.

By accumulating the difference between the number of outbreaks starting and the number of outbreaks detected in each month (Fig. 48) and comparing each month's accumulated total of undetected outbreaks with the number of outbreaks that were actually detected during the month, an index of surveillance efficiency can be derived. Unlike the discovery delay, which measures efficiency over the period of delay for each outbreak, which is of course variable, this index establishes efficiency over a fixed period. Provided this period corresponds to the cycle of surveillance it can be useful. By this index it can be seen that efficiency for most months was in the region of 40%, rising to over 50% during May and June of 1974.

The accumulated total of undiscovered outbreaks rose to 41 during May 1974 but these were distributed over 27 districts and posed no threat to the non-endemic status in any one district.

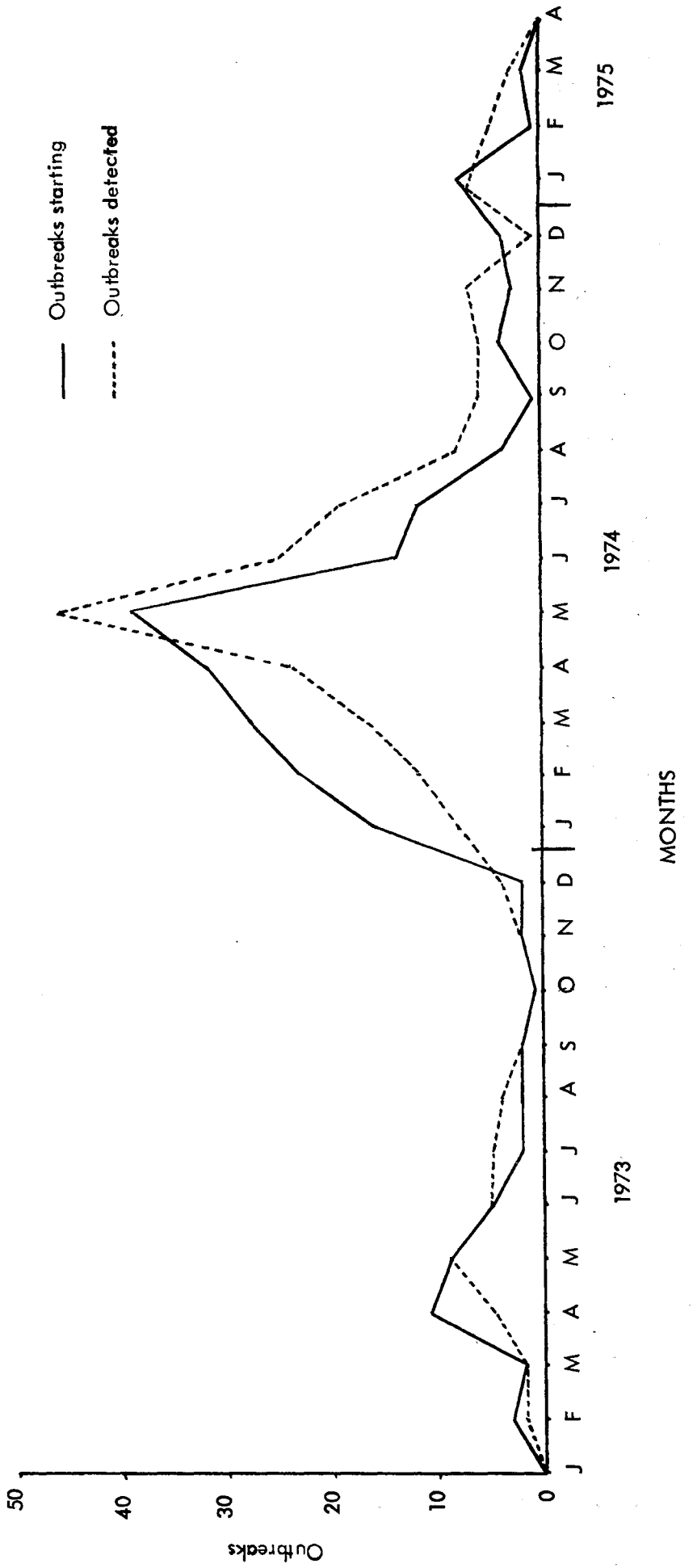
9. ASSESSMENT ACTIVITIES

Routine assessment of active surveillance activities since July 1975 has been carried out by the use of a subjective questionnaire administered by District Supervisors in their own districts and by the two national assessment teams (see "Assessment teams").

The proforma contains four questions:

1. Have you seen anybody recently inquiring about smallpox cases?
2. Has anybody shown you the smallpox recognition card recently?
3. Do you know about the reward offered for information about smallpox?
4. Do you know where to report any case of smallpox you hear about?

FIG. 48. OUTBREAKS BY MONTH OF ONSET AND MONTH OF DISCOVERY (1973-1975)



All of these questions are open to interpretation but, provided a liberal view is taken by the assessor, they can give reliable information on two factors:

(a) Whether surveillance workers have been working in the panchayat under assessment - questions 1 and 2.

(b) Whether the public awareness of the reward and appropriate action to be taken is at such a level that cases of smallpox would be brought to the attention of the authorities if they occurred - questions 3 and 4.

Questions 1 and 2 are more appropriate to those areas where smallpox eradication programme staff are operating, as these workers follow a routine aimed at providing the answers to these very questions. Malaria and integrated health service workers may be remembered as visitors, but not in connexion with smallpox, and they may well not use the identification card.

Questions 3 and 4 can be, and a small sample survey shows they frequently are, answered by reference to the thrice daily bulletin on Radio Nepal. Radios are a widespread luxury in Nepal.

The survey alluded to above clearly demonstrated that this assessment method, used within a short time of surveillance by reliable workers, could produce a good indication of surveillance efficiency. Full details are appended to this section.

The overall problem lies with the subjectivity of the test. The results of assessments by the national assessment teams vary very considerably from those produced in the same panchayats by district and assistant supervisors (see Fig. 49). These supervisors, assessing their own workers, invariably err on the side of generosity, while the national teams demonstrate perhaps an excessive zeal for accuracy on the part of the householders. The two sets of figures give a maximum and minimum for those districts which have been assessed by both groups. The truth probably lies closer to the lower than the upper figures, but the lowest assessments are still compatible with sufficient public awareness to make the undetected existence of cases of smallpox improbable. It seems likely, although there is no factual evidence to support it, that even if only 5% of the householders of a village know of the reward, an outbreak will not exist undetected for long.

Assessment of active surveillance by district personnel

The quality of surveillance in all non-integration districts is assessed routinely. District and assistant supervisors design for themselves programmes of supervision and assessment to cover all their panchayats over a period of months. In Category III districts a complete round of assessments may take a full year. In Category I and II districts it is generally completed within two or three months.

The district and assistant supervisors, acting individually, visit each panchayat and assess the surveillance that has been carried out there by using the questionnaire described on page 69. The questionnaire is administered to whichever adults happen to be available in at least 50 households in each panchayat. If there is a school the supervisor will pay a visit to it and inquire as to whether a surveillance worker has been there at the time scheduled on his surveillance programme. The reward slogans on the walls in the villages are examined.

The findings of the supervisors are summarized on form SEP 15 (Annex 6) and these are collated at SEP headquarters on a District Summary Form.

The results of the active surveillance assessments by District Personnel are summarized in Fig. 50.

The frequency of assessment is indicated in Fig. 51. Each monthly assessment covers only part of the total complement of panchayats in a district.

FIG. 49. DISTRICT AND NATIONAL ASSESSMENT RESULTS FOR COMPARISON

DISTRICT		SAMPLE	Q1 %	Q2 %	Q3 %	Q4 %
BARDIYA	DA	1397	86.0	79.0	79.0	74.0
	NA	689	14.8	19.4	14.4	12.5
BANKE	DA	1249	51.7	30.9	55.0	52.9
	NA	1157	11.2	16.1	15.9	15.8
KANCHANPUR	DA	2324	34.5	26.9	36.6	29.6
	NA	489	11.2	17.7	14.3	13.7
NAWALPARASI	DA	11640	60.7	61.6	54.4	47.1
	NA	1360	3.8	10.0	14.1	10.0
KAPILVASTU	DA	9187	45.0	47.5	50.6	47.3
	NA	1954	1.2	4.1	11.1	10.7
RUPANDEHI	DA	2659	27.4	25.1	25.8	22.1
	NA	1638	3.5	11.5	12.1	9.5
MAHOTARI	DA	2897	44.8	22.0	38.7	41.5
	NA	884	24.2	9.3	16.4	14.0
DHANUSHA	DA	2570	35.4	27.7	28.4	28.1
	NA	496	16.7	9.3	18.8	14.7
SARLAHI	DA	2450	44.4	40.3	45.8	42.9
	NA	1130	34.5	21.1	22.3	14.1
MORANG	DA	2266	55.4	53.2	51.1	49.9
	NA	1316	38.2	18.0	33.6	20.8
SUNSARI	DA	7112	41.8	30.3	34.9	31.3
	NA	1117	24.8	5.6	24.9	19.4
JHAPA	DA	4761	51.3	44.3	46.5	49.7
	NA	891	18.1	10.4	26.8	20.5
LALITPUR	DA	5903	74.4	62.6	63.3	60.0
	NA	758	33.5	13.8	51.5	35.3
KATHMANDU	DA	7271	85.9	75.2	72.3	76.1
	NA	1823	22.4	14.4	38.1	31.8
BHAKTAPUR	DA	2243	14.7	64.6	63.9	60.9
	NA	607	50.7	20.9	52.0	33.0

FIG. 50. MEAN SCORES ON ASSESSMENT BY DISTRICT (1975-76)

DISTRICT	Q1. %	Q2. %	Q3. %	Q4. %	SAMPLES
Nuwakot	50.6	49.0	39.9	30.6	9286
Dhading	3.5	2.9	2.7	1.4	368
Rasuwa	43.3	53.3	33.3	25.0	60
Lalitpur	74.4	62.6	63.3	60.0	5903
Kathmandu	85.9	75.2	72.3	76.1	7271
Sindhupalchok	35.2	31.6	32.4	33.6	4687
Bhaktapur	74.7	64.6	63.9	60.9	2243
Kabre	89.8	58.5	81.9	82.7	2528
Parbat	65.8	60.8	71.0	76.4	13757
Lamjung	61.8	49.6	61.1	29.9	2009
Gorkha	30.7	43.4	51.8	31.7	6058
Tanahu	79.1	81.6	71.9	70.5	973
Manang	-	-	-	-	-
Syangja	71.9	65.5	59.8	54.8	2343
Kaski	-	-	-	-	-
Teheratum	68.7	62.8	62.9	66.8	3163
Dhankuta	61.9	49.3	59.5	53.8	3089
Sankhuwas	71.6	60.4	64.1	56.3	3141
Morang	55.4	58.2	51.1	49.9	2266
Sunsari	41.8	30.3	34.9	31.3	7112
Makwanpur	39.9	34.8	36.2	31.1	589
Chitwan	81.5	40.5	75.0	72.4	1747
Parsa	-	-	-	-	-
Bara	-	-	-	-	-
Rauthat	-	-	-	-	-
Okhaldhunga	75.9	69.7	80.8	67.2	1434
Khotang	42.0	37.8	41.1	40.1	1546
Solukhumbu	77.6	76.0	66.6	64.1	1394

FIG. 50. MEAN SCORES ON ASSESSMENT BY DISTRICT (1975-76)
(continued)

District	Q1.%	Q2%	Q3.%	Q4.%	Samples
Bhojpur	72.8	66.2	71.0	66.2	6359
Siraha	60.6	47.7	53.5	40.1	810
Saptari	81.1	55.3	38.9	31.1	434
Udayapur	42.1	34.0	40.3	36.5	1399
Pyuthan	64.7	66.8	73.6	59.7	7439
Rukum	71.6	77.2	66.9	61.1	825
Rolpa	75.1	75.7	69.4	67.0	2077
Salyan	84.9	79.7	77.5	75.5	4924
Dang	81.3	82.9	75.3	70.6	4182
Jhapa	51.3	44.3	46.5	49.7	4761
Ilam	75.1	73.4	82.2	73.4	2302
Panchthar	77.5	75.7	73.3	70.2	3805
Taplejung	88.3	89.3	92.3	92.8	1907
Dolpa	56.7	81.7	59.3	44.1	1527
Myagdi	97.0	97.0	95.4	94.2	1866
Mustang	88.8	92.7	89.8	89.5	410
Baglung	82.0	83.3	65.4	81.6	6034
Nawalparasi	60.7	61.6	54.4	47.1	11640
Kapilvastu	45.0	47.5	50.6	47.3	9187
Rupandehi	27.4	25.1	25.8	22.1	2659
Palpa	52.9	47.6	45.9	37.4	2581
Gulmi	71.9	70.9	70.0	70.8	2006
Argakhanche	95.0	94.1	98.9	90.0	1618
Kailali	-	-	-	-	-
Achham	83.3	87.2	75.9	69.8	1526
Doti	48.7	47.8	50.2	42.6	4229
Bajura	-	-	-	-	-
Bhajang	-	-	-	-	-
Dolakha	39.6	20.5	31.6	32.2	2997
Mahotari	44.8	22.0	38.7	41.5	2897
Dhanusha	35.4	27.0	28.4	28.1	2570

FIG. 50. MEAN SOURCES ON ASSESSMENT BY DISTRICT (1975-76)
(continued)

District	Q1.%	Q2.%	Q3.%	Q4.%	Samples
Sarlahi	44.4	40.3	45.8	42.9	2450
Sindhuli	67.2	60.6	68.7	64.9	1459
Ramechhap	62.8	41.5	63.1	43.1	833
Jumla	69.2	72.9	65.5	64.3	3482
Tibrikot	73.9	76.6	68.9	64.9	919
Humla	67.0	88.0	68.0	64.0	100
Mugu	84.9	82.3	81.1	81.1	470
Kanchanpur	84.5	26.9	36.6	29.6	2324
Baitadi	80.9	73.5	40.5	39.6	1448
Darchula	93.9	72.8	16.8	41.5	850
Dandeldhura	59.5	45.6	65.8	49.4	2647
Bardiya	85.9	78.8	79.2	74.1	1397
Banke	51.7	30.9	55.0	52.9	1249
Dailekh	85.3	83.3	80.0	83.8	8060
Jajarkot	60.5	46.1	37.6	33.3	4680
Surkhet	65.0	41.6	63.4	54.8	640

FIG. 51. SURVEILLANCE ASSESSMENT REPORTS RECEIVED BY NEPALESE, MONTHS, 1975-76

		MONTHS											
ZONE	DISTRICT	1	2	3	4	5	6	7	8	9	10	11	12
DHAULAGIRI	DULPA	*	*	X	*	X	X	X	X	*	X	*	*
	MYAGDI	*	*	*	*	*	X	*	*	*	X	*	*
	MUSTANG	X	X	*	X	X	X	X	X	X	X	*	X
	BAGLUNG	*	*	*	*	*	X	*	*	*	*	*	*
MECHI	JHAPA	X	*	*	X	*	X	X	X	X	*	*	*
	ILAM	X	X	X	*	*	*	*	*	*	*	*	*
	PANCHTHAR	X	X	X	*	*	X	X	*	*	*	*	*
	TAPLEJUNG	X	X	X	X	*	*	*	*	*	X	X	*
RAPTI	PYUTHAN	*	*	*	*	*	*	*	*	*	*	*	X
	RUKUM	*	X	X	X	X	*	X	X	*	*	X	X
	ROLPA	*	*	*	X	*	X	*	*	*	X	X	*
	SALYAN	*	*	*	*	*	*	*	*	*	*	*	*
	DANG	X	*	*	*	*	*	*	*	*	*	*	*
SAGARMATHA	OKHALDUNGA	X	X	X	X	X	X	X	X	*	*	*	*
	KHOTANG	X	X	X	*	*	*	*	*	X	X	*	X
	SOLUKHUMBU	X	*	*	*	*	*	X	X	*	*	*	X
	BHOJPUR	*	*	*	*	*	*	*	*	*	*	*	*
	SIRAHA	X	*	*	*	*	*	*	*	X	X	*	X
	SAPTARI	X	X	X	*	*	*	X	X	X	X	*	*
	UDAYPUR	*	*	X	*	*	*	*	*	X	X	*	*
NARAYANI	MAKWANPUR	X	X	X	X	X	X	*	*	*	*	*	*
	CHITWAN	X	*	*	*	*	*	*		*	*	*	*
	PARSA	X	X	X	X	X	X	X	X	X	X	X	X
	BARA	X	X	X	X	X	X	X	X	X	X	X	X
	RAUTHAT	X	X	X	X	X	X	X	X	X	X	X	X
KOSI	TEHRATHUM	*	*	*	*	*	*	X	*	*	*	*	*
	DHANKUTA	*	*	*	*	*	X	X	*	*	*	*	*

FIG. 51. SURVEILLANCE ASSESSMENT REPORTS RECEIVED BY NEPALESE, MONTHS, 1975-76 (continued)

Zone	District	Months											
		1	2	3	4	5	6	7	8	9	10	11	12
	SANKHUWASABHA	*	*	*	*	*	X	*	*	*	*	X	*
	MORANG	X	*	*	*	X	X	X	X	X	X	*	*
	SUNSARI	*	*	*	*	*	*	*	*	*	*	X	*
GANDAKI	PARBAT	X	X	X	X	X	*	*	*	*	*	*	*
	LAMJUNG	X	X	X	X	X	X	X	X	*	*	*	*
	GORKHA	X	X	*	*	*	*	*	*	*	*	*	*
	TANAHU	X	*	X	*	*	*	*	*	*	*	*	*
	MANANG	X	X	X	X	X	X	X	X	X	X	X	X
	SYANGJA	X	X	X	*	*	*	*	*	*	*	*	*
	KASKI	X	X	X	X	X	X	X	X	X	X	X	X
BAGMATI	NUWAKOT	X	*	*	*	*	X	*	*	*	*	*	*
	DHADING	X	*	*	X	X	X	X	X	X	X	X	X
	RASUWA	X	X	X	*	X	X	X	X	X	X	X	X
	PATAN	*	*	*	*	*	X	*	*	*	*	*	*
	KATHMANDU	*	*	*	*	*	*	X	*	*	*	*	*
	SINDHUPALCHOK	*	*	*	*	*	*	*	*	*	*	*	*
	BHAKTAPUR	*	*	*	*	*	*	X	X	*	*	*	*
	KAVREPALANCHOK	*	*	*	*	*	*	X	*	*	*	*	*
JANAKPUR	DOLAKHA	*	*	*	*	*	*	*	*	*	*	*	*
	MAHOTARI	X	*	*	*	*	*	*	*	*	*	*	*
	DHANUSHA	*	*	*	*	*	*	*	*	*	*	*	*
	SARLAHI	X	*	*	*	X	X	X	X	*	*	*	X
	SINDHULI	X	X	X	*	*	*	*	*	*	*	*	*
	RAMECHHAP	X	X	X	X	X	X	*	*	X	*	X	*
SETI	KAILALI	X	X	X	X	X	X	X	X	X	X	X	X
	ACHHAM	*	X	*	X	X	*	*	*	*	X	*	X
	DOTI	*	*	X	*	*	*	*	*	*	*	*	*
	BAJURA	X	X	X	X	X	X	X	X	X	X	X	X
	BHAJANG	X	X	X	X	X	X	X	X	X	X	X	X
LUMBINI	NAWALPARASI	X	*	*	*	*	*	*	*	*	*	*	*
	KAPILVASTU	X	X	X	*	*	*	*	*	*	*	X	*
	RUPANDEHI	*	*	*	*	X	X	X	*	*	*	X	*

FIG. 51. SURVEILLANCE ASSESSMENT REPORTS RECEIVED BY NEPALESE, MONTHS, 1975-76 (continued)

Zone	District	Months											
		1	2	3	4	5	6	7	8	9	10	11	12
	PALPA	X	*	*	X	*		*	*	*	*	*	*
	GULMI	X		*	*	*	*	*	*	*	*	*	*
	ARGAKHANCHI	X	*	*	*	*	X	X	X	*	*	*	*
MAHAKALI	KANCHANPUR	X	X	X	*	*	X	X	X	*	*	*	*
	BAITADI	*	X	*	*	*	*	*	*	*	*	X	X
	DARCHULA	X	X	X	X	X	*	X	*	*	*	*	X
	DANDELDHURA	X	X	X	X	X	X	*	*	*	*	*	*
KARNALI	JUMLA	*	*	*	*	*	*	*	*	*	*	X	X
	TIBRIKOT	*	*	*	*	X	*	X	*	*	X	X	X
	HUMLA	X	X	*	X	X	X	X	X	X	X	X	X
	MUGU	X	X	X	X	X	X	X	*	X	X	*	X
BHERE	BARDIYA	X	X	X	X	*	X	X	*	X	X	*	*
	BANKE	X	*	*	X	*	X	*	*	X	*	X	*
	DAILEKH	X	X	*	*	*	*	*	*	*	*	*	*
	JAJARKOT	X	X	X	X	X	X	*	*	*	*	*	*
	SURKHET	X	X	X	X	X	X	X	*	*	X	X	*

* Received

X Not received

Assessment teams

Two assessment teams were formed in early 1976 with financial assistance from UNICEF. Their purpose is to formally assess the quality of surveillance at district level. Each team consists of one senior supervisor and one surveillance inspector who is the equivalent of a district or assistant supervisor. The teams are guided by the Chief of the Smallpox Eradication Programme and by the WHO Operations Officer.

The teams work with the surveillance team from district to district. The first day of their visit is taken up with planning the field programmes for themselves and for the surveillance teams in consultation with the district staff. Panchayats are selected for assessment according to their history of previous infection, their vulnerability to importation and their remoteness from the district headquarters. If large weekly markets - "Hat Bazaars" - are a feature of the district they are used for assessment purposes. A number of schools are also selected.

In each district the teams assess about half the panchayats. They go from house to house administering the questionnaire described under "Assessment Activities" to each household. The numbers recorded on the assessment forms are therefore of households, not of individuals, except when individuals have been questioned in markets.

In those villages that had been sites of infection the teams review the old outbreaks, using the investigation forms completed at the time. They try to identify all the recorded cases and search for any others that might have escaped detection. In this way two previously unrecorded cases were found in known outbreaks and one previously unknown outbreak of four cases was discovered. The last of the cases in this latter outbreak, which occurred in Kailali district, developed his rash in March 1974.

The results of the assessments carried out in comparison with those made within a reasonable period by district personnel are shown in Fig. 49 and discussed in the section on "Assessment Activities".

The second duty of the assessment teams is pockmark surveys. These are carried out by examining young children.

The official guideline "Duties of Assessment Teams" is to be found in Annex 7.

Evaluation of the assessment method

When it was found that widely different results had been obtained from assessments in some districts by the national assessment teams and by the district staff, a small study was planned to evaluate the method of asssessment.

Two panchayats in Kathmandu district were selected. Both had been assessed by both assessment team and district personnel in the previous three months and both were subject to regular surveillance at two-monthly intervals by district SEP staff. A reliable worker, from the surveillance team, was deputed to carry out thorough surveillance of 100 houses in each of the two panchayats, following exactly the procedures laid down in the operational guidelines. He made a special mark on each of the houses so visited.

One week later the panchayats were visited by the national assessment team leaders. They visited as many of the marked houses as they could find and matched these with unmarked houses chosen at random on the spot. They followed the assessment procedure described above. They also asked those with a knowledge of the reward how they had come by that knowledge.

The results are tabulated in Figs. 52 and 53.

Discussion

1. All questions were answered correctly by significantly more people in the marked houses than in the unmarked houses ($p = < .01$ in all cases). This suggests that the assessment results can be influenced by a previous surveillance effort.

2. Despite first class surveillance by the standard method two questions were correctly answered by less than 50% of people. Question 2 in Mahankal Badrakali and question 4 in Sinamangal, suggesting that relatively low figures may be compatible with a good search.

FIG. 52. RESULTS OF ASSESSMENT EVALUATION

	Total questioned	(%) knew of search (1)	(%) saw photo card (2)	(%) knew of reward (3)	(%) knew where to report (4)
Sinamangal					
Searched	86	73 (84.8)	64 (74.4)	68 (79)	40 (46.5)
Not searched	81	28 (34.5)	16 (19.7)	40 (49.3)	22 (27.1)
Mahankal Bhadrakali					
Searched	69	59 (85.5)	33 (47.8)	65 (94.2)	63 (91.3)
Not searched	128	66 (51.5)	29 (22.6)	87 (67.9)	83 (64.8)

FIG. 53. SOURCE OF INFORMATION ABOUT QUESTION 3

	Total	Information source		
		(%) radio	(%) SEP	(%) other
Sinamangal				
Searched	68	36 (53)	29 (43)	3 (4)
Not searched	40	26 (65)	7 (18)	7 (18)
Mahankal Bhadrakali				
Searched	65	21 (32)	42 (65)	2 (3)
Not searched	87	28 (32)	43 (49)	16 (18)

3. The variation between the panchayats in the numbers of occupants of "unmarked" houses correctly answering questions 1, 3, and 4 is more than can be attributed to chance. This suggests that even within densely populated districts with good communications widely differing results may be obtained between panchayats and raises the question as to how much more pronounced this might be in a district with less advantages.

4. The excess between the number of occupants of unmarked houses giving correct answers to questions 1, 3, and 4 in Mahankhal Bhadrakali in this assessment, and in that carried out by the assessment team on a previous occasion six weeks earlier, is greater than can be accounted for by chance ($p = < .001$ for all three questions), suggesting either that there has been a very significant increase in knowledge over the period, perhaps as an overlap effect from the surveillance carried out for the test, or that the necessarily small size of the samples of the population (50 houses) taken at each routine assessment prevents any degree of precision.

5. A considerable proportion (between 32 and 65%) of the population of these two panchayats claim radio broadcasts as the source of their knowledge of the reward and the appropriate action to be taken. In Sinamangal the numbers of those who received their information from the radio and from other sources declined insignificantly in order to allow a significant rise in those claiming to have heard it from SEP workers. This may suggest that good surveillance can produce a substantial impact at least in the short-term. In Mahankal Bhadrakali there was a significant fall in the small number of persons getting their information from "other sources" ($\chi^2 = 8.33$ 1 df $p < .01$) which is not matched by significant rises in questions relating to the other two sources.

Generally it can be said that the evidence points to this method of assessment being valid and useful provided a broad and liberal view be taken of both the answers to the questions and the overall results of the assessment.

10. LABORATORY INVESTIGATION

From mid-1972 onwards it became policy to send a scab specimen for examination from one case in each outbreak. When possible the scabs were taken from the index case but often it was more convenient to take specimens from other patients. The practice was not adhered to throughout, particularly in situations where the epidemiological and clinical evidence overwhelmingly supported a diagnosis of smallpox. A total of 106 specimens were sent between May 1972 and August 1976. The results are tabulated in Fig. 54.

The specimens were sent in special double containers, and were routed through SEARO and/or WHO headquarters, Geneva to the Center for Disease Control, Atlanta, United States of America or to the Research Institute of Virus Preparations, Moscow, USSR. Results were returned by telegram, usually within three weeks or less.

This delay ruled out the use of virological testing as a primary means of diagnosis. On the only occasion that a virological examination was really needed for a diagnosis to be made - a patient in Saptari district who was discovered shortly after the date of the last case in Morang district - the result was delayed for six weeks, by which time further specimens had had to be specially despatched to Geneva. In almost all other cases scabs were sent to confirm the diagnosis and only one specimen, from a case in Rupandehi district, was negative against expectations.

Probably as a result of the emphasis on training the diagnostic skill of the SEP has always been high. Disagreement between district and headquarters personnel was rare in the time that smallpox was extant, and on only 10 occasions since the last case has there been sufficient uncertainty in the minds of the staff to warrant the laboratory examination of scabs.

FIG. 54. RESULTS OF LABORATORY INVESTIGATION
(1972-1976)

Virological diagnosis	1972	1973	1974	1975		1976	Total
				First half	Second half		
Smallpox	3	29	36	4	0	0	72
Chickenpox	0	4	1	1	2	3	11
No virus	3	6	7	3	4	0	23
Total	6	39	44	8	6	3	106

FIG. 55. ANNUAL PERCENTAGE OF WEEKLY REPORTS RECEIVED WITHIN TWO WEEKS OF EXPECTED DATE

District	1973	1974	1975	1976	District	1973	1974	1975	1976
TAPLEJUNG	56	90	83		LAMJUNG	88	60	40	
PANCHTHAR	96	90	100		GORKHA	85	98	87	
ILAM	94	96	96		SYANJA	92	81	65	
JHAPA	92	81	98		TANAHU	85	98	90	
SANKHUWASABHA	98	92	98		GULMI	60	88	88	
TERATHUM	98	96	98		PALPA	27	69	73	
DHANKHUTA	98	98	98		ARGAKHANCHI	88	90	94	
SUNSARI	96	92	98		KAPILVASTU	81	71	40	
MORANG	98	86	92		RUPANDEHI	65	87	62	
SOLUKHUMBU	96	100	98		NAWALPARASI	98	92	87	
OKHALDUNGA	96	100	100		DOLPA	86	79	90	
KHOTANG	92	94	96		MUSTANG	96	81	100	
BHOJPUR	88	92	73		MYAGDI	96	87	100	
UDAYPUR	81	60	73		BAGLUNG	96	94	100	
SIRAHA	94	94	83		RUKUM	52	71	96	
SAPTARI	90	67	67		ROLPA	79	90	98	
DOLAKHA	62	92	96		SALYAN	87	94	96	
RAMECHHAP	63	86	94		PYUTHAN	77	87	96	
SINDHULI	96	88	94		DANG DEOKHURI	79	98	98	
SARLAHI	96	98	96		HUMLA	88	96	92	
MAHOTARI	98	85	98		MUGU	87	100	92	
DHANUSHA	98	94	94		JUMLA	88	98	92	
RASUWA	88	94	96		TIBRIKOT	87	100	92	
DHADING	88	92	98		DAILEKH	85	96	98	
NUWAKOT	88	92	96		SURKHET	87	98	96	
SINDHUPALCHOK	58	94	98		JAJARKOT	69	77	81	
KAVREPALANCHOK	98	86	90		BARDIA	75	90	98	
KATHMANDU	96	75	85		BANKE	94	90	100	
LALITPUR	94	75	81		BAJHANG	50	62	73	
BHAKTAPUR	98	60	90		BAJURA	69	85	48	
CHITWAN	48	98	98		DOTI	89	94	86	
MAKWANPUR	54	77	67		ACHHAM	86	75	67	
PARSA	87	85	92		KAILALI	94	96	94	
BARA	88	81	87		DARCHULA	50	87	81	
RAUTHAT	96	92	50		BAITADI	94	96	83	
MANANG	0	0	65		DANDELDHURA	87	88	90	
PARBAT	90	98	94		KANCHANPUR	94	92	94	
KASKI	88	94	50						

11. REPORTING

From late 1972 onwards all districts have despatched a weekly telegraphic report to SEP headquarters stating the number of cases, if any, that had occurred during that week and giving details of any outbreaks that had been detected during the week. If no cases or outbreaks had occurred or were pending, a nil report was despatched.

Fig. 55 shows the percentage of reports received on time from each district per year. Reports that were received more than two weeks late are not included in this percentage.

The percentage of districts despatching 90% or more of their reports on time during 1973, 1974 and 1975 were 43%, 57% and 64% respectively.

12. CROSS-NOTIFICATIONS

Whenever an outbreak was traced to a source outside Nepal notification of the district, block and other details of the putative source were sent to the Indian SEP personnel responsible for the area via WHO SEARO. Indian SEP workers similarly sent information on possible sources in Nepal to the Nepal SEP.

The outcome of these notifications and the investigations that followed them are shown in Figs. 56 and 57.

FIG. 56. RESULTS OF REQUESTS BY NEPAL SEP FOR INFORMATION ON PROBABLE SOURCES IN INDIA (1974-1975)

State	No. sent	No. confirmed	No. not confirmed	No reply
Bihar	90	50 (55%)	12 (13%)	28 (32%)
Uttar Pradesh	23	6 (26%)	3 (13%)	14 (61%)
Total	113	56 (50%)	15 (13%)	42 (37%)

FIG. 57. OUTCOME OF REQUESTS RECEIVED FROM INDIAN SEP FOR INFORMATION ON PROBABLE SOURCES IN NEPAL (1974-1975)

State	Received	Confirmed	Not confirmed
Bihar	15	7 (47%)	8 (53%)
Uttar Pradesh	4	1 (25%)	3 (75%)
West Bengal	4	2 (50%)	2 (50%)
Assam	1	0 (0%)	1 (100%)
Total	24	10 (42%)	14 (58%)

13. CONTAINMENT

The containment routine followed from 1972 up to the last five outbreaks of 1975 was as follows.

The SEP worker, usually a senior vaccinator, who first received the information about an outbreak would immediately proceed to the village and commence containment. He would ascertain the number of cases and attempt to vaccinate as many people in the village or surrounding community as possible, concentrating first on the occupants of the infected houses. Having vaccinated as many people as he could he would return to the district office and notify the district supervisor of the outbreak and his actions. Depending on the nature of the outbreaks, the distance from his office and the reliability of the vaccinator, the supervisor would decide whether or not to inform the SEP headquarters before he had visited the outbreak himself. Here, as elsewhere, the responsibility placed on the district staff is shown by the refusal to insist on his following a slavish routine without recourse to his own initiative.

The district supervisor, once he had reached the outbreak, would examine all surviving cases and attempt to elicit information on the source of infection and any possible forward spread to other villages or areas. In only about 25% of those outbreaks whose sources were finally elucidated were the district staff unable to obtain the relevant information.

The policy of vaccination in all outbreaks was to attempt to vaccinate or revaccinate all the inhabitants of the infected village. The vaccinators and supervisors moved from house to house examining all occupants for smallpox and vaccinating them. Home rosters were not compiled but inquiry was made at each house for any household member who was away and a note was made to return to that house at a later date.

When all vaccinations were complete an informal house-to-house search was made of the villages within the immediate neighbourhood. If no cases were found, and no other relevant information pointing to infection there was obtained, no further searches were carried out.

In some of the outbreaks in 1973 it was suggested that SEP workers should stay in the village until the risk of further infection was passed but the shortage of staff and of daily allowances made this impracticable. Thereafter, the orders were that all outbreaks should be visited daily until all vaccination was complete and the last case was past the worst infective period, and then for a further two weeks if there were no fresh cases. Weekly visits were then made for four weeks. In most cases the decision to consider an outbreak finished was made by the district staff.

All outbreaks were visited at the earliest opportunity by staff from SEP headquarters. They reviewed the information obtained on source and forward tracing, often obtaining much of the detailed data on the outbreak. They evaluated the containment already done, went from house to house to review vaccination status and made whatever changes were needed. The support of headquarters staff was particularly necessary in villages whose occupants were resisting vaccination for whatever reason.

The containment of the last five outbreaks in Morang in 1975 was managed differently. Whereas the approach to containment in all other outbreaks had been flexible and somewhat ad hoc, the situation in Morang demanded a more disciplined method. After the investigation of each outbreak, lists were prepared of all the houses in the village and a systematic vaccination programme was carried out. Following the Indian SEP containment method which was used for these few outbreaks, houseguards were appointed from among the villagers to prevent any unvaccinated persons entering an infected house or any infected person leaving it. These houseguards were supervised by the members of the two national assessment teams.

Formal house-to-house searches were carried out in all villages within a five mile radius of each infected village by SEP staff and temporary workers employed for the purpose. The last two outbreaks in Armadaha and Belahi villages were found in these searches.

There seems no doubt that this more formal containment method was highly effective in finally terminating the intra-caste spread that was occurring in the Armadaha area of Morang district. Whether it would have prevented spread in less fertile areas is open to conjecture.

Containment efficiency

Perfect containment of an outbreak will prevent any case occurring beyond those already suffering from smallpox at the time of the detection of the outbreak. In reality vaccination only protects contacts with any degree of certainty if it is administered within the first three days of the incubation period. Cases occurring up to 14 days from the date of discovery may thus reasonably be said to have been inevitable. Any case occurring beyond this time must have been infected after the start of containment and is therefore an indication of the efficiency of the containment effort.

"Containment Delay" is here taken to mean the time that elapses between the date of detection of the outbreak and the date of onset of rash of the last case.

Note that a delay of zero days may imply either that the containment had successfully prevented any further cases or that the outbreak had burnt itself out before it was detected, something that occurred seven times in 1974 but not at all in either 1973 or 1975.

The containment delays for 1973, 1974 and 1975 are shown in Fig. 58. The numbers indicated are too small for any assessment of significance in the differences among the numbers and distributions of delay periods for the four quarters of 1974. The percentages of outbreaks contained sufficiently effectively for no new cases to occur after 14 days in 1973, 1974 and 1975 were respectively 82.1, 78.2, and 93.75.

Outbreaks whose containment lasted beyond 42 days were confined to one each in Kapilvastu and Mahotari districts in 1973 and to Kailali (3), Jhapa (2), Dhanusha (2), Kathmandu (2) and Mahotari (1) in 1974. In almost all of these outbreaks containment was delayed by problems of resistance to vaccination by the population. The importance of these outbreaks lies in the frequency (60%) with which they acted as sources of infection in other villages (see page 68).

FIG. 58. CONTAINMENT DELAY BY YEAR

	Days				Total (%)
	0-14 (%)	15-28 (%)	29-42 (%)	43+ (%)	
1973	32 (82.1)	5 (12.8)	0 (0)	2 (5.1)	39 (100)
1974					
First qtr	24 (63.2)	4 (10.5)	4 (10.5)	6 (15.8)	38 (100)
Second qtr	75 (79.8)	9 (9.6)	6 (6.4)	4 (4.2)	94 (100)
Third qtr	30 (90.9)	3 (9.1)	0 (0)	0 (0)	33 (100)
Fourth qtr	11 (78.6)	2 (14.3)	1 (7.1)	0 (0)	14 (100)
Total	140 (78.2)	18 (10.1)	11 (6.1)	10 (5.6)	179 (100)
1975	15 (93.75)			1 (6.25)	16 (100)

14. VACCINE STORAGE

It has been recognized since the middle 1960s that good freeze-dried smallpox vaccine is relatively heat stable and that refrigeration is more desirable than necessary for short-term storage. For this reason a "cold chain" has never been developed in the SEP beyond the provision of refrigerators to all district offices.

Between 1962 and 1976, 78 refrigerators were supplied through WHO. Each district has a refrigerator powered either by kerosene or electricity, and there are three chest-type deep freezers in headquarters which hold the stock of vaccine for distribution. A technician is employed to repair faulty refrigerators.

15. TRAINING

A major reason for the success of the SEP has been the efficiency of the district personnel, and more particularly of the district supervisors. It was decided in 1971, when the change-over to surveillance-containment took place, that it would be necessary to place great reliance on the district supervisors. Many of these people were young, completely inexperienced in health matters and with little knowledge of smallpox.

All zonal and district supervisors attended a training course during 1971 in which they were taught the basic principles of smallpox epidemiology and diagnosis and the detailed management of surveillance and containment activities. The supervisors were charged with the responsibility of handing on training and motivation to their juniors in the districts.

Each year since then the supervisors have been called in for refresher training and review. The courses are run by national and WHO staff and last for three days, during which any new developments are explained to the participants and sessions on management, diagnosis, recording and all other aspects of their work are provided.

The success of this training is reflected in the considerable competence demonstrated by district personnel from late 1971 onwards in all matters relating to surveillance and containment. It is felt by all senior personnel that the decision to place the emphasis on training early in the surveillance-containment programme was the single most important reason for the final interruption of transmission.

16. HEALTH EDUCATION

From 1962 until 1973 a health educator was attached to the programme. It was realized at an early stage that if the public was to accept vaccination and cooperate in the detection of outbreaks it would need to be supplied with information and motivation.

When problems of refusal of vaccination were encountered during the pilot project a survey was carried out in the Kathmandu valley to determine the public's attitude to smallpox and vaccination. The findings, confirming the impressions gained by the field workers, were that most people would agree to vaccination in the winter but would be more reluctant at other times; that many felt that a single vaccination was enough to last for a lifetime, and that a high proportion saw the necessity for informing the health department or panchayat office of any cases that might occur (SEA/HE WS/RM21 1967).

The majority of propanganda has been aimed at reminding people of their duty to report cases. Since March 1975 this has been accompanied by the offer of a reward. Information bulletins containing messages relevant to these two facts are broadcast three times a day on Radio Nepal. The survey described under "Assessment" and others of the same type suggests that this is a powerful and effective medium for this message.

Lantern slides containing relevant educational material are used regularly in the few cinemas in Nepal.

Posters have been printed and distributed to all districts, and reward slogans are painted on houses in all the villages visited by SEP surveillance workers. The level of literacy in Nepal is no higher overall than 10%, probably lower in many rural areas, and this medium may therefore be of limited value.

Finally, the national assessment teams carry portable loudspeakers with them to the villages and these are used for propaganda purposes.

17. INPUTS

Nepal spends about 6% of its total budget on health. The SEP has been allocated between 1% and 3% of the health budget each year since its inception.

Fig. 59 shows the annual expenditure on smallpox by His Majesty's Government and WHO since 1962. The conversion into dollars has been estimated at Rs 10 to the dollar until 1975 and Rs 12.50 thereafter. The total government expenditure was supplemented by WHO from 1969 onwards.

Annex 2 shows the expenditure on smallpox in relation to that on other programmes.

In cash terms the per capita expenditure for smallpox eradication in Nepal for the period 1962-1976 has been in the region of $ 0.15 - surely among the cheapest effective public health programmes in the world.

From the start of the project, WHO has supplied staff members to work in the project with the national staff.

WHO also provided money for supplies and equipment. All vaccine needles, vehicles, bicycles, motorcycles and refigerators, as well as other, less substantial items were supplied by WHO.

Since 1967 WHO has offered a number of fellowships each year to SEP personnel who would benefit from further training or experience. The cost of these is listed in the column headed "Other" in Fig. 59.

Special funding was arranged by WHO between 1971 and 1977 for per diem payments to participants in the annual refresher training programmes for supervisors. A total of $ 70 000 was made available by the Organization for helicopter flying time for WHO personnel between 1973 and 1977 and extra money was found to meet running expenses of vehicles used by WHO staff.

Funds were also obtained from UNICEF in the early years of the programme. Detailed accounts are not available beyond a sole payment of $ 14 000 for 1976-1977 to subsidize the national assessment teams.

Other gifts were as follows:

1. 1970 - one jeep and a supply of vaccine from the Government of Japan.

2. 1973 - free freight of bifurcated needles from Shipping Corporation of India, Rotterdam - Calcutta.

3. 1973 onwards - free freight for vaccine Delhi - Kathmandu from Royal Nepal Airlines.

FIG. 59. FINANCIAL INPUTS, 1961-1976

Year	His Majesty's Goverment $	Subsidy $	Supplies/ Equipment $	Other $
1961-62	2 447	-	-	-
1962-63	3 598	-	-	-
1963-64	4 702	-	380	-
1964-65	5 334	-	220	-
1965-66	N.A.	-	100	-
1966-67	N.A.	-	51 200	2 400
1967-68	53 615	-	49 200	8 400
1968-69	64 334	33 000	65 700	7 900
1969-70	82 400	49 500	20 500	4 500
1970-71	121 071	49 500	26 600	1 600
1971-72	147 339	59 500	27 100	4 500
1972-73	165 000	59 500	25 500	5 700
1973-74	163 500	61 000	25 500	7 200
1974-75	158 262	51 000	25 000	4 400
1975-76	169 343	51 000	25 000	N.A.

Project chiefs and WHO personnel

National project chiefs

1962-65	Dr T. L. Shrestha
1965-66	Dr R. B. Adiga
1966-67	Mr H. Gurubacharya
1967	Dr R. N. Sinha
1967-69	Dr A. Prajpati
1969-77	Dr P. N. Shrestha

Other medical officers who were temporarily in charge of the project in the absence of Dr P. N. Shrestha were:

Dr B. B. Karki
Dr R. Thapa

WHO staff members

1962-63	Mr L. Ramos	WHO Male Nurse
1964-65	Mr T. O. Crisp	Sanitarian
1966-67	Dr Satnam Singh	Medical Officer
1968-70	Dr R. Wasito	Medical Officer
1970-74	Mr R. Mason	Operations Officer
1970-76	Dr M. Sathianathan	Medical Officer
1972-77	Mr J. Friedman	Operations Officer
1974-75) 1976)	Mr D. Bassett	Operations Officer

18. SCAR SURVEYS

As part of their programme of routine field work district and assistant supervisors carry out regular scar surveys in the panchayats in which they are carrying out assessment of active surveillance. The purpose is to assess the size of the unprotected population. People are examined in their homes and in the markets. The percentage of the population reported as being unprotected is shown by district and year in Fig. 60. These figures suffer from the weaknesses that selection is not random, that not all panchayats are covered and that a certain amount of optimism may be expressed.

FIG. 60. SCAR SURVEYS - POPULATION SAMPLES BY YEAR AND BY DISTRICT WITH % UNPROTECTED

DISTRICT	TOTAL POP.	1971		1972		1973		1974		1975		1976	
		No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.
Taplejung	84715	-	-	-	-	-	-	-	-	7846	1.3		
Pancthar	145809	-	-	6000	0.3	28000	2.7	4901	2.4	14781	1.7		
Ilam	139538	16800	1.0	12986	0.3	5105	0.3	15270	0.4	8252	0.3		
Jhapa	247698	15600	6.0	17197	3.1	9208	3.9	800	1.1	6800	0.9		
Sankhuwasabha	114313	7200	10.0	9965	0.2	1836	1.1	12340	1.4	13120	0.9		
Terhathum	119307	-	-	4046	1.1	7155	1.9	70388	0.6	14695	1.1		
Dhankuta	107649	1600	4.0	6000	0.3	8769	0.7	10139	0.6	15063	1.0		
Sunsari	223434	25600	5.0	10000	0.3	22832	0.1	10663	0.3	-	-		
Morang	301557	29200	5.0	13075	0.8	9988	1.2	10775	0.1	12192	0.5		
Solukhumbu	105324	-	-	-	-	1149	5.2	609	2.4	12032	2.8		
Okhaldhunga	122682	7200	3.0	11378	1.4	13343	2.3	6546	2.6	15365	1.5		
Khotang	163297	-	-	11964	1.8	20064	0.7	7734	0.8	9640	1.5		
Bhojpur	194506	800	10.0	17573	0.5	22921	0.1	15683	0.7	4395	0.2		
Udaypur	112622	8000	3.0	8486	1.1	7757	0.5	5200	0.2	12715	5.1		

FIG. 60. SCAR SURVEYS - POPULATION SAMPLES BY YEAR AND BY DISTRICT WITH % UNPROTECTED (continued)

District	Total population	1971		1972		1973		1974		1975		1976	
		No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.
Baglung	172729	-	-	-	-	6411	0	6342	0.3	4953	0.6		
Rukum	96243	-	-	-	-	-	-	-	-	2400	0.08		
Rolpa	162955	-	-	-	-	987	2.2	4065	2.5	8304	0.9		
Sallyan	141457	2000	6.0	1984	1.7	4000	1.7	14329	1.1	5783	1.2		
Piuthan	137338	-	-	897	2.3	10276	0.9	6779	0.6	5014	1.1		
Dang	167820	7200	7.0	6856	2.7	9041	0.3	6753	1.8	6777	2.5		
Humla	29524	-	-	-	-	975	0	315	6.3	1282	0.2		
Mugu	25718	-	-	-	-	800	0	464	0	141	0.7		
Jumla	122753	-	-	-	-	2772	0	5121	1.1	4346	1.0		
Tibrikot	10017	-	-	-	-	668	0.7	967	0	1218	1.8		
Dailekh	156072	-	-	12755	1.4	23805	1.6	4800	2.0	14102	1.8		
Surkhet	104933	1200	12.0	6998	3.3	4577	1.5	4782	1.1	6260	3.6		
Jajarkot	86564	1200	5.0	-	-	4886	2.5	2342	1.7	4907	1.0		
Bardiya	101793	8400	15.0	4213	2.5	11375	1.6	5072	0.4	-	-		
Banke	125709	45000	14.0	-	-	19143	14.4	231	16.1	417	11.9		
Bahjang	108623	-	-	-	-	1990	0.2	135	0	2005	1.8		

FIG. 60. SCAR SURVEYS - POPULATION SAMPLES BY YEAR AND BY DISTRICT WITH % UNPROTECTED (continued)

District	Total population	1971		1972		1973		1974		1975		1976	
		No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.
Bajura	61342	-	-	-	-	-	-	-	-	-	-		
Doti	166070	-	-	5600	0.8	8800	0.8	7753	2.5	2400	7.7		
Acham	132212	-	-	-	-	247	4.8	96	14.5	4386	0.1		
Siraha	302304	-	-	-	-	3492	1.2	5992	1.3	16832	0.9		
Saptari	312565	28400	4.0	9721	3.8	31082	2.6	3200	1.5	-	-		
Dolkha	130022	-	-	8095	3.2	-	-	3404	7.1	3537	3.6		
Ramechap	197349	5600	6.0	4229	0.6	5700	2.8	2954	3.7	4194	11.5		
Sindhuli	147409	6800	17.0	799	3.2	7601	2.7	5773	3.0	2633	4.4		
Mahotari	324831	4000	1.1	4076	5.4	13469	3.0	1529	0.4	11131	1.6		
Sarlahi	175543	8000	12.0	11659	5.2	9813	8.3	15543	9.9	6751	9.9		
Dhanusa	330601	32000	15.0	23428	4.0	30400	4.3	5623	4.3	9206	4.8		
Rasuwa	17517	-	-	-	-	1214	0.9	-	-	-	-		
Dhading	236272	16000	7.0	-	-	-	-	1636	4.5	2369	2.8		
Nuwakot	172718	8400	14.0	4000	1.3	4911	3.1	4822	3.7	3946	3.3		
Sindhupalchok	245165	5200	8.0	-	-	8795	4.4	12242	4.5	12659	4.0		
Kabrepalanchok	206384	16000	2.0	8549	3.2	9991	1.9	9811	2.4	3538	3.2		
Kathmandu	353756	47200	3.0	18877	4.0	24943	2.6	12885	3.5	39693	4.4		

FIG. 60. SCAR SURVEYS - POPULATION SAMPLES BY YEAR AND BY DISTRICT WITH % UNPROTECTED (continued)

District	Total population	1971		1972		1973		1974		1975		1976	
		No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.
Lalitpur	154998	11600	4.0	1684	6.5	15610	4.2	7999	2.6	36090	4.0		
Bhaktapur	110157	17600	3.0	3200	7.9	10994	8.4	12242	3.3	3470	9.0		
Chitwan	183644	16800	6.0	4964	1.4	6827	6.0	6524	5.9	5149	3.0		
Makwanpur	162766	14800	5.0	7600	0.7	2466	2.6	1342	6.8	1726	7.4		
Parsa	202123	23600	12.0	26026	4.3	28255	2.5	12483	5.9	790	11.1		
Bara	233401	12000	5.0	2800	1.2	1579	0.6	890	19.1	466	8.3		
Rautahat	320093	20800	7.0	18000	1.4	21575	2.5	13710	2.0	8489	1.7		
Manang	7436	-	-	-	-	-	-	-	-	-	-		
Parbat	118689	-	-	10650	0.8	13111	8.3	19592	0.6	14798	1.0		
Kaski	151749	14000	3.0	3602	1.3	7307	1.2	18592	0.7	-	-		
Lamjung	140226	4000	2.0	24010	4.2	6148	2.3	13594	1.5	5825	1.9		
Gorkha	178265	19600	1.0	5525	0.7	12496	1.8	8225	1.4	4426	1.9		
Syanja	268606	9600	1.0	393	0.7	664	1.5	5413	1.8	4539	1.4		
Tanahu	158139	10800	5.0	5840	0.5	12081	2.8	12275	1.4	11285	1.3		
Gulmi	227746	12800	11.0	35156	1.3	-	-	5715	4.4	8415	2.2		
Palpa	212633	6000	5.0	4424	2.3	1504	0	1200	0.5	4200	0.9		

FIG. 60. SCAR SURVEYS - POPULATION SAMPLES BY YEAR AND BY DISTRICT WITH % UNPROTECTED (continued)

District	Total population	1971		1972		1973		1974		1975		1976	
		No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot.	No. Examd.	% Unprot	No. Examd.	% Unprot.
Argakhanchi	130202	3600	2.0	6364	2.0	8529	1.9	1230	2.8	6446	3.9		
Kapilvastu	205216	18800	19.0	22032	5.1	32199	5.5	5739	7.3	15709	7.7		
Rupandehi	243346	6800	12.0	30283	5.6	1059	2.8	9160	3.1	15475	7.0		
Nawalparasi	146548	20800	16.0	21682	5.6	21386	8.1	17867	6.8	5896	13.9		
Dolpa	19110	-	-	-	-	1293	0.3	1162	7.0	399	3.2		
Mustang	26944	-	-	-	-	-	-	1905	0.5	-	-		
Myagdi	57946	-	-	-	-	-	-	4112	0.7	2305	0.8		
Kailali	128887	-	-	8952	2.8	7209	1.1	5830	2.2	1937	0.8		
Darchula	68868	-	-	-	-	626	7.6	841	1.0	1264	1.4		
Baitadi	128696	-	-	-	-	3081	5.0	2616	2.7	3439	1.3		
Dandelphura	94743	-	-	6218	4.8	14239	7.3	1042	21.2	3635	2.1		
Kanchanpur	68863	-	-	1799	1.2	4206	2.3	4965	2.5	1593	1.0		
TOTAL		608600	8.28%	512610	2.8%	654735	3.1%	439784	2.6%	503742	2.8%		

ANNEX 1

WHO DOCUMENTS CONCERNING THE NEPAL SMALLPOX ERADICATION PROGRAMME

Field Visit Report on Smallpox Control Pilot Project, Nepal. WHO Project: Nepal 9. Dr A. Zahra	SEA/Smallpox/4	1962
Field Visit Report on Smallpox Control Pilot Project, Nepal. WHO Project: Nepal 9.	SEA/Smallpox/5	1963
Field Visit Report on Smallpox Control Pilot Project, Nepal. WHO Project: Nepal 9. V. E. Vichniakov	SEA/Smallpox/8	1965
Study of the Admission of Cases of Infectious Diseases to the Infectious Diseases Hospital in Kathmandu, Nepal. V. E. Vichniakov	SEA/CD/13	1965
Assignment Report on Smallpox Eradication Programme in Nepal. WHO Project: SEARO 136. K. M. Lal	SEA/Smallpox/13	1967
Report on a Visit to Nepal. B. Ignjatovic	SEA/CD/14	1968
Report on a Visit to the Programme for Smallpox Eradication and Control of other Communicable Diseases, Nepal. WHO Project: Nepal 0009.	SEA/Smallpox/23 Rev.1	1968
Report on an Assessment of the Smallpox Eradication Programme, Nepal. WHO Project: Nepal 0009. A joint Government of Nepal/WHO Assessment Team.	SEA/Smallpox/36	1970
Report on a Visit to Nepal. A. J. Oles	SEA/Smallpox/37	1970
Report on the Training Course for Smallpox Outbreak Containment Teams, Kathmandu, 31st May to 5th June 1970. A. J. Oles	SEA/Smallpox/45	1970
Report on a Visit to Smallpox Eradication Programme in Nepal. WHO Project: Nepal 0009. A. J. Oles	SEA/Smallpox/47	1971
Assignment Report on Smallpox Eradication and Control of other Communicable Diseases, Nepal. WHO Project: Nepal 0009. R. Wasito	SEA/Smallpox/50	1972
Assignment Report on Smallpox Eradication Programme, Nepal. M. Sathianathan		1976

Annex 1

A Study of the Knowledge, Beliefs and Attitude of the People Relating to Specific Problems Encountered in the Smallpox Eradication Programme in Nepal.		
WHO	SEA/HE WS/RM 21	1967
Assignment Report on Smallpox Eradication and Control of other Communicable Diseases.		
Satnam Singh & N. K. Shah	SEA/CD/20	1968

ANNEX 2

GENERAL DATA RELEVANT TO HEALTH SERVICES IN NEPAL

1976

A. General

1.	Area	54 517 square miles 140 797 km^2
2.	Administrative regions	4
3.	Zones	14
4.	Districts	75
5.	Villages	28 780
6.	Population (projection 1975-76)	12 587 000
	% rural	96
	% under 15 years	40.4
7.	Annual rate of population growth	2.52% (1974-75)
8.	Crude birth rate/1000	44.7 (1974-75)
9.	Crude death rate/1000	19.5 (1974-75)
10.	Infant mortality rate/1000	132.5 (1974-75)
	Males	141.2 (1974-75)
	Females	123.0 (1974-75)
11.	Expectation of life at birth (years)	
	Male	46.0 (1974-75)
	Female	42.5 (1974-75)
12.	Per capita income (approx.)	$ 90-100/annum

B. Health budget and health programmes

1.	National budget for 1976-77	
	Regular	Rs 823 437 000
	Development	Rs 1 783 183 000
	Total	Rs 2 606 620 000
2.	Health budget for 1976-77	
	Regular	Rs 36 172 000
	Development	Rs 126 312 000
	Total	Rs 162 484 000
3.	Percentage of national budget allocated to health	6.23%

Annex 2

4.	Per capita health expenditure (1975-76 projected pop.)	Rs 12.90
5.	Distribution of health budget among health programmes	
	Malaria Eradication Project	Rs 57 669 000 (35.5%)
	Family Planning/MCH	23 428 000 (14.4%)
	Smallpox Eradication	3 710 000 (2.3%)
	Tuberculosis Control	818 000 (0.5%)
	Leprosy Control	2 231 000 (1.4%)
	Curative and other health services	74 628 000 (45.9%)

C. Health manpower

1.	Doctors	338
	Doctor/population ratio	1:37 240
2.	Dentists	8
3.	Nurses (all grades)	335
	Nurse/population ratio	1:37 573
4.	Assistant nurse-midwives (ANM)	515
	Nurse + ANM/population ratio	1:14 808
5.	Health assistants	159
6.	Senior auxiliary health workers	365
7.	Auxiliary health workers	605
8.	Health laboratory technicians and assistants	30
9.	Radiographers and dark room assistants	27
10.	Health educators	13
11.	Sanitarians	8
12.	Kavirajs (senior ayurvedic practitioners)	96
13.	Vaidyas (junior ayurvedic practitioners)	85

D. Training facilities (Institute of Medicine)

1.	Health assistants	1
2.	Health laboratory technicians	1
3.	Radiography technicians	1
4.	Pharmacy technicians	1
5.	Senior auxiliary health workers	1

Annex 2

6.	Nurses	2
7.	Assistant nurse-widwives	5
8.	Ayurvedic physicians	1
9.	General medical auxiliaries	1
10.	Auxiliary health workers	1

E. Health facilities

Hospitals		
	Department of Health Services	47
	Other	14
Beds		
	Department of Health Services	1465
	Other	773
Health centres		31
Health posts		
	Fully integrated	65
	E stage	50
	Non-integrated	288
Ayurvedic dispensaries		82
Unani dispensary		1
Central chest clinic		1
Central leprosy clinic		1
Homeopathic hospital		1
District health offices		
	Integrated	6
	Non-integrated	5
	Primary	37

ANNEX 3

DUTIES OF SURVEILLANCE TEAM

The main function of the surveillance team is to supplement the regular surveillance system of the districts, particularly the Terai districts. The team will work under the close supervision and guidance of the assessment team. Each surveillance team will consist of one assistant surveillance inspector and two to three surveillance aides.

1. The team must get acquainted with the smallpox situation of the district.

2. The team must get acquainted with the geography of the district (maps must be studied).

3. The advance tour programme of the surveillance team will be prepared by the assessment teams, paying more attention to high risk areas, like previously affected areas, and areas unlikely to be visited by the district staff.

4. The team will visit:

   (a) panchayats - ward to ward in and around the ward members' houses;

   (b) schools in the panchayats they are visiting;

   (c) tea shops, factories, brick kilns, etc., in the panchayats they are visiting;

   (d) important weekly markets;

   (e) malaria offices and health posts;

   (f) fairs, if any.

5. While doing surveillance, the team members will:

   (a) show recognition cards;

   (b) inquire about smallpox;

   (c) publicize about Rs 1000 reward
   (i) verbally
   (ii) posters
   (iii) slogans on walls;

   (d) inform where to report;

   (e) collect details of suspect cases.

6. If a team member comes to know of a suspect case in the area where he is working, he must investigate the case himself.

7. If a team member is sure that the case is smallpox or is doubtful, he must interrupt his programme and must immediately report to the district office and/or the assessment team.

8. Documentation: Each team member will record his activities as follows:

   (a) SEP 14 - daily, while doing surveillance anywhere;

   (b) market surveillance form - while doing market surveillance;

   (c) list of suspect cases form - for listing the details of all suspect cases.

Annex 3

9. Each member of the team must have with him the following:

(a) advance tour programme;

(b) SEP 14;

(c) market surveillance form;

(d) list of suspect cases form;

(e) recognition card;

(f) posters.

ANNEX 4

DUTIES OF ASSESSMENT TEAMS

The main functions of the assessment team are to assess the performance of and guide the district staff and to supervise and guide the surveillance teams. Each team will consist of one medical officer (whenever available), one senior supervisor, one surveillance inspector and one driver.

1. The team must get fully acquainted with the smallpox situation of the district, particularly the problem areas like the previously affected areas and areas unlikely to be visited by the district staff.

2. The team must get fully acquainted with the geography and general aspects of the district:

   (a) location and days of weekly markets;

   (b) schools and their location;

   (c) hospital, health centre, health post and NMEO district and unit offices;

   (d) fairs, festivals, brick kilns, bus stops, etc.

3. The team will closely supervise and guide the surveillance team and will prepare the latter's advance tour programme paying more attention to problem areas.

4. The team will assess the surveillance being done by the district by visiting:

   (a) house to house in panchayats;

   (b) weekly markets.

5. The team will carry out the pockmark survey of:

   (a) children under five years of age;

   (b) all persons in special surveys like Tibetan refugee camps.

6. The team will compare the result of the pockmark survey with the report on the known outbreak.

7. The team will investigate:

   (a) suspect cases referred by district staff;

   (b) certain portion of suspect cases verified by district staff;

   (c) certain portion of suspect cases verified by surveillance team;

   (d) suspect cases collected by the assessment team itself.

8. The team will collect specimens from:

   (a) definite case of smallpox;

   (b) suspect cases about which the district supervisor was in doubt;

   (c) cases about which the team itself is in doubt;

   (d) case of chickenpox who was a close contact of chickenpox death.

9. The team will carry out a special survey of chickenpox death.

Annex 4

10. Whenever possible, the team will also collect information about suspect cases. These cases will be entered in the suspect case register of the team as well as of the district.

11. Wherever possible, the team will publicize Rs 1000 reward through posters, megamikes and other means.

12. The team will also assess all activities of the district including administration, accounts, stores, etc.

13. The team will acquaint the district with the result of the assessment and will give necessary guidance in all aspects including surveillance and documentation.

14. The team will discuss with NMEO regional/district/unit staff about the surveillance and the result of assessment.

15. The team will make a brief report for each trip.

16. Documentation

(a) Advance tour programme form.

(b) SEP 9 (modified) for pockmark survey.

(c) Details of pockmarks found form for listing the people with pockmarks.

(d) Suspect case register - for cases collected and/or investigated by the team.

(e) SEP 15 (modified) - for assessment of surveillance in household and market.

17. The team will carry with it the following:

SEP (modified)	Map of the district
SEP 14	Recognition card
SEP 15 (modified)	Plasticized photo
Suspect case register	Posters
Market surveillance form	Specimen containers
Advance tour programme form	Sterilized needles
Details of pockmarks found form	Megamike
Set of all district forms	Operational guide
Forms for NMEO	Documents from headquarters to district.

ANNEX 5

LINE LISTS FOR ALL OUTBREAKS OCCURRING DURING 1973, 1974 AND 1975

Line list - Outbreaks reported in 1973

No.	District	Date of onset of 1st case	Date reported to district	Reported by	Date of Kathmandu Report	Date of Investigation	Date of onset of last case	Total cases	Sources
1	Doti	10 Feb. 1973	24 Feb. 1973	Doctor	27 Feb. 1973	22 Mar. 1973	4 Mar. 1973	9	Bareilly U.P.
2	Banke	12 Feb.	14 Feb.	Doctor	15 Feb.	1 Mar.	12 Feb.	1	Saran Bihar
3	Rolpa	14 Feb.	26 Mar.	Vaccinator	4 April	5 May	23 Mar.	7	Kanpur U.P.
4	Bardiya	9 Mar.	12 Mar.	Hospital	14 Mar.	18 Mar.	9 Mar.	1	Bahraich U.P.
5	Banke	21 Mar.	18 May	Vaccinator	21 May	13 June	15 May	15	Bahraich U.P.
6	Banke	5 April	21 May	Vaccinator	24 May	13 June	19 April	2	Outbreak 5
7	Dang	7 April	14 May	Villager	16 May	28 May	10 May	4	U.P.
8	Banke	7 April	29 May	Vaccinator	2 June	14 June	6 June	23	Outbreak 5
9	Morang	11 April	14 April	Hospital	18 April	23 April	11 April	1	Ballia U.P.
10	Banke	11 April	17 April	Vaccinator	19 April	25 April	11 April	1	Bahraich U.P.
11	Kailali	12 April	12 April	Hospital	20 April	29 April	12 April	1	Saharanpur U.P.
12	Banke	14 April	22 April	F.P. Aide	25 April	25 April	14 April	1	Gonda U.P.
13	Kailali	15 April	20 April	Road Official	22 April	29 April	15 April	1	Ballia U.P.
14	Mugu	15 April	7 May	Villager	14 May	28 May	14 May	1	Nainital U.P.
15	Dandeldhura	16 April	8 May	S.E.P.	20 May	5 June	17 May	10	Nainital U.P.
16	Mugu	26 April	7 May	Villager	14 May	28 May	12 May	2	Nainital U.P.
17	Banke	1 May	7 May	S.E.P.	11 May	12 June	1 May	1	Outbreak 5
18	Banke	1 May	3 June	Vaccinator		12 June	8 June	5	Outbreak 5
19	Kailali	4 May	6 May	S.E.P.	11 May	3 June	2 June	5	Outbreak 11 (Confirmed)
20	Kanchanpur	4 May	10 May	Villager	20 May	3 June	4 May	1	Outbreak 11 (Outbreak)
21	Kapilvastu	7 May	15 Aug.	Villager	24 Aug.	2 Sept.	27 Oct.	30	Gonda U.P.
22	Rupandehi	8 May	3 July	Vaccinator	12 July	17 July	18 July	27	Basti
23	Parsa	12 May	3 June	Vaccinator	4 June	10 June	12 May	1	Champaran Bihar
24	Jhapa	23 May	23 July	Malaria	30 July	6 Aug.	15 June	6	Dumka Bihar
25	Kanchanpur	26 May	28 May	Hospital	30 May	2 Aug.	26 May	1	Bareilly U.P.
26	Rupandehi	7 June	20 July	S.E.P.	23 July	21 July	22 June	2	Bombay
27	Dandeldhura	15 June	13 July	Health Post	25 July	1 Aug.	25 July	21	Almora U.P.
28	Dandeldhura	15 June	7 Aug.	Vaccinator	15 Aug.	7 Aug.	20 July	5	Almora U.P.
29	Banke	23 June	17 Aug.	Villager	26 Aug.	21 Sept.	10 Sept.	5	Outbreak 8
30	Parsa	25 June	26 June	Hospital	1 July	3 July	25 June	1	Samastipur Bihar
31	Rupandehi	16 July	29 Aug.	Villager	4 Sept.	14 Sept.	13 Sept.	38	Azamgarh U.P.
32	Dhanusa	20 July	1 Aug.	Villager	3 Aug.	13 Aug.	10 Aug.	3	Bihar
33	Jhapa	7 Aug.	13 Sept.	S.E.P.	19 Sept.	25 Sept.	19 Sept.	11	Mongayr Bihar
34	Jhapa	28 Aug.	22 Oct.	Local official	3 Nov.	9 Nov.	4 Nov.	10	Outbreak 32
35	Kailali	6 Sept.	9 Sept.	Villager	12 Sept.	20 Sept.	6 Sept.	1	Kheri U.P.
36	Sapitari	29 Sept.	22 Nov.	S.E.P.	24 Nov.	27 Nov.	28 Nov.	4	Dumka
37	Parsa	30 Oct.	8 Nov.	Family	11 Nov.	12 Nov.	25 Nov.	4	Dharbanga
38	Mahotari	13 Nov.	27 Dec.	S.E.P.	1 Jan. 1974	4 Jan. 1974	22 Mar. 1974	25	Sitamarhi Bihar
39	Kapilvastu	18 Dec.	31 Dec.	S.E.P.	8 Jan.	14 Jan.	6 Jan.	4	Gorarhpur

Annex 5

SMALLPOX OUTBREAKS NEPAL 1974

S.NO.	District	Panchayat	Date of First Case	Date of Report to Dist S.E.P affi	Who Reported	Date Report Received in Kathmandu	Date Investigated by H.Q	Date of Last Cases	Total Cases	Source of Infections
1	Mahottari	Parsa Dewarjabdi	13 Nov 1973	27 Dec 1974	Temporari - Vacci	1 Jan 1974	4 Jan 1974	22 Mar 1974	25	Sitamarhi, Bihar
2	Kapilvastu	Banaspur	18 Dec 1973	31 Dec 1973	S.E.P Staff	8 Jan 1974	14 Jan 1974	6 Jan 1974	4	Gorakhpur, U.P
3	Morang	Motipur	2 Jan 1974	5 Jan 1974	Medical Officer	6 Jan 1974	9 Jan 1974	2 Jan 1974	1	Purnia, Bihar
4	Kanchanpur	Mahendra Nagar	4 Jan 1974	7 Jan 1974	Businessman	11 Jan 1974	14 Jan 1974	4 Jan 1974	1	U.P Or Bihar
5	" "	" "	3 Jan 1974	7 Jan 1974	" "	" "	" "	3 Jan 1974	1	" "
6	" "	" "	" "	" "	" "	" "	" "	" "	1	" "
7	Kathmandu	Kathmandu	9 Jan 1974	13 Jan 1974	Hospital	13 Jan 1974	13 Jan 1974	1 Feb 1974	2	" "
8	Kabhre Palanchok	Nalaugrachandi	16 Jan 1974	21 Jan 1974	S.E.P Staff	22 Jan 1974	23 Jan 1974	16 Jan 1974	1	" "
9	Kailali	Nimdi	26 Jan 1974	29 Jan 1974	Temporari - Vacci	1 Feb 1974	5 Feb 1974	26 Jan 1974	1	Kheri U.P
10	Mahotari	Sarsaula	12 Dec 1973	" "	S.E.P Staff	5 Feb 1974	12 Feb 1974	28 Feb 1974	6	Madhubani Bihar
11	Kailali	Bhajni	6 Jan 1974	4 Feb 1974	Health Centre	" "	5 Feb 1974	29 Apr 1974	43	Kheri, U.P
12	Jhapa	Sharnamati	8 Jan 1974	9 Feb 1974	S.E.P Staff	24 Feb 1974	1 Mar 1974	8 Feb 1974	3	Purnia, Bihar
13	Mahotari	Sarpola	21 Jan 1974	15 Feb 1974	" "	15 Feb 1974	15 Feb 1974	1 Feb 1974	2	Madhubani Bihar
14	Sunsari	Amarwa	21 Nov 1974	" "	Plantation Manager	21 Feb 1974	25 Feb 1974	2 Mar 1974	20	Dumka Bihar
15	Morang	Birat Nagar	14 Jan 1974	" "	S.E.P Staff	" "	3 Mar 1974	4 Feb 1975	4	Darbhanga Bihar
16	Sunsari	Dubi	13 Feb 1974	18 Feb 1974	" "	25 Feb 1974	Patient returned India on Feb 20	13 Feb 1974	1	Saharsa, Bihar
17	Nawalparasi	Majiri	26 Jan 1974	19 Feb 1974		22 Feb 1974		11 Feb 1974	2	Gorakhpur U.P
18	Morang	Birat Nagar	5 Feb 1974	" "	S.E.P Staff	21 Feb 1974	25 Feb 1974	23 Mar 1974	4	Madhubani Bihar
19	" "	" "	16 Feb 1974	" "	" "	" "	3 Mar 1974	16 Feb 1974	1	Purnia, Bihar
20	Siraha	Basabitti	15 Feb 1974	22 Feb 1974	Pradhan Pancha	26 Feb 1974	12 Mar 1974	15 Feb 1974	1	Sitamarhi, Bihar
21	Jhapa	Topgachi	16 Feb 1974	" "	S.E.P Staff	24 Feb 1974	1 Mar 1974	23 Apr 1974	8	Bhagalpur, Bihar
22	Doti	Durgamanda	1 Feb 1974	22 Feb 1974	Pradhan Pancha	23 Feb 1974	10 Mar 1974	18 Feb 1974	2	Kheri, U.P
23	Jhapa	Haldebari	16 Dec 1973	26 Feb 1974	Local Official	2 Mar 1974	27 Feb 1974	10 Mar 1974	25	Darbhanga, Bihar
24	Saptari	Rajbiraj	21 Feb 1974	27 Feb 1974	S.E.P Staff	28 Feb 1974	12 Mar 1974	5 Mar 1974	2	" "
25	Kanchanpur	Suda	20 Jan 1974	27 Feb 1974	" "	3 Mar 1974	10,29 Mar 1974	17 Mar 1974	22	Outbreaks 4, 5, 6
26	Morang	Birat Nagar	23 Feb 1974	2 Mar 1974	" "	5 Mar 1974	3 Mar 1974	23 Feb 1974	1	Saharsa, Bihar
27	Kailali	Ratanpur	10 Feb 1974	5 Mar 1974	" "	8 Mar 1974	11 Mar 1974	30 Apr 1974	17	Kheri, U.P
28	" "	Parbara	12 Feb 1974	" "	" "	" "	" "	29 Apr 1974	43	" "
29	Dhanusha	Janakpur	" "	6 Mar 1974	" "	10 Mar 1974	26 Mar 1974	7 Jul 1974	31	Madhubani Bihar
30	Mahotari	Padul	19 Jan 1974	10 Mar 1974	" "	12 Mar 1974	26 Mar 1974	13 Feb 1974	12	Sitamarhi, Bihar
31	Dhanusha	Lakhuri	28 Jan 1974	12 Mar 1974	" "	15 Mar 1974	23 Mar 1974	11 May 1974	16	Unknown
32	" "	Deoria	11 Feb 1974	14 Mar 1974	" "	" "	" "	25 Apr 1974	20	" "
33	Sunsari	Inarwa	26 Feb 1974	18 Mar 1974		20 Mar 1974		14 Mar 1974	3	Purnia, Bihar
34	Kailali	Ramshikhar	7 Feb 1974	15 Mar 1974		19 Mar 1974	1 Apr 1974	1 Mar 1974	3	Kheri, U.P
35	Jhapa	Nakalbanda	" "	21 Mar 1974	Local Official	22 Mar 1974	7 Apr 1974	20 Apr 1974	30	Dumka, Bihar
36	Mahotari	Ghegga	10 Mar 1974	25 Mar 1974	S.E.P Staff	26 Mar 1974	25 Mar 1974	22 Mar 1974	2	Outbreak 10, Sarsaula
37	Kabhrepalanchok	Naldumbalwa	4 Feb 1974	" "	" "	" "	28 Mar 1974	18 Apr 1974	7	Gaya, Bihar
38	Bajhang	Rayak	13 Mar 1974	29 Mar 1974	Local Official	30 Mar 1974	25 Apr 1974	9 Apr 1974	9	Outbreak 25 Kancharpur
39	Jhapa	Kumarkot	23 Feb 1974	" "	Health Post	2 Apr 1974	6 Apr 1974	24 Mar 1974	3	Purnia, Bihar
40	" "	" "	6 Mar 1974	" "	" "	" "	" "	6 Mar 1974	1	" "
41	" "	" "	9 Mar 1974	" "	" "	" "	" "	22 Mar 1974	2	" "
42	Dhanusha	Balhagoth Mahuwa	28 Feb 1974	31 Mar 1974		3 Apr 1974	10 Apr 1974	12 Apr 1974	17	Outbreak 29 Janakpur
43	Morang	Keroan	31 Mar 1974	5 Apr 1974	Villager	12 Apr 1974		31 Mar 1974	1	Outbreak 21 Topgachi
44	Kailali	Gajaraya	11 Mar 1974	" "	S.E.P Staff	8 Apr 1974	28 Apr 1974	25 Mar 1974	3	Outbreak 28 Parbara
45	Jhapa	Duwagadi	6 Mar 1974	6 Apr 1974	" "	6 Apr 1974	6 Apr 1974	2 Apr 1974	4	Purnia, Bihar
46	Morang	Jorhat	21 Mar 1974	7 Apr 1974	Temporary Vacci	8 Apr 1974	10 Apr 1974	21 Mar 1974	1	" "
47	Bara	Parsauni	8 Mar 1974	" "	S.E.P Staff	12 Apr 1974		8 Mar 1974	1	Aajamgarh U.P
48	Dhanusha	Dhanauji	7 Feb 1974	" "	" "	8 Apr 1974		9 Apr 1974	6	Madhubani, Bihar
49	Sunsari	Bhokaraha	12 Feb 1974	" "	Local Official	14 Apr 1974	10 May 1974	17 Apr 1974	40	Unknown
50	Tanahu	Dordor	24 Mar 1974	8 Apr 1974		11 Apr 1974		24 Mar 1974	1	Singhbhum, Bihar
51	Jhapa	Jamalgadhi	14 Mar 1974	" "	S.E.P Staff	9 Apr 1974	9 Apr 1974	4 Apr 1974	5	Outbreak 23 Haldebari
52	" "	Bhadrapur	21 Feb 1974	" "	" "	8 Apr 1974	8 Apr 1974	9 Jun 1974	19	Darbhanga, Bihar
53	Dhading	Khari	20 Apr 1974	9 Apr 1974		13 Apr 1974	5 May 1974	5 May 1974	9	Varanasi, U.P
54	Siraha	Chatari	11 Mar 1974	12 Apr 1974	S.E.P Staff	14 Apr 1974	31 May 1974	19 Apr 1974	6	Madhubani, Bihar
55	Morang	Bhakari	4 Apr 1974	13 Apr 1974	Local Medical Offi	5 May 1974	8 May 1974	14 Apr 1974	3	Purnia, Bihar
56	Kathmandu	Kathmandu	Apr 1974	14 Apr 1974	S.E.P Staff	14 Apr 1974	14 Apr 1974	1 Jul 1974	23	Outbreak 58 Sankhu
57	Sarlahi	Pokhariya	23 Mar 1974	18 Apr 1974		21 Apr 1974		15 Apr 1974	4	Sitamarhi, Bihar
58	Kathmandu	Sankhu	17 Apr 1974	20 Apr 1974	S.E.P Staff	" "	22 Apr 1974	20 Aug 1974	34	Outbreak, 37 Naldumbalwa
59	Sarlahi	Kishanpur	17 Mar 1974	24 Apr 1974		25 Apr 1974		7 Apr 1974	2	Sitamarhi, Bihar
60	" "	Isopur	14 Apr 1974	" "		" "		14 Apr 1974	1	Janakpur Nepal or Sitamarhi Bihar
61	Dhanusha	Haryana	29 Mar 1974	" "		" "		21 Apr 1974	4	Darbhanga, Bihar
62	" "	Nagaryan	28 Mar 1974	26 Apr 1974		29 Apr 1974		28 Mar 1974	1	Samastipur, Bihar
63	" "	Pareswar	20 Apr 1976	" "	S.E.P Staff	28 Apr 1974		20 Apr 1974	1	Outbreak 29 Janakpur
64	Mahotari	Tirapur	28 Mar 1974	27 Apr 1974	Villager	" "	28 Apr 1974	9 May 1974	11	" " 82
65	" "	Samsi	7 Apr 1974	28 Apr 1974	S.E.P Staff	5 May 1974	13 May 1974	23 Apr 1974	4	Sitamarhi, Bihar
66	" "	Basbitti	10 Apr 1974	" "	" "	" "	" "	27 Apr 1974	4	" "
67	" "	Sundapur Beriafulka	3 Mar 1974	" "	" "	6 May 1974	" "	11 May 1974	51	" "
68	" "	Shivabhaktipur	5 Mar 1974	" "	" "	" "	" "	28 May 1974	33	" "
69	" "	Baratpurkur	2 Mar 1974	" "	" "	" "	" "	30 Apr 1974	35	" "
70	Saptari	Hanuman Nagar	23 Apr 1974	30 Apr 1974	" "	" "	12 May 1974	20 May 1974	6	Outbreak 72 Haripur Panchayat
71	Morang	Darbesa [illegible]	21 Mar 1974	1 May 1974	Health Post	5 May 1974	9 May 1974	8 May 1974	21	Dumka, Bihar
72	Saptari	Haripur	4 Apr 1974	" "	S.E.P Staff	6 May 1974	12 May 1974	10 May 1974	15	Purnia, Bihar

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73	Morang	Biratnagar Ward-2	18 Apr 1974	2 May 1974	S.E.P Staff	5 May 1974	8 May 1974	8 May 1974	2	Saharsa, Bihar
74	" "	" " "14,16	4 Apr 1974	" "	" "	" "	" "	30 Apr 1974	5	Purnia, Bihar
75	" "	" " "16,17	6 Mar 1974	" "	" "	" "	" "	6 Apr 1974	3	Madhubani, Bihar
76	" "	Jatuwa Ward-4	1 Apr 1974	" "	" "	" "	" "	17 Apr 1974	3	Saharsa, Bihar
77	Mahotari	Manora	5 Apr 1974	5 May 1974	" "	8 May 1974	8 May 1974	17 Jun 1974	12	Madhubani, Bihar
78	Dhanusha	Basbitti	6 Apr 1974	" "	" "	2 Jun 1974		6 Apr 1974	1	" "
79	Morang	Babbia	25 Feb 1974	6 May 1974	" "	7 May 1974	8 May 1974	24 Mar 1974	9	Purnia, Bihar
80	Saptari	Sripurjabdi Ward-I	27 Apr 1974	7 May 1974	" "	8 May 1974	8 May 1974	27 Apr 1974	1	" "
81	" "	" " "	22 Apr 1974	" "	" "	" "	" "	22 Apr 1974	2	Saharsa, Bihar
82	Siraha	Mador	20 Mar 1974	" "	" "	10 May 1974	8 May 1974	10 May 1974	18	Madhubani, Bihar
83	Saptari	Kushaha	23 Apr 1974	" "	" "	7 May 1974	9 May 1974	10 June 1974	7	Outbreak-49 Bhukaraha Panchayat
84	Morang	Darbesa, Jamuapur ward	13 Apr 1974	8 May 1974	S.E.P/WHO Staff	10 May 1974	8 May 1974	8 May 1974	15	Dumka, Bihar
85	" "	Jatuwa, Ward-5	20 Apr 1974	" "	" "	" "	" "	20 Apr 1974	1	Purnia, Bihar
86	" "	Darbesa, Harkhpur ward	28 Apr 1974	9 May 1974	" "	11 May 1974	9 May 1974	28 Apr 1974	1	Saharsa, Bihar
87	Kathmandu	Dallu	21 Apr 1974	12 May 1974				15 Jun 1974	6	Outbreak 58 Kathmandu
88	Parsa	Birganja	12 Apr 1974	13 May 1974	Govt Official	13 May 1974	18 May 1974		6	Mujjaffarpur, Bihar
89	Dandeldhura	Ghar	17 Apr 1974	14 May 1974		14 May 1974	28 May 1974	6 May 1974	2	Outbreak-25 Suda Panchayat
90	Jhapa	Kumarkot	28 Apr 1974	15 May 1974	S.E.P Staff	16 May 1974	10 Jun 1974	28 Apr 1974	1	Purnia, Bihar
91	" "	Jiropani	18 Apr 1974	16 May 1974	" "	18 May 1974	11 Jun 1974		12	Unknown
92	Rupandehi	Kudabagar	20 Mar 1974	17 May 1974		21 May 1974			11	Basti, U.P
93	Kanchanpur	Mahendranagar	17 May 1974	19 May 1974		" "		17 May 1974	1	Pilibhit, U.P
94	Kavre Palanchok	Jayanagal, Banepa	14 Mar 1974	20 May 1974	Villager	20 May 1974	20 May 1974	27 May 1974	18	Darbhanga, Bihar
95	Morang	Biratnagar Ward 9	6 May 1974	21 May 1974	S.E.P Staff	25 May 1974	3 Jun 1974	6 May 1974	1	Purnia, Bihar
96	Dhanusha	Jhojikutaiya	19 Apr 1974	22 May 1974	" "	1 Jun 1974	30 May 1974	27 May 1974	15	Outbreak 31 Lakhani Panchayat
97	" "	Kurtha	18 May 1974	23 May 1974	" "	31 May 1974	1 Jun 1974	18 May 1974	1	Outbreak 96, Jhojikutaiya Panchayat
98	Dadeldhura	Chipur Bhadrapur	5 May 1974	24 May 1974		25 May 1974		10 Jun 1974	12	Pilibhit, U.P
99	Siraha	Kalyanpur	12 May 1974	" "	S.E.P Staff	27 May 1974	1 Jun 1974	12 May 1974	1	Darbhanga, Bihar
100	" "	Malhaniya	16 Apr 1974	25 May 1974		" "	31 May 1974	22 May 1974	15	Madhubani, Bihar
101	Parsa	Birganja	17 May 1974	27 May 1974	S.E.P Staff	" "	27 May 1974	17 May 1974	1	Darbhanga, Bihar
102	Mahotari	Bhamapura	28 Apr 1974	" "	" "	1 Jun 1974		27 May 1974	6	Sitamarhi, Bihar
103	Bajhang	Maulale	3 May 1974	29 May 1974		24 May 1974	29 May 1974	28 May 1974	2	Pilibhit, U.P
104	Mahotari	Ekdabella	11 Apr 1974	31 May 1974	S.E.P Staff	2 Jun 1974	1 Jun 1974	31 May 1974	19	Sitamarhi, Bihar
105	Sindhupalchok	Bhotang	14 Mar 1974	" "	Health Post	31 May 1974	6 Jun 1974	20 Apr 1974	8	Outbreak-37 Naldumbalwa Panchayat
106	Rupandehi	Babhani	7 May 1974	" "		10 Jun 1974		24 May 1974	4	Basti, U.P
107	" "	" "	20 May 1974	" "		" "		7 Jun 1974	9	" "
108	" "	" "	17 May 1974	" "		" "		9 Jun 1974	5	Gorakhpur, U.P
109	Dhanusha	Janakpur	2 May 1974	1 Jun 1974		4 Jun 1974		2 May 1974	1	Madhubani, Bihar
110	Mahotari	Ratauli	26 Apr 1974	3 Jun 1974	S.E.P Staff	8 Jun 1974	4 Jul 1974	20 Jun 1974	27	"
111	Sunsari	Madesha	16 May 1974	" "	" "	4 Jun 1974	3 Jun 1974	14 Jun 1974	10	Saharsa, Bihar
112	Rupandehi	Babhani	2 Apr 1974	7 Jun 1974		10 Jun 1974		2 Apr 1974	1	Unknown
113	Morang	Rajghat		" "	Malaria Staff	29 Jun 1974	16 Jul 1974	25 Jun 1974	27	Dumka Bihar
114	" "	Jatuwa	1 May 1974	8 Jun 1974	S.E.P Staff	10 Jun 1974	8 Jun 1974	1 May 1974	1	Purnia, Bihar
115	Jhapa	Kajargachi	10 May 1974	9 Jun 1974		" "	10 Jun 1974	6 Jun 1974	5	" "
116	" "	Gauriganj	20 Mar 1974	10 Jun 1974	S.E.P Staff	12 Jun 1974		8 Jun 1974	9	" "
117	Dhanusha	Singaljoda	10 May 1974	11 Jun 1974	" "	" "	7 Jul 1974	24 Jun 1974	13	Outbreak 110, Ratauli Panchayat
118	Morang	Amardaha	24 Dec 1974	12 Jun 1974	" "	13 Jun 1974	14 Jul 1974	9 Jun 1974	26	Purnia, Bihar
119	Kapilvastu	Patringa	31 May 1974	13 Jun 1974		17 Jun 1974		31 May 1974	1	Outbreak 12, Babhani Panchayat
120	Mahotari	Kalaiya	2 May 1974	" "	Villager	" "	8 Jul 1974	9 Jul 1974	10	Sitamarhi, Bihar
121	Morang	Biratnagar	19 Mar 1974	14 Jun 1974	" "		7 Jun 1974	29 May 1974	2	Outbreak 55, Bhokari Panchayat
122	Dhanusha	Janakpur	9 Jun 1974	16 Jun 1974		17 Jun 1974			2	Madhubani, Bihar
123	Kailali	Deoriya	3 Jun 1974	17 Jun 1974				29 Jun 1974	3	Outbreak-124, Parsa Panchayat
124	Kanchanpur	Parasan	11 May 1974	" "				26 May 1974	5	Kheri, U.P
125	Mahotari	Bahadurganja	5 May 1974	18 Jun 1974	Malaria Staff	23 Jun 1974	6 Jul 1974	22 Jun 1974	11	Outbreak-68 Shivabhakpur
126	Kabhrepalanchok	Subhagaon	18 Jun 1974	" "			27 Jun 1974	6 Jul 1974	2	" "-94 Jayanal Panchayat
127	Doti	Banlekh	18 May 1974	20 Jun 1974		22 Jun 1974		19 Jun 1974	7	Nainital U.P
128	Kapilvastu	Pakadi	29 May 1974	23 Jun 1974		6 Jul 1974		21 Jun 1974	3	Outbreak-112, Babhni Panchayat
129	Morang	Dulahari	23 May 1974	24 Jun 1974	Villager	26 Jun 1974	11 Jul 1974	2 Jul 1974	8	Rohtas, Bihar
130	Jhapa	Amardaha	26 May 1974	" "	S.E.P Staff	27 Jun 1974	13 Jul 1974	18 Jun 1974	4	Purnia, Bihar
131	Kapilvastu	Hathihawa, Dohani	6 Jun 1974	27 Jun 1974		6 Jul 1974		6 Jun 1974	1	Gorakhpu, U.P
132	" "	" " Deopur	5 Jun 1974	" "		3 Jul 1974		25 Jun 1974	4	Outbreak-108, Babhani, Rupandehi
133	Sindhpalchok	Pulchowk	16 May 1974	28 Jun 1974		28 Jun 1974		12 Jun 1974	2	" "-56, Kathmandu
134	Sarlahi	Bishnapur	25 Apr 1974	30 Jun 1974	S.E.P Staff	2 Jul 1974	5 Jul 1974	3 Jul 1974	11	Sitamarhi, Bihar
135	" "	Farhadwa	21 May 1974	6 Jul 1974	" "	6 Jul 1974	6 Jul 1974	26 Jun 1974	7	" " "
136	Kabhrepalanchok	Nalaugrachandi		7 Jul 1974				4 Jul 1974	8	Outbreak-58, Sankhu Panchayat
137	Lalitpur	Lalitpur	3 Apr 1974	9 Jul 1974				7 Jul 1974	11	" "-56, Kathmandu
138	Saptari	Madhubani	13 May 1974	10 Jul 1974	S.E.P Staff	12 Jul 1974	14 Jul 1974	29 Jun 1974	7	" "-49, Bhokaraha, Sunsari
139	Kanchanpur	Parasan	" "	" "				27 May 1974	4	Kheri, U.P
140	Dhanusha	Laxmipur, Bhagew	9 Jun 1974	11 Jul 1974	S.E.P Staff	13 Jul 1974	30 Jul 1974	20 Jul 1974	16	Outbreak-117, Singaljoda Panchayat
141	Sarlahi	Rampur	15 Jun 1974	12 Jul 1974	" "	" "	14 Jul 1974	5 Jul 1974	2	" "-138, Madhuban
142	Bhuktapur	Gundu	23 Jun 1974	13 Jul 1974				7 Jul 1974	3	" "-126, Subhagaon, Kathm
143	Sarlahi	Laxmipur Sukchina	21 Apr 1974	15 Jul 1974	S.E.P Staff	5 Jul 1974		26 Jun 1974	6	Sitamarhi, Bihar
144	Mahotari	Bhutaha Kajuriya	28 May 1974	18 Jul 1974		10 Aug 1974		4 Jul 1974	4	" " "
145	" "	" "	13 May 1974	" "		" "		30 Jul 1974	10	" " "
146	" "	" "	8 May 1974	" "		" "		8 May 1974	1	Outbreak-67, Beriful Kabhrepalanchok
147	Morang	Majhare	2 Jul 1974	25 Jul 1974		26 Jul 1974	22 Aug 1974	2 Jul 1974	3	" "-148, Kadmdaha
148	" "	Kadmadaha	17 Jun 1974	" "	S.E.P Staff	10 Aug 1974	21 Aug 1974		3	Unknown

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149	Morang	Majhare	28 May 1974	25 Jul 1974		26 Jul 1974	22 Aug 1974	15 Aug 1974	11	Purnia, Bihar
150	Saptari	Kachabhakari	" "	28 Jul 1974		29 Jul 1974	28 Aug 1974	9 Aug 1974	18	Saharsa, "
151	Ramechhap	Lakhanpur	3 Jun 1974	" "	S.E.P Staff	11 Aug 1974		16 Aug 1974	20	Outbreak-94, Jayanagal Panchayat
152	Kapilvastu	Jumila	20 Jun 1974	29 Jul 1974		30 Jul 1974		20 Jun 1974	1	Basti, U.P.
153	Rukum	Musikot	22 Jul 1974	30 Jul 1974		6 Jul 1974		22 Jul 1974	1	Unknown
154	Morang	Biratnagar	22 Jul 1974		Indian Notification	30 Sep 1974	1 Oct 1974	22 Jul 1974	1	Purnia, Bihar
155	" "	Bhakari	15 Jul 1974	11 Aug 1974		12 Aug 1974	21 Aug 1974	15 Jul 1974	1	" " "
156	Kabhrepalanchok	Chanderi	5 Jul 1974	13 Aug 1974		14 Aug 1974	14 Aug 1974	3 Aug 1974	3	Outbreak-94, Jayanagal Panchayat
157	Kathmandu	Lapsephedi	25 Jun 1974	16 Aug 1974		11 Aug 1974		25 Jul 1974	1	" " -58, Sankhu "
158	Kabhrepalanchok	Gothpani	4 Jul 1974	17 Aug 1974			5 Sep 1974	7 Aug 1974	4	" " -151, Lakhanpur "
159	" " "	Kartike deorali	8 Jul 1974	18 Aug 1974		25 Aug 1974	" "	31 Aug 1974	5	" " -164, Chaubas "
160	Mahotari	Gheda	22 May 1974	25 Aug 1974		26 Aug 1974		6 Jul 1974	3	Sitamarhi, Bihar
161	Kabhrepalanchok	Gothpani	5 Jul 1974	30 Aug 1974		31 Aug 1974	4 Sep 1974	24 Aug 1974	4	Outbreak-164, Chaubas "
162	Morang	Gobindapur	9 May 1974	3 Sep 1974		4 Sep 1974		20 Aug 1974	27	" " -118, Amardaha "
163	" "	Biratnagar	16 Jun 1974	5 Sep 1974		6 Sep 1974		23 Sep 1974	17	" " -121, Biratnagar or Bihar
164	Kabhrepalanchok	Chaubas	25 May 1974	9 Sep 1974		9 Sep 1974	9 Sep 1974	11 Jun 1974	4	" " -94, Jaynagal "
165	Jhapa	Kobhara	25 Aug 1974	17 Sep 1974		25 Sep 1974		27 Sep 1974	5	" " -162, Gobindapur "
166	Dhading	Taruka deorali	23 Jun 1974	27 Sep 1974		30 Sep 1974	16 Oct 1974	5 Sep 1974	8	" " -87, Dallu, Kath
167	" "	" "	31 Jul 1974	" "		" "	" "	19 Sep 1974	7	" " -166, Same Panchayat
168	Morang	Biratnagar	28 Jul 1974	30 Sep 1974				14 Aug 1974	3	" " -155, Bhakari "
169	Dhading	Taruka deorali	20 Aug 1974	5 Oct 1974		30 Sep 1974	16 Oct 1974	20 Aug 1974	1	" " -166, Same Panchayat
170	Sunsari	Dubi	19 Aug 1974	9 Oct 1974		15 Oct 1974		29 Sep 1974	4	Saharsa, Bihar
171	Morang	Shorabag	31 Jul 1974			13 Oct 1974		22 Sep 1974	4	Purnia, Bihar
172	" "	" "	3 Oct 1974	15 Oct 1974		17 Oct 1974		6 Nov 1974	20	Outbreak, 171 Same Panchayat
173	" "	Biratnagar	9 Oct 1974	26 Oct 1974		3 Nov 1974		9 Oct 1974	1	Purnia, Bihar
174	" "	Shorabhag	9 Aug 1974	10 Nov 1974	S E P Staff	18 Nov 1974		18 Sep 1974	3	" " "
175	" "	Naujya	2 Nov 1974	" "		12 Nov 1974		2 Nov 1974	1	" " "
176	Jhapa	Chakchaki	4 Nov 1974	" "	S.E.P Staff	24 Nov 1974		16 Nov 1974	3	" " "
177	Morang	Amardaha	15 Apr 1974	" "	" "	17 Nov 1974		10 Nov 1974	62	Outbreak — 118, Same Panchayat
178	" "	Rangeli	17 Jul 1974	" "	" "	" "		9 Aug 1974	4	" " — 148, Kadmaha "
179	Rautahat	Rajpur Farhadwa	26 Sep 1974	23 Nov 1974	Integration Staff	24 Nov 1974	4 Dec 1974	3 Jan 1974	20	Sitamarhi, Bihar
180	Morang	Govindapur	11 Nov 1974	26 Nov 1974	S E P Staff	27 Nov 1974	26 Nov 1974	15 Dec 1974	12	Outbreak — 177, Amardaha "
181	" "	Biratnagar	28 Nov 1974	14 Dec 1974	Tracing from India	15 Dec 1974		10 Dec 1974	2	Champaran, Bihar

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SMALLPOX OUTBREAKS NEPAL 1974

S.NO	District	Panchayat	Date of First Case	Date of Report to Dist S E P offi	Who Reported	Date Report Received in Kathmandu	Date Investigated by H Q	Date of Last Cases	Total Cases	Source of Infections
1	Mahottari	Parsa Dewarjabdi	13 Nov 1973	27 Dec 1974	Temporari - Vacci	1 Jan 1974	4 Jan 1974	22 Mar 1974	25	Sitamarhi, Bihar
2	Kapilvastu	Banaspur	18 Dec 1973	31 Dec 1973	S E P Staff	8 Jan 1974	14 Jan 1974	6 Jan 1974	4	Gorakhpur U P
3	Morang	Motipur	2 Jan 1974	5 Jan 1974	Medical Officer	6 Jan 1974	9 Jan 1974	2 Jan 1974	1	Purnia, Bihar
4	Kanchanpur	Mahendra Nagar	4 Jan 1974	7 Jan 1974	Businessman	11 Jan 1974	14 Jan 1974	4 Jan 1974	1	U P or Bihar
5	" "	" "	3 Jan 1974	7 Jan 1974	" "	" "	" "	3 Jan 1974	1	" "
6	" "	" "	" "	" "	" "	" "	" "	" "	1	" "
7	Kathmandu	Kathmandu	9 Jan 1974	13 Jan 1974	Hospital	13 Jan 1974	13 Jan 1974	1 Feb 1974	2	" "
8	Kabhre Palanchok	Nalaugrachandi	16 Jan 1974	21 Jan 1974	S E P Staff	22 Jan 1974	23 Jan 1974	16 Jan 1974	1	" "
9	Kailali	Nimdi	26 Jan 1974	29 Jan 1974	Temporari - Vacci	1 Feb 1974	5 Feb 1974	26 Jan 1974	1	Kheri U P
10	Mahotari	Sarsaula	12 Dec 1973	" "	S E P Staff	5 Feb 1974	12 Feb 1974	28 Feb 1974	6	Madhubani Bihar
11	Kailali	Bhajni	6 Jan 1974	4 Feb 1974	Health Centre	" "	5 Feb 1974	29 Apr 1974	43	Kheri, U P
12	Jhapa	Sharnamati	8 Jan 1974	9 Feb 1974	S E P Staff	24 Feb 1974	1 Mar 1974	8 Feb 1974	3	Purnia, Bihar
13	Mahotari	Sarpola	21 Jan 1974	15 Feb 1974	" "	15 Feb 1974	15 Feb 1974	1 Feb 1974	2	Madhubani Bihar
14	Sunsari	Amarwa	21 Nov 1974	" "	Plantation Manager	21 Feb 1974	25 Feb 1974	2 Mar 1974	20	Dumka Bihar
15	Morang	Birat Nagar	14 Jan 1974	" "	S E P Staff	" "	3 Mar 1974	4 Feb 1975	4	Darbhanga, Bihar
16	Sunsari	Dubi	13 Feb 1974	18 Feb 1974	" "	25 Feb 1974	Patient left India on Feb 20	13 Feb 1974	1	Saharsa, Bihar
17	Nawalparasi	Majuri	26 Jan 1974	19 Feb 1974		22 Feb 1974		11 Feb 1974	2	Gorakhpur U P
18	Morang	Birat Nagar	5 Feb 1974	" "	S E P Staff	21 Feb 1974	25 Feb 1974	23 Mar 1974	4	Madhubani Bihar
19	" "	" "	16 Feb 1974	" "	" "	" "	3 Mar 1974	16 Feb 1974	1	Purnia, Bihar
20	Siraha	Basabitti	15 Feb 1974	22 Feb 1974	Pradhan Pancha	26 Feb 1974	12 Mar 1974	15 Feb 1974	1	Sitamarhi, Bihar
21	Jhapa	Topgachi	16 Feb 1974	" "	S E P Staff	24 Feb 1974	1 Mar 1974	23 Apr 1974	8	Bhojpur, Bihar
22	Doti	Durgamanda	1 Feb 1974	22 Feb 1974	Pradhan Pancha	23 Feb 1974	10 Mar 1974	18 Feb 1974	2	Kheri, U P
23	Jhapa	Haldebari	16 Dec 1973	26 Feb 1974	Local Official	2 Mar 1974	27 Feb 1974	10 Mar 1974	28	Darbhanga, Bihar
24	Saptari	Rajbiraj	21 Feb 1974	27 Feb 1974	S E P Staff	28 Feb 1974	12 Mar 1974	5 Mar 1974	2	" "
25	Kanchanpur	Suda	20 Jan 1974	27 Feb 1974	" "	3 Mar 1974	10-29 Mar 1974	17 Mar 1974	22	Kheri, U P
26	Morang	Birat Nagar	23 Feb 1974	2 Mar 1974	" "	5 Mar 1974	3 Mar 1974	23 Feb 1974	1	Purnia, Bihar
27	Kailali	Ratanpur	10 Feb 1974	5 Mar 1974	" "	8 Mar 1974	11 Mar 1974	30 Apr 1974	17	Kheri, U P
28	" "	Parbara	12 Feb 1974	" "	" "	" "	" "	29 Apr 1974	43	" "
29	Dhanusha	Janakpur	" "	6 Mar 1974	" "	10 Mar 1974	26 Mar 1974	7 Jul 1974	31	Madhubani Bihar
30	Mahotari	Padul	19 Jan 1974	10 Mar 1974	" "	12 Mar 1974	26 Mar 1974	13 Feb 1974	12	Sitamarhi, Bihar
31	Dhanusha	Lakhuri	28 Jan 1974	12 Mar 1974	" "	15 Mar 1974	23 Mar 1974	11 May 1974	16	Darbhanga
32	" "	Deoria	11 Feb 1974	14 Mar 1974	" "	" "	" "	25 Apr 1974	20	" "
33	Sunsari	Inarwa	26 Feb 1974	18 Mar 1974		20 Mar 1974		14 Mar 1974	3	Purnia, Bihar
34	Kailali	Ramshikhar	7 Feb 1974	15 Mar 1974		19 Mar 1974	1 Apr 1974	1 Mar 1974	3	Kheri, U P
35	Jhapa	Nakalbanda	" "	21 Mar 1974	Local Official	22 Mar 1974	7 Apr 1974	20 Apr 1974	30	Dumka, Bihar
36	Mahotari	Ghedg	10 Mar 1974	25 Mar 1974	S E P Staff	26 Mar 1974	25 Mar 1974	22 Mar 1974	2	Outbreak 10 Sarlahi
37	Kabhrepalanchok	Naldumbalwa	4 Feb 1974	" "	" "	" "	28 Mar 1974	18 Apr 1974	7	Gaya, Bihar
38	Bajhang	Rayak	13 Mar 1974	29 Mar 1974	Local Official	30 Mar 1974	25 Apr 1974	9 Apr 1974	9	Outbreak 25 Kanchanpur
39	Jhapa	Kumarkot	23 Feb 1974	" "	Health Post	2 Apr 1974	6 Apr 1974	24 Mar 1974	3	Purnia, Bihar
40	" "	" "	6 Mar 1974	" "	" "	" "	" "	6 Mar 1974	1	" "
41	" "	" "	9 Mar 1974	" "	" "	" "	" "	22 Mar 1974	2	" "
42	Dhanusha	Balhagoth Mahuwa	28 Feb 1974	31 Mar 1974		3 Apr 1974	10 Apr 1974	12 Apr 1974	17	Outbreak 29 Janakpur
43	Morang	Keroan	31 Mar 1974	5 Apr 1974	Villager	12 Apr 1974		31 Mar 1974	1	Outbreak 21 Tapgachi
44	Kailali	Gajaraya	11 Mar 1974	" "	S E P Staff	8 Apr 1974	28 Apr 1974	25 Mar 1974	3	Outbreak 28 Parbara
45	Jhapa	Duwagadi	6 Mar 1974	6 Apr 1974	" "	6 Apr 1974	6 Apr 1974	2 Apr 1974	4	Purnia, Bihar
46	Morang	Jorhat	21 Mar 1974	7 Apr 1974	Temporary Vacci	8 Apr 1974	10 Apr 1974	21 Mar 1974	1	" "
47	Bara	Parsauni	8 Mar 1974	" "	S E P Staff	12 Apr 1974		8 Mar 1974	1	Azamgarh U P
48	Dhanusha	Dhanauji	7 Feb 1974	" "	" "	8 Apr 1974		9 Apr 1974	6	Madhubani, Bihar
49	Sunsari	Bhokaraha	12 Feb 1974	" "	Local Official	14 Apr 1974	10 May 1974	17 Apr 1974	40	Unknown
50	Tanahu	Dordor	24 Mar 1974	8 Apr 1974		11 Apr 1974		24 Mar 1974	1	Singhbhum, Bihar
51	Jhapa	Jamalgadhi	14 Mar 1974	" "	S E P Staff	9 Apr 1974	9 Apr 1974	4 Apr 1974	5	Outbreak 23 Haldebari
52	" "	Bhadrapur	21 Feb 1974	" "	" "	8 Apr 1974	8 Apr 1974	9 Jun 1974	19	Darbhanga, Bihar
53	Dhading	Khari	20 Apr 1974	9 Apr 1974		13 Apr 1974	5 May 1974	5 May 1974	9	Varanasi, U P
54	Siraha	Chatari	11 Mar 1974	12 Apr 1974	S E P Staff	14 Apr 1974	31 May 1974	19 Apr 1974	6	Madhubani, Bihar
55	Morang	Bhakari	4 Apr 1974	13 Apr 1974	Local Medical Offi	5 May 1974	8 May 1974	14 Apr 1974	3	Purnia, Bihar
56	Kathmandu	Kathmandu	Apr 1974	14 Apr 1974	S E P Staff	14 Apr 1974	14 Apr 1974	1 Jul 1974	23	Outbreak 58 Sankhu
57	Sarlahi	Pokhariya	23 Mar 1974	18 Apr 1974		21 Apr 1974		15 Apr 1974	4	Sitamarhi, Bihar
58	Kathmandu	Sankhu	17 Apr 1974	20 Apr 1974	S E P Staff	" "	22 Apr 1974	20 Aug 1974	34	Outbreak 37 Naldumbalwa
59	Sarlahi	Kishanpur	17 Mar 1974	24 Apr 1974		25 Apr 1974		7 Apr 1974	2	Sitamarhi, Bihar
60	" "	Isopur	14 Apr 1974	" "		" "		14 Apr 1974	1	Janakpur Nepal or Sitamarhi Bihar
61	Dhanusha	Haryana	29 Mar 1974	" "		" "		21 Apr 1974	4	Darbhanga, Bihar
62	" "	Nagaryan	28 Mar 1974	26 Apr 1974		29 Apr 1974		28 Mar 1974	1	Samastipur, Bihar
63	" "	Pareswar	20 Apr 1976	" "	S E P Staff	28 Apr 1974		20 Apr 1974	1	Outbreak 29 Janakpur
64	Mahotari	Tirapur	28 Mar 1974	27 Apr 1974	Villager	" "	26 Apr 1974	9 May 1974	11	" " 82
65	" "	Samsi	7 Apr 1974	28 Apr 1974	S E P Staff	5 May 1974	13 May 1974	23 Apr 1974	4	Sitamarhi, Bihar
66	" "	Basbitti	10 Apr 1974	" "	" "	" "	" "	27 Apr 1974	4	" "
67	" "	Sundapur Beriafulka	3 Mar 1974	" "	" "	6 May 1974	" "	11 May 1974	51	" "
68	" "	Shivabhaktipur	5 Mar 1974	" "	" "	" "	" "	28 May 1974	33	" "
69	" "	Baratpurkur	2 Mar 1974	" "	" "	" "	" "	30 Apr 1974	35	" "
70	Saptari	Hanuman Nagar	23 Apr 1974	30 Apr 1974	" "	" "	12 May 1974	20 May 1974	6	Outbreak 72 Haripur Panchayat
71	Morang	Darbesa	21 Mar 1974	1 May 1974	Health Post	5 May 1974	9 May 1974	8 May 1974	21	Dumka, Bihar
72	Saptari	Haripur	4 Apr 1974	" "	S E P Staff	6 May 1974	12 May 1974	10 May 1974	15	Purnia, Bihar

Annex 5

CONTINUED.....1974

73	Morang	Biratnagar Ward-2	18 Apr 1974	2 May 1974	S E P Staff	5 May 1974	8 May 1974	8 May 1974	2	Saharsa, Bihar
74	" "	" " "14,16	4 Apr 1974	" "	" "	" "	" "	30 Apr 1974	5	Purnia, Bihar
75	" "	" " "16,17	6 Mar 1974	" "	" "	" "	" "	6 Apr 1974	3	Madhubani, Bihar
76	" "	Jatuwa Ward-4	1 Apr 1974	" "	" "	" "	" "	17 Apr 1974	3	Saharsa, Bihar
77	Mahotari	Manora	5 Apr 1974	5 May 1974	" "	8 May 1974	6 May 1974	17 Jun 1974	12	Madhubani, Bihar
78	Dhanusha	Basbitti	6 Apr 1974	" "	" "	2 Jun 1974		6 Apr 1974	1	" "
79	Morang	Babbia	25 Feb 1974	6 May 1974	" "	7 May 1974	[illegible] May 1974	24 Mar 1974	9	Purnia, Bihar
80	Saptari	Sripurjabdi Ward 1	27 Apr 1974	7 May 1974	" "	8 May 1974	[illegible] May 1974	27 Apr 1974	1	" "
81	" "	" " "	22 Apr 1974	" "	" "	" "	" "	22 Apr 1974	2	Saharsa, Bihar
82	Siraha	Mador	20 Mar 1974	" "	" "	10 May 1974	[illegible] May 1974	10 May 1974	18	Madhubani, Bihar
83	Saptari	Kushaha	23 Apr 1974	" "	" "	7 May 1974	[illegible] May 1974	10 June 1974	7	Outbreak-49 Bhokaraha Panchayat
84	Morang	Darbesa, [illegible]	13 Apr 1974	8 May 1974	S E P/WHO Staff	10 May 1974	[illegible]	8 May 1974	15	Dumka, Bihar
85	" "	Jatuwa, Ward-5	20 Apr 1974	" "	" "	" "	" "	20 Apr 1974	1	Purnia, Bihar
86	" "	Darbesa, Harkhpur [illegible]	28 Apr 1374	9 May 1974	" "	11 May 1974	9 May 1974	28 Apr 1974	1	Saharsa, Bihar
87	Kathmandu	Dallu	21 Apr 1974	12 May 1974				15 Jun 1974	6	Outbreak 58 Kathmandu
88	Parsa	Birganja	12 Apr 1974	13 May 1974	Govt Official	13 May 1974	18 May 1974		6	Mujjaffarpur, Bihar
89	Dandeldhura	Ghor	17 Apr 1974	14 May 1974		14 May 1974	28 May 1974	6 May 1974	2	Outbreak-25 Suda Panchayat
90	Jhapa	Kumarkot	28 Apr 1974	15 May 1974	S E P Staff	16 May 1974	10 Jun 1974	28 Apr 1974	1	Purnia, Bihar
91	" "	Jiropani	18 Apr 1974	16 May 1974	" "	18 May 1974	11 Jun 1974		12	Unknown
92	Rupandehi	Kudabagar	20 Mar 1974	17 May 1974		21 May 1974			11	Basti, U P
93	Kanchanpur	Mahendranagar	17 May 1974	19 May 1974		" "		17 May 1974	1	Pilibhit, U P
94	Kavre Palanchok	Jayanagal, Banepa	14 Mar 1974	20 May 1974	Villager	20 May 1974	24 May 1974	27 May 1974	18	Darbhanga, Bihar
95	Morang	Biratnagar Ward 9	6 May 1974	21 May 1974	S E P Staff	25 May 1974	3 Jun 1974	6 May 1974	1	Purnia, Bihar
96	Dhanusha	Jhojikutaiya	19 Apr 1974	22 May 1974	" "	1 Jun 1974	30 May 1974	27 May 1974	15	Outbreak 31 Lakhuri [illegible]
97	" "	Kurtha	18 May 1974	23 May 1974	" "	31 May 1974	1 Jun 1974	18 May 1974	1	Outbreak 96 Jhojikutaiya Panchayat
98	Dadeldhura	Chipur Bhadrapur	5 May 1974	24 May 1974		25 May 1974		10 Jun 1974	12	Pilibhit, U P
99	Siraha	Kalyanpur	12 May 1974	" "	S E P Staff	27 May 1974	1 Jun 1974	12 May 1974	1	Darbhanga, Bihar
100	" "	Malhaniya	16 Apr 1974	25 May 1974		" "	31 May 1974	22 May 1974	15	Madhubani, Bihar
101	Parsa	Birganja	17 May 1974	27 May 1974	S E P Staff	" "	27 May 1974	17 May 1974	1	Darbhanga Bihar
102	Mahotari	Bhamapura	28 Apr 1974	" "	" "	1 Jun 1974		27 May 1974	6	Sitamarhi Bihar
103	Bajhang	Maulale	3 May 1974	29 May 1974		24 May 1974	29 May 1974	28 May 1974	2	Pilibhit, U P
104	Mahotari	Ekdabella	11 Apr 1974	31 May 1974	S.E P Staff	2 Jun 1974	1 Jun 1974	31 May 1974	19	Sitamarhi, Bihar
105	Sindhupalchok	Bhotang	14 Mar 1974	" "	Health Post	31 May 1974	6 Jun 1974	20 Apr 1974	8	Outbreak-37 Naldumbalwa Panchayat
106	Rupandehi	Babhani	7 May 1974	" "		10 Jun 1974		24 May 1974	4	Basti, U P
107	" "	" "	20 May 1974	" "		" "		7 Jun 1974	9	" "
108	" "	" "	17 May 1974	" "		" "		9 Jun 1974	5	Gorakhpur, U P
109	Dhanusha	Janakpur	2 May 1974	1 Jun 1974		4 Jun 1974		2 May 1974	1	Madhubani, Bihar
110	Mahotari	Ratauli	26 Apr 1974	3 Jun 1974	S E P Staff	8 Jun 1974	4 Jul 1974	20 Jun 1974	27	" "
111	Sunsari	Madesha	16 May 1974	" "	" "	4 Jun 1974	3 Jun 1974	14 Jun 1974	10	Saharsa, Bihar
112	Rupandehi	Babhani	2 Apr 1974	7 Jun 1974		10 Jun 1974		2 Apr 1974	1	Unknown
113	Morang	Rajghat		" "	Malaria Staff	29 Jun 1974	16 Jul 1974	25 Jun 1974	27	Dumka Bihar
114	" "	Jatuwa	1 May 1974	8 Jun 1974	S.E P Staff	10 Jun 1974	8 Jun 1974	1 May 1974	1	Purnia, Bihar
115	Jhapa	Kajargachi	10 May 1974	9 Jun 1974		" "	10 Jun 1974	6 Jun 1974	5	" "
116	" "	Gauriganj	20 Mar 1974	10 Jun 1974	S E P Staff	12 Jun 1974		8 Jun 1974	9	" "
117	Dhanusha	Singaljoda	10 May 1974	11 Jun 1974	" "	" "	7 Jul 1974	24 Jun 1974	13	Outbreak 110, Ratauli Panchayat
118	Morang	Amardaha	24 Dec 1974	12 Jun 1974	" "	13 Jun 1974	14 Jul 1974	9 Jun 1974	26	Purnia, Bihar
119	Kapilvastu	Patringa	31 May 1974	13 Jun 1974		17 Jun 1974		31 May 1974	1	Outbreak 112, Babhani Panchayat
120	Mahotari	Kalaiya	2 May 1974	" "	Villager	" "	8 Jul 1974	9 Jul 1974	10	Sitamarhi, Bihar
121	Morang	Biratnagar	19 Mar 1974	14 Jun 1974	" "		7 Jun 1974	29 May 1974	2	Outbreak 55, Bhakari Panchayat
122	Dhanusha	Janakpur	9 Jun 1974	16 Jun 1974		17 Jun 1974			2	Madhubani, Bihar
123	Kailali	Deoriya	3 Jun 1974	17 Jun 1974				29 Jun 1974	3	Outbreak-124, Parsa Panchayat
124	Kanchanpur	Parasan	11 May 1974	" "				26 May 1974	5	Kheri, U P
125	Mahotari	Bahadurganja	5 May 1974	18 Jun 1974	Malaria Staff	23 Jun 1974	6 Jul 1974	22 Jun 1974	11	Outbreak-68 Shivabhaktipur
126	Kabhrepalanchok	Subhagaon	18 Jun 1974	" "			27 Jun 1974	6 Jul 1974	2	" " -94 Jayanat Panchayat
127	Doti	Banlekh	18 May 1974	20 Jun 1974		22 Jun 1974		19 Jun 1974	7	Nainital U P
128	Kapilvastu	Pakadi	29 May 1974	23 Jun 1974		6 Jul 1974		21 Jun 1974	3	Outbreak-112, Babhni Panchayat
129	Morang	Dulahari	23 May 1974	24 Jun 1974	Villager	26 Jun 1974	11 Jul 1974	2 Jul 1974	8	Rohtas, Bihar
130	Jhapa	Amardaha	26 May 1974	" "	S E P Staff	27 Jun 1974	13 Jul 1974	18 Jun 1974	4	Purnia, Bihar
131	Kapilvastu	Hathihawa, Dohani	6 Jun 1974	27 Jun 1974		6 Jul 1974		6 Jun 1974	1	Gorakhpu, U P
132	" "	" " Deopur	5 Jun 1974	" "		3 Jul 1974		25 Jun 1974	4	Outbreak-108, Babhani, Rupandehi
133	Sindhpalchok	Pulchowk	16 May 1974	28 Jun 1974		28 Jun 1974		12 Jun 1974	2	" " -56, Kathmandu
134	Sarlahi	Bishnapur	25 Apr 1974	30 Jun 1974	S E P Staff	2 Jul 1974	5 Jul 1974	3 Jul 1974	11	Sitamarhi, Bihar
135	" "	Farhadwa	21 May 1974	6 Jul 1974	" "	6 Jul 1974	6 Jul 1974	26 Jun 1974	7	" " "
136	Kabhrepalanchok	Nalaugrachandi		7 Jul 1974				4 Jul 1974	8	Outbreak-58, Sankhu Panchayat
137	Lalitpur	Lalitpur	3 Apr 1974	9 Jul 1974				7 Jul 1974	11	" " -56, Kathmandu
138	Saptari	Madhubani	13 May 1974	10 Jul 1974	S E P Staff	12 Jul 1974	14 Jul 1974	29 Jun 1974	7	" " -49, Bhokaraha, Sunsari
139	Kanchanpur	Parasan	" "	" "				27 May 1974	4	Kheri, U P
140	Dhanusha	Laxmipur, Bhagew	9 Jun 1974	11 Jul 1974	S E P Staff	13 Jul 1974	30 Jul 1974	20 Jul 1974	16	Outbreak-117, Singaljoda Panchayat
141	Sarlahi	Rampur	15 Jun 1974	12 Jul 1974	" "	" "	14 Jul 1974	5 Jul 1974	2	" " -138, Madhubani
142	Bhaktapur	Gundu	23 Jun 1974	13 Jul 1974				7 Jul 1974	3	" " -126, Subhagaon, Kabhre
143	Sarlahi	Laxmipur Sukchina	21 Apr 1974	15 Jul 1974	S E P Staff	5 Jul 1974		26 Jun 1974	6	Sitamarhi, Bihar
144	Mahotari	Bhutaha Kajuriya	28 May 1974	18 Jul 1974		10 Aug 1974		4 Jul 1974	4	" " "
145	" "	" "	13 May 1974	" "		" "		30 Jul 1974	10	" " "
146	" "	" "	8 May 1974	" "		" "		8 May 1974	1	Outbreak —67, Berif[illegible]
147	Morang	Majhare	2 Jul 1974	25 Jul 1974		26 Jul 1974	22 Aug 1974	2 Jul 1974	3	" " -148, Kadmaha
148	" "	Kadmadaha	17 Jun 1974	" "	S E P Staff	10 Aug 1974	21 Aug 1974		3	Unknown

NEPAL 1975

WEEKLY SMALLPOX INCIDENCE OUTBREAK CONTAINMENT FOLLOW UP

OUT BREAK NO	DISTRICT	PANCHAYAT WARD	VILLAGE	DATE OF REPORT TO DISTRICT	DATE OF REPORT TO H.Q.	DATE OF FIRST CASE	DATE OF LAST CASE	Containment BEGING	Containment END	NO OF CASES DETECTED JANUARY WEEK NO 1	2	3	4	5	FEBRUARY 6	7	8	9	MARCH 10	11	12	13	APRIL 14	15	16	17	18	MAY 19	20	21	22	JUNE 23	24	25	26	SOURCE OF INFECTION
	RAUTAHAT	RAJPUR FARHADWA 7	KUDIYA	23.11.74		26.9.74	3.1.75	48		0/0	2/0	0/0	0/0	1/0	0/0	1/0	0/0	0/0	0/0	0/0	0/0	(0/0)													SULGANIYA SITAMARI
1	MORANG	SORABHAG 6	DAKUWA DANGA			13.11.74	4.1.75	52		20/3	0/0	1/0	0/0	0/0	0/0	(0/0)	X	X																	SORABHAG 4 MORANG
2	MORANG	MAJHARE 9	NAYA PATTITAR		3.1.75	10.12.74	17.12.74	1			1/0	1/0	0/0	(0/0)	X	X																			DUMARI PURNIA
3	RAUTAHAT	LAXMIPUR			13.1.75	11.12.74	23.2.75	2				5/0	8/0	3/0	1/0	0/0	0/0	0/0	0/0	0/0	1/0	0/0	0/0	0/0	(0/0)	X	X									KUDIYA RAUTAHAT
4	MORANG	AMARDAHA 2	SUGAHAT		16.1.75	2.12.74	5.2.75	11.1.75					15/3	4/0	1/1	1/0	0/0	0/0	0/0	0/0	0/0	(0/0)	X	X													GOBINDAPUR MORANG
5	MORANG	GOBINDAPUR 3	LETI		16.1.75	17.12.74	19.1.75	14.1.75					5/0	0/0	1/0	0/0	0/0	0/0	(0/0)	X	X															" " "
6	MORANG	RAJGHAT 6	KOILI		20.1.75	11.1.75	11.1.75	18.1.75					1/0	0/0	0/0	0/0	(0/0)	X	X																	DARBHANGA
7	MORANG	AMARDAHA 4	HASANDA		3.2.75	24.1.75	24.1.75	25.1.75						1/0	0/0	0/0	0/0	0/0	(0/0)	X	X															SUGAHAT MORANG
8	MORANG	GOBINDAPUR 3	LETI		3.2.75	7.1.75	7.1.75	5							1/0	0/0	(0/0)	X	X																	GOBINDAPUR 9 MORANG
9	MORANG	DARBESA 8	DOBHANA		10.2.75	10.1.75	20.2.75	6								2/1	0/0	0/0	1/0	0/0	0/0	0/0	(0/0)	X	X											LETI MORANG
10	MORANG	BABIA BIRTA 3	KALA BANJAR		3.3.75	11.1.75	25.1.75												(3/0)	X	X															DAKUWA DHAN MORANG
11	MORANG	GOBINDAPUR 2	BAHUN DOB		3.3.75	27.1.75	27.1.75	8												1/0	(0/0)	X	X													SUGAHAT MORANG
12	MORANG	JHAPA BAIDYA-NATHPUR	MUSARI TOLA		3.3.75	29.1.75	29.1.75	9												1/1	(0/0)	X	X													DOBHANA MORANG
13	MORANG	RAJGHAT 6	DODHARA		3.3.75	24.1.75	2.3.75	9												5/3	0/0	0/0	0/0	0/0	0/0	(0/0)	X	X								SUGAHAT MORANG
14	MORANG	AMARDAHA 8	BHELAHI CHINTATOLE	1.3.75	3.3.75	21.2.75	12.3.75	9												3/0	0/0	0/0	0/0	0/0	0/0	(0/0)	X									" " "
15	MORANG	AMARDAHA 1	AMARDAHA	24.3.75	29.3.75	19.3.75	19.3.75	13															1/0	0/0	0/0	0/0	0/0	(0/0)	X	X						BHELHI CHINTATOLE MORANG
16	MORANG	AMARDAHA 8	BELAHI	24.3.75	29.3.75	21.3.75	6.4.75																1/0	0/0	2/0	0/0	0/0	0/0	0/0	(0/0)	X	X				" " "
~~17~~	~~SAPTARI~~	~~AGADI 1~~	~~SONARA~~			1.4.75				DELETED			VARICELLA																							SINHASWAR ASRAM SAHARSA
TOTAL CASES DURING THE WEEK										20/3	3/0	7/0	29/3	9/0	4/1	4/1	0/0	0/0	4/0	11/4	0/0	2/0	0/0	2/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	
CUMULATIVE TOTAL										20/3	23/3	30/3	59/6	68/6	72/7	76/8	76/8	76/8	80/8	91/12	91/12	93/12	93/12	95/12	96/12	96/12	96/12	96/12	96/12	96/12	95/12	95/12	95/12	95/12	
PENDING OUTBREAK AT THE BEGINNING OF THE WEEK										1	2	3	4	7	7	8	8	6	6	4	8	5	6	5	4	4	3	2	2	1	0	0	0	0	
NEW OUTBREAK DURING THE WEEK										1	1	1	3	1	1	1	0	0	1	4	0	2	0	0	1	0	0	0	0	0	0	0	0	0	
OUTBREAK CONTAINED DURING THE WEEK										0	0	0	0	1	0	1	2	0	3	0	3	1	1	1	1	1	1	0	1	1	0	0	0	0	
TOTAL OUTBREAK AT THE END OF THE WEEK										2	3	4	7	7	8	8	6	6	4	8	5	6	5	4	4	3	2	2	1	0	0	0	0	0	

ANNEX 6

ENGLISH TRANSLATIONS OF FORMS IN CURRENT USE IN THE SMALLPOX ERADICATION PROGRAMME

S.E.P. 1

श्री ५ को सरकार

वि. ऊ. आ. १

Temporary Vaccinator's Report

अस्थायी भ्याक्सिनेटरहरूको प्रतिवेदन

अञ्चल Zone ... जिल्ला District ...

पञ्चायत Panchayat ... वडा नं. Ward No. ... मिति Date :...

क्रम संख्या	घर मुलीको नाम	घरको जनसंख्या	खोप Vaccination			बिफरको बिरामी छ/छैन	कैफियत
			प्रथम	पुन:	जम्मा		
Serial No.	Household	House No.	Primary	Revaccination	Total	Case of Smallpox. Yes/No	Remarks
२							
३							
४							
५							
६							
७							
८							
९							
१०							
११							
१२							
१३							
१४							
१५							
१६							
१७							
१८							
१९							
२०							
२१							
२२							
२३							
२४							
२५							
२६							
२७							
२८							
२९							
३०							
	जम्मा Total						

खर्च भएको भ्याक्सिन एम्पुल Vaccine Ampoule ...

भ्याक्सिनेटरको नाम Vaccinator's Name ...

Annex 6

S.E.P. 1a
बि. उ. या. १ (क)

श्री ५ को सरकार

बिफर उन्मूलन आयोजना
घर परिवार लगत र खोप

List of Houses, families and Vaccination

जिल्ला District .... पंचायत Panchayat .... वडा नं. Ward No. .... गाउं Village ....

घर सं.	क्रम सं.	नाम	उमेर	लिङ्ग	खोपको खत छ । छैन	हाल खोपाएको मिति	Recent Vaccination		कैफियत
							प्रथम	पुनः	
House No.	Serial No.	Name	Age	Sex	Scar. Yes/No	Date of Recent Vaccination	Primary	Revaccination	Remarks

Annex 6

S.E.P. 2a
बि. उ. आ. २ (क)

श्री ५ को सरकार

Senior Vaccinators Report

सिनियर भ्याक्सिनेटरको प्रतिवेदन

जिल्ला District ―――――― महिना Month ―――――― साल Year ――――

सि. भ्या. को नाम Senior Vaccinator's Name ―――――― दस्तखत Signature ――――

गते Date	काम गरेको स्थान Working Place	शंकास्पद बिफरको सङ्ख्या No. Suspected Smallpox Cases	खोप Vaccination प्रथम Primary	 पुनः Revaccinations	 जम्मा Total	कैफियत Remarks
	जम्मा Total					

Annex 6

S.E.P. 3a.
वि.उ.आ.३ (क)

श्री ५ को सरकार

Supervisor/Assistant Supervisor's Report
सुपरभाइजर । सहायक सुपरभाइजरको प्रतिवेदन

जिल्ला District ... महिना Month .. साल Year .. ...
नाम Name ... दर्जा Title .. ... दस्तखत Signature

गते Date	काम गरेको स्थान Working Place	सर्भेलेन्स मुल्यांकन Surveillance	खत सर्भेक्षण Scar Survey	शंकास्पद बिफरको Suspected Smallpox अनुसन्धान Investigation	नतिजा Result बिफर Smallpox	ठेउला Measles	दादुरा Chickenpox	अरू Others	कैफियत Remarks
	जम्मा Total								

Annex 6

S.E.P. 6a

श्री ५ को सरकार

वि. उ. आ. ६ (क)

बिफर उन्मूलन आयोजना

मासिक प्रतिवेदन Monthly Report

जिल्ला.. District महिना . Month साल Year

शंकास्पद बिफरको सूचना Notice of Suspected Smallpox

सूचना संख्या	अनुसन्धान गरेको संख्या	अनुसन्धानको नतिजा				कैफियत
	No. of Investigations	बिफर	ठेउला	दादुरा	अरू	
No. of Notice		Smallpox	Chicken pox	Measles	Other	Remarks

सुपरभाइजर । सहायक सुपरभाइजर Supervisor/Assistant Supervisor

नाम	दर्जा	फिल्ड गएको दिन संख्या	सर्भेलेन्स मुल्याँकन सं.	खत सर्भेक्षण सं.	अनुसन्धान गरेको सं.	कैफियत
Name	Title	Days in Field	No. of Assessments	No. of Scar Surveys	No. of Investigation	Remarks

सिनियर भ्याक्सिनेटर Senior Vaccinator

नाम	फिल्ड गएको दिन संख्या	शंकास्पद बिफरको सूचना संख्या	खोप Vaccination			कैफियत
			प्रथम	पुनः	जम्मा	
Name	Days in Field	No. Suspected Smallpox Cases	Primary	Revaccination	Total	Remarks

Primary Vaccination Done by Others

अर्कले खोपाएका: प्रथम खोप: पुनः खोप: Revaccination जम्मा खोप: Total

कैफियत: Remarks

प्रतिवेदन पठाउनेको नाम Name of Reporter — दर्जा- Title - — —दस्तखत Signature

Annex 6

S.E.P.7

श्री ५ को सरकार

बि. ऊ. आ. ७

Temporary Vaccinators Monthly Report

अस्थायी भ्याक्सिनेटरको मासिक कार्य प्रतिवेदन

जिल्ला District ... — — — — — महिना Month ... — साल Year ... — —

क्रम संख्या	अस्थायी भ्याक्सिनेटरको नाम	पञ्चायत	घरको संख्या	घरके जन संख्या	खोप Vaccination			भ्याक्सिन एम्पुल खर्च
					प्रथम खोप	पुनः खोप	जम्मा	
Serial No.	Name of Temp. Vaccinator	Panchayat	House No.	No. in Family	Primary	Revaccination	Total	Vaccine Ampoules
२								
३								
४								
५								
६								
७								
८								
९								
१०								
११								
१२								
१३								
१४								
१५								
१६								
१७								
१८								
१९								
२०								
२१								
२२								
२३								
२४								
२५								
२६								
२७								
२८								
२९								
३०								
३१								
३२								
३३								
	जम्मा	Total						

Annex 6

S.E.P. 9 |

बि. उ. आ ६

श्री ५ को सरकार

बिफर उन्मूलन आयोजना

खत सर्भेक्षण Scar Survey

अञ्चल Zone ..... जिल्ला District

नगर / गाउँ पञ्चायत Village/Nagar Panchayat

सर्भे गर्ने Surveyor .....

मिति Date .....

चिन्हहरू:–

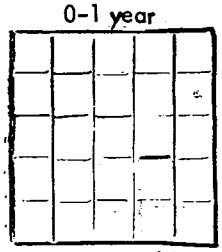
P = बिफरको दाग भएको

X = खोपाएको खत भएको

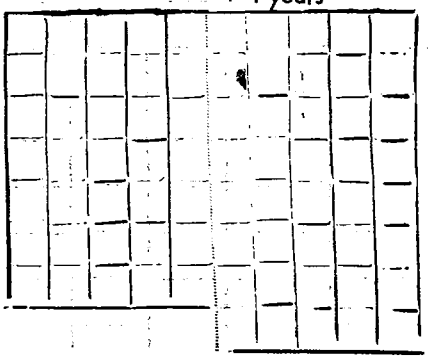
V = भेरियोलेसन खत भएको

O = कुनै पनि खत नभएको

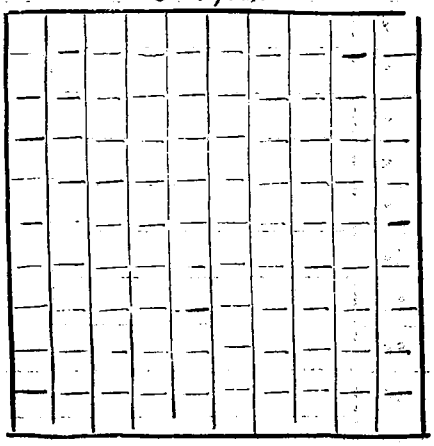
१ वर्ष मुनि
0-1 year



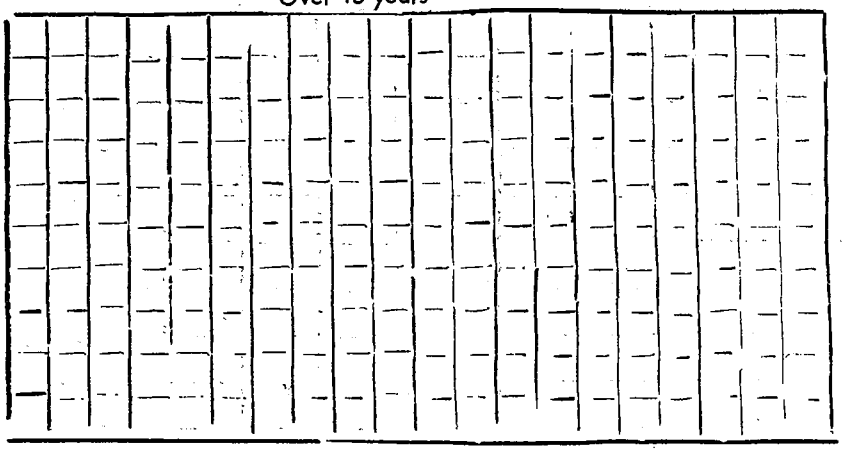
१ देखि ४ वर्ष
1-4 years



५ देखि १४ वर्ष
5-14 years



१५ वर्ष र माथि
Over 15 years



चिन्हको जोड र असुरक्षित प्रतिशत

	१ वर्ष मुनि	१ देखि ४	५ देखि १४	१५वर्षर माथि	जम्मा
P	0-1 year	1-4 years	5-14 years	Over 15	Total
X					
V					
O					
जम्मा	Total				
असुरक्षित प्रतिशत	Percentage unprotected				

Annex 6

बि. उ. श्रा. १०
S.E.P. 10

श्री ५ को सरकार

Result of Scar Survey

खत सर्भेक्षणको नतिजा

अचल Zone .... जिल्ला District .... महीना Month .. साल Year

क्रम संख्या Serial No.	पञ्चायत Panchayat	१ वर्ष मुनी Under 1 year					१ देखि ४ वर्ष 1-4 years					५ देखि १४ वर्ष 5-14 years					१५ वर्ष र माथि Over 15 years					जम्मा Total				
		P	X	V	O	जम्मा Total	P	X	V	O	जम्मा Total	P	X	V	O	जम्मा Total	P	X	V	O	जम्मा Total	P	X	V	O	जम्मा Total

Annex 6

S.E.P. 11a

श्री ३ को सरकार

वि.उ.ख. ११ (क)

बिफर उन्मूलन आयोजना

Outbreak Report

जिल्ला District ... पञ्चायत Panchayat ... वडा नं. Ward No. ... गाउँ Village ...

जिल्लालाई सूचना गर्नेको नाम र ठेगाना Name and Address of Reporter ... ...

जिल्लालाई सूचना गरेको मिति:- Date of Report in District

केन्द्रीय कार्यालयलाई सूचना गरेको मिति:- Date of Report at Head Office

गर्नेको नाम र दर्जा:- Name and Title of Investigator

अनुसन्धान गरेको मिति:- Date of Investigation

कन्टेनमेन्ट शुरु गरेको मिति:- Date Containment Started

स्रोतको नाम र पुरा ठेगाना Name and Address of Source

पहिलो बिरामीको अवस्था Condition of First Case

. . . . . .

. . . . . .

. . . . . .

. . . . . .

बिरामीहरुको नामावली Names of Cases

क्रम सं. Serial No.	नाम Name	उमेर Age	लिङ्ग Sex	घरमूलीको नाम Name of Household	खोपको दाग छ। छैन Scar Yes/No	फोका देखा परेको मिति Date of Rash	कैफियत Remarks

घर परिवार संख्या र खोप List of Houses, Families and Vaccinations

क्रम सं. Serial No.	पंचायत Panchayat	घर सं. No. of Houses	जन संख्या Population	प्रथम खोप Primary Vaccination	पुनःखोप Revaccination	जम्मा खोप Total	कैफियत Remarks

प्रतिवेदन पठाउनेको

नाम:- Name of Reporter

दर्जा:- Title

दस्तखत:- Signature

Annex 6

S.E.P. 12a

श्री ५ को सरकार वि उ.आ. १२ (क)

वित्त उन्मूलन आयोजना

अंचल सुपरभाइजरको मासिक प्रतिवेदन
Zonal Supervisor's Monthly Report

अंचल Zone ..... महिना Month ..... साल Year .....

नाम Name ..... दस्तखत Signature ..... मिति Date .....

जिल्ला District	पंचायत Panchayat	फिल्ड गरेको दिन संख्या No. of Days in Field	अनुसन्धान गरेको संख्या No. of Investigations	सर्भेलेन्स मुल्यांकन गरेको जन संख्या No. of Assessments	सर्भेक्षण गरेको संख्या No. of Scar Surveys

फिल्ड भ्रमणको विवरण :- Description of Field Visits

Annex 6

श्री ५ को सरकार S.E.P. 13

हप्ता नं. Week No. Weekly Report of Smallpox वि. ऊ. फा. १३

बिफरको साप्ताहिक प्रतिवेदन

जिल्ला District ... ... यस हप्ताको आखिरी दिन Week Ending (Date) Year साल Month महिना Date गते

१. १.[ ] यस हप्तामा बिफरको बिरामी पत्ता नलागेमा √ चिन्ह लगाउनु होला Tick if cases found

२. २. बिफरको बिरामी पत्ता लागेमा तलको विवरण दिनु होला। If Cases Found Plese Fill up Following

पंचायत	वडा नं	गाउं	बिरामी संख्या	मृत्यु संख्या
Panchayat	Ward No.	Village	No. of Cases	No. of Deaths

३. पुरानो प्रतिवेदनमा अपघट Changes to last Report

मिति:— Date

जिल्ला सुपरभाइजर
District Supervisor

Annex 6

S.E.P. 14
बि. उ. आ. १४

श्री ५ को सरकार

बिफर उन्मूलन आयोजना

बिफरको सर्भेलेन्स Surveillance of Smallpox

जिल्ला District .... सर्भेलेन्स गर्नेको नाम Surveyor's Name .... दर्जा Title ....

मिति Date	पञ्चायत Panchayat	वडा नं. Ward No.	घर संख्या Number of Houses	प्रधान पञ्च Pradhan Panch	वडा सदस्य Ward Member	स्कूल शिक्षक School Teacher	मन्दिर मेला इत्यादि Temple, Market etc.	बिफरको बिरामी संख्या No. of Smallpox Cases	ठेउलाको बिरामी संख्या No. of Chickenpox cases	कैफियत Remarks

द्रष्टव्यः- बिफर र ठेउलाका बिरामीहरूको नाम र पूरा ठेगाना पछाडि लेख्नुपर्छ।
Write Names and Addresses of Chickenpox cases on Back.

ACTIVE SURVEILLANCE ASSESSMENT

S.E.P. 15

Designation :-

District:-

Assessor's Name:-

Date	Pancha-yat	Surveilla-nce Yes/no	Surveillance School Yes/no	Number of people					Adequate reward slogans yes no	Fever with rash rumours	
				Questioned by you	Who knew of search	Who saw photo	Who knew of reward	Who knew where to report		patient identity	Contents

N.B. At least fifty persons must be questioned in each panchayat

ANNEX 7

NEPAL SMALLPOX ERADICATION PROJECT
OPERATIONAL GUIDE FOR SMALLPOX ERADICATION IN NEPAL FROM SHRAWAN 2032 (JULY 1975)

1. Introduction

The last case of smallpox in Nepal occurred in Morang District on 24 Chaitra 2032 (6 April 1975). Intensive surveillance, including a house-to-house search by Malaria and Integration staff in all the terai districts, with a Rs. 100 reward as an incentive for reporting and finding out smallpox cases, has failed to turn up a single case since then. This is obviously due to the fact that Uttar Pradesh in India is now free of smallpox and Bihar almost free. The problem in India at present is mainly due to importations from Bangladesh. In Bangladesh there are presently less than 1000 outbreaks but all indications are that this figure, which was more than 1200 a month ago, is now rapidly falling.

2. Surveillance

The top priority of the smallpox eradication programme in Nepal is to establish and maintain an intensive active surveillance until two years after the last smallpox case. As before, the basic objectives are to find all smallpox outbreaks quickly and to contain them effectively, thereby interrupting transmission. It is very important to ensure that surveillance is of high quality.

Categorization: For the purpose of surveillance, Nepal has been divided into three categories based upon the susceptibility to importation from India and Bangladesh. A house-to-house search will be done all over the country.

Category I includes all the terai districts and Kaski. In these districts, every house will be visited once every month for smallpox surveillance which will be done by the Junior Auxiliary Health Workers in the integrated districts and by the Malaria House Visitors in the remaining terai districts. The districts in Category I are Jhapa, Morang, Sunsari, Saptari, Siraha, Dhanusha, Mahottari, Sarlahi, Rautahat, Bara, Parsa, Chitaun, Nawalparasi, Rupandehi, Kapilvastu, Dang Deukhuri, Banke, Bardia, Kailali, Lanchanpur and Kaski.

In the districts of Category II, every house will be visited once a month by Malaria House Visitors wherever they operate. The remaining houses will be visited once in two months by the Smallpox Senior Vaccinators. These districts are Ilam, Panchthar, Dhankuta, Tehrathum, Bhojpur, Khotang, Udaipur, Okhaldhunga, Sindhuli, Ramechhap, Makwanpur, Kathmandu, Patan, Bhaktapur, Kabhrepalanchok, Sindhupalchok, Nuwakot, Dhading, Palpa, Arghakhanchi, Gulmi, Tanahu, Syangja, Gorkha, Lamjung, Parbat, Baglung, Salyan, Pyuthan, Surkhet, Doli, Dandeldhura and Baitadi.

In Category III districts, every house will be visited once a month by the Malaria House Visitors wherever they operate. The remaining houses will be visited once in four months by the Smallpox Senior Vaccinators. These districts are Taplejung, Sankhuwasabha, Solukhumbu, Dolakha, Rasuwa, Manang, Myagdi, Mustang, Dolpa, Rolpa, Rukum, Dailekh, Jajarkot, Tibrikot, Mugu, Humla, Jumla, Bajhang, Bajura, Achham and Darchula.

The number of houses to be visited per day by the Junior Auxiliary Health Workers and Malaria House Visitors will be according to the schedule already in operation, while that for the Senior Vaccinators will be determined by the District Supervisor according to the local situation. The number of Senior Vaccinators in each district will also be determined according to the local situation.

In addition, house-to-house surveillance will also be done by Temporary Vaccinators in 23 districts wherever they are employed (see later). When Temporary Vaccinators are working, Senior Vaccinators will function as supervisors.

Annex 7

Surveillance methods: Surveillance will be carried out by visiting every house, school, college, important market, factory, brick kiln, fair and other places where people assemble. The worker will inquire about smallpox, showing the recognition card at the same time, will inform about the reward and will inform where to report in case of smallpox outbreak. When a smallpox case or death, or a suspected case is detected, all information about the name, address, age and sex of the patient must be sent immediately to the District Smallpox Office.

House to house surveillance will be done by workers as mentioned in page 1 of Annex 7. Surveillance in the remaining places like schools, markets, fairs, etc. will be done by Smallpox Senior Vaccinators.

Stencils will be made in every house visited. These are already made by the Junior Auxiliary Workers of Malaria House Visitors. The houses not visited by them will be numbered and stencils made by the Senior Vaccinators as follows:

SEP No. .....

Date	Name	Designation

These stencils should be at or near the door of every house and will also be signed by the supervisors during their visits. Stencils will be written by locally available materials.

Reward slogans will be written by the Senior Vaccinators at the rate of one new slogan per every ward during each visit. The slogan will be

Rs. 100 REWARD

To the first informer of smallpox. Please inform
the nearest smallpox office or health institution.

The slogan must be written in Nepali, legibly, in bold letters, at prominent places and must be signed with date. It will be written by materials locally available.

While visiting house to house, special efforts must be made to meet the Pradhan Panch, ward members, local practitioners and other local leaders for inquiring about smallpox. In addition passive surveillance sources such as class organizations will be developed.

Schools: Schools and colleges are very important sources of information. They draw students from many houses of many villages and students are more likely to volunteer readily any information about smallpox. Hence surveillance in schools and colleges is very economical and quite productive. A list of schools and colleges should be prepared by the District Supervisor and a schedule made to visit all of them regularly according to the categorization of the district. The Reward slogan must be written in every school and college. School teachers will be urged to play an active role between visits by smallpox staff to their school.

Markets: Surveillance in weekly markets is efficient and economical because information can be collected from, as well as dispersed to, a large number of people attending the markets. A list of markets would be compiled by the District Supervisor, and a schedule prepared for visiting important ones regularly.

Conversations with buyers and sellers are most productive when they are entering or leaving markets rather than while they are busy in the market buying or selling. Therefore the market surveillance workers should reach the market place before the crowd and should be placed at access points where they can contact most people entering or leaving the market.

Fairs, festivals etc., are also important places for surveillance, particularly in districts where weekly markets are not held.

3. Report follow-up

Case reports will start coming at an increasing rate. In Morang District, for example, over 60 reports were received during the month of Baisakh. All case reports must be personally verified by the District or Assistant Supervisor. They will be helped by the Zonal Supervisor and the Civil Surgeon at the Zonal Office. If the report load is too much for the supervisors, certain reports may be left to the most experienced and competent Senior Vaccinators.

Whenever there is doubt about the diagnosis, such cases must be verified by the District Supervisors. If still considered doubtful, the Zonal Office and the SEP Headquarters must be telegraphed immediately as in the case of confirmed cases.

All case reports must be entered in a Suspect Case Register as soon as they are received. The register will be kept at every District and Zonal Office and will be maintained in English as far as possible. The result will be entered after verification. This register is useful not only to keep the records, but also to avoid repeated verification of the same cases.

4. Containment

If a smallpox outbreak is detected, immediate and effective containment of the outbreak becomes imperative. At this point, the global eradication programme as a whole can be placed in jeopardy by a single outbreak being poorly contained. Every outbreak must be treated as a health emergency. The following procedures should be carried out in containment:

(a) Use adequate personnel to contain the outbreak quickly by mobilizing the workers from the field and hiring new workers. A containment team should contain about 20 workers.

(b) Enumerate the entire locality including the absentees before vaccination is started. Enumeration should be completed in about four hours. Use form SEP 1(A) for enumeration and vaccination.

(c) Find out the source of infection and look for all smallpox cases. Use SEP 11(A).

(d) Vaccinate the entire locality as fast as possible. Vaccination can be better performed by vaccinators in teams of two, with one supervisor for two such teams. Some of them (four vaccinators and a supervisor) must be kept overnight every night in order to vaccinate those missed during the day. Containment vaccination should be done according to the following priorities:

First priority: households affected
Second priority: 50 households neighbouring
Third priority: remaining population of the affected locality
Fourth priority: remaining people in the panchayat and in 1 mile radius

Annex 7

(e) Watchguards should be placed immediately at every infected house round the clock - two for the day and two for the night. These two watchguards should never leave the house together, and should go on errands one at a time only, so that at least one will be guarding at any given time. The watchguards should be maintained until all scabs have fallen from the patients. Watchguards will be responsible for (i) preventing the smallpox patients from going out of the house and maintaining isolation of the patients; (ii) restricting entry of visitors to the affected houses and vaccinating all persons coming to the affected houses; (iii) noting the details of all contacts leaving for other areas or of those who might have had contact prior to containment; (iv) disposal of scabs and fomites.

Watchguards should be well supervised and their work assessed daily.

(f) Outbreaks should be reported immediately to the Zonal Office and SEP Headquarters, and cross-notification about the source of infection or about the contacts going to other areas should be sent promptly to the concerned districts.

(g) A special house-to-house surveillance should be carried out within a 10 mile radius to detect more cases after the enumeration and initial containment of the affected locality are completed. This will be done by daily wage workers. Experience has shown that most of the sources of infection are within 10 miles of the outbreak, and so are also the secondary outbreaks. A repeat surveillance should be carried out after two weeks to find cases which might have been in the incubation period during the first surveillance.

(h) All outbreaks will be considered active until six weeks after the onset of the last case. Vaccinators will remain in the affected locality as long as the outbreak is active, to vaccinate newcomers and to detect new cases. The affected locality will be visited by the District Supervisor at least twice a week and by the Zonal Supervisor once a week. The Civil Surgeon will be generally responsible for effective containment measures.

Containment action may be summarized in the following steps:

Step 1: Posting of watchguards.
Step 2: Enumeration of the affected locality and looking for all cases.
Step 3: Vaccination of the affected locality starting from the affected houses.
Step 4: Surveillance within a 10 mile radius.
Step 5: Enumeration and vaccination of the remaining people in the panchayat and within a one mile radius.
Step 6: Second surveillance within a 10 mile radius.

Containment of an outbreak is the direct responsibility of the District Supervisor with adequate support from the Zonal Supervisor and the Civil Surgeon. Additional support will also be provided by the SEP Headquarters staff who will visit every outbreak. No effort will be spared from the SEP Headquarters in terms of financial, logistic and technical support. A central surveillance team will be sent as soon as possible after the report of the outbreak is received at the Headquarters. Payment of daily wage workers like watchguards and vaccinators, who will be hired without any formality preferably from among experienced workers, will be made from the special WHO Fund set up for this purpose. Their wage will be according to the locally prevailing rate.

5. Reward

Rs. 100 reward will be given to various persons for every new (previously unknown) outbreak as follows:

(a) Rs. 100 reward to the first public informer of the outbreak.

(b) Second reward of Rs. 100 to the health worker (smallpox, malaria, hospital, health post, etc.) who first collects the information and passes it on to the Smallpox Office.

(c) Third reward of Rs. 100 to the smallpox or malaria staff who first verifies the report as smallpox.

(d) If the report is first verified by the malaria staff, fourth reward of Rs. 100 will be given to the smallpox staff who verifies the report.

The reward will be paid only after verification by the SEP Headquarters staff including WHO staff. If more than one person is involved simultaneously in notification or verification, the reward will be equally shared. No person will get rewarded in more than one category. The reward will be paid out of the special WHO Fund. No reward will be paid if the outbreak is detected more than six weeks after the date of rash of the last case.

6. Vaccination

The districts proposed to be taken up for routine vaccination during 2032/33 (1975/76) are Jhapa, Panchthar, Morang, Dhankuta, Sarlahi, Ramechhap, Kabhrepalanchok, Kathmandu, Nuwakot, Rupandehi, Arghakhanchi, Lamjung, Gorkha, Baglung, Mustang, Rukum, Pyuthan, Bardia, Dailekh, Tibrikot, Kailali, Bajhang and Kanchanpur.

BCG vaccinations will also be done during the year in the districts of Sarlahi, Rupandehi, Lamjung, Bardia, Kailali and Kanchanpur.

The above vaccinations will be given by Temporary Vaccinators.

7. Supervision

Junior Auxiliary Health Workers and Malaria House Visitors will follow their field programmes according to their schedule, and will be supervised by their supervisors as usual.

Senior Vaccinators will spend at least 20 working days per month in the field and will be supervised by Assistant and District Supervisor, each of whom will spend at least 15 working days per month in the field. Zonal Supervisors will also prepare their regular field programmes and will spend 10-15 working days in the field in a month. The Civil Surgeon will regularly supervise the district activities giving more emphasis to susceptible areas. Field allowance will be paid to the Senior Vaccinators and Assistant and District Supervisors according to the number of working days in the field.

8. Assessment

Assessment is very important and all important activities must be regularly assessed.

(a) Assessment of routine surveillance is the responsibility of Assistant and District Supervisors. It will be further supplemented by Zonal and Headquarters staff. Assessment will be done by checking on stencils and inquiring about smallpox, and about the knowledge of the people about the reward. Use Surveillance Assessment Form (SEP 15).

(b) Assessment of containment should be done continually until the outbreak is fully contained. The following activities will be paid particular attention:

(i) Enumeration of the households: whether complete or not.

(ii) Containment vaccination: whether total or not; take rate should be checked.

(iii) Activities of watchguards: whether isolation effective or not; whether all contacts noted or not.

Annex 7

(iv) Surveillance within a 10 mile radius: whether all cases detected or not.

(v) Time from beginning of containment to onset of last case: if it is more than two weeks, it shows that containment has been poor.

Although assessment of containment is the primary responsibility of the District Supervisor assisted by the Assistant Supervisor, it will be further strengthened by the Zonal Supervisor and Civil Surgeon, and also by the Headquarters staff.

(c) Assessment of routine vaccination will be done as usual through scar surveys.

9. Training

District Supervisors will be briefed about these guidelines in the Headquarters. Assistant Supervisors and Senior Vaccinators should be briefed at the district level by the District Supervisor with the help of Zonal Supervisor and also of Civil Surgeon. The malaria staff in hill districts will be trained by district supervisors along with the concerned malaria staff.

10. Reporting

All reports must be sent regularly and in time. Some of the forms have been discarded, some revised and others retained. The revised list of forms are:

Form SEP	To be filled by	Remarks
1	Temporary Vaccinator	as usual
1(A)	Containment Team	for enumeration and vaccination; to be kept at District Office
2(A)	Senior Vaccinators	in place of SEP 2
3(A)	District/Assistant Supervisor	in place of SEP 3
6(A)	District Supervisor	in place of SEP 5 and 6
7	District Supervisor	as usual
8	Supervisors	as usual
9	Supervisors	as usual
10	District Supervisor	as usual
11(A)	District Supervisor	in place of SEP 11
12(A)	Zonal Supervisor	in place of SEP 11
13	District Supervisor	in place of SEP 11
14	Surveillance workers	for surveillance to be kept at district office
15	Supervisors	for assessment of surveillance. Copy to be sent to Zonal Office and SEP headquarters

The weekly telegram will be sent as usual.

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