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# METHODS TO ASCERTAIN THAT SMALLPOX TRANSMISSION IN AN AREA HAS BEEN INTERRUPTED

by

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Smallpox incidence registered a sharp decline in the years 1970 and 1971 in Gujarat State as shown below:

| Year | Smallpox Cases |
|---|---|
| 1968 | 7 249 |
| 1969 | 6 278 |
| 1970 | 2 503 |
| 1971 | 239 |
| 1972 (to end Sept.) | 39 (including 11 importations) |

In 1971, transmission appeared to have been interrupted as a zero incidence was recorded from the month of July onwards. Thus it became necessary to determine whether or not this absence of reported smallpox really implied the interruption of smallpox transmission.

Dr I. Arita, W.H.O. Consultant visited Gujarat State from 16 October to 8 November, 1971, for assessment. On his arrival, the following data were reviewed.

1) Smallpox incidence in the State for the last 5 years.

2) Information about common borders with other States.

3) Details of each outbreak in 1971 and the location of infected villages.

4) Level of vaccination immunity in 1969 and 1971.

5) Epidemiological factors which had sustained indigenous transmission.

6) Surveillance measures which had been instituted.

On the basis of this information, a programme of assessment was worked out which included visiting 11 of the State's 19 districts. The selection of the districts was based on the following:

a) Districts having common borders with the States of Rajasthan, Madhya Pradesh and Maharashtra.

b) Districts which had shown high incidence in the past 2 years.

c) Districts which reported the largest number of cases in the year 1971 (January to June).

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The assessment team consisted of Dr Arita; Dr S.D. Verma, the State Programme Officer; and 4 Senior Para-medical Workers.

On reaching a district the team visited the District Office for appraisal of the surveillance and outbreak containment measures. Weekly reports from Primary Health Centres and outbreak records were thoroughly examined. Blocks in the district were then selected for carrying out an active search for smallpox cases and for assessing the containment measures which had been taken.

Blocks were selected on the basis of the following (Table I):

1) Primary Health Centres submitting irregular 'nil' reports of incidence.

2) Areas where smallpox cases were reported in 1971 or where smallpox had been reported year after year.

3) Industrial/Slum areas with a large turnover of population from Gujarat and neighbouring States.

4) Areas from which suspected cases had been reported to the District Office but had not been visited by District Health staff for confirmation.

5) Areas sharing borders with Rajasthan and Madhya Pradesh.

The team divided itself into 3 groups for visits to selected Primary Health Centres, villages and towns. At the Primary Health Centre, weekly tour diaries of the N.S.E.P. staff were examined to ascertain the extent of their surveillance activities. On the way to villages and in the village groups of people were contacted at bus stands and shops, wherever they were found, to inquire about smallpox occurence in their village or surrounding villages. Visits were also paid to village leaders, Secretaries of the village level administrative bodies (Village Panchayats) and Government staff stationed in villages (especially Public Health staff like M.C.H. Workers). Sub-centres of the Primary Health Centres, M.C.H. Centres, were also specifically contacted. Village children were observed for evidence of fresh pock marks. Children were also asked about persons with fever and rash. Unfortunately, the schools were closed for Diwali vacation and so could not be visited. All reported cases in the area were examined by the teams.

While enquiring about cases with fever and rash, use was made of W.H.O. Recognition Cards. These attracted the villagers, aroused their interest in the disease and made the operation easier.

Each evening the 3 teams met and discussed their findings.

A total of 30 Primary Health Centres and 90 villages were visited by the teams in the 11 Districts as well as the District Offices (Table II). Seventy of the 226 reported up to that time were visited to assess the containment measures taken. Vaccination coverage was also assessed by the teams especially in the areas where outbreaks had been contained. Thus, during these visits it was possible to determine the efficacy of (i) active surveillance activities, (ii) detection of source of infection, (iii) notification of cases, (iv) confirmation of suspected cases by Block & District staff, (v) the containment measures taken and (vi) cross notification.

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This assessment was extremely useful in spotting the less effective aspects of the programme so that corrective measures could be taken. A map depicting the areas of the State visited is shown in Fig. 1.

In 1969 and 1970, as well, a critical review of the on-going programme was made at the Directorate level and it was realised that the programme suffered because (1) there was late notification of cases, (2) the source of infection was not traced in most outbreaks, (3) the containment measures were not prompt and complete and (4) there was a huge backlog of vaccination in the community in certain areas. Because the containment was not complete, the infection lingered month after month in the area and the disease spread from these lingering foci to other parts of the State. The following measures were taken:

1) All staff working in the Block under the Medical Officer, Primary Health Centre now submit a weekly 'nil' report to the Medical Officer, mentioning the names of villages visited by them during the week and certifying that the same are free from smallpox. The Medical Officer, P.H.C., in turn, submits a weekly 'nil' report telegraphically to the District Health Officer and the District Health Officer submits the same in respect of his district to the Programme Officer.

2) The Malaria Surveillance Workers who visit all families in their charge every fortnight have been supplied with prepaid red cards through which they must immediately inform District Health Officers if they come across any suspected case of smallpox. The card gives the name of the patient, age, sex, house number and exact address along with date of detection by the worker who signs and mentions his circle number also.

3) The Vaccination Supervisors and the Sanitary Inspectors of the Primary Health Centres have been asked to carry out Active Surveillance along with vaccination assessment and Rapid Random Scar Surveys in the visited villages. The whole of the N.S.E.P. staff during their visit to the villages are asked to contact village Panchayat members, village leaders, teachers and schoolchildren, and ask all groups of people about any cases of fever with rash. All N.S.E.P. staff have been provided with W.H.O. Recognition Cards for this purpose.

4) A "Note on Surveillance in N.S.E.P." was circulated to all Medical Officers of Primary Health Centres and District Health Officers for implementation in their area. A Gujarati translation of the same is being printed and shall be supplied to each Para-medical Worker for study and implementation.

5) Each reported suspect case must be confirmed by the Medical Officer, P.H.C., and the District Health Officer and also by the Programme Officer or his senior Para-medical Worker. This, incidentally, affords an opportunity to the District/ State Programme Officer to trace the 'Source of Infection' for cross notification and to check the 'containment measures'.

6) Regular visits of Vaccinators to the villages and all houses are ensured by a fixed bimonthly programme; the visits paid to villages are dependent on their population. This way the Vaccinator himself screens his area regularly.

7) Officially, the Secretary of the Village Panchayat - village level administrative body - is responsible for immediate notification of an outbreak of smallpox. The Medical Officer of the P.H.C. has been asked to attend monthly meetings of the Secretaries of the Village Panchayats at the Block for eliciting information about exanthematous fevers in villages under their charge.

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8) The Medical Officer of the P.H.C. has also been asked to attend the quarterly meeting at the Block level of the Chairman of the Village Panchayats to collect information about suspect smallpox cases in their villages. The Recognition Card is used in these meetings.

9) The mobile surveillance teams are detailed for regular active surveillance of slum and border areas and other vulnerable areas. This squad, and other N.S.E.P. supervisory staff, have been specifically instructed to screen all migratory population groups which they come across during their visits.

10) A careful watch is kept on the big industrial concerns and construction projects since there is a large turnover of population in them and they draw labour not only from Gujarat State but also from other neighbouring States.

11) Senior Para-medical Workers are detailed from the State level for the surveillance of vulnerable areas of the various districts to ensure that 'nil' incidence reports really mean a 'zero' incidence.

12) The concerned District Health Officers are kept informed about the reported cases of smallpox from the neighbouring States and are asked to keep a vigil on their area and to screen adjoining borders.

13) The staff has also been instructed to cross into areas outside their jurisdiction or the jurisdiction of this State to trace the source of infection, if need be.

As a precautionary measure the staff has also been asked to determine the source of infection for chicken pox cases for confirmation of diagnosis.

14) Material is collected from suspected and difficult cases for confirmation of diagnosis by the laboratory.

15) Follow up visits each week for 6 weeks are made by the Medical Officers of Primary Health Centres to the affected village. The Medical Officer informs the Programme Officer every week telegraphically about the situation after his personal visit to the affected village. Two visits during this same period are paid by the District office supervisory staff, to ensure that no lingering focus of infection remains in the affected area. The area is also visited by the State level staff as soon as the report of a case is received and also after 6 weeks to check the containment measures and the interruption of transmission.

An indirect judgement about the smallpox-free status of Gujarat may also be made from the fact that no neighbouring State has reported an imported infection from Gujarat State.

While making all these efforts for the stabilization of surveillance operations, efforts are also directed to the vaccination coverage of the susceptible population to see that no person - especially children up to 14 years of age - remains unprotected in the population and also to see that all births, as far as possible, are protected in the neonatal period.

TABLE I

Areas Screened during Active Search for Cases

| | Total No. | Irregular reporting | Reason for Selection | | |
|---|---|---|---|---|---|
| | | | Previous smallpox outbreak | Suspected case report | Endemic border area |
| Block or P.H.C. | 30 | 5 | 15 | 6 | 4 |
| Village or town | 90 | 12 | 49 | 16 | 13 |

TABLE II

Results of active surveillance

| District | Block or P.H.C. | No. of villages or towns visited | Reason for selection & results of Investigation | | | | |
|---|---|---|---|---|---|---|---|
| | | | Irregular reporting | Previous outbreak | Suspected cases report | Endemic border area | No. of smallpox cases found |
| Jamnagar | Kalavad | 2 | - | - | + | - | Nil |
| | Jamjodhpur | 6 | - | + | - | - | Nil |
| Junagadh | Vanthali | 1 | - | - | + | - | Nil |
| | Keshod | 1 | - | - | + | - | Nil |
| | Veraval | 1 | + | - | - | - | Nil |
| | Chuda | 2 | + | - | - | - | Nil |
| | Vadal | 2 | - | + | - | - | Nil |
| | Menerda | 1 | + | - | - | - | Nil |
| Ahmedabad | Dholera | 1 | - | + | - | - | Nil |
| Mehsana | Nana | 10 | - | + | - | - | Nil |
| | Patan ) | 3 | - | + | - | - | Nil |
| | Sariad ) | | - | + | - | - | Nil |
| Banas-kantha | Vadgam | 2 | - | + | - | - | Nil |
| | Malan | 5 | - | - | - | + | 4 Convalescent patients in Rajasthan. |
| | Sihori | 5 | - | - | - | + | Nil |
| | Radhanpur | 1 | - | - | - | + | Nil |
| | Bhabher | 1 | - | - | - | + | Nil |
| Sabar-kantha | Bayad | 3 | + | + | - | - | Nil |
| Panch-mahals | Limkheda | 1 | - | - | + | - | of 4 Chickenpox cases recorded in Jan, 2 were highly suspicious of smallpox |
| | Katuwara | 1 | + | + | - | - | Nil |
| Baroda | Zoz | 16 | - | - | - | + | Nil |
| | Gadhboriad | 3 | - | + | - | - | Nil |
| | Kawant | 3 | - | + | - | - | Nil |
| Surat | Ukhaldi | 1 | - | - | - | + | Nil |
| | Chorasi | 1 | - | + | - | - | Nil |
| | Piplod | 9 | - | + | - | - | Nil |
| Bulsar | Maroli | 4 | - | + | - | - | Nil |
| | Rohina | 5 | + | - | - | - | Nil |
| | Amalsad | 1 | - | + | - | - | Nil |
| Broach | Jambusar | 10 | - | - | + | - | Nil* |

* 53 suspected cases reported Jan - May 1971

Figure 1

GUJARAT STATE