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This Month

National Smallpox Eradication Programme—A Review

Assessment of Smallpox Eradication Programme

Smallpox and its Spread

Swasth Hind

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**SMALLPOX
ERADICATION
NUMBER**

SWASTH HIND

Objectives

Swasth Hind (Healthy India) is a monthly journal in English published by the Central Health Education Bureau, Directorate General of Health Services, Ministry of Health, Government of India, New Delhi. Some of its important objectives and aims are to :

REPORT and interpret the policies, plans, programmes and achievements of the Central Ministry of Health.

ACT as a medium of exchange of information on health activities of the Central and State Health Organizations.

FOCUS attention on the major public health problems in India and to report on the latest trends in public health.

KEEP in touch with health and welfare workers and agencies in India and abroad.

REPORT on important seminars, conferences, discussions, etc., on health topics.

Articles on health topics are invited for publication in this journal. State Health Directorates are requested to send reports of their activities for publication.

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OUR COVER

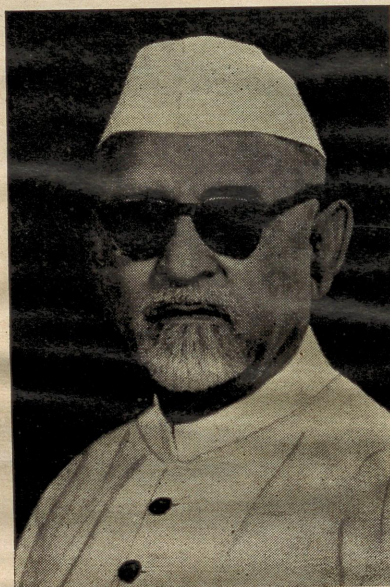
Eradication of smallpox from India is our aim. And this can be achieved if the entire population—infants, children, adults and the old—get vaccinated periodically. The National Smallpox Eradication Week is being observed from September 25 to make the people aware of the need for vaccination. Let us dedicate ourselves to the task and help our nation take a place among those who have wiped out this disease completely. Our Cover shows primary vaccination of a child and re-vaccination of an adult.



RASHTRAPATI BHAVAN
NEW DELHI-4
August 24, 1963

Smallpox Eradication Week is being observed this year from the 25th September to the 1st October. Much has been accomplished in the national programme to stamp out this dread disease and over 111 million people have been vaccinated, but it is necessary to protect the entire population if smallpox is to be wiped out completely. For this, cooperation of everyone is essential and I trust that it will be forthcoming.

S. Radhakrishnan
(S. RADHA KRISHNAN)



VICE-PRESIDENT

INDIA

NEW DELHI

August 21, 1963

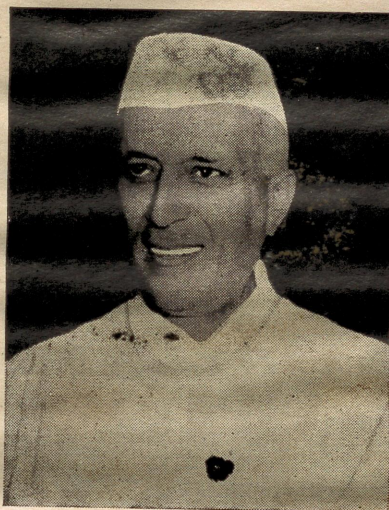
I am glad to know that Smallpox Eradication Week will be celebrated from the 25th September to 1st October.

It is a pity that smallpox continues to be prevalent in this country accounting for substantially high morbidity and mortality. In most of the advanced countries of the world this communicable disease has been more or less completely eradicated. If Health Ministry's endeavours have to succeed they must have the full cooperation of the people. The officials and non-officials of the various voluntary organizations in the country will have to work with a missionary zeal. I do hope such cooperation will be forthcoming in abundant measure.

I send my best wishes for the success of efforts of Health Ministry in eradicating this dreadful communicable disease.

A handwritten signature in dark ink, which appears to read 'Zakir Hussain'. The signature is written in a cursive style with a horizontal line underneath.

(Zakir Hussain)



NEW DELHI

September 16, 1963

Before discovery of vaccination, smallpox was a major killer of mankind in all parts of the world and it is on record that smallpox killed one out of every five infants before they reached the age of five years.

The countries, that have taken up systematic mass vaccination campaigns, have now completely eradicated smallpox, but in our own country, in spite of vaccination having been in vogue for more than 100 years, smallpox epidemics have been recurring with periodic cyclicity every five to seven years claiming a heavy toll of life. The reason is that there has been no systematic vaccination of all our people so far. It was in view of this that National Smallpox Eradication Programme was launched last year in order to rid the country of this scourge. This year a concerted drive is being made beginning 25th September to give an increasing tempo to the programme.

No programme in health can, however, succeed without the whole-hearted cooperation of the people. I hope the much needed cooperation will be forthcoming in an abundant measure so that the targets set up by the Ministry of Health are achieved and India becomes free from the stigma of being an endemic home of this perfectly preventable disease.

Jawaharlal Nehru



MINISTER FOR HEALTH, INDIA
NEW DELHI
August 19, 1963

I am very happy that this year a whole week beginning 25th September is being observed as a Smallpox Eradication Week to focus concerted attention all over the country both in urban and rural areas for preparing a climate for the mass acceptance of vaccination, and increasing the tempo of the crash programme.

We are entering the second year of implementation of the National Smallpox Eradication Programme. I understand that 111 million people have been vaccinated so far but it cannot be said that in the districts covered by this programme, we have vaccinated all the inhabitants of the district and thus completed the programme. This means that intensive mopping up operations are necessary during this week and for this the help of staff and the leaders of the community everywhere is necessary.

Progress has not been uniform in all the States. While a few States have vaccinated more than half of their population, majority of the States and Union Territories have to redouble their efforts and go all out to achieve the objectives in view. It must be remembered that we can eliminate smallpox from the country once for all during the coming year if all of us make up our minds to do so.

For the complete success of this programme, not only sustained efforts of public health authorities in every district of every State are necessary but coupled with that, active cooperation of all sections of people is equally important. In the name of religious and other prejudices, let us not expose our people to avoidable loss of life and suffering. Smallpox must disappear from India. It is a stigma on the fair name of our country which must be removed.

Sushila Nayar

(Sushila Nayar)

NATIONAL SMALLPOX ERADICATION PROGRAMME—A REVIEW

Dr K. M. Lal

THE National Smallpox Eradication Programme was launched in a majority of States with the full number of sanctioned units from October/November 1962. Mysore started the programme in February 1962, Punjab during end of May and Gujarat from July 1962. Some other States like Rajasthan started the programme from January 1963, while Madras launched it from March 1963. Prior to the launching of the National Smallpox Eradication Programme, pilot projects had been carried out in all the States and in the Union Territory of Delhi.

The total number of units working in the whole country is 150 but progress in all the States is not uniform. While Mysore, Punjab and Jammu and Kashmir have each covered more than 50 per cent of their population, overall coverage in other States varies from about 15 to 30 per cent. The number of both primary and re-vaccinations performed in each State and Union Territory according to information available with us up to 31 July, 1963 is given on next page—see Table.

According to the present rate of progress, it is expected that only two States will complete their targets by the middle of 1964, and simultaneously get ready to observe obligations of maintenance phase. Other States are expected to complete the attack phase of the programme by March 1965 and one or two States may go up to the end of 1965. Simultaneously all States have been enjoined to carry out mopping-up and surveillance operations in areas where coverage has not been very nearly 100 per cent and utmost emphasis is being laid that no new-born infant should escape primary vaccination and that there should be regular re-vaccination at the ages 5, 10, and 15 and that mass vaccination of contacts should take place on the occurrence of sporadic cases of smallpox.

Three Essential Fundamentals

There are three essential fundamentals for the success of this programme. Availability of a potent and stable vaccine in the field is one such basic factor. Russian freeze-dried vaccine is being used throughout the country for the eradication programme. It is being ensured that supplies of this vaccine do not get depleted and demands of all States, Union Territories, Corporations, etc., are being fully met at present. States and Corporations that had, in the first instance, not taken up the use of freeze-dried vaccine are now convinced of its efficacy as it gives a much higher success rate in re-vaccinations as compared to the liquid lymph vaccine. All vaccines, whether freeze-dried or liquid lymph, are being subjected to potency testing on eggs. Only vaccines of accepted potency are being used in the field. Freeze-dried vaccine is giving, on an average, a success rate of 50-60 per cent in re-vaccination and nearly 100 per cent in primary vaccination. Whereas liquid lymph vaccine gives, on an average, a success rate of 90-95 per cent in primary and only 20-30 per cent in re-vaccination.

Freeze-dried Vaccine

The freeze-dried vaccine, conforming to WHO standards, has already been produced by State Vaccine Institute, Patwadangar, U.P. and mass production now is on the way. Freeze-dried vaccine produced at King's Institute, Guindy, has been sent to WHO for potency testing. Vaccine Institutes at Hyderabad and Belgaum have also been selected for production of freeze-dried vaccine and necessary formalities in connection with the training of staff and supply of equipment by WHO/UNICEF are being processed.

Another basic factor for the success of the programme is the existence of a devoted public health organization able to vaccinate the population entrusted to its care and exercise constant supervision over the vaccination work so that no lacunae may remain both in the enumeration of the population and in the recording of results.

The third factor for a successful programme is the cooperation of the people. For the success of such gigantic public health programme, it is necessary that all sections of the public should appreciate and realize that vaccination is for their own good and that untold suffering and misery can be avoided if everyone gets himself or herself

NUMBER OF VACCINATIONS PERFORMED

Name of State/Admn.	Popula- tion in lakhs	Total No. of vaccinations performed			Percentage of population covered	Period ending
		Primary Vaccination	Re-vaccination	Total		
1. Andhra Pradesh	359.78	6,77,254	55,39,681	62,16,935	17.27	30.6.63
2. Assam	118.60	4,86,549	22,57,345	27,43,894	23.12	15.6.63
3. Bihar	464.57	4,38,124	64,50,337	68,88,461	14.82	15.6.63
4. Gujarat	206.21	5,70,741	47,66,688	53,37,429	25.87	31.5.63
5. Jammu & Kashmir	35.83	1,99,754	19,94,259	21,94,013	61.26	31.5.63
6. Kerala	168.75	4,56,810	42,50,375	47,07,185	27.89	30.6.63
7. Madhya Pradesh	323.94	18,09,783	77,09,811	95,19,594	29.38	15.6.63
8. Maharashtra	347.17	5,32,725	37,22,995	42,56,720	14.30	15.5.63
Bombay						
Corporation	41.46	68,329	12,58,749	13,27,078		15.5.63
Nagpur						
Corporation	6.42	1,687	66,752	68,439		15.5.63
9. Madras	336.50	3,58,272	69,44,633	73,02,905	21.67	18.5.63
10. Mysore	235.47	9,08,398	1,16,51,319	1,25,59,717	53.33	30.6.63
11. Orissa	175.66	5,72,765	35,17,643	40,90,408	23.28	30.4.63
12. Punjab	202.98	9,78,098	1,02,01,532	1,11,79,630	55.07	30.6.63
13. Rajasthan	201.46	4,42,375	24,88,614	29,30,989	14.54	15.6.63
14. Uttar Pradesh	737.53	25,14,328	1,52,08,137	1,77,22,465	24.28	15.6.63
15. West Bengal	285.68	5,94,837	40,64,607	46,59,444	22.46	15.6.63
Greater Calcutta	35.00	1,35,186	19,81,869	21,17,055		18.5.63
Calcutta						
Corporation	29.00	24,780	10,53,410	10,78,190		18.5.63
*16. Himachal Pradesh	13.50	22,357	2,39,365	2,61,722	18.35	31.3.63
17. Delhi	29.40	3,22,586	32,61,703	35,84,289	63.00	31.5.63
					by	
					independent	
					assessment	
18. Manipur	7.78	60,370	2,85,818	3,46,188	44.47	30.6.63
19. Tripura	11.41	1,00,331	5,30,557	6,30,888	55.21	31.5.63
20. Andaman & Nicobar Islands	0.63	367	4,283	4,650	7.31	8.6.63
21. Laccadive, Minicoy & Amindivi Islands	0.24	1,485	8,399	9,884	40.90	31.3.63
22. NEFA	3.30	4,702	11,822	16,524	4.84	31.3.63
23. Dadra & Nagar Haveli	0.58	2,376	33,606	35,982	61.20	31.3.63
GRAND TOTAL		12,285,369	99,504,309	111,789,678	25%	

*These figures include the vaccinations performed during the Pilot Project period.

vaccinated. To make people accept vaccination, health education work, properly conducted, should precede mass vaccination drive and should be continued, if possible, even during the mopping-up and maintenance phase.

Smallpox Eradication Week

This year, a whole week beginning 25 September is being observed as National Smallpox Eradication Week to arouse consciousness among the people to accept vaccination with the object of carrying conviction that :

- (i) Smallpox is a perfectly preventible disease ;
- (ii) Untold suffering and misery can be avoided if everyone gets himself vaccinated ;
- (iii) We can eradicate this scourge from our country by successfully carrying out mass vaccination drives amongst the entire population; and
- (iv) We should give an increasing tempo to the smallpox eradication programme with the help and cooperation of official, non-official and voluntary agencies.

Assessment and Evaluation

A Committee was constituted by the Ministry of Health in March 1963 to independently assess and evaluate the Smallpox Eradication Programme in the Union Territory of Delhi in its attack phase and to find out whether it meets the criteria for entering the maintenance phase. Before starting the assessment and evaluation, the Committee laid down certain criteria for the assessment of the attack phase and also for the maintenance phase, and these criteria now form a very valuable guideline for future assessments of this kind both concurrent and terminal which are in the process of being started in several States, where attack phase of the programme has been completed or about to be completed.

The Delhi Committee completed the assessment work, both by observations in the field, challenge vaccination of stratified random sampling of the population, study of epi-centres and the comparison of the Corporation vaccination registers with the new registers prepared by the assessment investigators. It came to the conclusion that smallpox

eradication programme in the Union Territory of Delhi has not yet fully met the criteria for entering into the maintenance phase, as more than 80 per cent of every sector of the population had not been successfully vaccinated or re-vaccinated, coverage being only 63 per cent and the quality of vaccinations being 86 per cent. The Committee made concrete recommendations for removing shortcomings and the lacunae pointed out in detail in the report. The report has been circulated to all State Governments and the officers-in-charge of the eradication programme so that the mistakes pointed out by the Committee may not be repeated.

Epidemiological Investigation

Epidemiological investigation of several epidemics of smallpox has revealed that a few cases of smallpox occurring in September, October and November 1962, were not taken note of by the respective State health authorities, resulting in flare-up of epidemic conditions in December 1962 and January and February 1963. Detailed investigation further revealed that there was a big time-lag in the reporting of cases of smallpox, that a lot of newborn infants had escaped primary vaccination and that cases admitted to Infectious Diseases Hospital were mostly children who had remained unvaccinated and adults who have had no re-vaccination.

Difficulties and Experiences

Barring a few States, coverage on the whole during the first impact of the attack phase is not at all adequate and mopping-up and surveillance operations have to be a regular feature to achieve the desired coverage. Supervision over the vaccination staff and supervisory inspecting staff is not adequate resulting in many lacunae both in the enumeration of the population and in the recording of results. Cooperation of the people is not forthcoming in an abundant measure for the achievement of the targets within the stipulated period. At many places, specially in urban areas, there is resistance to vaccination out of mere indifference. At other places it is due to ignorance and wrong beliefs. Thus, the importance of the programme is not appreciated.

Vaccination Complications

We have by now vaccinated nearly 100 million population with freeze-dried vaccine but complications of post-vaccinal encephalitis reported so far are only 12. Revised instructions have been issued regarding reducing the number of insertions in the case of primary vaccination from four and three to only two. It has been repeatedly stressed that only one insertion be given in children above four years who are getting vaccination for the first time.

Targets

The original target for completing the attack phase of the programme was two years but seeing the present progress in all the States, only Mysore and Punjab are expected to complete the programme including mopping-up operations in nearly two and a half years and achieve the desired coverage. Other States are likely to take nearly three years to complete the attack phase and carry out effective mopping-up operations.

Modifications in Scheme Targets

The Expert Committee on Smallpox had only projected attack phase of the programme in achieving the target of eradication. But in the actual experience, it has been found that the attack phase of the programme has to be supplemented with mopping-up and surveillance operations to achieve more than 90 per cent coverage. It was considered earlier that a coverage of 80 per cent of all sections of the people will achieve eradication. But the independent assessment and evaluation of the smallpox eradication programme in Delhi has revealed that we have to aim at 100 per cent coverage before we can achieve eradication. Hence mopping-up and surveillance operations have to form a very essential facet of the attack phase of the programme. Detailed instructions have been sent to States so that they carry out effectively mopping-up operations to reach at least more than 90 per cent cover-

age if the eradication units have moved from that area. Unless this much coverage is achieved, maintenance phase operations cannot be started.

It has also to be stressed that maintenance phase operations also form an important facet of the eradication programme. Eradication will be considered as achieved only when for three years in succession after the attack phase, there are no cases of smallpox in any territory.

The continued occurrence of cases of smallpox in several pilot project districts and their subsequent epidemiological investigation is a pointer in this direction. Cases have been occurring in those pilot project districts where coverage was not adequate in the first instance and mopping-up and surveillance operations were not carried out and no rigid planning was done to carry out obligations of the maintenance phase. The normal health staff has to be augmented where necessary and responsibility fixed sector-wise to achieve the ultimate goal of eradication.

Adjoining Countries

To be effective, eradication of smallpox makes it desirable that all adjoining countries develop synchronized mass vaccination campaigns. So far as is known, Pakistan and Nepal have yet to develop systematic mass vaccination of their total population, their current activities being limited to local control programmes. Smallpox eradication programmes conducted in Assam and Union Territory of Tripura as also in parts of Rajasthan, Punjab, Jammu & Kashmir bordering on Pakistan, along with the part of Bihar bordering on Nepal can become infructuous if the adjoining territories do not simultaneously undertake smallpox eradication. There should not be any reservoir of infection either in our country or in the adjoining countries of Pakistan and Nepal, if the danger of importation of the disease to countries that have eradicated it, is to be removed.

Assessment of Smallpox Eradication Programme

Dr S.C. Seal

INDIA still remains the endemic home of smallpox, but many countries in the world have been able to eradicate it, because it is one of the diseases against which a reliable preventive measure in the form of vaccination is available. What is needed is its intensive and systematic application. The reasons for the condition remaining static in India are manifold, but the commonest ones are:

1. Incomplete registration of births leading to incomplete primary vaccination and accumulation of susceptibles.
2. Inadequate efforts to carry out a thorough vaccination and re-vaccination programme year to year, resulting in further accumulation of susceptibles and periodic rise of epidemics of smallpox. Spurtive vaccination programme is launched only when the disease appears in a serious epidemic form.
3. Uncontrolled movement of the new-born from the towns to the villages and *vice versa* leading to the escape of a sizeable sector of susceptibles.
4. Lopsided re-vaccination programme covering only those who accept it repeatedly.

5. Certain amount of malpractices in preparing the returns of vaccination and re-vaccination work.

6. Shortage of lymph production in the country and lack of facilities for maintaining a uniform standard.

7. Quick deterioration of liquid lymph vaccine during field work and unsuitability of certain seasons for vaccination work.

8. Incomplete and defective record keeping and reading of results.

9. Absence of uniform legal measures throughout the country such as, compulsory certification of births, deaths and compulsory vaccination and re-vaccination, notification of smallpox cases, etc.

10. Existence of conscientious objectors and those who evade vaccination due to superstition, religious beliefs and ignorances.

11. Absence of specific treatment for smallpox and incomplete reporting, and hiding of smallpox cases.

12. Inadequate arrangement for the control of epidemic, investigation and follow-up of cases and contacts.

13. Unsatisfactory management of the existing Infectious Diseases Hospitals.

14. Rapid increase of population imbalancing the vaccinator-population ratio.

Expert Committee

The Ministry of Health, Government of India, took note of the recurring epidemics of smallpox with its appalling consequences namely, death, disability and disfigurement, and of all existing shortcomings of the vaccination programme in the States. It decided in 1958 to appoint an Expert Committee to examine the question in all its aspects, and to suggest ways and means for the eradication of smallpox. It is a move in the right direction. This Committee in collaboration with similar committees formed simultaneously in the different States of India examined the problem of smallpox along with another equally important disease—cholera—and made certain recommendations to the Government of India for dealing with them. The Government accepted these

recommendations and decided to launch a programme of eradication of smallpox in the first instance.

Main Recommendations

The eight important steps towards the achievement of this programme were :

- (1) Adoption of measures for proper recording of births and deaths so as to know the exact position in regard to the number of new-born infants who will have to be vaccinated against smallpox and the places and situations where smallpox deaths were occurring so as to adopt appropriate preventive measures in time ;
- (2) Adequate production and supply of potent lymph vaccine of standard quality and certain amount of dried lymph vaccine for use in the eradication programme, along with arrangements for storage and preservation of lymph in various centres and sub-centres as well as during actual field operations ;
- (3) Setting up of an organization for detection of smallpox cases at an early stage and notification of such cases in time to the public health authorities for taking appropriate measures ;
- (4) Preparation of programme schedule and training of vaccinators ;
- (5) Institution of pilot projects and estimation of costs of smallpox eradication programme, and enumeration of families with their members in all areas in the country prior to the launching of the main eradication programme ;
- (6) Intensified health education measures prior to and during the operation of the programme ; and
- (7) Enactment of laws making primary vaccination and re-vaccination compulsory throughout the country ;
- (8) Launching of the actual programme, *i.e.*, to vaccinate all persons of all ages and sexes throughout the country irrespective of their

previous vaccination status and recording of the results in the register prepared for the purpose.

According to the recommendations, steps were taken to augment the production of both dry lymph vaccine and liquid vaccine in the country. Pilot projects were set up in the States to gain information on the requirements of staff, finance and the possible difficulties to be overcome. The Government also appointed 'Smallpox Pilot Projects Committee' to study the results of the pilot projects and to recommend measures to be taken during the eradication programme.

Delhi Programme and Assessment

A pilot project was started in Delhi and New Delhi areas in 1960. This was eventually converted into an actual eradication programme. In spite of this, programme having been pursued for over two years and 31 lakh people vaccinated or re-vaccinated during this period, (as claimed by the Delhi Corporation) Delhi was having epidemic of smallpox particularly during the first quarter of 1963. The Ministry of Health thought it appropriate to appoint a committee for carrying out an independent assessment and evaluation of the Smallpox Eradication Programme in the Union Territory of Delhi in its attack phase. It was considered that the results would be helpful not only for Delhi but would also throw light on the shortcomings of the programme which might be operating in other areas so that timely action might be taken to correct those shortcomings and overcome the difficulties that arise. This committee* in its initial deliberations developed criteria and methodology for the assessment work. It may be mentioned here that the entire eradication programme was divided into three stages: (1) the attack phase, (2) the maintenance phase, and (3) actual eradication phase. The criteria recommended by this committee are as follows :

Criteria for assessment of the attack phase

I More than 80 per cent of every sector of the population have been vaccinated or

*Members of the Committee were : Chairman—Dr S. C. Seal, (Directorate General of Health Services) ; Member—Lt.-Col. S. L. Kalra, (All-India Institute of Medical Sciences) ; Dr Harold Frederiksen (US-AID) ; Dr M. Radovanoic (WHO) ; Dr V. Parisi (WHO) ; Dr P. K. Topa (Uttar Pradesh) ; Dr L. Ramachandran (Delhi) ; Member-Secretary—Dr K. C. Patnaik (Directorate General of Health Services).

re-vaccinated by the campaign staff within a period of two years. (All attempts should have been made to cover 100 per cent of the population.)

- II (a) Virtually all primary vaccinations have been successful.
 - (b) More than 50 per cent of re-vaccination in persons above 25 years of age vaccinated more than five years ago have been successful as evidenced by vesiculation six days after vaccination.
 - (c) Challenge of those vaccinated or re-vaccinated by the campaign (within the past two years) by re-vaccination (at the time of assessment) generally does not result in primary or accelerated 'takes' (the sample would include unvaccinated persons as control).
- III Apparent or virtual interruption of transmission has been achieved (*i.e.*, virtually all cases are proven to be imported or introduced).
- IV Adequate facilities are available to meet the criteria for the maintenance phase without interruption of the continuity of the campaign.

Criteria for the maintenance phase

- I A high level of immunity is being maintained, (since the attack phase) by routine vaccination of virtually all infants and by re-vaccination of more than 80 per cent of the population once more within five years, whereupon the new generation would be re-vaccinated at several points of school attendance (*i.e.*, at ages 5, 10 and 15).
- (a) If reporting of births is less than 90 per cent complete a system of surveillance should be set up for detection of all births for the successful implementation of the policy of routine vaccination of all infants.
- (b) If routine re-vaccination is inadequate to maintain a high level of immunity in more than 80 per cent of the population, periodic mass re-vaccination supplements routine re-vaccination.

- II (a) Virtually all primary vaccinations are successful.
- (b) More than 50 per cent of the vaccination in persons (who had not been re-vaccinated before and had their primary vaccination prior to the campaign) are successful as evidenced by vesiculation six days after the vaccination.
- (c) Challenge of those vaccinated or re-vaccinated by the campaign (within the past years) by re-vaccination (at the time of the assessment) generally does not result in primary or accelerated 'takes' (the sample would include unvaccinated persons as control).

III Facilities and measures for case detection, laboratory confirmation, case investigation and contact vaccination along with the maintenance of a high level of immunity in the community are sufficient to limit the spread of infection from imported cases to the first generation of cases (*i.e.*, introduced cases).

- (a) If reporting of mortality (due to all causes) is less than 90 per cent complete, it would be presumed that reporting of smallpox is also incomplete, in which event a system of smallpox surveillance and pox surveys (of those born since the attack phase) would supplement the inadequate reporting of smallpox.

Criteria for conditional certification of eradication

- I Transmission has been interrupted for more than three years.
- (a) If reporting of mortality (due to all causes) is less than 90 per cent complete, apparent interruption of transmission (as evidenced by the absence of reporting cases and deaths) is subject to confirmation by the results of smallpox surveillance and pox surveys (of those born since the attack phase). The pox surveys would be incorporated either in the system of surveillance or in cycles of mass vaccination supplementing inadequate routine re-vaccination.

II The area from which eradication of smallpox is to be declared should neither be contiguous with areas of continued endemicity nor exposed to the unrestricted influx of smallpox cases. Thus interruption of transmission would have been synchronized throughout the area within the barriers of quarantine (*i.e.*, the national territory).

III The certification of eradication is subject to the condition that the criteria for successful maintenance have been and will be met until global or true eradication of smallpox renders maintenance unnecessary.

The Committee after completion of the assessment work through field observation, challenge vaccination of stratified random sample of population, study of epicentres, comparison of the Delhi Municipal Corporation's vaccination registers with new registers prepared by the Assessment Investigators and after deliberations came to the following conclusions :

Conclusions

(i) The Smallpox Eradication Programme of the Union Territory of Delhi has not yet fully met the criteria for entering the maintenance phase.

(ii) More than 80 per cent of every sector of the population by age, sex and residence as required has not been successfully vaccinated or re-vaccinated by the Corporation during the campaign, the coverage being 63 per cent and the quality of vaccinations being 86 per cent.

(iii) Interruption of transmission has not yet been achieved, there being in the first three months of 1963 a total of 223 cases with 3.6 local cases for every imported case, distributed in 25 foci in only six of which local infection may be considered to have been introduced from outside while in the remaining 19 it is the result of autochthonous (local or indigenous) infection.

(iv) Adequate facilities are not available at present to meet the criteria for entry into the maintenance phase without interruption of the continuity of the campaign namely,

(a) a system of surveillance to compensate for deficient reporting of births, which is basic for a policy of routine vaccination during infancy, and

(b) a system of surveillance of smallpox which is required to reduce the time-lag between the onset of the first case and remedial action (*i.e.*, contact vaccination and isolation) taken in the locality which has been 24 days on the average during the first quarter of 1963.

(v) During the field investigation several vulnerable spots such as labour camps, brick kilns, *jhuggies* and domestic servant population came to the notice of the Assessment Committee. Special effort to keep a high level of immunity in this population by vaccination and re-vaccination is an urgent necessity.

(vi) The criteria of more than 50 per cent successful takes amongst the vaccinated in the age-group above 25 years could not be examined due to the paucity of recording of the results of re-vaccination in the Corporation registers in sufficient numbers in this age-group.

Shortcomings

(vii) The following shortcomings were noted in the vaccination programme :

Enumeration, recording of data and of results were highly incomplete and irregular which resulted in great difficulties in assessment and will be a serious impediment for elaboration and proper utilization of the data necessary to obtain the evidence to decide whether the criteria are being met at every stage of the programme.

(viii) There has also been a lack of uniformity in the use of abbreviations which is a dangerous practice and leads to a lot of confusion.

(ix) Having dwelt on the shortcomings of the campaign, let it also be said that much has been achieved so that once the measures outlined in the recommendations have been successfully initiated, without interruption to the continuity of the campaign, the Smallpox Eradication Programme in the Union Territory of Delhi can be considered to enter into the maintenance phase.

(x) In view of the continued occurrence of smallpox cases even after the overall immunity level has reached 84 per cent in the Union Territory of Delhi and also in view of the high endemicity of smallpox in the country, the Committee feels that the standard of 80 per cent level of herd immunity, even if uniformly distributed in all sectors may not be sufficient to

prevent the continuance of transmission in the community. If eradication has to be achieved the aim should be to reach 100 per cent level.

Recommendations

Reviewing the findings as above, the committee recommended that the following measures should be taken by the Delhi Corporation to ensure early completion of the attack phase, the maintenance of high level of immunity and the interruption of transmission of smallpox as long as the threat of re-introduction of smallpox persists.

1. The Corporation should complete the enumeration and repeat house-to-house vaccination or re-vaccination of the pre-school population and the non-school population up to the age of 14 and all others that have not been enumerated, vaccinated or re-vaccinated by the campaign so that virtually all in these groups will be protected prior to the next transmission season.

2. It is recommended that a special squad should be established as part of the eradication programme to keep a continuous vigilance and for carrying out vaccination and re-vaccination work among the floating population in brick kilns, labour camps, *jhuggies*, temporary establishments, etc.

3. Establish or utilize a system of surveillance :
- (a) to achieve the notification and routine successful vaccination of virtually all births within six months of birth, and
 - (b) to supplement and speed up the notification of smallpox.

4. Establish a system of routine vaccination during infancy by a closely supervised squad or squads so that all infants are vaccinated within three months of their birth. Any failures will again be vaccinated before six months.

5. Establish an Epidemiological Unit with a flying squad to undertake contact investigation and arrange immediate contact vaccination of all close and remote contacts.

6. Upon completion of the vaccination or re-vaccination of pre-school group and non-school groups up to the age of 14 years, 25 per cent of the entire population should be vaccinated or re-vaccinated annually by house-to-house visits, so that

the entire population will be reached once more within a period of four years.

7. In the implementation of the above recommendations attention should be given to the completeness of coverage which should be uniformly high in all sectors and sections of population as the assessment has observed considerable difference in the levels of immunity in different sectors of population.

8. Upon completion of the vaccination or re-vaccination of the entire population, vaccinate or re-vaccinate the school population on entering school and at ages 8, 11 and 14.

9. The vaccination centres should be staffed by personnel other than those expected to undertake house-to-house vaccination which is the basic approach to smallpox eradication.

To ensure systematic house-to-house re-vaccination by closely supervised teams of vaccinators, no out-of-turn calls for the vaccination of individual households should be accepted, unless it is for primary vaccination of an infant or for vaccination or re-vaccination of contacts of a case of smallpox.

10. Establish a system of independent and continuous self-assessment, whereby 10 per cent of the primary vaccination and 50 per cent of re-vaccination would be inspected by Senior Inspectors, who would have the responsibility of consecutive inspection of 'takes', but not the concurrent supervision of vaccination. This means that inspection of 'takes' will not be performed by the vaccinators or their immediate supervisors. The medical officer will double check the results of inspection of 'takes' performed by the Senior Inspector. The results of the consecutive inspections should be routinely tabulated to permit continuous evaluation of the quantity and quality of the work of each vaccinator from month to month. Any vaccinator or inspector who is unable to meet the established criteria for quantity and quality of work required for the eradication of smallpox, should not continue to be employed by the smallpox eradication programme.

11. Noting the virtually absolute failure of public and physicians to report the first case of smallpox promptly, if at all, and noting the time-lag of 24 days between the onset of the first case in an area and the compulsory removal of a case from that area

to the isolation hospital, it is recommended that the policy of mandatory removal be reviewed in consultation with the Draft Model Public Health Act, Section 11 (i) and (ii) (Chapter VIII).

12. Establish a laboratory—as part of Epidemiological Unit to facilitate confirmation of smallpox in all suspected cases of smallpox and all chickenpox cases.

13. Develop reporting and routine investigation of all cases of chickenpox as well as smallpox.

14. It is further recommended that the Centre in cooperation with the Corporation undertake a trial to compare the relative effectiveness, efficiency

and economy of the current equipment and method of vaccination involving the use of the rotary lancet with that involving the use of straight brass pins as disposable vaccino-styles.

15. In view of the frequent internal and external movements of families, the Committee feels that an introduction of 'family card system' would obviate the difficulties resulting from such frequent movement and ensure better vaccinal status of the family.

16. It is recommended that prior to undertaking the house-to-house vaccinations listed under other headings of the recommendations that the enumerators, vaccinators and inspectors be given a refresher

Different types of reaction after vaccination—Vesicle (left) and Dry Vesicle (right)





Different types of reaction after vaccination—pustules

course in their respective duties. All new recruitments in these categories should be given a thorough training irrespective of their previous experience.

17. To achieve consistency and comparability in the reading and recording of results it is recommended that the inspector should describe what he sees on the sixth day and record the findings as follows :

“Vesicle, Pustules, Dry Vesicle, Ulcer or No Reaction.”

18. In respect of health education, the Committee feels that the most important and effective approach to the public is the face-to-face contact of

the eradication staff themselves. It is therefore recommended that the refresher course referred to under item No. 16 should include thorough orientation of the staff in the proper approach to and information of the public and that in addition to this basic approach, more effective use might also be made of the mass media.

The summary of the above report is presented here in the hope that it might serve as a guideline for the proper conduction of the *attack phase* now under operation in the various constituent States, so that at the end of the phase all the criteria may have been met for entering into the *maintenance phase*.

LONG before it was discovered that smallpox was caused by a minute living organism, called the virus of smallpox, our ancients knew that it was a highly contagious disease and that it spreads through the scabs that fall off during the recovery of the patient. Ancient Indians, we were told, used to rub into the skin of a healthy man well-ground suspensions of smallpox scabs to protect him from the disease. Similarly, in China they were using finely powdered scabs as snuff and in middle eastern countries they were eating scabs, all as a prophylactic measure against smallpox. These practices may appear crude to us ; but then, we have only rediscovered the principle behind what they practised some thousands of years ago. Vaccination, intranasal instillation of virus suspensions and oral viral vaccines of our modern medicine appear in no way different from the ancient remedies except that they are finer products. Thus it was a very old concept that the scabs of smallpox cases are highly infectious and even till recently we held this view. But recent work tends to show that the scabs alone are not responsible there being several other factors involved in the spread of the disease. Now that we have launched the smallpox eradication programme on a nation-wide basis it is necessary that all of us should have some fundamental knowledge of the mode of spread of smallpox.

To understand the way in which transmission of an infection from the sick to the healthy occurs one should have knowledge of the following factors :

(i) the possible sources of infection ; (ii) the infective materials ; (iii) the portal of exit of the infective materials from the source ; (iv) the transport of infective material ; (v) the portal of entry in the new host ; and (vi) the dissemination in the host.

SOURCE OF INFECTION

(a) Smallpox Cases

This is the most important source of infection. It may be true that the scabs of smallpox patients contain a lot of virus which survives in the scab for a considerable number of years. The role which the

Smallpox and its Spread

Dr A.R. Rao

scab plays in the transmission of disease, is worth considering here. Recent work done in this field has shown that the case is more infective in the early stage. The virus was isolated from the throat washings of several cases even from the third day of disease, *i.e.*, either on the day of appearance of rash on the skin or even a few hours earlier. The throat washings and discharges from the mouth and the nose may be positive till nearly the 15th day or so. Then the lesions on the skin break down releasing a lot of virus. When the scabs are formed the patient is infective till the last scab falls off. Thus except for the first two days of fever, the case is infective throughout the entire course of the disease in one way or the other.

(b) Missed Cases

In this country, it is very common that all cases of smallpox are not notified to the Health authorities. Either knowingly or unknowingly, the public hide the cases which form a source of infection.

(c) Mis-diagnosed Cases

Even though the cases are brought to the notice of medical practitioners, the diagnosis may be wrong. It is not uncommon to find that mild cases of

smallpox are labelled as chickenpox and consequently haemorrhagic smallpox cases end fatally. This is very common in countries where smallpox cases are rare. Several epidemics in England have started from mis-diagnosed cases.

(d) Subclinical Cases

Subclinical cases may not play a significant role, yet one should not forget that in certain types of smallpox like *variola sine eruptione*, where there may not be rash on the skin, the patient may have a few lesions on the mucous membrane of the mouth which may be the source of infection.

(e) Fomites

Investigations carried out by WHO experts have shown that fomites are a source of infection. When a blanket used by a case of streptococcal sore throat can harbour nearly 1.5 million streptococci, it is not surprising that linen used by a smallpox patient can harbour as many, if not more virus particles. Depending on the stage of the disease, one particular type of linen may be more infective than another. For instance pillow cases were found to be more infective in the early stage of the disease. During convalescence, the bedsheets contained more virus. Similarly, the utensils used by the patients may be infective because of the contamination with saliva and these fomites may be a source of infection.

(f) Infected Room

Even after a case is removed from the room, the atmosphere inside the room is infective. For, it contains floating matter, *i.e.*, the droplet nuclei derived from droplets coughed by the patient, containing virus particles and the infective dust. Thus, the atmosphere in the infected room may be the source of infection for persons who use it without adequate protection.

INFECTIVE MATERIALS

It is surprising that we know so little about the infective materials that are the source of smallpox infection. We have always been harping on scabs and nothing else. But some workers have found the virus in excreta, etc. We did not attach much importance to them. Now we know there is nothing

which belongs to a smallpox patient which is not infective. The virus is present in the saliva, sputum, nasal discharge, and also in pharyngeal droplets which come out on coughing, sneezing, etc. Tears, urine and faeces also contain the virus. Thus everything that comes out of a smallpox case seems to be highly infective.

PORTAL OF EXIT

Depending upon the infective materials, the portal of exit varies, the naso-pharynx being the commonest portal, the skin for scabs, eye for tears, urethra and rectum for excreta. One more portal of exit is the placenta when a pregnant woman contracts the disease, the virus may pass through the placenta.

TRANSPORT OF INFECTION

(a) Air

The main transport of infection from the sick to the new host is air. Air will carry droplets, droplet nuclei and infective dust. From the naso-pharynx thousands of droplets come out while talking, coughing, sneezing, etc. All these may have the virus as the nuclei around which there is a thick film of moisture. These infect persons, who come in close contact with the patients—within a few feet. Even after removal of a case, these droplets float in the atmosphere as droplet nuclei after losing a little of their moisture and are transported by air to people who remain in the infected room. After several hours, they may settle down as infective dust on the floor and may be raised periodically when the floor is swept or when there is a strong breeze.

Besides the naso-pharyngeal droplets, all other infective materials like discharges from the nose, mouth, tears, sputum, excreta, etc., have to get dried and are converted into infective dust, before they can be carried by air. The scabs can be carried by air only when they are in the form of fine dust and, therefore, it is doubtful whether scabs, as they are, can play a significant role in the transmission of infection. The scabs cannot be inhaled as such. But they are potentially infective. Thus air is the most important vehicle of infection. However, there may be other possibilities of infection.

(b) Contact Infection

Contact infection may occur accidentally, the infection passing through the abrasion on the skin by close contact with the patient. There are cases where husband and wife get virus conjunctivitis and a mother and two children got conjunctival infection of smallpox.

(c) Vectors in Transmission

Eighty per cent of the flies sitting on smallpox patients, especially during the last stage of the disease, were found to be carrying the virus on their legs and wings. But whether they play any role in the transmission of the disease is not known. But there is a possibility of an infection when a fly sits near the anterior nares and deposits a little virus and the patient rubs it into the mucous membranes. Gratia and Lintz discovered long ago that *Vaccinia virus* can successfully be multiplied in bedbugs for 14 days. So it is quite possible that bedbugs play some role in the transmission of smallpox, particularly, when they feed on patients, in the viremia stage of the disease.

It has been observed that crows and dogs eat the scabs of smallpox patients. But they seem to be immune to smallpox and we do not know the fate of the virus in their gut. It is worth investigating whether their faeces contain unaltered virus. A study is being conducted on these lines. The findings may explain many things on transmission of the disease.

There are a few who believe that smallpox is an ingestion disease. It may be quite possible.

After all, anterior poliomyelitis which was once thought to be an inhalation disease is now known to be an ingestion disease.

PORTAL OF ENTRY

Whatever may be the transport of infection, the portal of entry is the naso-pharynx in many of the cases the exceptions being the placenta in congenital smallpox, and the skin in *variola inoculata*.

Some believe that the conjunctiva is always the portal of entry. But this is neither confirmed nor supported by others.

DISSEMINATION OF VIRUS IN THE HOST

The fate of the virus after it gets into the naso-pharynx till it presents signs and symptoms is not clearly known. But it is believed that the virus immediately penetrates the naso-pharynx. Then it breaks the lymphatic barrier, enters the blood and then disappears from there within two days after infection and settles finally in various internal organs in the reticulo-endothelial system. Thereupon it multiplies in large numbers and on the twelfth day of infection, overflows into the blood streams to produce typical signs of the prodromal stage of smallpox. This, in short, is the mode of transmission of smallpox.

For a successful eradication of smallpox from our country, there should be effective isolation of every case of smallpox and disinfection of all infected materials; successful vaccination of every man, woman and child; and successful re-vaccination of every person once in two or three years.

Three Million Vaccinations

Eighty-six per cent of Bolivia's 3.5 million inhabitants will be vaccinated against smallpox under an agreement signed by that country with the Pan American Sanitary Bureau. It is the country's first nationwide campaign since 1958.

—World Health, June 1963.

Surgical Complications of Smallpox

Lt.-Col. N.C. Chatterjee

SMALLPOX is caused by a virus and is characterized by generalized pustular eruption all over the body surface, which on healing leaves scars.

The chief complication in smallpox is involvement of the eye which is the major cause of partial or complete blindness in India.

Accurate figures of blindness in India due to various causes are not readily available, but an enumeration conducted in West Bengal in 1961 amongst a population of 30,56,263 in 2,758 villages, showed the figure as 3,797 (*i.e.*, 125 per 1,00,000). It is our belief that this figure would be more, if counting is done in the industrial areas.

Blindness induced by smallpox is preventable to a very great extent if people take vaccination, and resort to early treatment by competent ophthalmologist in affected cases.

Eye Complications

The eyelids are affected along with general eruptions all over the body and if ulceration takes place there may be cicatrization scarformation of the eyelids which may result in inversion or eversion of the lids (Entropion, Ectropion, Lagophthalmos).

The inner surface of the lids and the cornea or the conjunctiva of the eye balls may be affected and these may ulcerate and the lids become adherent to the globe of the eye at the time of healing. The condition is called 'Symblepharon'. Only efficient handling at the beginning can prevent formation of this crippling complication.

The lacrimal (tear forming) sacs may be affected in smallpox resulting in chronic inflammation of the

sac—dacryocystitis—which exacerbates, at times and may form into abscesses or remain a source of constant danger to the eye by becoming a local source of infection.

Ulcers of the cornea or the transparent front portion of the eye are the commonest complications in smallpox. The cornea is involved by the smallpox virus and ulcers are formed by breaking of vesicles and sometimes due to secondary infection. If progress of the ulcers is rapid and unchecked there is grave danger of perforation of these ulcers. The perforation may be small and localized but if the infection is virulent and widespread, the whole cornea may melt (slough out), exposing the anterior segment of the eye completely.

If the ulcer is localized and does not perforate, it may heal up completely, leaving only a white scar or opacity on the cornea which may partially or markedly affect the vision depending on its position in relation to the pupil. But if the ulcer is widespread the vision is invariably markedly affected.

When the infection is marked and the cornea perforates, the whole eye ball may be infected, inflamed and lost by 'panophthalmitis'. This condition may require removal of the eye ball or if left alone may result in gradual shrinking of the eye ball (Phthisis bulbi).

Perforated ulcers may leave a few sequelae depending on the size and position of the perforation and they may affect the vision and cause disfigurement of the victim.

Results of Corneal Ulcers

If the perforation is small, a tag of iris tissue (pupillary margin) may prolapse and remain adherent

to the perforated margin of the cornea at the ulcer site and when healed up, produce a small white scar with a dark patch (Adherent Leucoma—white scar with entangled iris behind it).

If the perforation is big, a considerable portion of iris may get entangled in the big corneal scar and the resulting loss of vision is marked.

If the whole cornea sloughs out with the exception of a narrow rim at the margin, the total prolapse of iris occurs. As healing progresses, a false membranous cornea or pseudocornea, as it is called, is formed with which is entangled the iris tissue. This cicatricial tissue is too weak to support the restored pressure inside the eye which is often increased, with the result that the new scar tends to bulge and form a bluish white lobulated bulging surface (called 'anterior staphyloma' due to its resemblance to a bunch of grapes).

If the perforation happens to be opposite the pupil, it cannot be covered up with the iris. The crystalline lens in such cases remains long in contact with the ulcer and permanent opacity occurs in it. This is called anterior capsular cataract.

It should be impressed that proper eye care and efficient nursing of smallpox cases can prevent development of the aforesaid eye complications to some extent and may avert total blindness in many cases if the patients survive. The most important preventive measure, however, is protection against smallpox by taking primary vaccination in time and re-vaccinations at regular intervals.

Osteomyelitis and Arthritis

Another common surgical complication which fortunately is not very common but causes most damage is the inflammatory reaction of bones and joints in the pustular stage of eruption or during the period when the scales separate. Thus osteomyelitis and arthritis often complicate the smallpox attack and are among the major crippling disorders of the

locomotor system prevalent in our country. The victims, often children, suffer throughout life.

The 'pock' mark on the face is a life-long disfigurement which easily becomes a social handicap. This tragedy will be a thing of the past if smallpox is completely eradicated as it has been in countries of the West.

The viral osteomyelitis and arthritis present special features. Clinically, two varieties were noted *viz.*, (1) a suppurative type leading to abscesses, osteomyelitis and arthritis, due probably to secondary infection, and (2) non-suppurative type characterized by mild clinical features with epiphyseal damage resulting in late deformities.

Other findings are bilateral involvement and affection of the elbow joints, secondary sinus formation in many cases, bony ankylosis, following sinus and secondary infection.

Treatment

The sub-acute cases with tense and swollen joints should be treated with plaster of paris cast, immobilization, aspiration of joint fluid and general suppurative treatment. Antibiotics are useful if secondary infections are found. Usually, after two to three weeks, active use and physiotherapy are advised to improve the range of movements in the joints affected. In only osseous lesions, curatage and sequestrectomy are to be done.

In late cases, with crippling deformities orthopaedic operations such as corrective osteotomy, arthrodesis and arthroplasty, when required, may be done as an elective procedure.

The importance of physiotherapy in the rehabilitation of the crippled as a result of smallpox cannot be over-emphasized.

The treatment of pock marks on the face is another problem. However, abrasive surgery has been found to improve the appearance of the victim to a great extent.

SMALLPOX TODAY

THE number of reported cases of smallpox in the world in the years 1958-62 is given in the table below, which shows that the number of cases in 1962 was less than in 1961 or 1959, but more than in 1960, and in both Africa and Asia it remained high. In Africa there was an increase in the number of smallpox cases in some countries, a fall in others. The number rose, for example, from 605 in 1960 to 3785 in 1962 in the Congo (Leopoldville); from 96 in 1961 to 2948 in 1962 in Guinea; and from 3538 in 1961 to

NUMBER OF SMALLPOX CASES REPORTED IN THE WORLD, 1958-1962*

	1958	1959	1960	1961	1962**
Africa	14403	14155	15851	24146	23984
America	4334	4899	3090	1923	3029
Asia	227229	58487	39241	52342	46629
Europe	12	14	47	25	136
Oceania	—	—	1	—	—
Total	245978	77555	58230	78430	73778

*Countries grouped by continents, and not by WHO Regions.

**These figures are provisional.

3863 in 1962 in Nigeria. Between 1961 and 1962, the number fell from 4656 to 1900 in the Ivory Coast; from 1740 to 1038 in the Niger; and from 2360 to 1335 in Upper Volta.

In South America the number of cases notified in Brazil rose from 650 in 1960 to 1411 in 1961 and 2759 in 1962, but fell in Ecuador, the other Latin American country most affected, from 2185 in 1960 to 491 in 1961 and 205 in 1962.

In Asia the principal endemic areas are India and Pakistan. In India 31,052 cases were reported in 1960; 45,195 in 1961, and 42,231 in 1962; in Pakistan 2005 in 1960; 2741 in 1961, and 3420 in 1962.

The rates per 100,000 total population show that, contrary to what is usually thought, Africa is as

highly endemic as Asia with its densely populated endemic areas. In 1962, 14 countries in Africa reported over 500 cases each, eight of them at the rate of over 30 per 100,000 population. By comparison, the incidence rate in India, the highest in Asia, was only 10 per 100,000. Taking all the endemic countries together in Asia, the incidence rate is approximately seven per 100,000 population, as against 15 in Africa.

In endemic areas in some countries smallpox cases are reported during a few weeks only in the year, but in the majority of countries cases occur almost all the year round. The weekly frequency shown on the map cannot be regarded as a measure of the degree of endemicity of smallpox in a country, but in spite of the unreliability and irregularity of notification of cases in many countries it does single out the areas of highest endemicity and draws attention to the constant exposure to the disease neighbouring countries are compelled to undergo.

Progress Towards Eradication

Since 1958 five countries taking part in the world-wide eradication programme—Bolivia, Paraguay, Ceylon (except for small outbreaks resulting from imported cases), Iraq, and Lebanon—have become free from smallpox. Four—Liberia, Colombia, Cambodia, and Iran—have completed eradication programmes but still report some residual foci. Ten—three in Africa, two in America, and five in Asia—are at present developing programmes, and 22—18 in Africa, one in America, and three in Asia—have programmes ready. There remain eight countries—seven in Africa and one in Asia—that have not yet prepared any plans.

Africa

Cameroon, one of the African countries where most cases of smallpox occur, has planned a vaccination campaign to cover about 1.5 million inhabitants yearly for three years—and thus the entire population, which is just over four million.

Campaigns are carried out annually in the Congo (Brazzaville) by the *Service des grandes endemies*. In the Congo (Leopoldville), the epidemic that broke out in 1962 was brought under control by a vigorous mass vaccination campaign, but sporadic cases and local outbreaks of varying severity are frequently reported from provincial areas. WHO sent a staff member in February 1962 to advise on the mass vaccination campaign, and he visited the Congo a second time to advise on future activities. A pilot eradication scheme has been prepared for one province and presented to the Government. WHO will provide the vaccine needed for mass eradication campaigns.

Guinea, where the number of cases rose from 96 in 1961 to 2948 in 1962, is preparing a vaccination programme to cover the whole population of about three million. The Government has requested assistance from UNICEF and WHO in setting up a centre for the production of freeze-dried vaccine at the Pasteur Institute at Kindia, which would supply the needs not only of Guinea but also of neighbouring countries.

In the Ivory Coast, a national smallpox eradication campaign was started in 1961 (a year in which 4656 cases were notified) and is still in progress. Up to the end of 1962, 3,109,943 vaccinations had been performed, and the campaign is expected to be completed by the end of 1963 and to have covered the whole population. WHO has provided freeze-dried vaccine for the campaign.

In Mali, a plan for eradication has been agreed upon, with WHO assisting, and it is proposed to vaccinate at least 80 per cent of the population within a period of three years. WHO has again provided freeze-dried vaccine, and the Government of Mali has asked for the services of a WHO medical officer to help the campaign.

In the Niger a programme for quadrennial vaccination against smallpox and yellow fever already exists. Vaccination is carried out by mobile teams for nomads, mobile units, school health services, and maternal and child health services; 124,000 persons having been vaccinated in 1961. The coverage, however, is not more than 56 per cent and five new mobile vaccination teams will be needed to raise it to a minimum of 80 per cent.

Other countries are contemplating mounting a major attack on smallpox in their territories, the

main obstacle they face being a shortage of funds, equipment, and trained staff.

The Americas

Of the 1923 smallpox cases in the Americas in 1961, 1411 occurred in Rio de Janeiro, 491 in Ecuador, 16 in Colombia, four in Argentina, and one in Uruguay. In 1962, of the 3029 cases, 2759, occurred in Brazil, 205 in Ecuador, 41 in Colombia, 11 in Venezuela, 10 in Uruguay, two in Argentina, and one in Canada.

The eradication programme begun in Colombia in 1955 and completed in 1962 was planned, organized, and put into operation with considerable efficiency; WHO provided a consultant, a specialist in the production of dried vaccine, and fellowships. The Pan American Sanitary Bureau (PASB), the WHO Regional Office for the Americas, has signed an agreement with Bolivia for a nation-wide campaign to vaccinate three million Bolivians (86 per cent of the population) against smallpox. Following the vaccination of almost 80 per cent of the population in 1958, the number of cases notified dropped from a yearly average of 604 between 1946 and 1957 to seven in 1959 and one in 1960, and no cases have been reported for 1961 and 1962. The aim of the new campaign is to maintain a high level of immunity against smallpox in the population.

The Government of Brazil has decided to initiate an experimental programme in some parts of Rio de Janeiro and Sergipe State and subsequently to extend it to Alagoas State. When suitable working methods have been evolved, the campaign will be extended to cover the whole country and take in at least 80 per cent of the population. WHO has provided equipment for producing freeze-dried vaccine and awarded a fellowship enabling a medical officer to visit various centres producing freeze-dried vaccine on a large scale.

The smallpox eradication campaign started in Ecuador in 1958 aimed at vaccinating 80 per cent of the population within five years. Over 1.5 million people—about a third of the population—living mostly in remote areas of the mountains and coast, remain to be vaccinated.

Asia

In East Pakistan, following the visit of a WHO medical officer in 1960, a plan was prepared for the

eradication of smallpox from the entire province. After a pilot scheme, the mass vaccination of the whole population was begun in November 1961, and will be achieved in three phases lasting till the end of 1967. Since the middle of 1961 the Institute of Public Health in Dacca has produced freeze-dried vaccine of satisfactory quality. In West Pakistan a smallpox vaccination campaign is to be integrated with the BCG campaign over a period of five years.

Pilot smallpox vaccination projects were carried out in all 16 states of India, and by January 1963 the national eradication campaign that had been launched had been completed in 23 districts and was in progress in 125 others, 53.65 million vaccinations having been performed. The amount of vaccine required is enormous. The Government of the USSR is providing some, and two centres produce freeze-dried vaccine with WHO and UNICEF help, but the Indian Government is considering starting manufacture in two other centres.

In Indonesia no formal smallpox eradication programme has yet been planned, but a network of epidemiological services is being established (with the help of a WHO epidemiologist), and it is proposed to embark upon a smallpox vaccination campaign when the epidemiological organization has been strengthened. When a smallpox epidemic broke out in November 1962 in Bukasi, a mass vaccination campaign was begun by the epidemiological unit and the local health authorities. A unit for the production of freeze-dried vaccine has been set up in Bandung with assistance from WHO and UNICEF and has started experimental production.

Epidemiological and Other Studies

The basis for the sound planning of eradication campaigns is an understanding of the epidemiology of smallpox. It might be thought that all the necessary information would be available in the literature, which goes back for over a century, but on many points of particular importance for eradication campaigns information is either entirely lacking or only partially complete. More information is needed, for example, on the behaviour of smallpox in densely as opposed to sparsely populated areas; in different age groups; and in persons whose immunity has partly waned because of long intervals

between vaccinations or the use of vaccines that, although adequate for primary vaccination, are insufficiently potent for re-vaccination. More information is needed also on whether these partially immune persons constitute a reservoir of infection in the over-crowded parts of the larger cities. If they do, would elimination of the reservoir by adequate vaccination lead to a substantial reduction in the incidence of the disease?

Studies are being made of methods of measuring protection levels against smallpox. Vaccination and re-vaccination with a standard high-potency vaccine are being performed on random samples of populations to determine the percentage of susceptible persons by age and by interval since the last vaccination. This will give information on the optimum intervals between vaccinations for persons of different ages. Laboratory studies are also in progress on antibody levels in the blood of vaccinated persons that will protect against challenge with highly potent vaccines. The assumption on which they are based is that resistance to challenge with vaccines runs parallel with resistance to natural infection, so that if the serum protection levels were known serological surveys could be carried out to determine the susceptibility of populations to smallpox.

The importance of vaccines being stable and highly potent cannot be overemphasized. One of the great difficulties in vaccination campaigns has always been the rapid deterioration of glycerinated lymph vaccine. Attempts to surmount the difficulty have largely resulted in the production of dried vaccines, but laboratory tests and field experience have shown that desiccation by itself does not make smallpox vaccine stable and heat-resistant. In comparative studies organized by WHO on vaccines produced by different methods, it was shown that vaccines produced by desiccation from the frozen state (lyophilization) gave 100 per cent successful primary vaccination rates after periods of storage of up to 64 weeks at 37° and 45°C, other vaccines being less satisfactory.

Potency is no less important than stability. It has been established that to obtain a high percentage of "takes" a certain concentration of virus is required. The WHO Study Group on Smallpox Vaccine, basing itself on studies sponsored by

WHO on persons previously vaccinated¹, established potency tests to ensure effective in the field. More recent studies² have shown that only vaccines of the highest potency give satisfactory "take" rates on re-vaccination. With a standard vaccine the percentage of "takes" increases with the interval from the previous vaccination: thus while after two years the rate is about 33 per cent, after five it increases to about 70 per cent. This is of obvious importance in eradication campaigns. A vaccine producing a high percentage of "takes" in primary vaccination but failing partially or completely in revaccinations not only condemns a campaign to failure but also imparts a dangerously false sense of security.

A new method of administering smallpox vaccine rapidly to large numbers of persons is by jet injectors. Trials comparing the new method and the multiple-pressure method are taking place in Liberia. Preliminary trials have shown that some persons inoculated by jet injectors respond with induration without vesiculation, and the immunological significance of this response is being studied.

The vaccination of contacts is not always successful as a protective measure in smallpox, the chance of failure increasing, obviously enough, with the interval between exposure and vaccination. Studies supported by WHO³ have been carried out on the use of vaccinal hyperimmune gamma-globulin in the protection of contacts and have demonstrated its effectiveness. However, gamma-globulin is in short supply, and its use for this purpose has to be restricted to the persons most at risk. It is of in-

terest that gamma-globulin from hyperimmune animals has been reported to be highly effective⁴. WHO is supporting studies on the production and testing of animal gamma-globulin for this purpose.

Epidemiological observations suggest that smallpox is not highly infectious in the pre-eruptive stage of the illness—a point of importance in the isolation of contacts and in the determination of the period of a patient's infectiousness. In a study carried out in Madras with WHO support⁵, no virus was recovered from mouth washings and garglings in the first two days of the disease, but it was frequently recovered from the sixth to the ninth days.

Another study was concerned with the controversial question of aerial spread of the disease⁶. Contrary to what was expected, virus was very difficult to recover, even when large volumes of air were collected in the proximity of acutely ill patients. Further studies are being carried out in the hope that fresh light will be shed on this question.

Postvaccinal encephalitis is not common, but it still occurs, and cases are regularly reported from some countries though not from others. A recent report⁷ describes the successful use of anti-vaccinal gamma-globulin prophylactically at the same time as vaccination. Efforts are also being made to develop an inactivated vaccine, though so far without great success. Apart from the value of such a vaccine in reducing the amount of encephalitis, it might be possible to combine it with others and so cut down the number of vaccinations a child receives in the earliest period of its life.

—WHO Chronicle
Vol. 17, No. 8—August 1963

¹Cockburn, W.C. et al. (1957) *Bull. Wld Hlth Org.*, **16**, 63.

²Hobday, T.L. et al. (1961) *Bull. Wld Hlth Org.*, **25**, 41;

Mastyukova, Y.N. et al. (1961) *Prob. Virol.*, **6**, 207.

³Kempe, C.H. et al. (1961) *Bull. Wld Hlth Org.*, **25**, 41.

⁴Marennikova, S.S. (1962) *Bull. Wld Hlth Org.*, **27**, 325.

⁵Downie, A.W. et al. (1961) *Bull. Wld Hlth Org.*, **25**, 49.

⁶Meiklejohn, G. (1961) *Bull. Wld Hlth Org.*, **25**, 63.

⁷Manning W. (1962) *Bull. Wld Hlth Org.*, **27**, 317.

Smallpox Eradication in Bihar

Dr B.P. Jamuar

AAVAILABLE records of Bihar show that about thirty lakh cases of smallpox occurred during the past 60 years out of which about six lakhs died. On an average there have been 50,000 cases with about 10,000 deaths every year.

The highest number of deaths was recorded in 1933 and 1951 when the figures rose to 31,395 and 41,995 respectively. It was observed that every five to seven years there is usually a rise in the incidence of smallpox. Experts are of the opinion that this cyclic rise is due to the accumulation of susceptibles on account of new-born infants and incomplete vaccination.

In Bihar, the incidence of smallpox begins to rise from the month of November every year and reaches its peak in May. The incidence declines with the onset of rains and from August to October. Rains reduce the dust in atmosphere and thereby decrease the incidence. Smallpox deaths occur mainly in the age below five years and in higher age-groups especially those above ten years.

Laws for Vaccination

To prevent smallpox, the Bengal Vaccination Act was passed in 1880 when Bihar, Bengal and

Orissa were one province. Though the Act has been in existence ever since, it was not strictly enforced. Some of the health authorities have tried to implement the Act more vigorously and even had several persons prosecuted, still many children in the same family or some locality remain un-vaccinated.

Pilot Project

In Bihar, the Pilot Project Programme was taken up in Ranchi district. The population covered under the Project was one million. The programme was inaugurated on 1 September, 1960 at Khunti (Ranchi). Eighty-nine per cent of the population of the district was vaccinated under the project.

Ranchi district is inhabited by Adivasis also. They elect their own *Mukhias* and frame their own social bye-laws, which at times are at variance with the social customs prevalent in Bihar. All the new programmes have to be consistent with their own cultural pattern and must be approved by their *Mukhias*. Thus the acceptance of any new programme by them becomes very difficult.

Adivasis' Beliefs

In the course of interviews with the *Mukhias* and other elderly persons of the Adivasi community, the following customs and beliefs were found to be prevalent:

Smallpox is caused by the wrath of 'Sitla Mata'. To prevent and cure a case of smallpox, *Puja* is organised. People gather around the place of *Puja*. The Priest goes ahead and burns several articles to create smoke. As the house gets full of smoke, *Mantras* are recited to drive the evil away. At the end of the recitation a goat or a chicken is slaughtered at the *Puja* site. After the ceremony every body goes away without looking back towards the *Puja* site.

People burn *sandle wood*, *ghee*, etc., to keep their rooms scented to drive away the ghost.

A smallpox patient is worshipped by the Flowerman (Mali) or the most religious person of the family. It is believed that the goddess is residing in the patient.

Remnants left after the worship are kept in an earthen plate and thrown out of the village so that smallpox is driven away.

(Continued on page 282)



OBSERVANCE OF SMALLPOX ERADICATION WEEK

—Some Suggestions by Cheb

SMALLPOX, which is a preventible disease, unfortunately continues to be one of the major communicable diseases, accounting for a substantially high morbidity and mortality in our country.

India at present constitutes the biggest reservoir of this infection.

There is a real danger of importation of this disease from our country to others due to increasing speed and volume of traffic to other countries of the world, who by sustained efforts, have eradicated smallpox from their midst.

With a view to rid our nation of smallpox, the Union Ministry of Health advised all the States and Union Territories to launch smallpox eradication programme throughout the country from 1962. The Ministry made arrangements for the supply of freeze-dried vaccine to overcome the difficulty experienced with loss of potency of liquid lymph vaccine used in the past, specially for re-vaccinations.

No public health programme of such a magnitude which directly concerns the people, can succeed unless their willing co-operation is secured for the acceptance of the vaccination programme and the people realize that vaccination programme is for their own good. To secure the willing co-operation of the people, it is absolutely essential that all

possible help is obtained from official, non-official and voluntary organizations existing in the country. In short, all welfare and voluntary organizations, including Indian Medical Association, educational institutions, community development blocks, village leaders, etc., should join hands with health agencies in this national drive against smallpox. Intensive efforts should, therefore, be made to involve these organizations and personnel for the observance of the Smallpox Eradication Week.

Objectives of the Week

The Smallpox Eradication Week is to be observed from 25 September, 1963 to arouse the consciousness of the people to the dangers of smallpox and explain to them how the disease can be prevented and eradicated from our midst. The main aim is to get 100 per cent response to the vaccination drive to be launched from 25 September, 1963.

The following should be the objectives of the Week :

- (1) To make the people aware that
 - (a) Smallpox is a serious communicable disease.
 - (b) Vaccination and re-vaccination with a potent vaccine is the only sure way to prevent the disease.

- (c) The National Smallpox Eradication Programme has been launched with the objectives of eradicating the scourge from our country.

(2) To inform the people that

- (a) Many countries of the world have eradicated the disease by vaccination and periodic re-vaccination.
- (b) People's active participation is essential to win our country a place among the advanced nations which are free from smallpox.

Besides the general publicity through all mass communication methods and media for the campaign, it will be useful to plan the educational programme for different special target groups.

The target groups are: mothers, industrial workers, teachers, school children, rural and urban public, members of medical profession, ancillary medical personnel, etc. These should be actively involved in the programme so that their co-operation will be forthcoming in abundance.

All the groups should be provided with basic information on the subject.

Planning for the Week

It is very essential that the Public Health Departments should contact the various organizations mentioned

earlier, convince them about the need for the observance of the Week, brief them on the campaign and organize an effective action plan with inter-departmental co-ordination and co-operation. The action plan should give details of programmes for the Week and such a programme should not only suit the needs and capacity of the different administrative levels of the State but also of the different organizations and institutions.

The Planning stage should comprise the following :

1. Planning the programme with inter-departmental activities. The departments should include health education, publicity, broadcasting, etc. They should be briefed on facts about smallpox, what is known about it, what is being done about it and that the eradication programme has been launched with the object of offering complete protection against this scourge.
2. Briefing should be followed with a note giving specific information for action to be



taken. The personnel of these organizations should contact local leaders to involve them in organizing programmes.

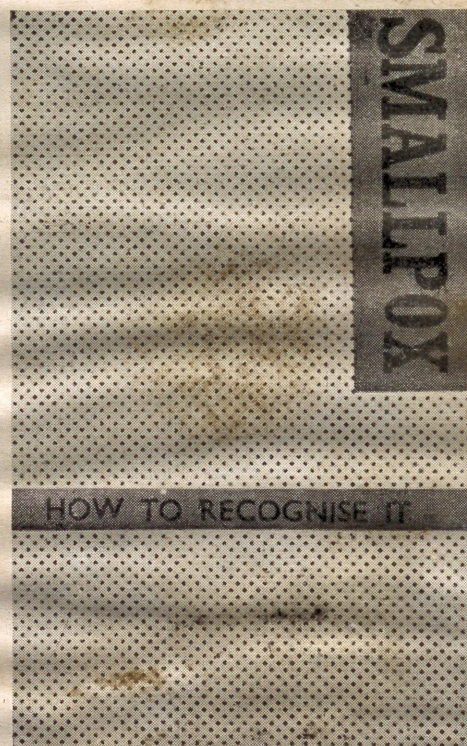
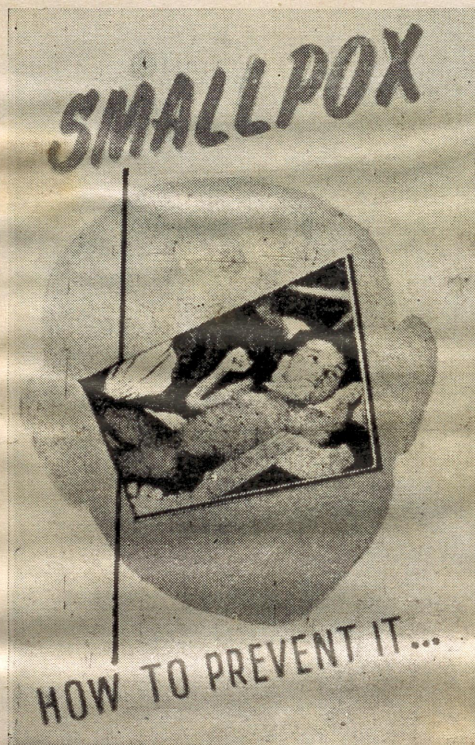
3. Produce and procure education materials.
4. Preparation of different types of aids—press releases, talking points, features and other aids for use by community leaders, local doctors, teachers, etc.
5. Making arrangements for the timely release of features, etc., and despatch these in such a way that these may reach the periphery on time.

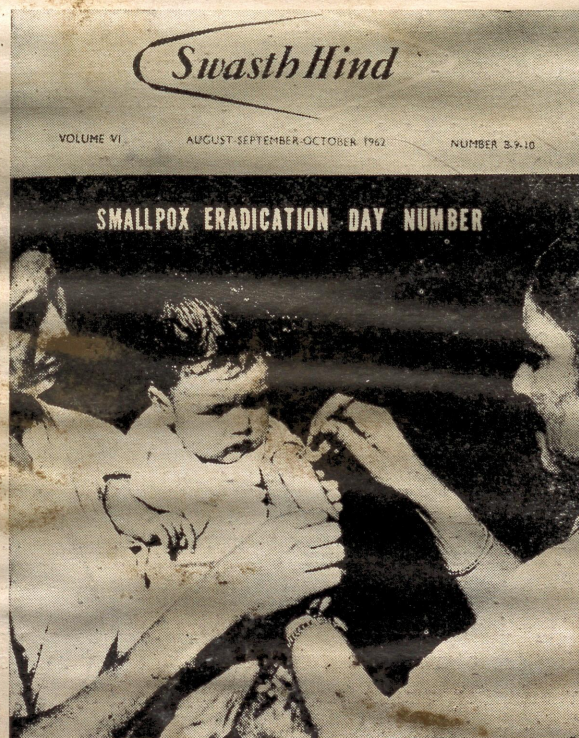
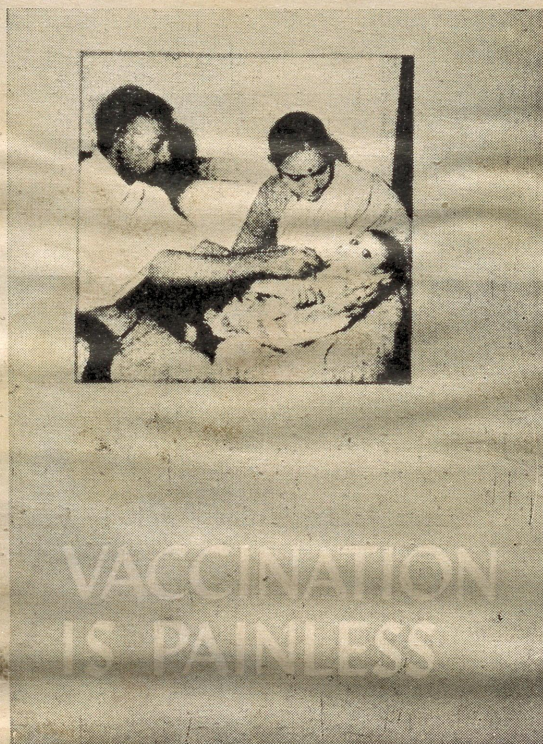
Prepare the Community for the Week

Main contents of community education to be included in the programme for the Week should comprise :

1. That smallpox is a major health problem and due to its communicability, it is a source of danger to us as well as to other countries.
2. That it has been completely eradicated in many advanced countries of the world.
3. That with proper planning and efforts we can also eradicate this perfectly preventible disease from our country.
4. That our Government have taken up this problem and are making every effort to wipe it out from the country. For this eradication work, the Government have obtained dried lymph vaccine which is much superior to the liquid lymph vaccine. This vaccine is being supplied free of charge to all the States for mass vaccination programme.
5. That we cannot succeed in eradicating the disease unless the programme is accepted by the people as their own programme and it takes the form of a national movement rather than a health campaign in which only the Government is interested.

The programme may not be accepted by the people till the various misconceptions and superstitions related to the disease are removed from their minds. It is, therefore, of prime importance to educate the community about the various aspects of





the disease as well as of the vaccination programme so that the misunderstanding and the ignorance related to vaccination may be removed. The contents of the educational programme may be so selected as to emphasize the positive aspect of vaccination rather than condemning some of their traditional beliefs which do not come into conflict with the acceptance of vaccination.

WORK AT DIFFERENT LEVELS

State Level

Planning committees should be formed at the State level involving local leaders, including Members of Legislatures and the Members of Parliament, eminent public personalities, representatives of Departments like Education, Publicity and Information and Broadcasting, State branches of the Indian Medical Association, Social Welfare Organizations like the Bharat Sewak Samaj, Social Welfare Board, etc. Activities can include the following:

Planning the programme for the Week with representatives of different organizations and leaders.

Issuing messages from National and State leaders. Production of education material and supply of the same to periphery.

Arrangements for broadcast of talks, etc., by Health Ministers, professional panels (Brains Trust Programme) and suitable programmes for the special audience like mothers, villagers, children, rural forum, etc. (It will be useful to organize listening clubs for these groups, so that questions asked may be answered. This will get the best co-operation and participation from the listeners).

Release of feature articles and handouts for the press.

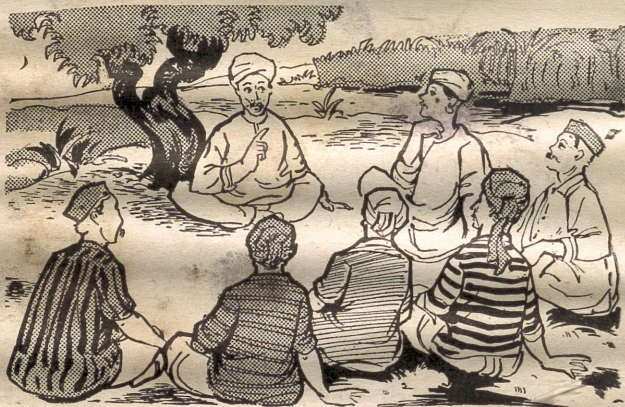
← Folders written in simple and non-technical language are valuable educational aids. The folders (facing page and top) prepared by the Bureau provide basic information on smallpox and its prevention. Special number of *Swasth Hind* (left) brought out last year contained articles laying focus on the disease and the eradication programme.

District Level

At the district headquarters, it is essential that district authorities along with representatives of education, health and publicity departments, local leaders and Members of Legislature and representatives of voluntary organizations should draw up a broad-based planning for education and publicity during the Smallpox Eradication Week. They should involve the local leaders in taking measures to educate the people.

Town and City Levels

Different wards and other administrative wards of the city or municipality can be taken as separate units for planning the activities for the Week. Zonal



Planning and execution of programmes can be discussed and decided upon at group meetings

committees (one in each ward) should be formed for the development and implementation of the programme for the Week.

A representative each of the zonal committees should constitute a Central Committee whose main responsibility should be to supervise, co-operate and co-ordinate the activities of these zonal committees.

The zonal committees may comprise the following :

Representatives of the municipality (*i.e.*, Municipal Councillors in-charge of health committees), Indian Medical Association, Youth Organizations, Women's Organizations and office bearers of Organizations in the locality (like clubs), Bharat Sewak Samaj, office bearers of different professional associations,

specially of medical practitioners, teachers, students, etc.

In labour and industrial areas, Trade Union leaders and workers' representatives may be actively involved in the committee.

These committees should have three major functions to perform :

- (i) To work out a general action plan for the respective zones, and for the entire city in collaboration with other zonal committees under the guidance of health departments and the Central Committee constituted for observing the Week.
- (ii) They should try to involve the various local institutions, organizations and leadership for the development and successful implementation of the action programme for the Week, and
- (iii) They will subsequently look after the implementation of smallpox eradication campaign within their respective zones even after the observance of the Week.

The plan of action may include :

- (a) Organizing public meetings, panel discussions, conferences and lectures by eminent physicians and local leaders ;
- (b) Arranging film shows and display, and distribution of other health education materials ;
- (c) Organizing *prabhat pheries* and processions led by leaders of the locality ;
- (d) Arranging exhibitions and other display of materials, etc.
- (e) Teams of vaccinators should launch actual vaccination operations in different areas or *mohallas* with the help of the members of the zonal committees.

The private practitioners of the locality should be actively involved in the programme. By their participation, a climate would be prepared for the willing acceptance of vaccination, as the advantages of vaccination would have been explained by them to their patients.

Schools and Institutions

Schools and institutions occupy a very important place in our society and unless they are actively involved in the programme, the desired momentum will not be gained in favour of the campaign. As the members of schools and institutions are comparatively more enlightened in scientific knowledge, they can be easily and more effectively involved in such a programme.

The various schools and institutions may, therefore, be stimulated to develop their programme for the Week in which the members of the governing committees of the schools and the parents may also be actively involved. Competitions—essays, drama, stories, display of exhibits and writing of slogans—may be organized to stimulate the students in actively participating in the programme. The schools at various levels, like towns, districts, blocks and villages may be directly involved and incentive may be provided by awarding trophies and certificates to the schools whose performance will be considered as best.

The higher authorities of the Directorate of Education and District Inspectors of Schools may be involved at the planning stage to secure their patronage and support for involving the schools to the maximum extent.

Labour Colonies and Slum Areas

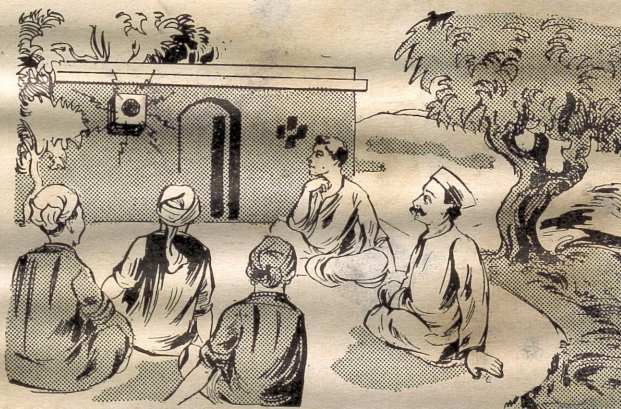
In labour colonies and slum areas, efforts should be made to involve the leaders, labour welfare officers, trade unions, public health personnel serving in those areas and members of voluntary and welfare agencies like *Vikas Mandals*, *Bharat Sevak Samaj*, *Red Cross Society*, *Youth organizations*, *mohalla committees* and local *M.L.As* in the planning and execution of the programme through group meetings, individual discussions, posters, pamphlets, film shows, etc., and helping the vaccinators in the vaccination work by bringing together the people and persuading them to accept vaccination.

At Village and Block Level

Educational activities at the village and block level may include planning and drawing out a prog-

ramme with the local leaders like Panchayat members, Gram Sabha members and other formal and informal leaders as well as personnel of Community Development Blocks. Actual educational activities may include: (i) organizing mass meetings, group discussions, (ii) conducting leaders' training camps, (iii) arranging film shows, (iv) display of posters, (v) organizing *prabhat pheries* and *bhajan mandals*.

The *mohalla samiti* may be actively involved both at planning and implementation phases of the educational programme. Besides educational activities, vaccination work should also be carried out at the village level. Trained vaccinators and if possible, assisted by village *pradhans* and *Mahila Samiti*, may be involved for vaccinating the villagers.



Special programmes can be broadcast in the form of talks, discussions, etc., in the general and special audience services. Community sets in rural areas command large number of audience

It would not be possible to cover all the villages in the country with such activities during the Smallpox Eradiction Week. But, at least one village in each village level worker's circle may be taken up for conducting educational activities as well as vaccination programme. This will sensitize the neighbouring villages in realizing the need for vaccination specially when they find that the incidence of smallpox after vaccination has been reduced in that particular village.

GENERALIZED PROGRAMMES

- (i) Meetings, symposia, *prabhat pheries*, *katha* and *lavni* on the smallpox problem can be

organized in different localities by the local leaders and the health workers, followed by a session of questions and answers which will prove effective.

(ii) Display and small exhibitions attract considerable public attention. Posters can be displayed at meetings, besides distributing printed material written in simple and non-technical language.

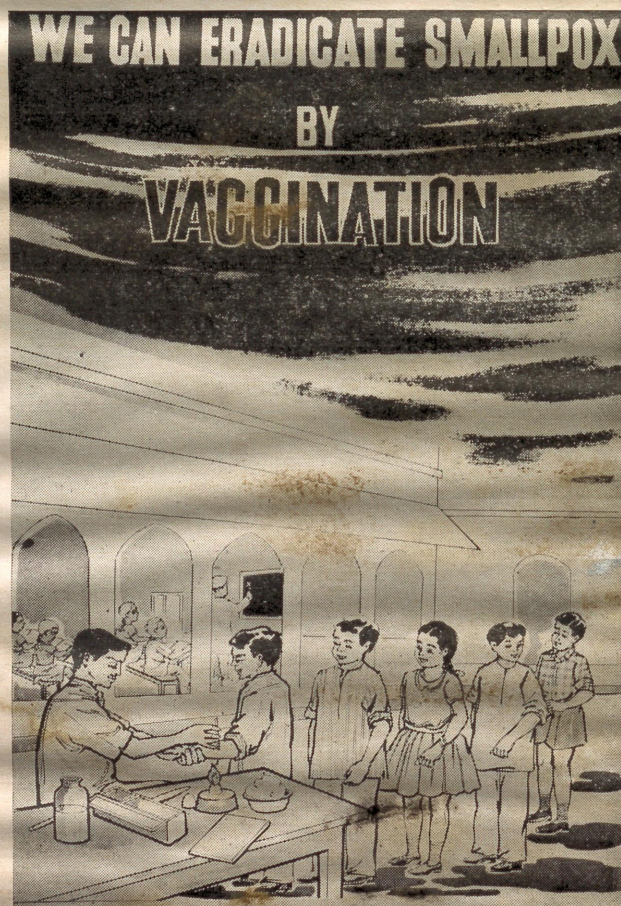
(iii) Film shows can be arranged in different localities depicting the dangers of smallpox and how it can be prevented by vaccination. Slides exhorting people in favour of vaccination can be displayed in the cinema houses.

(iv) Dramas, skits and puppet shows can be an added attraction during the Week.

(v) Newspapers and magazines can go a long way in rousing and motivating the people to action. Special articles suited to different sections of the population emphasizing the need to rid the country of smallpox and the role the people could play in implementing the National Smallpox Eradication Programme can be published in newspapers and periodicals.

The Week can be highlighted in advertisements, space for which may be donated by well-known organizations. Cartoons on the subject and competitions of one kind or another

Colourful posters catch attention. Here are some posters (below and the facing page) produced by the Central Health Education Bureau. These were aimed to different target groups.



- other relating to the problem may be published.
- (vi) The Radio is a highly effective media of putting across the message to the population. The A.I.R. can arrange special broadcasts in the form of questions and answers, panel discussions, dramas, skits, spot announcements, etc., from the local stations. Such programmes can be organized both on the general service and special audience programmes like rural forum, women's programme, etc. Short spot announcements can be made by the All India Radio.
- (vii) Slogans which can easily be remembered and are catchy can be displayed on hoardings or bill-boards.

TARGET GROUPS

Besides educating the general masses, it will be useful to reach certain target groups like, (i) mothers,

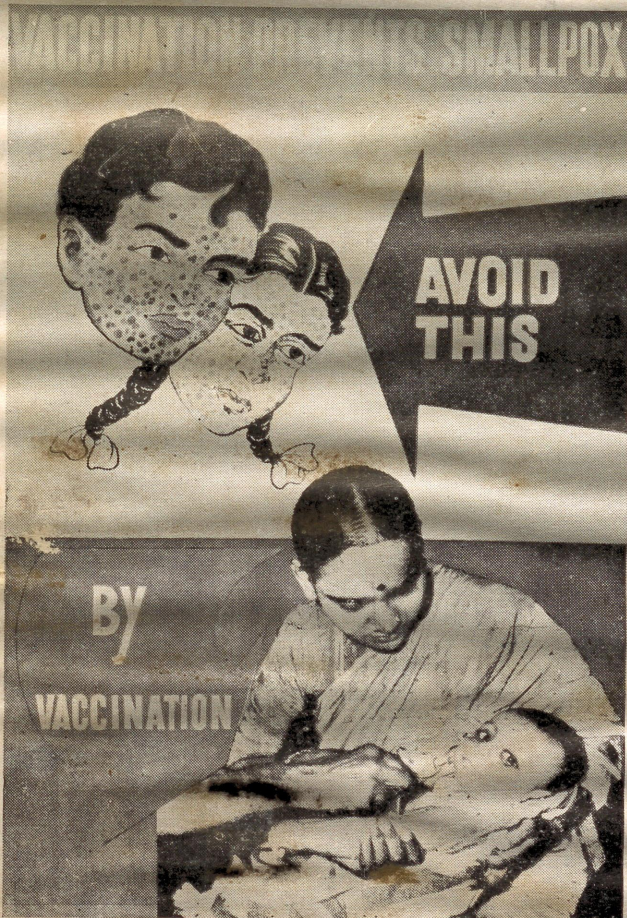
- (ii) industrial workers and labourers, (iii) school children, (iv) teachers, (v) rural and urban people, (vi) medical professions and auxiliary medical personnel.

The specific information to reach these groups and the methods and media that can be used are mentioned in the following pages.

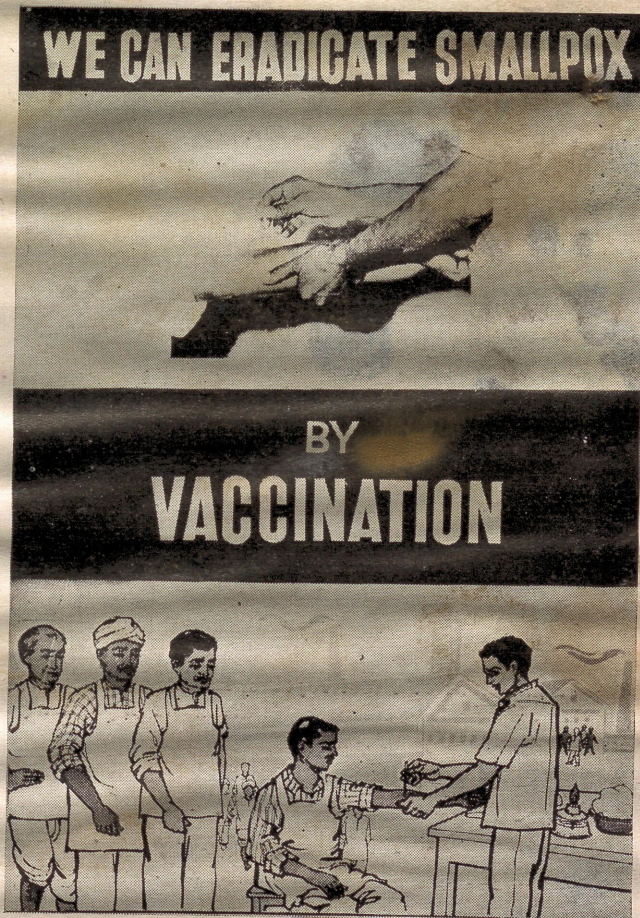
MOTHERS

Information to be Given

- (1) Basic information (given at the end).
- (2) Every infant must be vaccinated within first three months of its birth.
- (3) There is no harm if an infant is vaccinated even within a few days after birth. Vaccination can protect your child against any disfigurement.



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- (4) Vaccination should be done periodically—once in three years and immediately if a large number of cases break out in the community.
- (5) Vaccination is painless and vaccination staff has been instructed about the correct number of insertions and techniques.

How to Reach the Group

While planning for the observance of the Week, the following can be kept in mind.

- (a) *Mahila samities* may be approached to organize a meeting of the women where the

mothers on smallpox and vaccination.

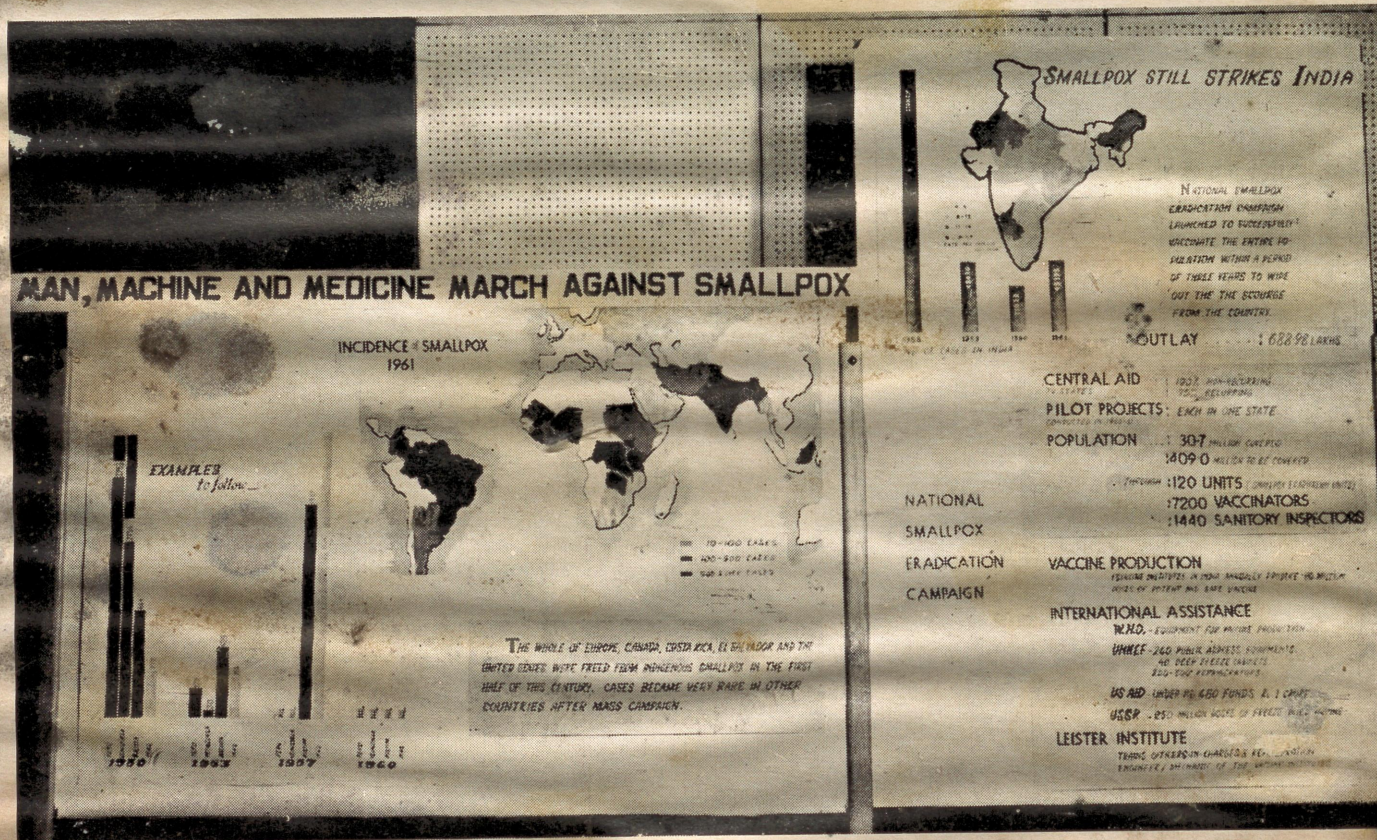
- (c) Classes may be arranged in MCH clinics to convey the same message.
- (d) The list of places where vaccination facilities are available should be provided to this group.

The mothers can discuss these and take a decision.

Educational Aids

Posters can be displayed in the MCH clinics, *mahila samiti* halls and other places which are visited by women.

Film shows and filmstrips on the subject may be



Exhibitions or visual representations of the saying "Seeing is believing". They are good motivational tools and have dramatic impact on people including the non-reading public.

need for vaccination may be explained.

- (b) Questions that are raised by mothers can be answered by public health personnel. These might relate to beliefs and attitudes of the

arranged for these groups.

Flashcards, flipcharts, etc., can also be used. A special feature on the women's programme by the All India Radio can be organized.

INDUSTRIAL WORKERS AND LABOURERS

Information to be Given

- (i) Basic information. (Given at the end).
- (ii) Smallpox, besides killing its victims, causes physical disfigurement and even blindness.
- (iii) Smallpox causes loss in wages during the period of illness and permanent loss of job if the victim becomes blind.
- (iv) It is necessary to get vaccinated every three years or immediately if there is an epidemic in the community.
- (v) All the members of the family should get vaccinated against the disease.

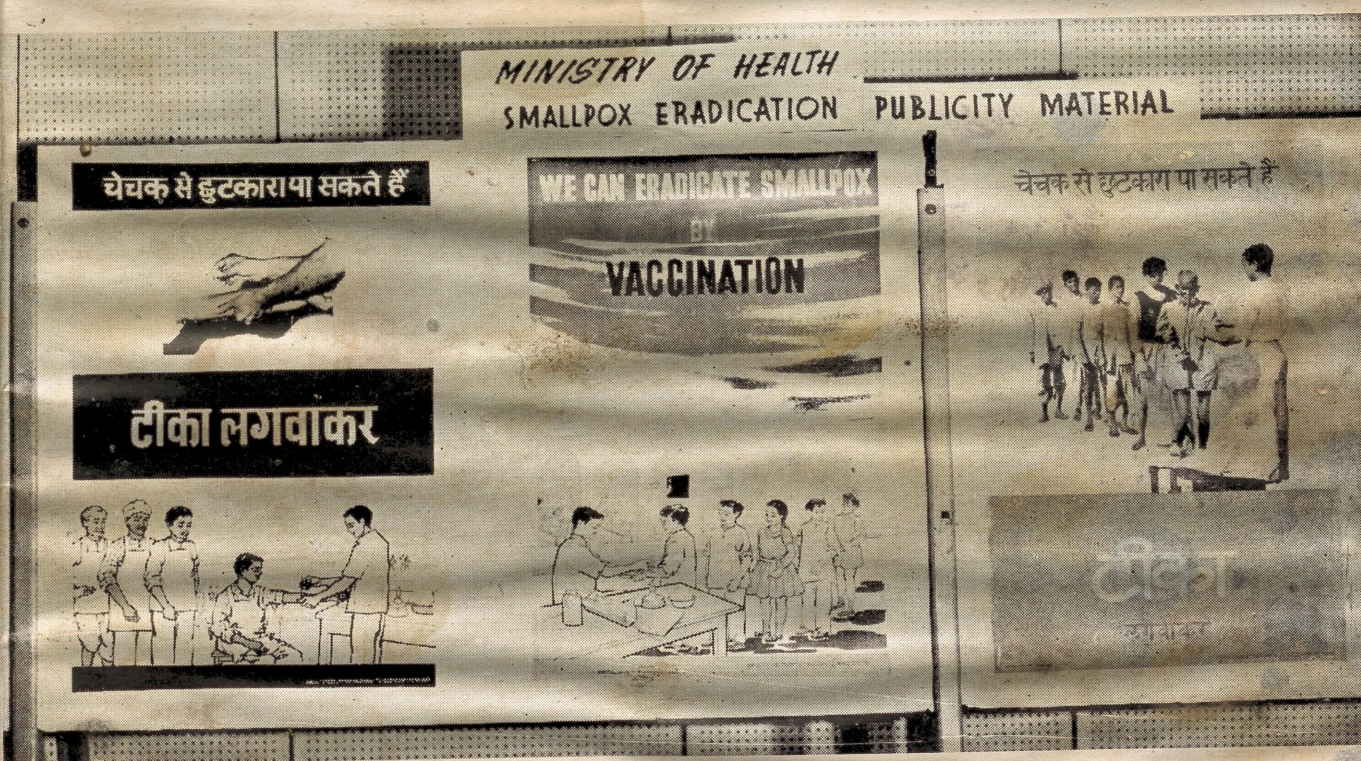
tives of the Week can be explained and workers can take a decision on accepting vaccination.

A committee can be formed among the members who can see that all the workers get vaccinated.

Places where facilities for vaccination are available should be mentioned.

Educational Aids

Poster displays, film and filmstrip shows and talks can be organized. A special feature in the workers' programme can be broadcast by the All India Radio. How smallpox is caused and how it can be prevented can be explained to the group.



Some of the posters produced by the Central Health Education Bureau on display at an exhibition

How to Reach this Group

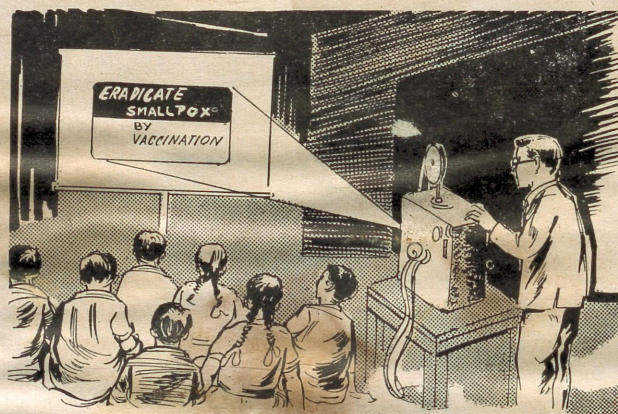
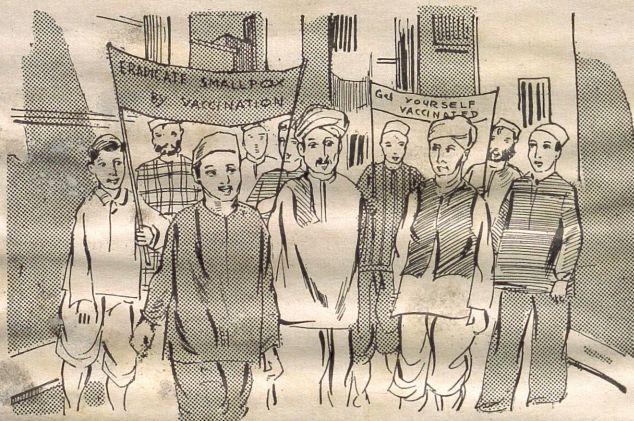
The welfare council in the factory/industrial establishment should be involved in planning the programme for the Week.

A general meeting may be held where the objec-

SCHOOL CHILDREN

Information to be Given

- (1) Basic information. (Given at the end).
- (2) How smallpox is caused.
- (3) They should get vaccination so that they can be healthy.



Prabhat pheries (left) especially in a rural area are attention getters. Films (right) can teach a point that can be understood better through action. All this media should be used not in isolation but as a complementary aid.

- (4) Importance of vaccination in eradicating the disease from the country.
- (5) Vaccination is a painless process.
- (6) Vaccination can prevent the disease and consequent disfigurement.

How to Reach the Group

Health committees may be formed in the schools. These committees can list out those not vaccinated. Classroom projects on smallpox and how it can be prevented can be conducted.

Students can find out how many of them have not got the vaccination during the recent drive. Then the health council may explain these children the need for vaccination.

Parent-teacher associations can stimulate and take action in this regard.

Teaching Aids

Posters, items on bulletin boards, wallcharts, film shows, flashcards.

TEACHERS

Information to be Given

- (1) Basic information. (Given at the end).
- (2) They should be explained the importance of immediately reporting the cases as this will help in vaccination of contacts and thus check further spread of the disease.

- (3) Explain also the importance of vaccination and that vaccination is painless.

How to Reach this Group

In-service orientation by the health department. Providing education material on the disease, its causes and symptoms and prevention.

Teaching Aids

Flashcards, pamphlets, posters.

VILLAGERS

Information to be Given

- (1) Basic information. (Given at the end).
- (2) Vaccination affords protection against smallpox.
- (3) Vaccination is safe, simple and painless.
- (4) Smallpox vaccination has to be taken periodically—every three years. One vaccination does not provide lifelong immunity.
- (5) Every child must be vaccinated and every adult should have periodical re-vaccination.
- (6) In the face of an epidemic, everyone should get vaccinated.
- (7) Vaccination is a sure preventive against small-

pox only and not against measles or chicken-pox.

How to Reach the Group

Meeting of village leaders, religious heads and elders can be organized where the importance of vaccination can be explained.

Village health committees, where present, can be involved in planning for the Week. This committee can consider the different objections the people have and provide answers to the same. (See also page 275 under head At Village and Block Level).

Teaching Aids

Posters, film shows, flipcharts, followed by talks and group discussions. A special programme on the rural forum of the All India Radio can also be organized.

BASIC INFORMATION

- Smallpox is a highly contagious communicable disease.
- The disease is caused by a virus—an organism which cannot be seen under an ordinary microscope.
- The disease brings disfigurement and death in many cases.
- The disease breaks out in unvaccinated communities.
- The disease is preventible.
- Vaccination and re-vaccination is the sure way to prevent the disease.
- Many countries of the world have eradicated the disease by launching systematic mass vaccination campaigns and we can also do it.

(These suggestions are not exhaustive. People who are in charge of organizing the activities for the Week, may keep in mind the local needs while working out detailed programmes).

—Prepared by the Media Division
Central Health Education Bureau.



(Continued from page 269)

Use of *ghee*, oil, etc., is not permitted in the house and non-vegeterian diet is prohibited.

Shaving and hair-cutting is not allowed until the final *Puja* is over.

Treatment of smallpox cases and vaccination of inmates when a case of smallpox exists is not allowed as it may displease the goddess.

On the fourth day or the seventh day a bath is given in early hour of the morning in the open courtyard after which a *Puja* is performed. Lastly a chicken is sacrificed.

No one is allowed to go out of the village nor any one is allowed entry until the *Puja* is performed.

Liberal use of *neem* leaves and *neem* twigs is made for fanning of the patients.

People being mostly agricultural labourers, they did not want to be vaccinated as they were afraid that they might suffer from the fever after vaccination and they would have to stay indoors.

Even if they agreed for vaccination, they preferred to be vaccinated by their own vaccinators.

Solving the Problem

It was decided that the programmes should be based on the beliefs prevalent amongst them. On the analysis of various beliefs and attitudes, it was found that they could be divided into three categories:

- (i) Those which were scientifically beneficial for the cure and prevention of the disease,
- (ii) Those which had no effect on cure and prevention of disease or were neutral, and
- (iii) Those which had a definite harmful effect on the people.

In course of the programme, beliefs which were scientifically beneficial were picked up and given encouragements. Beliefs which had no good or evil effects were left as such and were not interfered with. But those which had harmful effects on health were cautiously discouraged. A slogan was popularized: Worship the goddess but to please her take vaccination.

Isolation of the patients and not allowing entry of any person in the village (which are scientifically sound) were very much encouraged. No comment on beliefs like use of *neem* twigs, etc., was made. When

people said that these had germicidal properties, we nodded our head.

Involving the Leaders

A meeting of the *Mukhias* of the various Gram Panchayats was called. The Deputy Commissioner, Ranchi, explained to them the importance of the Pilot Project and requested them to extend their co-operation. This had a definite value as the vaccinators got much help in the areas of those *Mukhias*. Meetings of the local village leaders were organized by the *Mukhias* where some volunteers were picked up to help the vaccinators to get the inmates of the houses vaccinated. The programme was explained and the suggestions put forward by the villagers were given due consideration. Quite often old men used to say that as other inmates of this house had been protected, they would have been protected. An elderly man who had never taken any vaccination in his life, thought it was not desirable to take vaccination at this age when he was nearing God. In most cases after prolonged persuasion, most of the elderly persons also took vaccination. The local students under the guidance of the school teachers helped in the launching of the programme.

Education Materials

Health education materials brought out by the State Health Education Bureau and the Central Health Education Bureau were displayed while the meeting was in session. But in course of the programme, it was found that the talks had greater effect on the people. One of the beliefs of the people was that even after smallpox vaccination, cases of smallpox occurred. Every case of eruption was mistaken as smallpox. It was explained to them that those were not the cases of smallpox but cases of chicken pox or measles. Pictorial descriptions were of value in convincing them. Film shows also arranged had a large attendance. The theme of the programme and problem faced were explained to the people.

Specific programme planning was done jointly by the people and the members of the health team. The people's desires were respected. People in general were not prepared to take vaccination during summer

(Continued on page 285)

Smallpox Eradication in Madhya Pradesh

Dr S.L. Shah

MADHYA PRADESH with an area of 1,71,217 sq miles, is the largest State in India as far as area is concerned. Forty per cent of the area is covered by thick forests and mountains. Total population of the State is 32.4 million with an average density of 189 per sq mile. Thirty-three per cent of the population consists of Scheduled Castes and Scheduled Tribes. The literacy rate is only 17 per cent. The State is very much backward in communications and most of the places are totally cut off during the rains.

Public Health Agencies

Control of epidemics and vaccination in rural areas are the responsibility of the Public Health Department in the Madhya Bharat, Bhopal, Vindhya Pradesh and Rajasthan areas, while in the Mahakoshal region they are the responsibility of the local bodies, viz., *Janpad Sabhas*. In the urban areas, the Municipal Corporations and Committees are responsible for these functions.

Due to lack of sufficient funds, efficient organization and technical supervision and guidance, most of the local bodies can fulfil these obligations only with variable efficiency.

The vaccination programme, limited mostly to primary vaccinations of the new-born, begins from October and ends in March every year. No emphasis is laid on re-vaccination except in times of epidemics when available contacts are re-vaccinated.

The registration of births is not compulsory in most of the areas, and where it is compulsory it is not strictly enforced. The result is that a large number of new-born escape primary vaccination.

The liquid lymph used till recently is sent by post to farthest villages and it reaches the destination

after much delay. Thus the vaccine loses its potency if it is not used immediately.

There is too much delay in the reporting of smallpox cases to the public health authorities.

The cumulative effect of all these is that there have been epidemics of smallpox every 4-5 years as will be seen from the following table.

SMALLPOX IN MADHYA PRADESH

Year	Cases	Deaths
1958	13,275	2,416
1959	4,168	723
1960	2,316	363
1961	4,241	890
1962	9,051	1,827

Pilot Project

The Government of Madhya Pradesh launched the Smallpox Eradication Pilot Project in Durg district with a population of about 18 lakhs. This district was particularly selected because it comprised forests and hilly tracts; people were backward and mostly illiterate, and communications were difficult in most parts of the district. Part of the district consisting of Bhilai township and its ancillary mine areas has a highly educated and sophisticated population.

Within a period of about two years (October 1960 to September 1962) over 15 lakh people in the district were vaccinated, thus covering more than 83 per cent of the population.

Eradication Programme

Encouraged by the results of the Pilot Project, the State Government also decided to launch the

National Smallpox Eradication Programme in the State from 1 October, 1962. Before the launching of the programme, meetings of all the Civil Surgeons and Additional Civil Surgeons (District Health Officers) of the State were held in different regions to explain the salient features of the programme, its working and implications in detail. The programme was launched by the State Minister of Public Health, on 25 September, 1962—National Smallpox Eradication Day.

For the purpose of the Eradication Programme, the State is divided into 11 units—each consisting of approximately 30 lakh population. One-half of the population in each unit—15 lakhs—will be covered during the first phase of the Programme (1 October, 1962 to 31 March, 1964) while the rest is expected to be covered by June 1965.

The training of vaccinators, enumerators, sanitary inspectors and other personnel was started at the Unit headquarters from 15 October, 1962 and hence the actual vaccination programme could be started from 1 December only.

Staff and Equipment

Each unit is under a Supervising Medical Officer, who is assisted by one para-medical assistant and a clerk at the headquarters. There are two health educators with vans and public address equipment for carrying out health education work. In each unit there are 12 sanitary inspectors, 60 vaccinators, 12 enumerators, three drivers and 12 class IV servants to carry out the work in the field.

Four deep-freeze cabinets have been supplied by the UNICEF in addition to several special type of refrigerators. Besides this, the State has supplied three refrigerators for each unit to be located at convenient places for storage of vaccine.

Vaccine Lymph

The freeze-dried vaccine is used for the entire eradication programme during the first phase. During the second phase, the liquid lymph manufactured at the State Government's Manpur Lymph Depot, will be used in big cities like Indore, Gwalior, Jabalpur and Bilaspur, where deep-freeze cabinets have now been installed. A sample of the liquid lymph was tested and found to be a potent vaccine.

Plan of Work

Vaccination in each unit is carried out blockwise, taking each *gram-sewak* circle in turn. This facilitates intensive education before and during vaccination campaign, leading to wide cooperation from local agencies and better supervision.

Health Education

Two sets of public address equipment with vans have been supplied to each unit. In addition to this, Government of India through UNICEF have supplied 10 portable transistorized megamikes. These have proved very useful in the rural areas for publicity work.

Cooperation from Director of Social Welfare and Panchayats has been obtained. Posters, folders, etc., are distributed to nearly 20,000 Panchayats in the State. Publicity from time to time is given through their monthly bulletin.

A large number of posters, folders, and other publicity material has been supplied to each unit. One film on smallpox has been supplied to each district for publicity. But it has not been possible to utilize it fully for want of projectors in each district. The District Publicity Officer has a publicity van with projector but it is not always available at places where it is required. Recently the State Government has purchased one projector which has been used for intensive audio-visual publicity in the districts where the progress is slow. The public response is very much encouraging.

In the urban areas, people are not generally interested in these "street shows". The response to vaccination is very poor in urban areas and people are generally indifferent to this programme. If a few documentaries are prepared by the Films Division and exhibited compulsorily in the cinema houses regularly all over the country, it will have much more effect than these scattered measures. If this is not possible, 35 mm films on smallpox should be supplied to each State so that arrangements can be made for their exhibition in the cinema houses in different towns when the work is in progress. Audio-visual publicity is perhaps the most effective media for health education of the masses.

Progress of Work

During the first phase of the programme it is

anticipated to cover a population of 162 lakhs in the State. Out of these, 90,48,670 persons have been vaccinated ending 30 June, 1963, (Primary 17,67,291 and re-vaccination 72,81,379), thus covering 55.8 per cent of population within a period of seven months.

The following table will give an idea of the progress of work in different units of the State.

Name of the Unit	Population to be covered in the 1st phase.	Total vaccinations per- formed.	Percentage of popula- tion covered ending 30 June, 1963.
Gwalior	14,99,854	4,64,367	30.9
Ratlam	15,55,001	4,04,808	26.0
Barwani	16,76,644	7,00,418	41.7
Sehore	15,86,134	6,42,672	40.5
Sagar	15,00,365	10,16,635	67.7
Hoshangabad	13,40,238	5,55,685	41.4
Balaghat	12,06,620	5,26,956*	43.6
Jagdulpur	14,97,934	8,85,899	59.0
Bilaspur	12,18,924	5,37,465	44.1
Ambikapur	13,90,332	5,86,640	41.1
Chhatarpur	13,75,113	9,16,134	66.6

*ending 15 June, 1963

(Continued from page 282)

months or even in rainy season as they believed that smallpox vaccination is taken only during the winter and the spring.

Health Education

Educational programmes were planned and organized before the vaccination team visited the areas. Success and failures were constantly evaluated and programme shaped accordingly. The members of the health team were given in-service training in the principles of health education and the method of approach to the people. Members of the health

Public Cooperation

A public health programme of such a magnitude wherein each and every member of the society is to be contacted cannot be successfully implemented without the active and voluntary cooperation of the common man.

Old beliefs and superstitions associated with smallpox are deep-rooted in the minds of the people. Efforts have to be made to overcome these obstacles by emphasizing the positive aspect of the programme. Measures have to be so formulated that they are linked with old teachings and should aim at enlisting the support of the village leaders. One has to understand that both the old and the new can co-exist and time alone will make the truth prevail provided one's own efforts are sincere in spreading the truth.

With this end in view, efforts are being made through the village leaders, local Panchayat and other Government and non-government agencies to enlist the cooperation of the public.

team were explained their responsibilities. The team members very often felt that since there is a health educator with every team, the responsibility of health education rests only upon him. But it is not possible for one person to motivate the entire population. Each member of the health team must realize that he is primarily a health educator. If he has been a successful health educator, the problem of vaccination is automatically solved.

A successfully vaccinated person is the best demonstration which can be offered, and has much more value than the various audio-visual aids.

Smallpox Eradication in Punjab

Dr R.L. Chopra

SMALLPOX vaccination has been carried out in the Punjab State for nearly a hundred years. The local bodies, both urban and rural, had employed whole-time vaccinators and supervisors to provide compulsory primary vaccination to children under six months of age as required under the Vaccination Act, 1880. This Act was brought up-to-date as the Punjab Vaccination Act, 1953 under which compulsory primary vaccination to all infants under six months and two re-vaccinations before the age of 13 years with a maximum of five years interval between the primary vaccination and first re-vaccination and between the first and second re-vaccination was introduced.

In the rural area, a vaccinator was assigned a population of 75,000 to 80,000. In urban Class I Municipalities, whole-time vaccinator for a similar population group was employed while the smaller urban bodies either had a multi-purpose worker, or utilized the services of district board workers on part-time basis. The lymph vaccine being destroyed by heat the vaccination season was restricted to the winter months, i.e., October to mid-April. The vaccinators, according to a fixed programme, tour the various villages or town sectors twice during the vaccination season to offer primary vaccination to infants in house-to-house visits. The inspection was done between 6th to 9th day of the vaccination. If there is a case of smallpox in a locality primary vaccinations and re-vaccinations were offered to the whole population of the locality or village. Originally three insertions for primary vaccination and two for re-vaccination were given but from 1953 even for primary vaccination only two insertions are given. With the eradication programme the number of insertions for primary vaccination has again been changed to three.

In the face of regular vaccination work in the State, cases of smallpox in sporadic or epidemic form have continued to occur year after year. There were 216 deaths in 1951, 84 in 1956, and 715 in 1961 due to smallpox.

Pilot Project

In 1960-61, pilot work with liquid vaccine was carried out in the Gurgaon district with the help of a full unit of 60 vaccinators, 12 vaccination inspectors and one District Medical Officer of Health. Out of a population of 12.38 lakhs, 9.52 lakhs were vaccinated. During 1961-62, this team was shifted to Hissar and Mohindergarh districts where 16.33 lakh vaccinations were provided against the population of 20.93 lakhs. From the 1962, smallpox eradication programme was taken up in the six districts of Rohtak, Karnal, Patiala, Sangrur, Bhatinda, and Ferozepore and part of Amritsar, by the creation of six field eradication units in accordance with the norm laid down by the Government of India. The regular vaccination staff of the districts and the health staff worked with the eradication teams.

Problems

The programme was started late by one and-a-half month. Full supervisory and vaccination staff was not available for the units. The vaccinators, vaccination inspectors and District Medical Officers of Health found the work hard without any compensation or additional allowance, etc. These sometimes did not stick to the job and at other times did not take full interest in their work. Moreover, there was lack of cooperation and coordination of the unit staff with the regular workers.

At some places families resisting vaccination were encountered. In two to three cases police help was required to protect the workers.

The Smallpox Eradication Day was observed throughout the State on 25 September, 1962, to boost up the eradication work.

Two whole-time health educators were attached to each unit and the existing health education agencies were also utilized to make the programme acceptable to the people. The workers were also educated in Public Relations.

Supply of Vaccine

Supplies of freeze-dried vaccine from the Government of India were stocked at two central places, viz., Karnal and Amritsar in refrigerators and deep-freeze cabinets. At one stage, it was felt that the diluent received with the individual vaccine vials was not enough to make liquid vaccine. One laboratory technician was trained in the preparation of the diluent at the Patwadangar Vaccine Institute and the work of preparation of diluent was taken up at the Amritsar Vaccine Institute.

Implementation

Transport vehicles for the teams for publicity and trucks for equipment were made available to the teams to improve the work. The Assistant Director (Smallpox), Dr Kartar Singh undertook intensive tours to check the field operations and to guide the individual workers in the correct technique of vaccination and checking of the vaccination results. Special powers were obtained to dispense with the services of unwilling or unsatisfactory workers with a month's notice. It has been our experience, that the vaccinators were not careful to correctly enter the previous vaccination marks and to prepare the skin for vaccination. Similarly vaccination inspectors did not always inspect the vaccinations carried out by the vaccinators on the sixth day as required. It is also our experience that the hundred per cent acceptance of vaccination by the people, is by and large, dependent on the personality and tact of the vaccination team, and concurrent health education is more important than largely attended public meetings or film shows.

On the completion of the first round the vaccination coverage was evaluated and mopping-up

operations were taken up. Special attention was paid to the urban population as they were found to be less receptive than the rural people. It is felt that education and urbanization usually work against mass acceptance of the immunization programmes. On account of the difficulties encountered by the programme in its earlier stages the eradication units could not complete 85 per cent population coverage by 31 March, 1963 and the work continued in two units in the same areas till the end of May and up to the middle of July in other two units and middle of August in the remaining two units.

Intensive Campaign

In early 1963, fresh cases of smallpox were reported from Gurgaon district where the pilot work was completed in March 1961. In Karnal district also, where the eradication teams were working, some cases of smallpox occurred. To cope with this fresh crop of smallpox cases and to create the sense of urgency for integrated health work among the medical and health workers, an intensive all-out vaccination campaign was taken up throughout the State, in eradication and other districts for the period of two months, i.e., June and July, 1963. The assessment reports of this intensive campaign are now coming in from the districts and are being analysed in the Health Directorate.

Present Position

Up to the end of July 1963, (including the earlier work in Gurgaon, Hissar and Meharajgarh districts) 12.5 lakh vaccinations have been completed as against the total State population of 230 lakhs. The eradication units are now working in the districts of Ambala (includes Simla), Ludhiana, Jullundur (includes Kapurthala), Hoshiarpur, Amritsar (includes Gurdaspur), and Dharamsala (includes Lahaul and Spiti). At present there is shortage of the vaccination staff, and there are only two supervisors (District Medical Officers of Health) against the total strength of six. These district supervisors are urgently required for the successful completion of the smallpox eradication programme in the State within the next one and-a-half year.

FIRST PHASE OF SMALLPOX ERADICATION PROGRAMME IN U.P.

Dr K. K. Govil

PRIOR to 1962, Public Health Departments in the various States had been making efforts to control smallpox as one of their normal activities. But the epidemic situation had not materially altered from year to year as a result of such efforts. It was, therefore, considered necessary to make a radical change from the old established organizational practice to control smallpox and take a bolder step to eradicate it from the nation. As a part of this national scheme, the programme was also taken up in Uttar Pradesh in a phased manner so as to cover all the 54 districts in a period of three years. For the first year's programme commencing in 1962, work was started in 17 districts scattered in the following geographical regions: (1) a group of five districts contiguous to Delhi and Punjab where the programme was already started; (2) six eastern districts where smallpox has been more or less endemic; (3) in the central zone of the State, four districts surrounding the Pilot Project district of Sultanpur; and (4) two hill districts of Dehra Dun and Naini Tal.

The methodology of work in these districts was after the pattern recommended by the Government of India and it was also tried in the pilot projects. The first month was devoted to the enumeration and preparation of the family registers by house-to-house visits. In the next seven months, actual vaccination operations were carried out in the form of a mass campaign. The districts were allocated a staff comprising 72 vaccinators and six smallpox inspectors per one million population. These teams were grouped into two's to four's and each group was assigned to cover a Development Block within a stipulated time, which, on an average, lasted three

weeks. These groups launched a mass campaign starting from one end of the block and moving to the other. After completing the work therein, the teams were shifted to another group of contiguous blocks in the district. After the mass campaign was over, mopping operations were also taken up block-wise and one month's time was allotted for that purpose. The last month of the session was devoted to compilation of reports and records. To make the programme a success, participation by all different agencies at the block level—official and voluntary—was ensured. Wherever resistance persisted in spite of the above measures, recourse was taken to compulsory vaccination.

From the experiences of working in areas which had different topography and culture, it emerged that there was maximum response in the hills and districts of the Central Zone, less so in the western districts and least in the eastern districts. (See bar diagram). This favourable response in the first two zones may be attributed to lack of resistance towards acceptance of vaccination from hill tribes and the gainful influence created in the surrounding districts by the pilot project. Variations in response attracted the attention of the administration to probe into the causes for failure or default or any lacunae in the plan of operation.

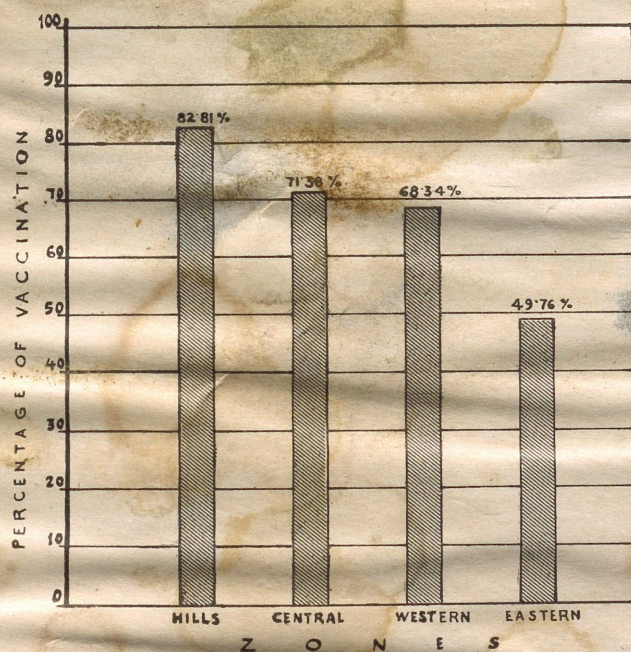
Highlights

Some of the highlights of the experiences gained from the working of the first phase of the programme in the State may be enumerated here. Adequate time was not devoted to enumeration work. This important aspect of the programme did not get the

attention that was necessary. As a result of this, enumeration in many areas either could not be done or was left incomplete in a hurry. Enumeration was a difficult job and required door-to-door visits by the staff which naturally entailed a lot of time and labour. Contrary to expectations, *Kutumbh* (family) Registers maintained in the blocks were not found to be of great use for the Programme staff in this work.

PERCENTAGE OF SMALLPOX VACCINATION IN 4 ZONES OF UTTAR PRADESH

(1ST PHASE OF N.S.E.P. IN 1962)



Performance in the first phase brought out the need for accelerated and efficient health education organization. In the routine set up two health educators were provided for each one million unit. Their performance did not prove to be very effective in creating a suitable climate for acceptance of vaccination by the public since the time at their disposal was too short for the extensive area they were required to cover. The experience confirmed the belief that not only there was a need for concurrent publicity at the time of actual operation, but there was also an imperative need for intensive educational

programme commencing well in advance of the actual vaccination programme.

To start with, glycerinated lymph was utilized in five districts and freeze-dried vaccine in the remaining 12 districts. It was observed that the success rate in case of re-vaccination was much higher where freeze-dried vaccine was used. The freeze-dried vaccine, therefore, gave much better and satisfactory results as compared to the glycerinated lymph. However, some deterioration was observed in the freeze-dried vaccine under conditions of extreme heat. A certain amount of complacency was noticed on the part of workers who felt over-satisfied with the freeze-dried vaccine with regard to maintaining its potency in all types of weather.

Coverage of Population

When the programme was first introduced, the existing concept was that if 80 per cent of the population could be covered, enough herd immunity would be built up to ward off any future danger of an epidemic. It was, however, subsequently felt that if the coverage was not uniformly distributed in all sections and areas of the population, effective coverage will always be less than the actual. Other factors such as deterioration in the potency of the lymph, errors of technique, extremes of climate, lack of elementary precautions by the people, etc., will also reduce the effective coverage. In order, therefore, to eliminate any chances of latent foci of infection, it is necessary to aim a coverage of 100 per cent population. There is a greater need for attaining the target in the eastern districts of the State, particularly where the response has been poorer, and suitable ways and means will have to be explored to achieve the required target.

In view of the factors that emerged from the experiences of the pilot project as well as the first round of the operations in the State, it will be appreciated that 100 per cent coverage is difficult to achieve during the attack phase. There is, therefore, an imperative need for introducing a mopping or surveillance phase as well, after the attack phase is over. During this phase, which should last for another vaccination season, the second round of the operation should be conducted by house-to-house visits and thus combing all the missed ones to bring up coverage to 100 per cent.

Programme Evaluation

Before the attack or surveillance operations are completely withdrawn from an area, it is essential to be reasonably sure that an optimum level of immunity has been built up in the community. For this purpose, an evaluation and assessment of the programme on the lines similar to one carried out in Delhi Corporation recently is necessary. It is only then that the decision to enter the maintenance phase should be taken. If evaluation reveals any deficiency, even a third round in certain difficult areas may have to be taken up, before passing on to the maintenance phase.

Last but not the least a "Maintenance Phase" should be included within the ambit of the National Smallpox Eradication Programme. All the labour and investment of funds in the programme will perhaps be a waste if we do not take care also to see that the level of immunity attained during eradication phase is maintained by regular vaccination of the new-born, immigrants and periodical re-vaccination of others. This cannot be left to the existing district vaccination organization and, therefore, it has to be improved and strengthened to enable it to shoulder this great responsibility.

Need for Health Educators

Judging from the experiences of the last year's work, some revision in the plan of operations is necessary. Let it be re-emphasized that there should be a preparatory phase lasting for one year before the actual

vaccination operations are undertaken during which not only enumeration should be completed, but also an intensive programme of health education be carried out. This will allow time to prepare the community for receiving vaccination and also permit the workers to complete the family registers which are an essential preliminary to any mass campaign.

Zonification

During the attack phase, instead of concentrating the entire energies in a part of a district at a time, it may perhaps be better to spread staff uniformly all over the district and fix areas of responsibility. The Government of India's scheme of zonification is a revised thinking on these lines. But a word of caution should be sounded here. Even after decentralization of the staff of the block, certain period has to be earmarked for vaccination drives as well, so that the spirit of mass campaign is not completely lost sight of. One round of mass campaign can surely get a good response and substantial figures of vaccination. After the attack phase is over, mopping-up or surveillance operations is an essential corollary. Once these operations have succeeded in completing an effective coverage of 80-90 per cent of the population and evaluation or assessment has confirmed that such a level of immunity does exist, then and then only the time would be ripe for the programme to enter the maintenance phases, which should ultimately form an integral part of the Basic Health Services at the periphery.



Maintenance Phase under Smallpox Eradication Programme in U.P.

Dr G. P. Chakravarti

IN order to speedily rid the country of the scourge of Smallpox, an eradication programme was started simultaneously in all the States in 1962. This was preceded in 1960-61 by the launching of Pilot Projects, one in each State. Their aim was to work out a methodology for the country-wide eradication programme. The Pilot Project in Uttar Pradesh was carried out in the district of Sultanpur. The programme was planned in a phased manner for a period of three years to cover a population of 73.75 million in 54 districts at the rate of 18 districts per year. Attack phase in the first group (I) of 18 districts (including the Pilot Project of Sultanpur) was completed in 1962-63. The second group (II) of 18 districts has been taken up during the current year and according to the original plan, the remaining or the third group (III) of 18 districts are scheduled to be covered in 1964-65. The break-up of the programme can be seen at a glance from the table given below.

Adequate Coverage

Although no provision for mopping or surveillance and maintenance phases was made in the National Smallpox Eradication Programme formulated by the Government of India, a reference to that effect has now been made to them by the Government of Uttar Pradesh and their approval is still awaited. This is based on the experiences gained after working the programme for one year. It has shown that, contrary to original planning, provision of separate phase for mopping-up operations is very necessary in order to achieve coverage adequate enough to provide herd immunity to eradicate the disease. Accordingly, such operations are proposed to be undertaken during the current year in the first group of 17 districts and the Pilot Project of Sultanpur, where coverage ranged from 40-83 per cent and similarly for other groups of districts as well according to the time schedule given in the table.

Table Showing the Schedule of Smallpox Eradication Programme

Phases of the Programme	Targets for the Third Plan					Target for the Fourth Plan
	1960-61	1962-63	1963-64	1964-65	1965-66	1966-67
1. Pilot Project Sultanpur	—	—	—	—	—	—
2. Attack Phase	—	I(18)	II(18)	III(18)	—	—
3. Mopping or Surveillance	—	—	I(18)	II(18)	III(18)	—
4. Maintenance	—	—	—	I(18)	II(18)	III(18)

N.B.—Figures in brackets indicate the number of districts in different groups.

The Committee for Assessment and Evaluation of Smallpox Eradication Programme in Delhi, set up by the Government of India recently, have stressed the necessity of providing a suitable organization to continue the maintenance work in the areas where mopping-up or surveillance has been completed. In recommendation No. 4, the committee has proposed to "establish a system of routine vaccination during infancy by a closely supervised squad or squads so that all infants are vaccinated within three months of their birth. Any failures will again be vaccinated before six months."

Again in the recommendation No. 6, it has been suggested that "upon completion of the vaccination or re-vaccination of pre-school group and non-school group up to the age of 14 years, 25 per cent of the entire population should be vaccinated or re-vaccinated annually by house-to-house visits so that entire population will be reached once more within a period of four years."

Further, under the Committee's recommendation No. 8, it has been mentioned that "upon completion of the vaccination or re-vaccination of the entire population vaccinate or re-vaccinate the school population on entering school and at ages 8, 11 and 14."

Maintenance Organization

These recommendations of the Committee require consideration and elaboration. There cannot be two opinions regarding the necessity of creating a maintenance organization to establish responsibility for maintaining a high level of immunity in the community so that any future chance of epidemic flare-up is obviated. The establishment of such an organization immediately after the attack and mopping phases to implement the above recommendations should, therefore, form an integral part of the National Smallpox Eradication Programme.

It is expected that at the rate of 40 births per 1000 population, there will be roughly 2500 new-born infants in a Community Development Block every year, who will require vaccination. These infants will be scattered roughly in 100 villages which the maintenance staff will have to visit every year. On the basis of past experience, it is also envisaged that there will be about 15 to 20 per cent missed ones who will either be immigrants or those who

have escaped vaccination. Or their results of vaccination during the attack or the surveillance phase may be unsuccessful for some reason or the other. In terms of numbers, they will constitute some 12,000 people. Thus, 14,500 people (12,000 missed ones + 2500 new-born infants) will demand immediate contact by the vaccinators employed in the maintenance organization. There will subsequently be need for vaccinating the school-going children and school-leaving children and also implementation of other measures recommended by the Committee. It will immediately be realized that it is beyond the physical capacity of one vaccinator, who is at present available from the local boards and attached to Primary Health Centres in a Block, to successfully complete the enumeration work in respect of the new-born and the immigrants as well as to vaccinate the number of people mentioned above.

Administrative Pattern

In view of all this, for an effective maintenance organization it is necessary to provide one vaccinator for 30,000 of population in rural areas and one for 15,000 in urban areas. Vaccinators in rural areas will be based at the Primary Health Centres and will work under the guidance and control of the Medical Officer Incharge of these centres. In the interest of effectiveness of the programme and with a view to achieve the objectives aimed at, it is necessary to introduce a change in the administrative pattern of the district vaccination organization. It is not unknown that from decades past vaccination work has been going on under the aegis of the Local Boards, but even then the epidemics of smallpox have continued to occur off and on. This calls for a change and it is high time that the services of the Local Boards' vaccinators are taken over by the Government and their posts made transferable. This will subject them to more effective administrative control and, in turn, increase their efficiency in the achievement of the objectives of eradication of this dreadful disease.

As the Block Sanitary Inspector will be engaged in multifarious activities, including food adulteration cases, requiring his frequent attendance in the court and consequent absence from the headquarters, it will be necessary to give a position of prestige to

the Assistant Superintendent of Vaccination at the district level so as to enable him to exercise an effective supervision over the vaccination staff of the district. Further it is also necessary to strengthen the district vaccination organization by providing a Senior Vaccinator, who may be given a little higher scale of pay than the field vaccinators. This incumbent will help the Assistant Superintendent of Vaccination in compiling and consolidating the vaccination reports and returns received from the whole district. He would also be made responsible for proper storage and distribution of vaccine lymph. In addition, it is proposed to have one or two posts of vaccinators at the headquarters to function as leave reserves so that in the absence of a field vaccinator on leave or illness this vitally important work does not suffer.

Epidemiological and Assessment Squads

As embodied in the recommendations of the Evaluation and Assessment Committee, special squads may also be raised for dealing with endemic smallpox foci in the areas covered under the eradication programme. These squads can also be utilized for periodical assessment of the immunity level during the maintenance period as well as for the training programmes as and when needed. Each mobile squad shall comprise the following staff: Medical Officer, a Para-Medical Assistant, a Smallpox Inspector, a Health Educator, six Vaccinators (one team), an Orderly Peon for Medical Officer, a Driver and a Class IV servant.

The squads have to be provided with a jeep and a publicity van to undertake intensive educa-

tional programme in difficult areas where coverage has not been up to the mark, like eastern districts of Uttar Pradesh. The number of such squads required for different States will be on the basis of population. It is, however, suggested that one Epidemiological and Assessment Squad may be provided at least for a population of 10-15 million.

Key to Success

The gigantic task of eradication of smallpox from the country will not be complete unless the establishment of a maintenance organization is placed on a sound footing before the actual withdrawal of the eradication staff. Experience of the pilot projects all over the country has shown beyond doubt that even after a comprehensive coverage to the desired extent, this programme cannot be left loose in the hands of a poorly staffed permanent vaccination organization employed by the Local Boards in most of the States. The key to success would, therefore, be to establish an effective agency for vigilance with regard to the maintenance of the optimum level of immunity after the mass campaign is completed, and not to restrict our interests and energies only to the completion of the attack phase as envisaged under the existing plan of operation. It is felt that other States also think alike. The conditions prevailing in this respect do not differ from State to State very much. Therefore, a national policy in this matter is indicated so that a uniform pattern of a Maintenance Organization could be set up all over the country and targets fixed to root out smallpox for all time.



Around the states



KERALA

Smallpox in Ernakulam

TWO hundred and thirty-one persons died of smallpox in Mattancherry in Ernakulam district till May 15, according to the reports received here. In all 434 persons were attacked by the disease.

The Health Services have launched smallpox eradication scheme, and 86 per cent of the total population of the area have been vaccinated by the Mattancherry Municipality with the help of the staff deputed by the Department of Health Services.

MAHARASHTRA

Unique Eye Operation

A UNIQUE corneal transplantation operation was performed on July 11 at Virar, a small town in Thana district of Bombay. On July 9, the cornea of a living person was transplanted into the left eye of a young woman.

The donation of a cornea by a living person was perhaps the first of its kind in the country. Shri M. D. Choudhri, Health Minister, had watched the operation scene.

Shri V. K. Nair, 55, of Virar who was totally blind in both the eyes due to a complete optica-trophy, decided to donate cornea of one of his eyes for transplanting it to a patient who was suffering from corneal opacity. Smt Tarabai Meher, aged 21, is the recipient of the cornea.

Old Lady Donates Eyes

SMT. CLARA SIMON GEORGE, 95-year-old lady of Kumbharwada, Agashi, who died on June 20, donated both her eyes to the Sanjivani

Eye Hospital at Virar. Her eyes were removed promptly by Dr M. S. Mankekar, Chief Medical Officer of the Sanjivani Health Cooperative Society, and the corneas have been used for the grandson of the old lady, Mr Alex D Mellow, and Shri Ratanlal Bhivraj of Nasik, with the cooperation of the Government Eye Bank authorities of Bombay.

Shri Wamanrao Samant, President of the Sanjivani Health Cooperative Society at Virar, said that they proposed to establish an Eye Bank at Virar.

Transplantation of Eye Tissue

TO TALLY blind for ten years, a 50-year-old man called at the Government Eye Bank at the J. J. Group of Hospitals for an examination. The cornea of his left eye, it was found, was completely healthy, but there was no light perception in the eye due to some damage of the retina and optic nerve. His right eye cornea, however, was opaque, and there was good projection.

It was, therefore, decided to transplant the tissue from his left eye to the right eye (autogenous corneal transplantation). The operation called for a special technique. A large, nine-milimetre in diameter graft was exchanged from the left to the right eye, and similarly from the right to the left eye at the same time.

As the transplantation of the grafts had to be done fast, a large contact glass was used to protect the internal structure from exposure to avoid complications.

This operation was done at the J. J. Group of Hospitals, Bombay.

Swasth Hind

MYSORE

Strict Enforcement of Drugs Standard Control

THE Third Southern Regional Health Ministers' Conference held at Bangalore on 3 and 4 July, 1963 resolved that the Drugs Controllers of the four Southern States and Maharashtra State should meet once in six months to discuss the ways and means to intensify the enforcement of Drugs Standard Control to ensure the quality and fair prices of drugs.

The Conference has also decided to effectively control the manufacture and sale of spirituous medicinal preparations to prevent their misuse, in the States where Prohibition Laws are in force.

Degree Course in Pharmacy

THE Government of Mysore have sanctioned the starting of a degree Course in Pharmacy in the Medical Colleges at Mysore and Bangalore from 1963-64. These colleges are affiliated to the University of Mysore.

WEST BENGAL

Smallpox Eradication

THE Government of West Bengal have been taking large scale measures to eradicate smallpox from the State and make people conscious about the dangers of the disease and how it can be prevented.

Important among these is a Smallpox Eradication Pilot Project launched in the Birbhum district. Work on the project was started on 31 October, 1960. Attention was paid from the initial stages to enlist popular support for the programme. At district, subdivisional and thana levels, anti-epidemic committees were formed with influential local people.

Supervising medical officers organized publicity in the Project in villages immediately before and during a campaign. Response from the public was favourable and there was visible consciousness among the villagers. Local papers welcomed the project in the editorials. Handbills, leaflets, posters and booklets in Bengali and local Santhali languages

were freely distributed through schools and colleges. Slides were exhibited at all cinema houses in the districts. The Block Development Officers, Presidents of Union Boards and Panchayats, and school authorities generally cooperated with the field staff. Work proceeded with a base target of 100 vaccinations daily. Till March 31, 1961, about 13.22 lakh people were enumerated, of whom 10.32 lakhs were vaccinated.

An assessment revealed that there has been no case of smallpox among those vaccinated, 78.07 per cent of the district population was immunized against smallpox. This is considered to be very near the significant figure, necessary for the establishment of herd immunity in a community.

Between 1 April, 1961 to 3 December, 1962, about 9.86 lakh people were enumerated of whom 8.56 lakhs were vaccinated.

Uniform Food Standard

THE ninth meeting of the Central Committee for Food Standards was held at Vigyan Bhavan, New Delhi, from 24 to 26 July, 1963. Dr M. S. Chadha, Director-General of Health Services presided.

The meeting was attended by the representatives of State Governments, the concerned Ministries of the Government of India and the trade interests.

A special session of the Committee heard representations from trade organizations.

The Committee took note of the steps so far taken to implement the decisions reached at its previous meeting. The Committee reviewed the recommendations made by its various sub-committees and collaborative panels, viz., the Permanent Sub-Committee of Analysts, the Ghee Sub-committee, the Asafoetida Panel, the Expert Committee on Honey, etc.

In the light of the data available after the collaborative studies, the Committee recommended certain modifications in the specifications for Asafoetida. Standards for ghee were also modified for certain regions of the country as an interim measure. The sub-committee on ghee has further been entrusted to report on the possibility of recommending a uniform standard of ghee on an All-India basis.

The Committee recommended the adoption of a general standard for all foodgrains as an interim measure. Standard for certain items of food such as pearl barley, barley powder, (cheese), paneer etc., were also finalized.

To enable detailed consideration of matters relating to food standards and other relevant matters on the working of the Prevention of Food Adulteration Act and to facilitate the deliberation of the Committee a number of sub-committees were formed. They are :

(i) A sub-committee each to review the standards for spices, (ii) to review the standards for dairy products, (iii) to review the existing rules and standards in general, (iv) to review the qualifications of public analysts and food inspectors appointed under the Act, and (v) to finalize the methods of analysis.

Dr Sushila Nayar, Union Minister for Health, was present at the afternoon session of the Committee on 24 July. She expressed her anxiety about the growing menace of food adulteration in the country and assured her full cooperation to eradicate this evil.

The Minister suggested that the Committee should be more realistic in its approach to the different problems and try to recommend such rules and standards as are easily comprehensible to the general public. She listened to the difficulties expressed by the Public Analysts of various States regarding the lack of proper laboratory facilities and the working conditions. She agreed to invite from the State Governments a detailed report regarding the available laboratory facilities and the service conditions of the Analysts and the technical staff.



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