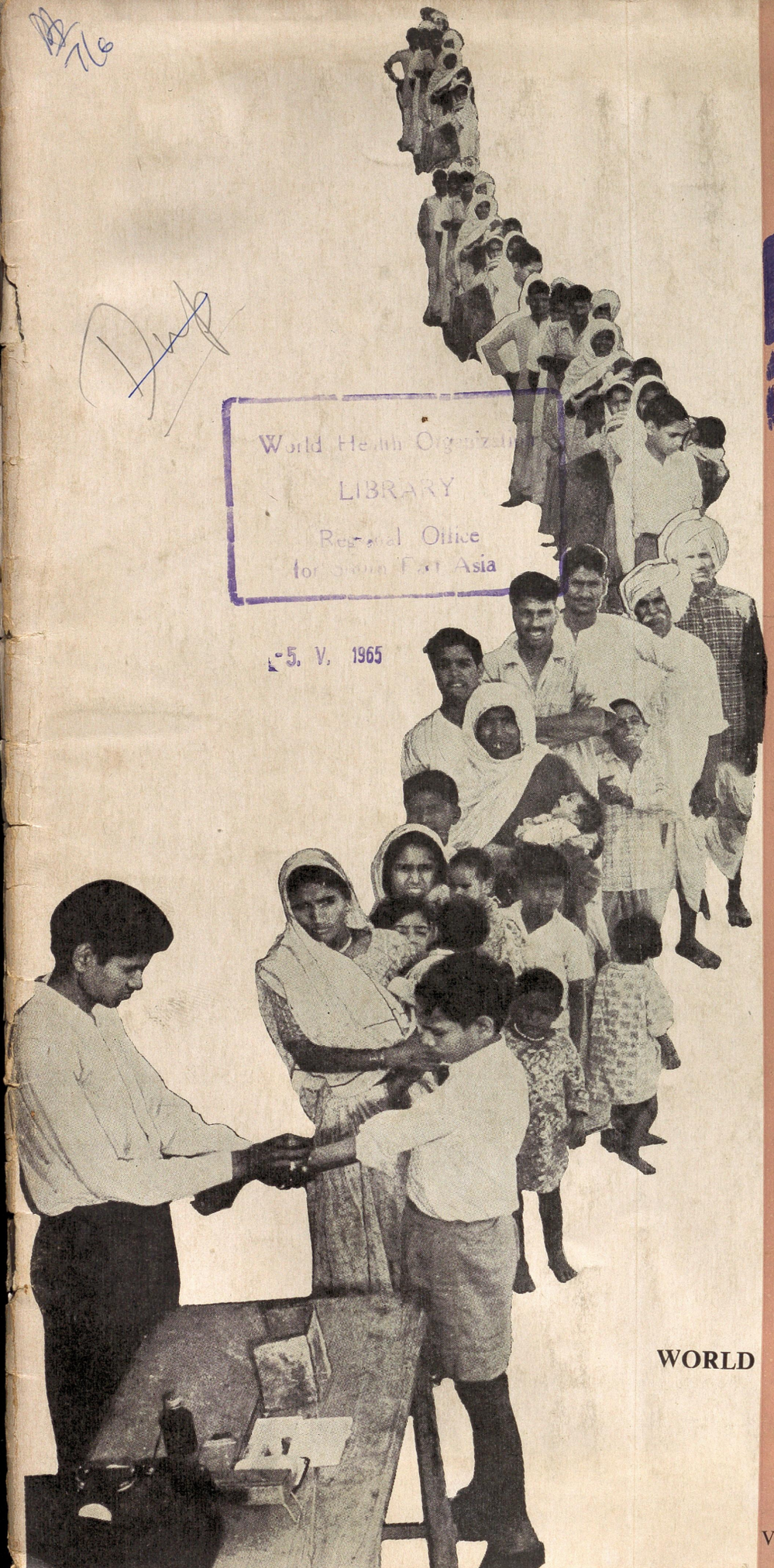

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Swasth Hind

WORLD HEALTH DAY NUMBER

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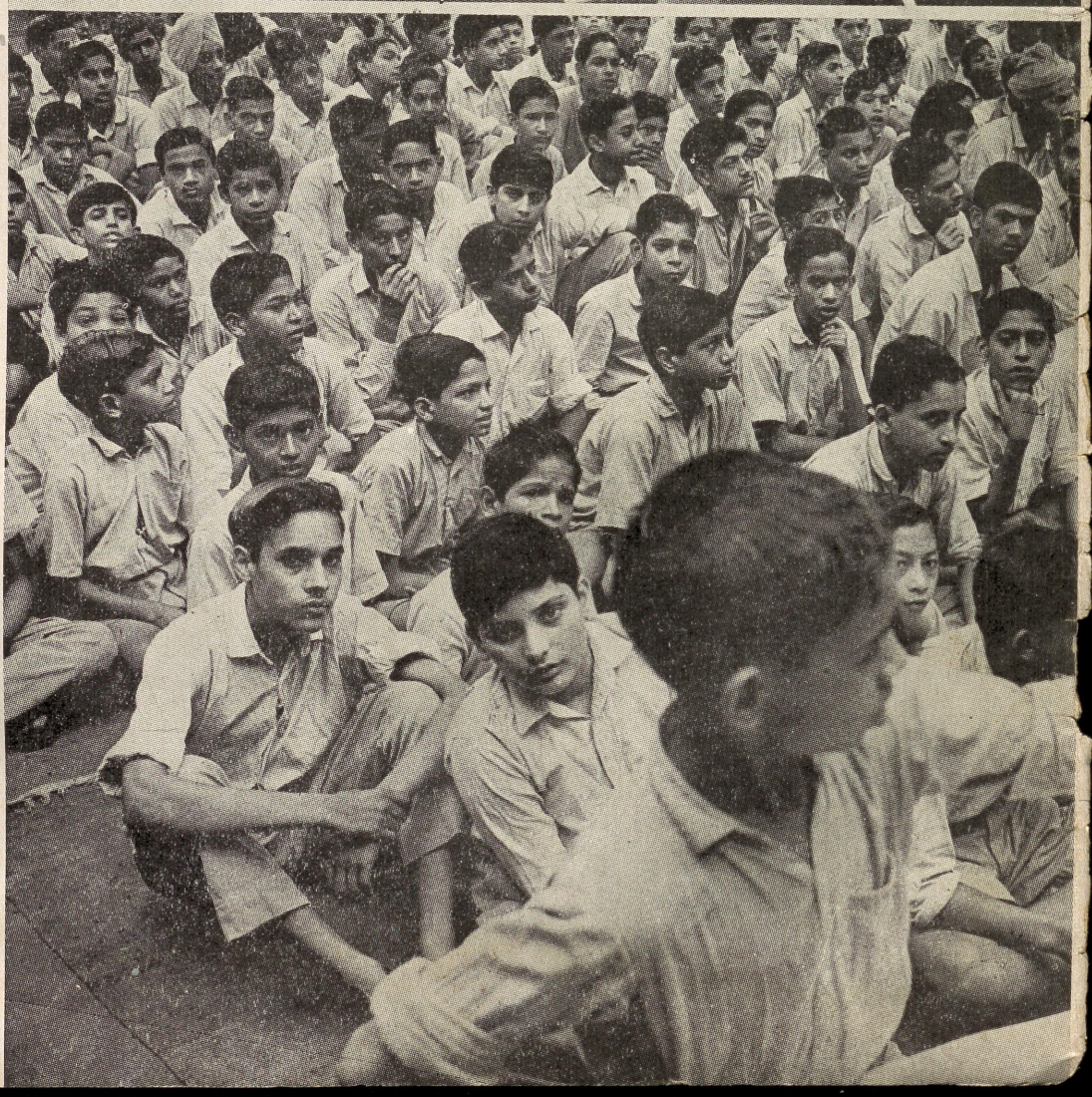
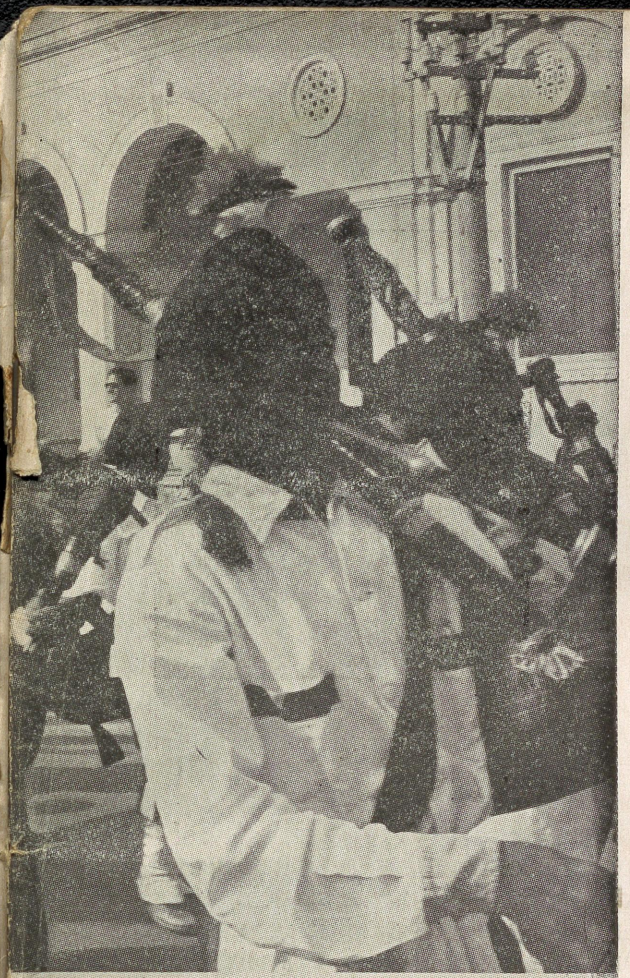


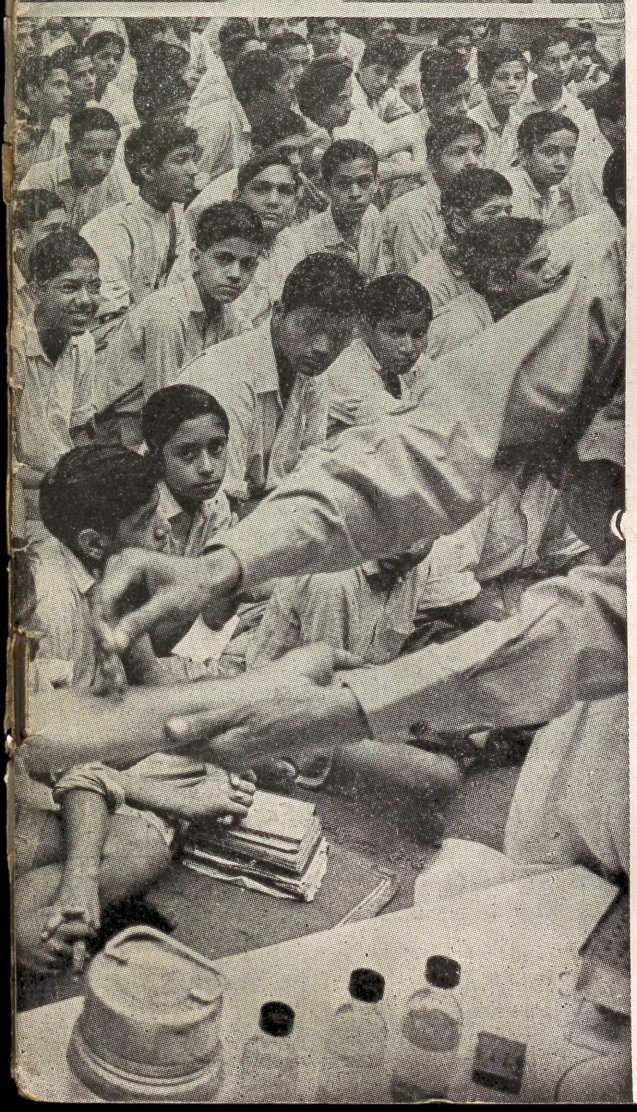
OUR COVER

The theme for the World Health Day—1965 is: Smallpox—Constant Alert. Smallpox has been eradicated from many countries of the world. This achievement was made possible by systematic vaccination and re-vaccination of the entire population. In spite of the availability of vaccination smallpox continues to occur in India and a few other countries. If the entire population of India gets vaccinated systematically, the disease can be eradicated from our nation. *Our Cover* shows people lining up for vaccination.

THIRD COVER

A portrait of Edward Jenner (1749-1823), an English doctor, whose researches led him to the discovery of vaccination against smallpox.





Swasth Hind

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

The opinions expressed by the contributors are not necessarily those of the Government of India.

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MINISTER OF HEALTH
INDIA
NEW DELHI

World Health Day, observed each year on 7th April, marks the anniversary of the coming into force of the Constitution of the World Health Organization in 1948. This year's theme is "Smallpox—Constant Alert". Science and medicine are international and we exchange experiences and learn from one another's experiences through the WHO. Problems of human health and welfare everywhere are alike and so are the methods of dealing with them.

Considering the heavy toll that Smallpox—a perfectly preventible disease—takes every year, its eradication has been taken up in many countries. Hence the theme of WHO Day for this year. We have launched national smallpox eradication programme in the current Five Year Plan and so far nearly 70 per cent of the country's population stands vaccinated. The impact of the work has already shown considerable reduction in the incidence of smallpox in our country but we should not be satisfied with the success so far achieved. We have still to tackle the hard core of the population which continues to suffer from age-old beliefs and superstitions. We have also to ensure that all newborns are vaccinated and school going population, immigrants and population residing in slums and suburban areas of big cities, are re-vaccinated at periodic intervals. Continuous vigilance on the part of all health personnel and integration of vaccination with other public health activities is necessary to ensure freedom from smallpox.

On the occasion of the World Health Day 1965 I send my good wishes to all the smallpox workers in every corner of the country, who are working with enthusiasm and hope that very soon smallpox will become a thing of the past, to be read about in books and seen in pictures. To ensure that "Constant Alert" must be observed everywhere.

Sushila Nayar

(Sushila Nayar)

DEPUTY MINISTER FOR HEALTH
INDIA,
NEW DELHI

I am happy to learn that this year the theme chosen for World Health Day is "Smallpox—Constant Alert." In our country the National Smallpox Eradication Programme is already on and the work so far done has shown a good impact. The theme of the World Health Day will definitely provide a tempo to our Programme. It will remind people everywhere of the constant threat of smallpox and to spur on the efforts to eradicate this disease.

Smallpox, which has been ravaging our country for centuries, has shown a complete disregard for race, age and sex of the patient and even sanitary surroundings. But now the time has come when smallpox should become a thing of the past, a bad dream, a sad memory and we should be determined that our future generations should be free from the danger of this scourge.

On this occasion, I wish to send my good wishes to all the workers who are fighting against this disease throughout our country for the cause of humanity.

P S Naskar

(P. S. Naskar)

SMALLPOX—CHALLENGE AND ANSWER

DR SUSHILA NAYAR

MEDICAL events in the last century have shown that no country can remain free from deadly communicable diseases until they are eradicated from other countries also. Different countries of the world have, therefore, embarked upon international co-operation in the field of health. This international co-operation gradually grew into the formation of the World Health Organization in 1948. The constitution of this Organization was adopted on 7th April, 18 years ago. To commemorate that Day, we celebrate the World Health Day every year and pledge again for international co-operation in the field of health. For some years, this memorable Day of international co-operation is being used to focus the attention on one of the diseases which is harming mankind. This year's theme of World Health Day is connected with the eradication of smallpox. The slogan is : "Smallpox—Constant Alert".

Smallpox is a dreaded infectious disease, which affects people indiscriminately in any part of the world. Every country is making efforts to prevent and ultimately eradicate it. As long as smallpox persists in any part of the world, preventive measures against it all over the world have got to be taken.

About 160 years back, vaccination for the prevention of smallpox was discovered, but we have failed to make the best use of this effective weapon. Even now, every year more than a lakh of people in the world fall a prey to smallpox and about 25,000 of them die. Therefore, we have to take a pledge today that we will be on the alert and see that we don't fall a victim to or die of smallpox—a preventible disease which can be easily controlled. To fulfil this pledge, science has given us an easy and simple method—vaccination. If all the people of the world get themselves vaccinated and re-vaccinated periodically, they will not suffer from smallpox. The pledge should be that none among us will be left unvaccinated.

The incidence of smallpox in India is the largest when compared to that of other countries. In the course of the last five years, about four lakh people suffered from it all over the world and about 88,000 of them died. Out of these, in India alone, 250,000 suffered and 70,000 succumbed to it during the course of five years. Though the means to get rid of this disease are available easily and free of cost, it is really sad that this disease takes a toll of thousands of lives every year. Not only this, even those who survive generally become blind, deaf, pock-marked or handicapped in some way or the other and thus become a burden for themselves and the society. The disfigured, pock-marked youth finds his future prospects dark and the life of young girls with pock marks or blinded as a result of smallpox is ruined. Did you ever imagine the dreadful and dangerous consequences of this disease ? Had you ever thought of the serious consequences of this problem, it should have been solved long ago.

On visualizing the serious situation of smallpox in India, the Central Government embarked upon the National Smallpox Eradication Programme in 1962. Under this programme 155 Smallpox Eradication Units are now working in the the country. Uptill now, in 144 districts of the country vaccination work has been completed and the vaccination coverage extended to nearly 70 per cent of the population, but the problem of smallpox still continues to be serious in certain places. It would have been all the more serious, had we not launched the eradication programme. As a result of mass vaccination under this programme, there has been a considerable decrease, as compared to previous years, in the incidence of smallpox. The year 1963-64 happened to be cyclic

year for the epidemic. In the seven months (November to May) of the year about 26,000 suffered from smallpox and about 7,000 of them died, whereas in the same period in 1950-51 and 1957-58, the years of cyclic epidemic, nearly 2,50,000 and 1,50,000 suffered from smallpox and out of them about 57,000 and 36,000 respectively died. In other words if 100 died in 1950-51, the number of deaths on account of smallpox were 65 in 1957-58 and 13 in 1963-64, the years of cyclic epidemic—that is death rate from smallpox in the cyclic year 1963-64 fell down by 81 per cent when compared to the death rate in the cyclic year 1957-58. The mass vaccination campaign has no doubt considerably brought down the number of cases of smallpox but we should not be satisfied with this only. We should be content only when smallpox is totally wiped out from our country and there is not a single person suffering from it.

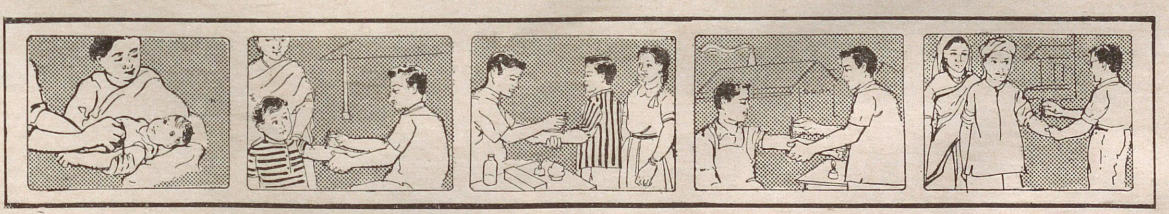
Is it possible that there may not be a single case of death due to smallpox in our country ? Yes. It can surely be. Smallpox has vanished from many of the countries of the world. Not only in USA or Europe, but even in some countries of Africa and Asia smallpox has become a thing of the past. When there could be complete eradication of smallpox from these countries, why couldn't it be so in our country ? Perhaps, you may think that it is due to the climate that there is no incidence in those countries. This is a misunderstanding. Climate has nothing to do with outbreaks of smallpox. Today, hardly one or two persons may suffer from smallpox in those countries where 150 years ago thousands of people died of smallpox. And this too happens only when infection is carried to their country from endemic areas.

The other misunderstanding that prevails is that if the house is a big one and kept clean, there would be no incidence of smallpox. History would bear it out that even great kings and emperors were the victims of smallpox. This was the disease that cost Maharaja Ranjit Singh his one eye. Very recently in our country one of the popular filmstars suffered from smallpox and died.

Why then even today there is very high incidence of smallpox in our country ? Because even now we believe in age-old superstitions and traditions. I do not want to hurt the beliefs and ideas of any one; rather I respect the religious beliefs. What I humbly want to request is that you can stick to your religious beliefs but accept vaccination also because it is for your good. Through vaccination alone a number of countries in the world have attained freedom from smallpox. They too might have beliefs and ideas when they went in for vaccination, but when they witnessed the results and had the proof of the efficacy of vaccination, they accepted it and got rid of smallpox. We too have to act in the same way.

I appeal to you on this World Health Day to realize the danger of smallpox and make a success of the National Smallpox Eradication Programme presently going on in our country. Give your fullest cooperation to the vaccination teams when they visit your village, neighbourhood or your house. Get yourself and your family vaccinated and make sure that no one is left unvaccinated in your neighbourhood, society or your village. If someone remains unvaccinated in your family, neighbourhood, society or village, this would give room for occurrence of smallpox.

Remember, there should be no one left in any part of our country without being vaccinated. The facilities for vaccination are today available free of cost in hospitals and vaccination centres, and vaccinators are going from door to door. I wish, on this World Health Day, you too should join hands with the people of other countries in taking a pledge of completely exterminating smallpox.—*Based on a talk broadcast by AIR.*



EVALUATION OF SMALLPOX ERADICATION PROGRAMME AND ITS LESSONS

DR A.K. KRISHNASWAMI

IN accordance with a directive from the Union Minister of Health, the National Institute of Communicable Diseases has completed the evaluation of the Smallpox Eradication Programme in four districts one in each of the States as below:

State	*District*	*Period of Evaluation*
Mysore	Mysore	Oct. 7 to 16, 1963
Kerala	Palghat	Nov. to Dec. 1963
Madras	Chingleput	Dec. 13 to 22, 1963
Uttar Pradesh	Varanasi	Sept. 15 to 23, 1964

In all these cases it was claimed by the States that the districts selected had completed the attack phase and the targets laid down had been reached. The evaluations revealed the shortfalls and deficiencies of planning technical and administrative aspects of the programme. Constructive recommendations for remedial action have been made in the evaluation reports.

The evaluation teams functioned as independent fact-finding missions and, apart from studying the progress of the programme, simultaneously trained a number of medical officers and ancillary staff in the techniques of evaluation. Further, based on the experience gained in these evaluations, National Institute of Communicable Diseases has prepared a manual describing a brief, simple, rapid and inexpensive techniqe which could be used by the officers at district level to assess the programme in the areas under their jurisdiction. The manual has been referred to as a 'do-it-yourself kit' for concurrent and consecutive evaluation which alone can yield necessary information about difficulties and failures permitting prompt solution and help to improve the tempo of the programme.

The procedure laid down in the manual makes it possible to assess the achievements of the programme in a district within a period of 10 days including one day at the beginning for the briefing participants and one day at the end for the tabulation of the data collected.

All aspects of the programme, covering details of administrative, organizational, technical and epidemiological were studied during the periods detailed below:

(A) ADMINISTRATIVE AND ORGANIZATIONAL

(*i*) The staff sanctioned and the staff in position and turnover category-wise.

(*ii*) The status of training of the staff.

(*iii*) Work-load for each category of staff—time-motion study.

(*iv*) Where lymph (liquid) is used, the organization for despatch, receipt and use.

(*v*) Routine arrangements for testing potency of lymph and cross-testing.

(*vi*) Organization for mopping up operation and its efficacy.

(*vii*) Efficiency of supervision.

(*viii*) Organization for attending to focal outbreaks.

(*ix*) Epidemiological investigation and remedial measures.

*A Guide for the evaluation of the NSEP at the District level (Govt. of India, Ministry of Health, New Delhi) 1964.

(*x*) Verification of the enumeration records.

(*xi*) Verification of the birth registration and its degree of completeness.

(B) TECHNICAL

(*i*) Vulnerable population and its location, proportion vaccinated and record of inspection.

(*ii*) Proportion of infants missed or refused vaccination in the last one year.

(*iii*) Success rate of primary vaccination and record of inspection.

(*iv*) Number of re-vaccinations in the mass vaccination, proportion of the target achieved, proportion of re-vaccinations inspected and record of results.

(C) CHALLENGE VACCINATION

Challenge vaccinations made during the evaluation and the results of each vaccination.

(D) EPIDEMIOLOGICAL

Smallpox cases occurring in the previous year in the areas of evaluation and the epidemiological investigation of each, remedial measures taken, the time factor between dates of reporting and investigations and remedial measures.

Sample for Evaluation

The assessment was carried out in selected areas of the district to ensure that a cross section of the entire district was examined taking into consideration the geographical, topographical, religious, socio-economic and other factors present in the district. Care was taken to include urban and rural communities as well as remote isolated areas and special population groups like labour camps, etc., in the sample, which was thus deliberately and purposefully biased. The targetted sample population was about one per cent in the rural areas and two per cent in the urban areas selected for the evaluation.

Staff

The staff for the evaluation was drawn mostly from the State where the evaluation was carried out. A few officers of the National Institute of Communicable Diseases, and from the neighbouring States were also deputed to help in the evaluation. A number of teams were formed, the number depending on the size of the district and the sample selected for evaluation. Each team consisted of a team leader*, a senior sanitary inspector (from the State Service, but outside the district under evaluation) and a guide (a local junior staff member of the Public Health Organization who was familiar with the area and the people). A team was assigned to each locality and had to cover a population of about 1200 (240 families) in the area allotted selected by the systematic sampling method. A team was expected to go through 40 houses in one day, but in actual practice it was observed that the target of 240 houses was completed often a day in advance, leaving ample time for tabulation of the data.

One team was incharge of the collection and compilation of data regarding the administrative and organizational aspects, which was obtained from the State/District headquarters. One team was placed incharge of epidemiological investigation of cases reported in the different areas during the previous 12 months.

The evaluation, though limited in duration to about 10 days, studied all the different aspects of the programme in great detail in a population selected at random and representative of the different social and economic strata and different terrains in the district selected for evaluation. The utilization of officers and other personnel drawn from outside the district and in some cases outside the State for the evaluation ensured an unbiased approach in the study, which was very essential for a correct appraisal. The conclusions and lessons emerging out of these four evaluations are briefly discussed here. While these lessons emanating from studies in widely separated parts of the counrty, are particulary applicable to the District and the State where the evaluation was carried out, many of them are probably applicable to other parts of the country as well.

Observations in general and their Lessons

(*i*) *Family registers*—The enumeration register, was in no case, maintained up-to-date. Gross deficiencies were noticed in the entries and many

*The Officer-trainees who participated in the first course in Epidemiology at the NICD (July-Dec. 1964) acted as Team Leaders in the evaluation in Varanasi district in Sept. 1964.

additions and deletions in the families had not been made since the time the registers were initially compiled. No space had been allowed after entries regarding each family for future additions. The registers were not sturdy enough to last over a number of years as would be necessary for follow-up vaccinations over the maintenance phase. Preparations of family cards in duplicate and kept-up-to-date would be invaluable. One card could be transferred to new areas to which a family may move, while the other could be used in the central registry.

(*ii*) The staff for the operations under the attack phase and arrangements for their recruitment and training were found to be adequate and satisfactory. Watching the vaccinators at work in some areas, however, showed that the proper technique and the need for observing strict aseptic precautions were not observed by them. For example many of them drew blood while operating the rotary lancet. In some areas the cleaning of the site and sterilization of the lancet were done in a casual manner, and in one instance the vaccinator was observed to pick up a cork which had accidentally dropped on the ground and replace it on the tube containing vaccine.

(*iii*) The coverage under both primary and re-vaccinations in the areas of evaluation was observed to fall far short of the target fixed, in spite of the fact that the claim had been made that the standards laid down under the programme had been met.

The inspection of the vaccinated persons was not satisfactory either. Not only did this fall far short of the target, but discrepancies in the results of the primary vaccinations were also not uncommon. There were many instances where the evaluating team could not find the scars in cases recorded as successful primary vaccinations by the local inspecting personnel. There were also instances where scars were noticed in individuals recorded as failures following primary vaccination.

All the above observations, those in the maintenance of registers, administration of vaccinations and their inspection, pointed to a gross deficiency in supervision. The institution of effective concurrent inspection would have helped the detection and rectification of such defects in the operation of the programme. The guide brought out by the National Institute of Communicable Diseases lays down simple, practical procedures which could be easily practised by the supervizing officer for a rapid assessment of the work in progress in any locality. The inspecting officer could easily carry out a spot-check and study the various aspects of the programme within a few hours during a random check. Such a practice would not only help prompt detection and rectification of operational deficiencies, but also tighten up the administrative aspects of the programme.

(*iv*) Though registration of births and vaccination of infants are compulsory according to the Public Health Acts in force, verification of the village registers showed that little attention was paid to these important procedures. The defaults in primary vaccination over years were reflected in the large number of individuals of higher age groups who required primary vaccinations. In one area, it was observed that only 29 per cent of the primary vaccinations administered under the programme was given to infants, 55 per cent was to those between one to five years, eight per cent six to 16 years, and seven per cent above 16 years. The large proportion of primary vaccinations in higher age-groups is an index of the accumulated arrears over years due to deficient coverage in primary vaccination of infants. Lack of prompt attention to the new-borns will inevitably lead to a similar situation in due course of time again.

(*v*) The need for meticulous attention to the vulnerable groups—who are often evasive in such Public Health Programmes—like the nomads, labour camps, pilgrims, etc., cannot be overemphasized. At present no attention is focussed on these groups except, probably, in the phase of a threatened epidemic.

(*vi*) In a programme aiming at the eradication of a disease, there is need for vigilance regarding cases occurring in the operational areas, their epidemiological investigation and focal action. Organization for this very important part of the programme was lacking in all the areas studied. In one area, out of 74 cases investigated, 57 were secondary to 13 imported cases. Case-reporting and case-investigation left much to be desired. There should be arrangements for inter-district and inter-State cross-reporting.

(*vii*) No facilities existed in some infectious diseases hospitals for disinfection of infected material

(Continued on page 87)

Maintenance Phase of Smallpox Eradication Programme

DR MAHENDRA SINGH

THE National Smallpox Eradication Programme is a time-scheduled crash programme. The attack phase, launched in the last quarter of 1962, was required to be completed by March 1965 after achieving 80 per cent coverage of all sectors of the population. So far, about 70 per cent of the population of the country has been vaccinated. In view of the occurrence of large number of smallpox cases even in the covered districts, the target of the attack phase has been revised from 80 per cent to 100 per cent of the population. The 70 per cent coverage secured so far also includes repeated re-vaccinations which might have been carried out in certain States. This 70 per cent coverage has been calculated on the total population according to 1961 census. For the successful implementation of the attack phase, the period up to March 1966, when it will be concluded after covering nearly 100 per cent population, is of great significance; during this period we will have to cover the remaining 30 to 40 per cent of the population which is the hard core. To achieve this objective, repeated house to house visits will have to be made to carry out the mopping up operations. It is only after the mopping up we can think of entering into the maintenance phase of the programme.

Maintenance phase means to maintain a high level of immunity against smallpox in the population after the conclusion of the attack phase in which nearly 100 per cent of all sectors of the population has been covered. All the new susceptibles added to the population are successfully protected. The high level of immunity once imparted with primary vaccinations will be maintained by periodic re-vaccinations at ages 4, 8, 12, 16 and 20. In other words, 100 per cent vaccinations of newborns, immigrants and floatting population and periodic routine re-vaccination of the whole population will be the main activities during the maintenance phase.

Thorough epidemiological investigations will have to be carried out whenever an outbreak or sporadic case occurred. To check the spread of the disease, mass vaccination of the contacts round the foci of infection and other control measures will have to be undertaken. Every suspected case will require a thorough clinical examination, and laboratory diagnosis should be made whenever there is any doubt in the diagnosis. So during this phase laboratory diagnostic services will become an essential part of the programme. If during the early stages of the maintenance phase the incidence of the disease remains high, re-assessment will be required and the attack phase may have to be repeated.

Another aspect to be looked into is the speed of the modern transport, more especially air travel, which makes it possible for a person to enter a country while incubating the disease. Airport medical officers and general practitioners must always consider the possibility of smallpox if the person examined is in an acute febrile condition with a history of passing through or arrival from an affected country. Apart from the segregation arrangements, it is also essential that efficient virus laboratory service is established for diagnosis and confirmation.

Smallpox may resemble purpura, acute leukaemia, or pneumonia; milder types are easily confused with chickenpox. During the maintenance phase, we will have to be always alert, persons with suspected smallpox should be isolated immediately and all the contacts vaccinated with a highly potent vaccine.

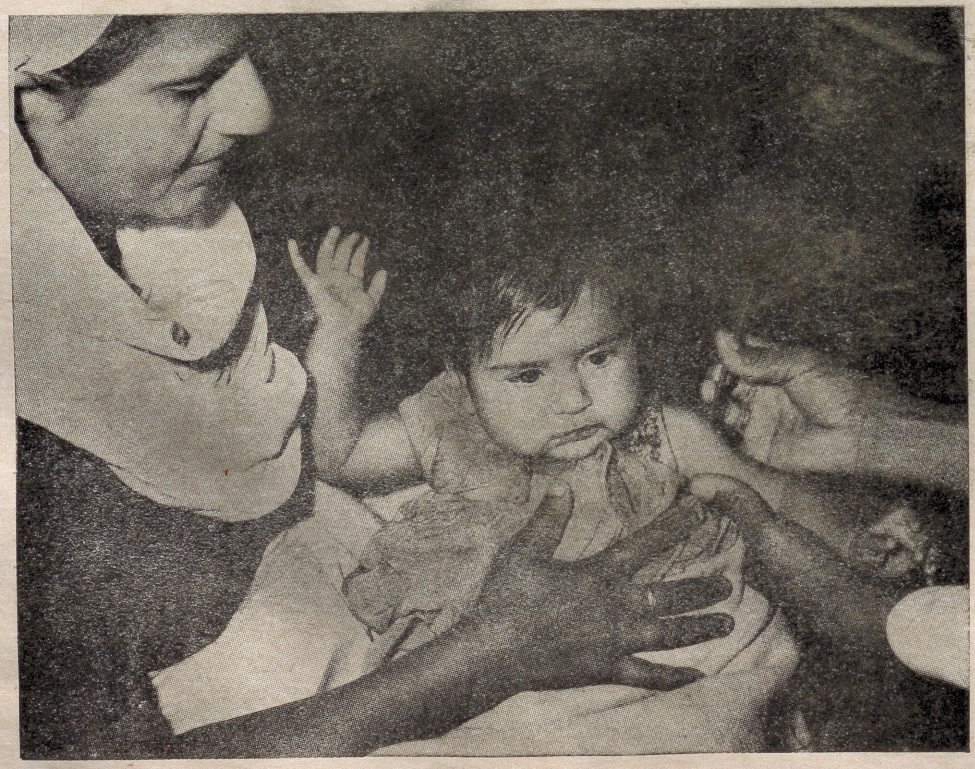
The risk of the international transmission of smallpox infection can best be reduced by the success-

ful vaccination of intending travellers. A traveller can be permitted to go abroad eight days after a successful primary vaccination, read on the sixth or eighth day. Re-vaccination should also be read between sixth and eighth day—if the result is equivocal the person concerned should be re-vaccinated again with more than one inoculation to speed up the development of the immunity.

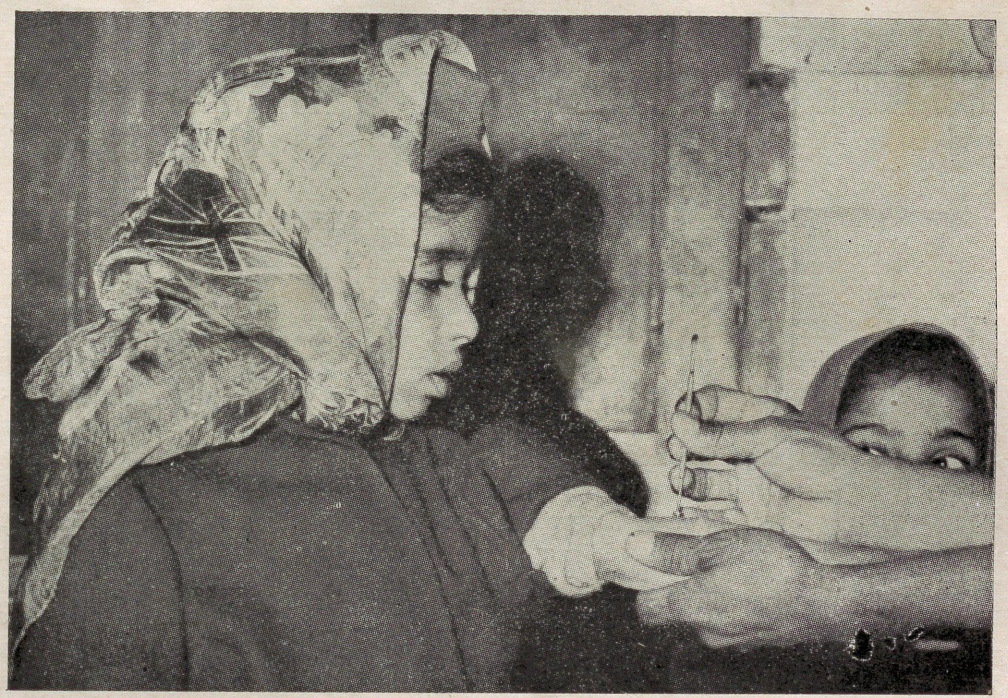
Role of Health Education

For a programme of this nature, active participation and co-operation of the people is of paramount importance. In the history of public health in the initial stages during the so-called 'sanitary era', quite a lot has been done without the active co-operation or participation of the public, *e.g.*, drains have been cleaned, slums have been removed and the people have been asked to shift to new homes with better surroundings. This has certainly improved the health of the people, but their active participation and co-operation had not been tapped to the maximum. In such programmes like National Smallpox Eradication and Family Planning where a person is directly involved or his emotions are required to be tackled, it is of paramount importance that his co-operation and active participation in the programme is sought for. National programmes like Smallpox Eradication can only be implemented successfully if in the initial stages of planning health education is given its proper place. So far as the maintenance phase of the National Smallpox Eradication Programme is concerned, continuous and sustained efforts will have to be made in promoting the health education among the people. Panchayats, being our basic units, one of the members of the Panchayats should be entrusted with the duties of conveying the message of health promotion to the people in his circle. This person should also be given necessary facilities and equipment for informing them about health schemes which are to be introduced in his area.

Health education which is a part of the general education, should have its proper place in the educational institutions. Some informative chapters on important health problems and programmes may be included in the text books. The doctor of the primary health centre should devote some time in educating the students in health matters while on his routine visits to the schools. The association of parents, teacher and doctor will be of great value in educating the children in health matters.



All infants should be vaccinated against smallpox.



Vaccination should be repeated periodically

During the maintenance phase of the programme we require to improve the registration of births, prompt notification of each outbreak or sporadic case and vaccination round the foci of infection. In the planning stage it is necessary for a health educator to study the attitudes, behaviour and various taboos of the population with specific reference to the above mentioned objects. With a tactful approach to their faith, people can be motivated to accept vaccination.

People's Role

While imparting health education, certain established facts about the disease and its prevention will have to be put before the people.

These facts are:

(1) Smallpox is a highly infectious disease caused by a virus.

(2) Vaccination is the only sure protection against smallpox known to modern science.

(3) Successful vaccination of 100 per cent of all sectors of the population can eradicate smallpox. However a constant alert is necessary to prevent the re-entry of the disease in the country.

(4) If we fail in our duty to successfully observe the obligations of the maintenance phase of the Programme, the susceptibles in the population will increase and will help smallpox to re-enter our country.

(5) A few individuals, who do not have any kind of immunity against the disease, may show mild reactions to vaccination like fever, swelling etc. These reactions only indicate that the body is fighting to develop the resistance to prevent any attack of the disease, hence we should not be afraid of such mild reactions.

(6) It is known to every body that smallpox is a dangerous disease, which causes blindness, deafness, facial disfigurement and sometimes affects the joints resulting in severe disabilities. It also leads to death. Apart from this, the social and economic repercussions of blindness and disfigurement strike at the very root of the prosperity of an individual and the community. Every one should avail himself of the maximum benefit of vaccination and periodic re-vaccination.

(7) Peoples' own money, to the tune of several crores, has been spent/is being spent on this public health project. We will be making this expenditure infructuous if we show even the slightest negligence in accepting vaccinati on not only for ourselves, but for every member o f our family.

It is also necessary that the representatives of the people should also be invited to participate in the planning of the programme in their areas. This will ensure maximum co-operation from them. ●

SELF-SUFFICIENCY IN FREEZE-DRIED VACCINE

DR P.K. TOPA

THOMAS JEFFERSON wrote in 1806 to Edward Jenner, the inventor of vaccination: "Future nations will know by history only that the loathsome smallpox had existed and by you has been extirpated." This prophecy, though eminently possible, has only been proved true in the European countries, where the assistance of this technique in the prevention of this disease was utilized in a scientific and organized manner. Those countries are no more visited by the periodical epidemics of smallpox as they continue to occur in the Indian Subcontinent in spite of the fact that vaccination has been practised ever since 1802 when it was introduced in this country. One of the reasons of this state of affairs was the question of maintaining the potency of smallpox vaccine under adverse tropical climate of the country. Ever since the introduction of vaccination this problem had been baffling the workers in the field and various methods had been tried, but the desired objective could not be achieved. Thanks to the invention of the technique of preservation of proteins by spin-freezing and drying during the World War II, it became possible to develop a method of manufacturing a stable Freeze-Dried Smallpox Vaccine which can stand adverse tropical climate for a long period. The credit for developing this method, which has been accepted ay the World Health Organization, goes to Dr Collier who worked patiently for a number of years on this problem at the Lister Institute of Preventive Medicine, Elstree, England. The original method of Collier has since been modified and simplified and it is now possible to manufacture the dried stable vaccine in any required quantity.

Simultaneously with the development of the technique of preservation of proteins by drying, came the finding that viruses could be grown on the chorioallantoic membrane of the fertile hen's eggs. Goodpasture, Woodruff and Buddingh were the first to show that vaccinia virus multiplies readily after inoculation on the chorioallantois. This gave a new, cheap and convenient method of finding the actual content of the live virus particles in a given vaccine with a certain degree of accuracy. It also helped in the finding that certain number of live virus particles were necessary in the vaccine at the time of vaccination to give satisfactory results on primary as well as re-vaccinations. It was also revealed that a vaccine with low virus content which may be good enough for primary vaccination will not be good for re-vaccinations. Thus an International Standard of potency of smallpox vaccine was laid down. Since the virus content of a liquid vaccine could not be guaranteed in the field under the tropical climatic conditions, unless costly methods of transporting the vaccine in refrigerated conditions and keeping it in the field in the same condition was adopted. None of these are required for the dried smallpox vaccine. Hence it became necessary to give preference to the latter.

The Government of India launched a nation-wide Smallpox Eradication Scheme in 1962 which was to be completed within three years of its commencement. To ensure the success of this scheme it was essential to have a large quantity of high potency smallpox vaccine which could conveniently be transported and utlilized with reasonable certainty about its potency. This was only possible with the freeze-dried vaccine which none of the Institutes in India were equipped to produce. In order to assist the Government of India in the fulfilment of this scheme, the World Health Organization agreed to train the staff of selected institutes, provide them with the necessary equipment and give technical guidance. To begin with State Vaccine Institute, Patwadangar, Naini Tal (Uttar Pradesh) and King Institute, Guindy, Madras were selected. It was soon realized that two institutes will not be able to meet the entire demand of the country. Two more institutes at Hyderabad (Andhra Pradesh), and Belgaum (Mysore) have been selected for the purpose. The WHO has also agreed

to give additional equipment which would enable these four institutes to manufacture the required quantity of 120 to 130 million doses annually. The training of workers at these institutes and setting up of the laboratories for the manufacture of the required quantity of freeze-dried smallpox vaccine was bound to take time. The NSEP could not be staggered till these institutes start manufacturing. Hence freeze-dried vaccine was obtained from other countries. And the immediate requirements were met by the massive gift of the dried smallpox vaccine from the USSR. But a large country like India cannot afford to depend upon the supplies from other countries. If what has been achieved so far under the NSEP is to be consolidated to reach the ultimate goal of eradication of smallpox, it is essential that India should produce her own requirements at the earliest.

The institutes at Patwadangar and Guindy have already started producing freeze-dried vaccine. As soon as all the four institutes are fully equipped, which is expected by the middle of 1965, they will be ready to go into mass production. It will be necessary to make available to these institutes all materials which are required in the production of this vaccine. These articles may be divided into two groups: Materials available in the country and those which are at the moment not available.

Materials which are Available

Of these, animals used for the production of the vaccine require special mention. It is essential to have healthy animals for vaccinating and collection of the pulp of high virus content on which depends the quality of the final product. In India we commonly use buffalo or cow calves for the production of this vaccine. Some institutes use sheep instead. The method of obtaining these animals is through the contractors who get them from the animal markets all over the country. These animals kept under unhygienic conditions are exposed to all types of infections which may hinder the production of the vaccine. In the absence of any organized animal farms the contractor is the only source for the institutes. Since the number of animals required for producing dried vaccine is greatly reduced it would be worthwhile to consider organization of farms from where healthy animals are assured as is done in other countries.

Regular supply of preferably white fertile eggs is another problem that these institutes will have to face. Breeding of poultry is not difficult. White Leghorn birds which are good egg layers can quite easily be bred. It would be much better if a poultry farm is attached to the institute for the supply of fertile eggs.

Materials which are at the moment not Available

These are: (a) special type of neutral glass ampoules, (b) rubber bungs, (c) Arcton, (d) Difco peptone, (e) special type of high vacuum oils, (f) spare parts of the machinery.

Glass ampoules and rubber bungs, which have to be strictly of required specifications and quality, will be required in millions every year. It will involve considerable foreign exchange to import these from abroad. Import may also cause delay which may adversely affect vaccine production. Some glass manufacturers in India should undertake manufacture and supply of these as per specifications. If some special machinery is required, facilities for such imports should be provided. Till such time as we are able to manufacture them in India, these will have to be imported.

Other articles mentioned will have to be imported as demand for them is not going to be very large. Foreign exchange will have to be made available for the purpose on a permanent basis as there is going to be a recurrent demand for these.

Equipping the laboratories and training their staff are not enough to make the country self-sufficient in freeze-dried smallpox vaccine. Self-sufficiency can be achieved when we do not depend upon imports in all respects. Machinery and components must be manufactured within the country if unhindered production is desired.

We must be grateful to the WHO and the UNICEF for the assistance they have given to make the country self-sufficient in respect of this vaccine. We are on the right path and with a little patience and perseverance the ultimate goal of eradication of smallpox will be achieved at not too distant a date. ●

SMALLPOX ERADICATION

WHO Report of Technical Discussions of Regional Committee for South-East Asia

AT the seventeenth session of the Regional Committee for South-East Asia, held in New Delhi, from 22 to 28 September, 1964, three meetings were devoted to technical discussions on the subject of "Smallpox Eradication." They were held under the chairmanship of Dr K.M. Lal (India), with Dr Ko Ko (Burma) as Rapporteur.

Situation in the Region

In reviewing the smallpox situation in the Region, it was noted that Asia remained the continent reporting the greatest number of smallpox cases and deaths. In the period from 1959 to 1963, Asia had reported from 67.3 per cent (39,221 cases) in 1960, to 81.3 per cent (75,424 cases), in 1963, of the world's total number of cases. As 1963 was expected to be a peak year, according to the cyclical trend shown by the disease in some of the countries in the Region, the increase in the number of cases was not unexpected.

In Mongolia and Ceylon, smallpox was no longer endemic, whilst in Thailand transmission had practically ceased. However, strict surveillance was being maintained to prevent re-introduction.

India reported the largest number of cases. There were 31,052 cases in 1960, 45,95 in 1961, 42,231 in 1962 and 69,768 cases in 1963.

Indonesia reported 7,967 cases and 239 deaths in 1963, and 874 cases and 57 deaths in the first six months of 1964.

In Afghanistan and Nepal, smallpox was endemic, but the reporting system was incomplete.

In Burma, smallpox had been endemic in certain areas before the Second World War, but a downward trend had been noticed since 1950; there were, for example, only 32 cases with one death reported in 1962. There had been an increase, however, in 1963, with 193 cases and 21 deaths.

Periodic vaccination and re-vaccination were being maintained in Ceylon and Mongolia, and an intensified systematic vaccination programme had been in operation in Thailand for a number of years.

A nation-wide eradication programme had been started in India in 1962 and in Afghanistan and Burma in 1964. In Indonesia, intensified mass vaccination had been in operation since 1963 in endemic and other neighbouring areas, to be completed by 1965; routine vaccination was continuing in the other parts of the country. In Nepal, a smallpox control pilot project was started in the Kathmandu Valley in early 1962; by March 1964, 70 per cent of the population in the Valley had been vaccinated.

(Detailed plans of the national smallpox eradication or control programmes in respect of Afghanistan, Burma, India, Indonesia and Thailand are contained in the documents submitted during the discussions).

Epidemiology

The epidemiological aspects of smallpox were discussed, with special reference to the role of factors such as persistence of infection, urban/rural distribution and immunity status, age distribution and seasonal and long-term periodicity.

Regarding the urban/rural distribution, it was brought out that smallpox, although beginning to show an over-all downward trend, persisted longest in overcrowded or newly established areas, such as slums

in cities and in suburban areas, areas where there was a to-and-fro migration of labour, and those difficult of access. The development of better communications and travel facilities to the suburban and urban areas and also between neighbouring countries added an extra link of transference of smallpox within the country and from outside, through the intermingling of population within the country and in inter-country border areas.

Regarding the age distribution, it was found that the age specificity varied according to the immunity status of the various segments of the population. In the absence of any system of reporting of smallpox by age-groups, the data available from the returns of the infectious disease hospitals in India, for example, showed that the largest number of admissions occurred in some cities in the 0-4 age-group, pointing to inadequacy in primary vaccinations, whilst in other cities the largest number occurred in the higher age-groups, due to lack of phased re-vaccination activities.

National Eradication Programmes

Planning, Organization and Execution

Important considerations in the different phases of eradication programmes (*viz.*, preparatory phase, attack phase and maintenance phase) were discussed. There were appreciation of and agreement on the guidelines to be taken into consideration in the various phases of organization of the smallpox eradication programme, as contained in document WHO/Smallpox/20, dated 25 May, 1964, and in the First Report of the WHO Expert Committee on Smallpox, 1964.

During the preparatory phase, stress was laid on the need for planning and providing for a long-term programme on a national scale, with adequate funds, the existence of well-trained and contented vaccination staff, adequate supervisory staff to check the results of vaccination, mobility of the staff, and the availability of a potent vaccine with facilities for its proper storage. Steps should be taken towards health education of the people, in order to enlist their active participation and that of various agencies in the effective implementation of the programme. Even at this stage, information on the social and cultural background of the people, as relating to smallpox, should be collected and utilized for educational purposes.

An analysis of the staffing patterns in the different countries had consistently shown that the tendency was to economize and therefore to understaff the programme. This indicated that, very early in the progress of the programme, it was frequently realized that both the field workers and the supervisory staff should have been much more numerous. It appeared desirable, therefore, to staff the programme adequately from the beginning and later, if necessary, to reduce, thus reversing "Parkinson's Law".

It was realized that the success of the programme would depend on effective administrative machinery, along with effective and maximal coverage of all segments of the population with a potent vaccine. In view of the heavy endemicity of smallpox in some countries, 100 per cent successful primary vaccinations should be achieved and as near as possible 100 per cent re-vaccinations should be aimed at. In addition to vaccinators, the need for active involvement of all maternal and child health and other medical services as well as of auxiliary staff was stressed. The educative role of teachers in ensuring that all primary/secondary school students under their charge were successfully vaccinated was realized, and it was felt that, for the success of the programme, their participation should be availed of to the maximum.

Great stress was placed on an independent evaluation of the programme, so that the gaps revealed by such an evaluation might be immediately plugged.

Inter-country Co-operation

(*a*) In view of the varied and large border areas existing between the countries of the Region, these areas should be given priority for vaccination on an intensified basis and preferably synchronizing such activities. This phase of the programme could be reviewed periodically at inter-country border meetings, which should usefully be organized yearly.

(*b*) Detailed studies of the epidemiological situation of smallpox and of anti-smallpox activities in the various countries of the Region, particularly in border areas, were presented. The value of these studies was evident, and a recommendation was therefore made that an exchange of such information, every six months, among countries of the Region would be of mutual advantage.

(*c*) In view of the efforts at controlling and eradicating smallpox in the Region, it was considered

desirable that all countries of the Region co-operate (i) by propmtly notifying smallpox cases, even on suspicion, both internationally and directly, to adjoining countries, and (ii) by taking all practicable measures to prevent the departure of any infected person or suspect by requiring departing travellers to present a valid international certificate of vaccination or re-vaccination against smallpox as required under Article 30 of the International Sanitary Regulations.

(*d*) The group recognized that freeze-dried vaccine was the vaccine of choice and confirmed that all countries that had embarked on eradication/control programmes were using it whenever possible. In view of the rapid progress of the programmes in these countries, the consumption of freeze-dried vaccine was far in excess of the quantities being kindly donated, and therefore the group urged that further quantities of freeze-dried vaccine, as required, should be obtained from donating countries or through WHO during this crucial phase, so that the programmes would not be jeopardized. Meanwhile, it was noted with satisfaction that four out of the six countries in which smallpox was endemic had made arrangements for the local production of freeze-dried vaccine with WHO/UNICEF assistance. This would, however, take a minimum of two years or more, and international assistance with supplies of freeze-dried vaccine would continue to be needed in this transitional period.

(*e*) As transmission of smallpox had ceased, for all practical purposes, in Ceylon, Mongolia and Thailand, the representatives of these three countries considered it advisable for WHO to arrange for refresher training courses in smallpox diagnosis and epidemiology, particularly for medical officers in charge of infectious disease hospitals and port and airport health services.

Special Considerations in National Programmes

Recording and Reporting of Smallpox

(*a*) The group agreed that, in the mass programmes being carried out, it was essential to maintain continuously the already-started census of families, both in the urban and rural areas. This had become an accepted feature in the programme, in which it had become a part of the job specification of the individual vaccinators, in the areas allotted to them, as well as being the responsibility of the inspectorates..

(*b*) The necessity of reporting all smallpox cases including those suspected, within each administrative unit and neighbouring areas as soon as possible was emphasized, in order that the necessary epidemiological investigations and control measures might be started around the cases both at the point of origin and at the point of encounter. As the programme advanced and a large proportion of the population was protected, the reporting of every suspected case at the earliest possible moment became all the more important. All methods of reporting and notification through all possible agencies should therefore be explored.

(*c*) The need for standard forms for reporting periodically the smallpox situation and vaccination activities as a prerequisite to the above and to assessment was accepted. Suitable forms were discussed and agreed upon.

Vaccination Techniques, Complications and Prevention

(*a*) As mentioned earlier, freeze-dried vaccine was considered the vaccine of choice in smallpox eradication programmes in the countries of this Region. All smallpox personnel, however, would have to be adequately instructed to the effect that even freeze-dried vaccine needs to be kept in suitable storage conditions and that, once the vaccine is distributed, direct sunlight must be avoided.

(*b*) *The techniques of vaccination in force* in the different countries were reviewed. The method to be followed should be the one that produced the least trauma, such as the multiple pressure technique or the linear scratch. In India, where the rotary lancet method was used, it was considered that the transition from this technique to one of the two other techniques would be gradually carried out. Evidence was produced of the significant advantage of following vaccination in the linear scratch and the rotary lancet techniques with immediate dabbing of the vaccinated place with the vaccine.

(*c*) Satisfaction was expressed that no significant serious complications, in particular post-vaccinal encephalitis, had been reported. In India, out of 273 million vaccinations, for every 13 million vaccinations not more than one post-vaccinal encephalitis-like case had been registered. Reference was also made to similar insignificant complications in the mass vaccination programme carried out in the USSR.

The precaution taken in some of the mass vaccination programmes in the Region whereby one insertion was given in primary vaccination to children over four years of age was noted. Regarding local reactions, emphasis was placed on the educative role which vaccinators and all concerned could play towards reducing the risk of such complications by observing basic principles of asepsis. There were reports of relatively severe local skin reactions following the use of batches of freeze-dried vaccine. However, it was appreciated that, as a result of a collaborative study of vaccinia virus strains used in vaccine production, there were very good prospects that a strain with high antigenicity and minimal reactions would soon be intoduced in vaccine production after controlled laboratory and field trials.

Laboratory Diagnosis

Until the load of smallpox infection in countries had been reduced to minimal levels, all cases of suspicious smallpox should be considered as smallpox and necessary action taken accordingly. The value of laboratory diagnostic methods became increasingly great in areas where sporadic cases occurred, and all efforts to make facilities available for these diagnostic methods should be pursued. These methods were discussed at length, but the discussion is not recorded here, since they are described in the First Report of the WHO Expert Committee on Smallpox.

Health Education

In planning all phases of programmes in smallpox eradication or control, a survey and study should be made of the people's understanding, attitudes, beliefs and practices with respect to the disease and the measures proposed (*i.e.*, vaccination and re-vaccination), channels of communication among them, available media for publicity and education and the local community organizations which would be available for co-operation with the programme.

The health education objectives should be clearly defined in relation to the programme objectives and operations, and the health education tasks for the various personnel engaged in the programme indicated. All the eradication personnel and others connected directly or indirectly, with the programme should be trained to discharge their educational responsibilities effectively. There should be well-trained health educators at appropriate levels, to plan and co-ordinate educational and publicity work, provide adequate supervision to the staff and conduct training programmes.

Integration with Regular Health Services

It was recognized that all task forces engaged in the eradication programme had ultimately, at one stage or other, to be integrated with the basic health services. This would, of course, depend on the degree of development of the basic health services in the respective countries at the time when the programmes were ready for integration. The other alternative would be to continue the task force and gradually build other health services around it.

In countries where national smallpox eradication programmes were in operation, it was considered premature to combine smallpox vaccination with other immunization procedures or other control activities. In countries where smallpox was no longer a major problem, the possibility of carrying out simultaneous control activities and/or combined immunizations should be seriously considered (for example, smallpox vaccination combined with BCG and/or other immunization procedures, or with yaws control activities wherever yaws remained endemic).

Administrative Aspects

It was proposed that the maximum utilization of available resources should continue to be made in all the countries with smallpox eradication programmes on a long-term basis. As mentioned earlier the major difficulty referred to was in the supply of freeze-dried vaccine in time as well as in adequate quantities.

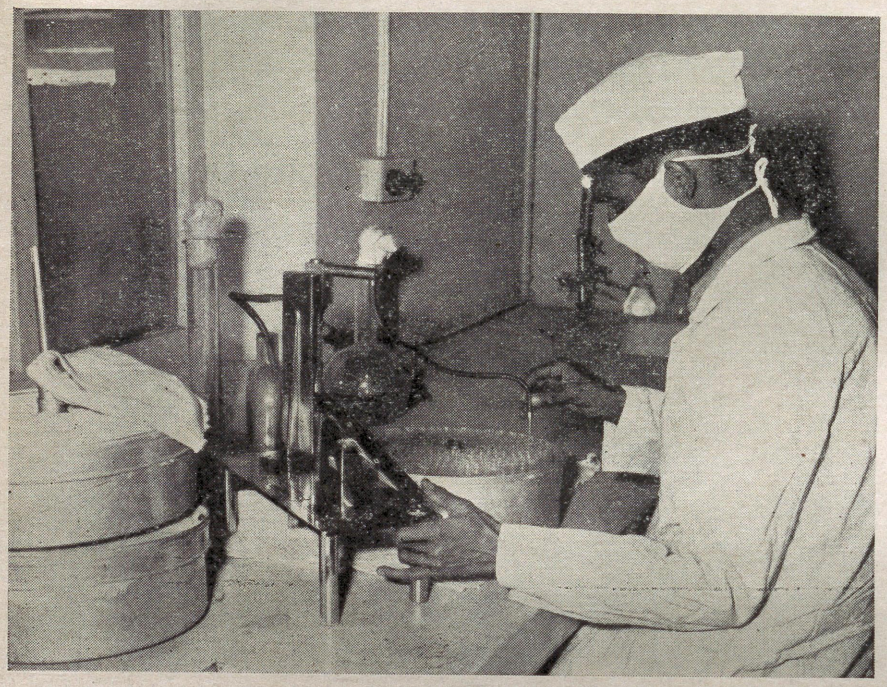
Legislation

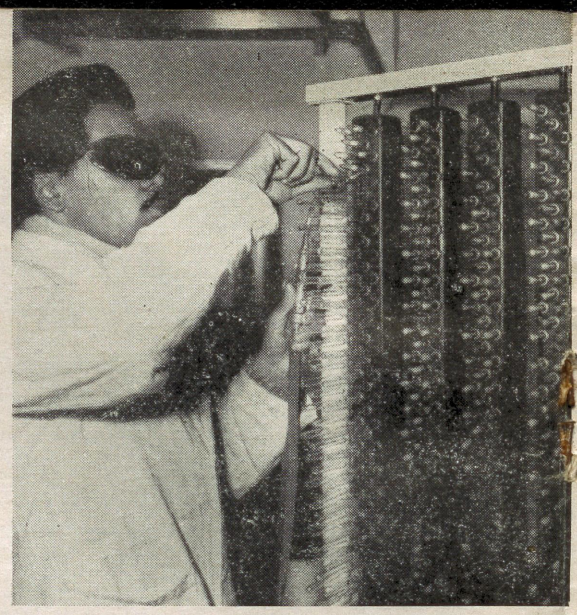
Although it was agreed that backing legislation should exist, the difficulties of implementing such legislation were realized. However, with continued education greater popular acceptance would be achieved and the need for enforcing legislation reduced. Efforts should be concentrated on obtaining acceptance of vaccination at school entry, on school-leaving and at the time of employment.

EVALUATION

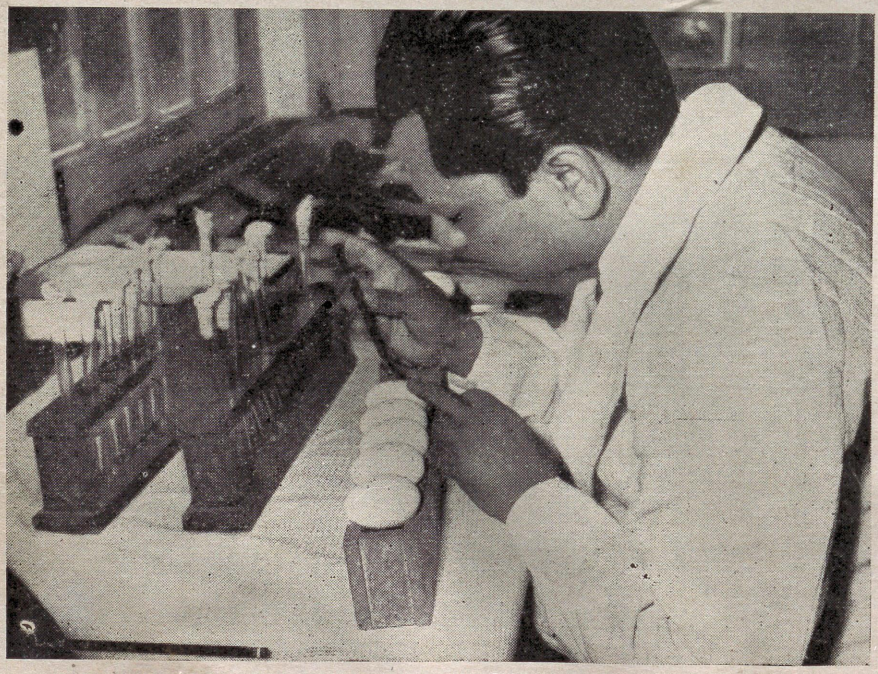
The subject of evaluation was discussed at great length, and much valuable information exchanged

1. Elementary bodies suspension of vaccinia virus being filled in glass ampoules for freeze drying. Freeze-dried vaccine is manufactured by preparing this suspension in a suitable medium and then drying the same in a frozen state.





2. The glass ampoules are sealed after secondary drying.



4. Twelve-day old eggs are inoculated for pock count of the dried vaccine. This helps test the potency of the vaccine.

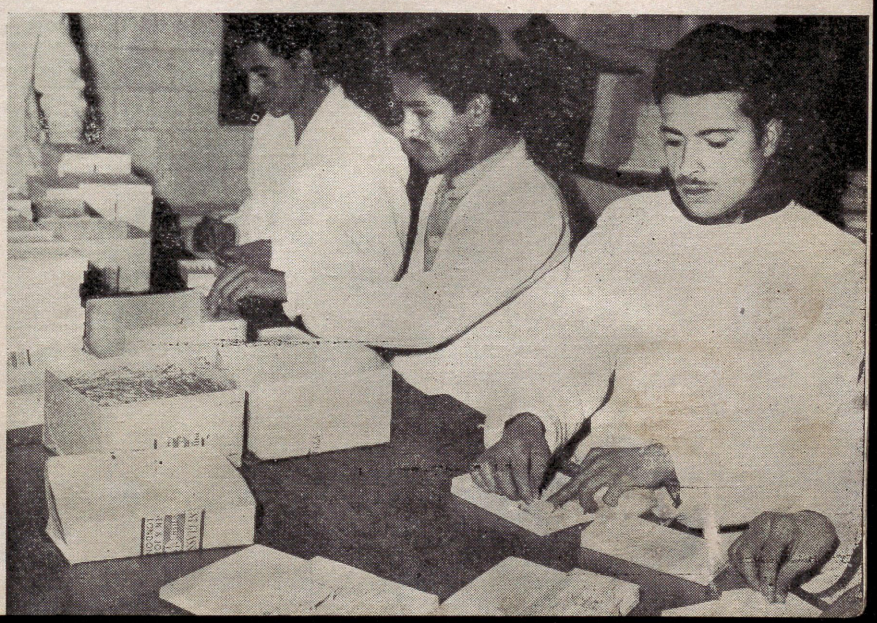
3. Sealed ampoules are tested for cracks by immersing them in ink solution in a dessicator on tests, cracked ampoules get filled with ink and discarded.

PRODUCTION OF FREEZE-DRIED VACCINE

Vaccination was the first prophylactic against smallpox given to the world by Dr Edward Jenner in 1796. Since then vaccination has been practised all over the world and its success has been demonstrated by the eradication of the disease from several parts of the world by planned mass vaccination and re-vaccination.

Till recently, liquid lymph was used but the lymph could not keep its potency for a long time under atmospheric conditions. With the advancement of the knowledge in the technique of freeze drying, it has now become possible to dry the vaccinia virus in a frozen state. Freeze-dried vaccine can stand the atmospheric temperature in tropical countries for months together without any marked deterioration.

King Institute, Guindy, Madras, the State Vaccine Institute, Patwadangar, Uttar Pradesh, Vaccine Institutes at Belgaum, Mysore, and at Hyderabad, Andhra Pradesh have been selected for manufacturing freeze-dried Smallpox Vaccine in India to make the country self-sufficient. Pictures on this page show some of the stages of vaccine production in the State Vaccine Institute at Patwadangar, which commenced production in January 1963.



5. The vaccine is tested on a rabbit. The result is read on the animal. (Top)

6. After laboratory tests the vaccine is tested in the field. At least six children are given primary vaccination. The result is read after a week. (Centre)

7. Vaccine is packed for despatch after trials on animals and humans. (Bottom)

on the lines of experience gained in India and recorded in "A Guide for the Evaluation of the National Smallpox Eradication Programme at District Level", produced by the Ministry of Health, Government of India.

International Sanitary Regulations

The participants were aware of the views of the WHO Committee on International Quarantine which met in 1964 and of the Expert Committee on Smallpox in regard to possible revision of the International Certificate of Vaccination and Re-vaccination. No comments were made, as Member-Governments would be reporting on this matter to the World Health Assembly.

It was, however, observed that in all the countries of this Region where smallpox was still endemic, freeze-dried vaccine, known to give a high percentage of successful "takes" in re-vaccination, was being utilized as widely as possible. This implied that arrangements and facilities were now available for all persons contemplating international travel from endemic countries to be vaccinated with freeze-dried smallpox vaccine.

Recommendations

Concept of "Eradication of Smallpox"

The concept of "control", limited to the protection of a national population and faced with the existence of endemic foci in other countries, required a perpetual and elaborate system of defence: education, general vaccination and re-vaccination, reporting, isolation, quarantine, investigation contact vaccination, international notification, etc. This was the situation in the South-East Asia Region, where smallpox was still endemic in some countries and no longer endemic in others. The realization of a change of concept of "control" to one of "eradication" of smallpox could only come through concerted national action by all countries of the Region. Regional eradication had now become the objective and task which the Region had set for itself, as a follow-up of the resolution of the Eleventh World Health Assembly in 1958 and resolutions of subsequent sessions of the Regional Committee.

In a region where smallpox was heavily endemic and where much movement of population took place, either within or across national boundaries, planning and continued implementation of such programmes on a long-term basis became essential. Whilst it was appreciated that most governments of the Region had already embarked upon national eradication programmes and had provided for the attack phase to be completed in as short a time as possible, there appeared uniformly to be inadequate provision for the adequate mopping up and maintenance phase on a long-term basis. It was therefore recommended that this should be provided for until the goal of eradication in the Region was achieved, in accordance with the criteria laid down in the report of the WHO Expert Committee on Smallpox.

Vaccine Requirements

Some of the countries of the Region had started the production of freeze-dried smallpox vaccine, but it would take a minimum of two years before they could meet their own requirements for the maintenance phase. It was recommended that, until such time, WHO should make further endeavours to obtain the necessary supplies from donating countries.

Inter-country Co-operation

The value of inter-country co-operation was recognized, and it was recommended that consideration be given to the synchronization of control measures, organization of inter-country border meetings, exchange of information, promotion of training facilities, and co-operation in the spirit of Article 30 of the International Sanitary Regulations.

Uniformity in Terminology

The recommendation of the First WHO Expert Committee on Smallpox in respect of definitions of terms used in smallpox eradication programmes were considered practicable, and it was recommended that in the Region, the widest distribution of this information be made so as to bring about uniformity in terminology.

Health Education

It was observed that in the various phases of eradication programmes not enough attention had been given to the place and value of health education. It was therefore recommended that the educational

(continued on page 87)

The National Smallpox Eradication Programme was launched in 1962. The progress of the programme in the States and the future plans are given in the following reports.

SMALLPOX ERADICATION PROGRAMME IN STATES

ANDHRA PRADESH

BY DR L. CHANDRASEKHARARAO

THE State of Andhra Pradesh extends over an area of 1,06,286 square miles divided into 20 Revenue Districts. It has 212 towns and cities and 29,000 villages. As per 1961 census, the total population of the State is 360 lakhs.

The State is a highly endemic zone for smallpox, the disease occurring in all the districts throughout the year and periodically resulting in epidemic outbreaks.

In August 1960 a population of 10 lakhs was taken up as Pilot Project in West Godavari District and 70 per cent of that population was vaccinated by March 1961 with an additional staff of 126 members. This unit of Pilot Project has been continued till the end of 1962 during which period plans have been finalized for starting a State-wide programme as per the recommendations of the Government of India, and to keep in conformity with the pattern of the National Programme. It was proposed to complete the vaccination of the entire population within a period of two years by establishing 15 units but in actual practice the programme had to be phased limiting to the availability of funds under the plan provision. Hence the National Programme was launched in September 1962 in only six districts (East Godavari, Krishna, Guntur, Nellore, Nalgonda and Hyderabad). Though the extension of the programme to 15 districts by April 1963 has been sanctioned but due to national emergency this could not be done. As a compromise the programme could be made to operate in 10 districts from June 1963. Four new districts, Warangal, Kurnool, Chittoor and Anantapur were added. During this period the city of Hyderabad was also taken up for mass vaccination programme and was completed during the course of one-and-a-half years. In West Godavari district and in the city of Hyderabad only liquid vaccine manufactured at Hyderabad was used. From June 1962 the vaccination is being carried out with the Russian freeze-dried vaccine. On account of the high incidence of smallpox two more districts namely Cuddapah and Visakhapatnam were taken up during October and December 1963. During October 1964 two more districts (Srikakulam and Nizamabad) were taken up thus bringing up the total NSEP Units functioning in the State to 14.

With the progressive addition of the Units, the scheme has gained its full momentum only in December 1964. Till the end of February 1965, 250 lakhs of vaccinations were conducted with freeze-dried vaccine by the special staff employed under the scheme. On the estimated population of 1961 it works out to a gross coverage of 69 per cent. The vaccinations done with the liquid vaccine, by the normal agencies approximately works out to 60 lakhs during the last two years and this has not been taken into account for working out the percentage, as large number of such vaccinations, are in schools and repeated vaccinations in epidemic areas, etc.

The units have been withdrawn from West Godavari, Krishna, Nalagonda, Hyderabad and Khammam districts (five districts) after completion of the programme and shifted to other districts. The average coverage in these districts varied from 60 per cent to

70 per cent. By the end of February 1965 the districts of East Godavari, Nellore, Guntur, Kurnool, Anantapur, Chittoor, Mahbubanagar and Warangal have completed with gross coverage varying from 70 per cent to 85 per cent.

Future Planning

The following budget allotment has been provided for the operation of the scheme in the State.

Year			*Rs.*
1960-61	...	...	2 lakhs.
1961-62	...	...	2.5 ,,
1962-63	...	...	12 ,,
1963-64	...	...	15 ,,
1964-65	...	...	25 ,,
1965-66	...	...	25 ,,

As already indicated the scheme has only taken its full momentum from December 1964. Though the first round of vaccination has been completed by February 1965 in eight of the districts, half the unit staff will be left in these districts till March 1966 for revisiting the areas and the remaining staff will be sent to the districts from where the units have totally been withdrawn previously. Sanction also has been received for taking up the vaccination programme once again in West Godavari district and also in the city of Hyderabad where the programme has been conducted much earlier and where liquid lymph was used. The only district still left out is Adilabad district with a population of 10 lakhs and will be taken up from April 1965. The planning is so arranged that from May 1965, the special staff employed under the NSEP, will be distributed in all the 20 districts of the State to work till March 1966, to achieve the highest target possible. During the second visit special emphasis is laid not only to clear all the unprotected children, etc., but also vaccinate those who have not successfully responded to the previous vaccination. All the towns with a population exceeding 10,000 will be taken up on a top priority basis to achieve the maximum coverage.

The vaccination of new-borns is in practice in one of the hospitals at Hyderabad and it is now extended to all the district headquarters hospitals in the State and also to the larger taluk hospitals. Apart from the special staff employed under the scheme the normal staff of the primary health centres including the health visitors and maternity assistants and those incharge of the special schemes like Malaria Eradication will be brought into the programme, so that a proper maintenance phase by the normal agencies takes a shape before March 1966.

The Institute of Preventive Medicine, Hyderabad, which is producing the liquid vaccine now, has been selected as one of the centres for the production of freeze-dried vaccine. The Institute might go into full production by 1966. Then the State will be self-sufficient in the freeze-dried vaccine.

Benefits of this Mass-Vaccination Drive

In spite of mass vaccination programme there was continued incidence of smallpox in the State. The reasons for this are many: lack of co-operation from the public to accept vaccinations, improper reporting of cases, existence of large number of unregistered births. However incidence of smallpox is practically nil or negligible in those areas where the vaccination programme has been carried out.

Now with the three continuous years of fighting against this disease we have gained an upper hand, and within a short period there is every possibility to control the infection and bring it to the minimum levels possible and with further sustained efforts, the disease will definitely be eradicated.

BIHAR

BY DR S.R. CHATTERJI

SMALLPOX is a major public health problem in Bihar. An average of 50,000 cases and 10,000 deaths from smallpox occurred every year in the State during the past 60 years. The highest number of deaths occurred in 1951.

A Pilot Project was started in Ranchi district in September 1960, with a view to preparing a comprehensive scheme for the smallpox eradication programme. A population of about 11 lakhs was taken up for the project and one round of vaccination

was completed in 13 months. In the first round only about 50 per cent of the population could be vaccinated. The people were reluctant to take vaccination. On the advice of the Deputy Commissioner, Ranchi, the co-operation of the *Mukhiayas* of *Gram-Panchayats* was secured. And a substantial percentage of the left out population was vaccinated in the second round. Total number of vaccinations performed by the Pilot project are given below:

Primary vaccinations	35,966
Re-vaccinations	935,648
Total	971,614

Total population covered was about 88 per cent. Since 1962, no case of smallpox has been reported from the area covered by the Pilot Project.

The National Smallpox Eradication Programme was started in the Ranchi district in April 1962 and between November 1962 to February 1963 in the remaining 16 districts of the State. In all, 15 Units were sanctioned for the State. A provision of Rs 90 lakhs was made for the programme during the Third Five Year Plan. One medical officer was placed in charge of each Unit and a Deputy Director (Smallpox) in charge of the Programme. Each Unit comprised 60 vaccinators, one health educator, three para-medical assistants, 12 team leaders, 24 enumerators, 12 workers and three motor drivers.

The 15 Units were distributed over all the 17 districts in the State, at the rate of one unit for a population of about three million.

The vaccination programme started from one end of the district and the teams moved from Block to Block after completing one round of vaccinations, followed by a quick mopping-up operation, covering altogether 60 per cent to 80 per cent of the population according to the response of the people. One round of vaccination was completed in the Ranchi and Saharsa districts by the end of 1964. In the other districts more than two-thirds of the area have been covered. Out of a population of 46.5 million 1,879,060 primary and 25,702,339 re-vaccinations have been performed till 12 December, 1964, which is about 60 per cent of the population of the State.

Impact of the Programme

Impact of the Eradication Programme on smallpox incidence in Bihar is not discernible at a glance. In 1964, there were 2472 reported deaths from smallpox in the State which was the highest since 1958. On scrutiny it will be found that the cases occurred in Bhagalpur, Gaya, Santhalparganas and Hazaribagh districts, in blocks not covered by the Eradication Programme. There were a few out-breaks in covered areas but these remained localized and died out before vaccination staff could be deputed. Secondary cases did occur in these out-breaks, amongst the un-vaccinated. All these cases could be traced to infections brought by patients coming from areas not covered by the programme. No case was reported in the districts of Ranchi and Saharsa which were covered by one round of vaccination.

Re-organization of the Programme

A population of three million was considered too big for one Unit and it was decided to pool all the local body vaccinators who were working outside the programme with a view to expanding the Eradication Unit in each district. Under the reorganized programme functioning since November 1964 a team of three to five vaccinators and one enumerator has been deputed according to population, block-wise in rural areas and circle or ward-wise in urban areas. The health officers of the districts and municipalities have been made responsible for operation of the programme. The medical officers of the Units work under guidance of the health officers. Freeze-dried vaccine supplemented by vaccine lymph from the Namkum Vaccine Institute is used for vaccination.

The Programme in this State has not yet been subjected to any independent assessment in any of the districts. An epidemiological unit under a medical officer of health, sanctioned in the directorate, is expected to take up the evaluation in Ranchi and Saharsa districts in the near future.

Problems

The main difficulties encountered by the vaccination staff is the resistance of the people to vaccination. Even when smallpox breaks out in the village the villagers are not willing to take vaccination as to this would displease the goddess "Shitla". Legal action is not very helpful as the cases are taken up months after they are instituted. The vaccination staff are also unwilling to antagonize the people resorting to legal proceedings. Best efforts of all

the vaccination staff and health educators with the aid of films and other health education media supplied by the Central Health Education Bureau, New Delhi, have not been able to change the attitude of the hard core of population. Health education is a slow process and one or two exposures during the visits of vaccination teams are not adequate to bring in any change in the attitude of the people.

The problem of delayed reporting or non-reporting of smallpox and other epidemic diseases baffles the health workers. The present system of reporting by the *chowkidars* to *Gram Sevaks* (Gram Panchayat Secretary) and by *Gram Sevaks* to Blocks is a complete failure. First reports of an out-break are often seen in local newspapers but by that time the epidemic has spread far and wide. The reporting will improve if we entrust one man in each village, preferably the village headman, with this task and pay him cash reward for each reporting.

JAMMU AND KASHMIR

BY DR GULAM NABI

THE National Smallpox Eradication Programme was started from June 1962 with the staff of pilot project having two units one for Kashmir Province and the other for Jammu Province.

Pilot Project

The pilot project was started during the middle of 1960 and Anantnag and Srinagar districts were selected. Out of these districts Srinagar andTehsil Pulwama were covered.

Target

At the beginning it was decided that the target should be 80 per cent coverage but in 1963 it was raised to 90 per cent coverage and now the aim is to have 100 per cent coverage. The district Leh which was not covered since the inception of the Programme has been taken up this time and whole district has been covered except Zanskar.

Achievements

The position regarding the work done by the eradication programme from June 1962 to June 1964 is as under:

Primary vaccination	2,22,986
Re-vaccination	16,79,490
Total vaccination	19,02,476
Percentage of population covered ...	57
From July 1964 *to October* 1964 *:*	
Primary vaccination	40,488
Re-vaccination	2,92,432
Total vaccination	3,32,920
Percentage of population covered ...	65

Reasons for Low Coverage

Non-existence of regulation for compulsory primary vaccination and re-vaccination in muffasils and re-vaccination in municipalities of Jammu and Kashmir results in refusal of the vaccination by the public.

Health Education Bureau has not yet started functioning with the result the public could not be motivated for accepting vaccination. The wrong beliefs and superstitions still exist which come in the way of successful implementation of the programme.

Due to unforeseen severe winter in Kashmir valley with the result that the output of the work has fallen short of expectations.

The State being a hilly one and the population being scattered at different peaks of mountains where communication facilities were absent the vaccinator has to waste much time for door to door visits.

Sickness and temporary absence of people from houses during harvesting and transplanting seasons, the movement of population for employment and grazing their livestocks during summer have also been the reasons of low coverage.

With intensive health education of the masses in local languages, film shows, dramas and radio talks and with inter-department co-ordination and co-operation especially of block development officers, village level workers, teachers, social welfare organizations, M.L.A's and local leaders we shall be able to overcome the difficulty.

Other Measures

Smallpox Eradication Week was observed all over the State from 25 September, 1964 in a fitting manner as was done last year. Programmes included conducting of meetings and exhibiting films, radio talks, dramas, plays and articles in daily papers, pamphlets and posters on smallpox and its danger, and the need for vaccination.

MADHYA PRADESH

BY DR A.S. AHUJA

THE National Smallpox Eradication Programme was launched in Madhya Pradesh in December 1962. Eleven units were established under the scheme. Each unit has a supervising medical officer, one para-medical assistant, two health educators, 12 sanitary inspectors, 12 enumerators and three vehicles.

According to the original logistics of the programme, the attack phase was to have been completed by March 1965. From the progress achieved up to September 1963, it was felt that the field staff will have to be augmented and accordingly the Government sanctioned additional staff from March 1964. This includes 30 sanitary inspectors, 30 enumerators and 150 vaccinators. Eleven more posts of para-medical assistants have been sanctioned from September 1964.

An area comprising 22 districts and parts of five districts with a total population of 156 lakhs (48 per cent of the State's population) was taken up in the first phase. Each unit was allotted population varying from 10.3 lakhs to 16.8 lakhs. After covering over 80 per cent of the population in this area by March 1964, the teams were shifted to the remaining areas comprising 16 districts and parts of five districts.

Since the Vaccination Units of the NSEP have shifted to the area of the second phase, mopping up operations (vaccination of all left-outs, new-borns and mobile population, etc.), are being conducted by the regular public health staff like sanitary inspectors, health visitors, auxiliary nurse-midwives, vaccinators, etc., and the vaccinators of the local bodies in the areas covered under the first phase of the programme.

Coverage

National Smallpox Eradication Programme work is in progress in all the remaining areas of the State. Sixty to eighty per cent coverage has been achieved in nine districts, 40-60 per cent coverage in seven districts and 20 to 40 per cent coverage in four districts. The monthly output of vaccinations is around 10 lakhs (three per cent) of population. Having achieved an overall coverage of over 82 per cent by December 1964, the State does not anticipate any difficulty in achieving an overall 90 per cent coverage by March 1965.

Assessment

The NSEP work done in Bhopal city, Narsingpur, Raisen, Gwalior, Bhind, Khandwa, Tikamgarh, Durg, Bastar, Panna, Jabalpur and Betul districts was subjected to an independent assessment.

Assessment of Bhopal and Narsingpur has revealed both qualitative and quantitative deficiencies, notable among them being considerable lacunae in the coverage. The coverage of 80 per cent had not been done ward-wise and village-wise in Bhopal and Narsingpur. The shortfall in the effective coverage was found to be largely due to low success rate. Effective coverage of 60 per cent has been achieved in Narsingpur. Remedial steps to correct all the shortfalls are being taken.

An overall coverage of 82 per cent has been achieved in the State and thus the State stands fourth in coverage among the 16 States of India, excluding the Union Territories.

Incidence of Smallpox

After the launching of the NSEP there is a significant reduction in the incidence of smallpox, as shown in the following tables.

SMALLPOX CASES AND DEATHS IN MADHYA PRADESH

Year	*Cases*	*Deaths*
1961	4,241	890
1962	9,051	1,827
1963	6,321	1,745
1964	2,118	500

INCIDENCE OF SMALLPOX DURING PERIODIC CYCLICITY

Period	*Cases*	*Deaths*
1950-51 (Nov. to May)	21,660	3,186
1957-58 (Nov. to May)	13,168	2,364
1963-64 (Nov. to May)	1,486	231

Steps taken for Improvement

The State Education Department has issued instructions that the schools should insist on the production of certificate of vaccination/re-vaccination before admission to nursery/primary schools and on a second re-vaccination before the student joins the secondary school. Vaccination and birth certificates should be issued to children free of charge.

A number of steps have been taken to educate the people to get vaccinated.

Medical officer of primary health centres, hospitals, dispensaries, and private practitioners have been requested to advise their patients to get vaccinated willingly. A considerable labour from neighbouring districts and States are drawn by many industrial undertakings in the State. These labourers stay for a short period and miss vaccination. The authorities of such undertakings have been requested to appoint sufficient vaccination staff to vaccinate the immigrant labour. Similarly Labour Commissioner has issued instructions to all the trade unions to co-operate with the vaccination teams that visit labour colonies.

Future Plans (1965-66)

The State Government had sanctioned the continuance of NSEP staff till February 1966. This staff has been posted in each district and the Civil Surgeon will be in overall supervision of work. The Civil Surgeon will be assisted by the Additional Civil Surgeon and a para-medical assistant who will be provided with a vehicle. There will be one vaccinator for every 18,000 population and one sanitary inspector for every four vaccinators.

Fourth Plan

It has been proposed that the existing level of expenditure under the NSEP should be kept up at least during first three years of the Fourth Plan. The budget provision for 1965-66 is Rs 20.36 lakhs Under the proposals submitted, there will be an epidemiological unit at directorate level and a field unit under the cholera control scheme which will take care of the National Smallpox Eradication Programme work also.

MAHARASHTRA

BY DR B.V. SHIROLKAR

MAHARASHTRA State has the population of 3.95 crores as per 1961 census and an area of 306,345 square kilometres.

The National Smallpox Eradication Programme was undertaken from 2 October, 1962. This scheme was worked out on a strict economic basis and therefore the pattern of eradication units were slightly different from the one recommended by the Government of India.

In the beginning of the scheme the target laid down was 80 per cent coverage of the population. This was later on raised to 100 per cent or near 100 per cent. Therefore the plan has to be revised.

The NSEP was phased in two stages. The first stage (phase) was from 2 October, 1962 to 31 October, 1963 (which was subsequently extended to 31 May, 1964 for 80 per cent coverage). During this phase, the eight districts of Vidarbha region (Nagpur, Wardha, Amaroti, Akola, Buldhana, Chanda, Bhandara and Yeotmal) and five districts of Marathawada (Aurangabad, Parbhani, Nanded, Bhir, Osmanabad) and two districts of Western Maharashtra (Jalgaon and Dhulia) were taken up. This included two Corporations of Bombay and Nagpur.

The population covered during this phase was 2,27,99,454 and the overall coverage achieved was about 80 per cent.

During the second phase which was started on 1 November 1963 and will be continued up to 31 March 1965 the following ten districts of Western Maharashtra were taken up (Poona, Ahmedanagar, Sholapur Satara, Sangli, Kolhapur, Nasik, Kolaba, Thana and Ratnagiri). In addition, Poona Municipal Corporation was also taken up. The population covered was 1,67,54,264 and the overall coverage is about 60 per cent and the work is in progress.

The Municipal Corporations (Bombay, Poona and Nagpur) have carried out the NSEP independently.

Results

There was a remarkable reduction in cases and deaths due to smallpox as can be seen

from the following figures:

Year	*Cases*	*Deaths*
1950-51	28,876	5,264
1957-58	20,941	3,396
1963-64	2,826	435

Even though there is marked reduction in attacks and deaths due to smallpox we have to go a long way to achieve complete eradication and frequent outbreaks of smallpox epidemic do occur for various reasons. One of the main reasons is that we have yet to achieve 100 per cent or near 100 per cent of coverage so as to get the complete herd immunity. Secondly we have yet to tackle the pockets such as slum areas, floating population and migrant labour population from the adjoining States of Andhra Pradesh, Kerala, Mysore, Madhya Pradesh, and Gujarat, to the highly industrial cities like Bombay, Sholapur, Poona, and Nagpur. There is also a problem of wandering tribes such as Lamanies, Vanjaries, etc., who travel from place to place continuously. They are mostly unvaccinated and they are the source of spreading smallpox not only amongst them but also to the surrounding population. In addition to above there are absentees and refusals due to superstitions, etc., though the percentage of this population which escapes vaccination is only five per cent, it is amongst this population only the smallpox cases take place and there is a spread of smallpox to surrounding areas.

Maharashtra is the first State to pass comprehensive Act known as Maharashtra State Vaccination Act of 1964 which has been passed by the Legislature recently. The Act will come into force very soon. The Act has made primary vaccination compulsory and re-vaccination compulsory whenever the occasion arises.

Future Plans

The attack phase and mopping up operation will be continued up to 31 March, 1965 in all the districts of the State except three districts of Thana, Ratnagiri and Kolaba where it will be extended to 31 July, 1965 as the eradication programme was withheld during the monsoon period due to heavy rains and road communications were difficult.

The maintenance phase will have to be taken up during Fourth Five Year Plan period.

The districts which have completed the attack phase and mopping up operations and which have covered nerely 100 per cent of population will be taken up for evaluation.

Proposals have been submitted to the Government to set up a permanent vaccination establishment at the rate of one vaccinator per 20,000 population in urban areas, one vaccinator per 15,000 population in rural areas and one vaccinator per 10,000 population in desert, jungle and difficult areas. Similarly supervisory staff at the rate of one sanitary inspector for four vaccinators is also proposed.

It is also suggested to have flying squads for the Corporations, *viz.*, Bombay, Poona, and Nagpur to tackle the pockets, slum areas, floating populations, migratory labour population, etc., as per Delhi pattern.

ORISSA

BY DR B.K. ACHARYYA

THE Smallpox Eradication Programme was launched from 1 October, 1961 in Orissa. Two Units were raised. Sambalpur and Sundergarh districts were taken up. On completion of the attack phase in these two districts, Koraput and Kalahandi districts were taken up in July 1962. Three more units were raised in December 1962 and the districts of Balasore, Mayurbhanj, Dhenkanal and Keonjhar were taken up by the new units. The district of Phulbani. was covered by the unit working in Kalahandi district on completion of the attack phase there. At present five units of Smallpox Eradication Programme are working in the State. Ten out of thirteen districts have already been covered under the attack phase. Three remaining districts—Cuttack, Puri and Ganjam —are now being covered. Two units are working in the district of Cuttack, two in Ganjam and one in Puri.

Mopping-up Operations

It has not been possible to secure 100 per cent coverage in any district during the attack phase due

to absence, sickness and refusals. In order to achieve the target of vaccination of the entire population, mopping-up operations are being carried out in the districts already covered under the attack phase. The vaccinators of the Blocks have been engaged in the mopping-up operations in their respective Blocks under the supervision of the Block sanitary inspector, medical officer of primary health centres and overall supervision of the district health officers.

Achievements

The achievements of the Smallpox Eradication Programme and mopping-up operations in the districts already covered under the attack phase, are given below:

District	*Percentage of population covered* (up to Nov. 1964)
Bolangir	89.1
Sambalpur	76
Sundergarh	76.5
Kalahandi	84.3
Mayurbhanj	80.1
Balasore	92
Koraput	70
Phulbani	71.9
Dhenkanal	83.3
Keonjhar	82.5

Smallpox Incidence in Covered Districts

There has been no incidence of smallpox in the district of Bolangir, covered under the Pilot Project, after August 1961. The districts of Kalahandi Phulbani, Sundergarh and Dhenkanal are practically free from smallpox during 1964. Some cases of smallpox occurred in other districts where satisfactory coverage had not been possible in some pockets due to heavy refusals.

Difficulties

During enumeration, many people do not come forward with the names of their children in order to avoid vaccination. Heavy refusals are met with particularly during cultivation season. The Adivasi population evade vaccination by running away to the nearest jungles when the vaccination party visits their village in spite of persuasion and advance publicity. Protection of cent per cent of population is not possible to achieve during the attack phase as a large number of people are found to be absent from their villages with their families and serving in offices and industries elsewhere. A number of sick children and adults also escaped vaccination during the attack phase of the Programme.

Future Plan

The Programme is expected to be completed in the entire State by 1965-66. The task of detecting the new-borns, entering their names in the respective family registers and affording protection to them within the first six months of their lives will rest with the smallpox workers. Periodic vaccination at the ages of 4, 8, 12 and 16 will have to be done. This responsibility will have to be shouldered by the vaccination staff stationed in the Blocks according to the re-organization pattern. Strict surveillance regarding occurrence of smallpox cases will be done by the vaccination staff and the basic health workers. Information of occurrence of smallpox will be obligatory on all health workers. Strict attention will have to be paid on inter-State spread of the disease. Immediate information will be sent to the health authorities of the State from which a case of smallpox is reported to have come with full name and address of the case. If he or she halted for some time in another State, the health authorities of that State will also be informed. If such information is received from any other State in respect of a case imported from this State, immediate arrangement will be made to vaccinate the immediate and remote contacts and also carry on mass vaccination in the locality.

From the encouraging results of the Programme so far achieved, it may not be far when the deadly scourge will be eradicated from our country.

UTTAR PRADESH

BY DR G.P. CHAKRAVARTI

THE National Smallpox Eradication Programme, was launched in Uttar Pradesh from 2 October, 1962. The Pilot Project in Sultanpur district was covered in 1960-61.

Since U.P. is the biggest State of the country with over 73 million population in 54 districts (1961 census), it was decided to cover the whole State in three phases. In the year 1962-63, 17 districts with a

population of 27 million were taken up and in the remaining 36 districts with a population of over 45 million in subsequent two years (1963-64 and 1964-65).

Progress

The achievements of the scheme in its different phases in Uttar Pradesh are given in Table 1.

As per findings of the evaluation and assessment conducted by the National Institute of Communicable Diseases in Varanasi district or by the State Evaluation Teams in several other districts (Table 2) the real achievement is something different from the overall coverage.

primary vaccinations, which is evidently the hard core who always escape vaccination.

Impact on Smallpox Incidence

Intensive mass vaccination campaigns, as envisaged under the Eradication Programme, had its due impact on the incidence of smallpox not only in U.P. but also in the country as a whole. If figures of deaths from smallpox for India and U.P. for the year 1957-58 (Nov.-May), the last cyclic epidemic year, is compared with that of 1963-64 (Nov.-May), another year of cyclic epidemic, there is a striking reduction in incidence, as will be seen in Table 3.

But such an achievement is only limited to control of the disease, the goal of eradication being still far

TABLE 1

Phases	No. of districts	Population (in million)	Total Vaccination performed up to 31 December, 1964			Percentage of progressive coverage to total population
			Primary Vaccination	Re-vaccination	Total	
(i) Pilot Project	1	1.43	387,787	1,008,443	1,396,230	98.21
(ii) I Phase	17	26.79	3,325,594	21,297,477	24,623,071	91.89
(iii) II Phase	18	24.31	1,852,907	18,462,355	20,315,262	83.55
(iv) III Phase	18	21.22	817,235	9,125,173	9,942,408	46.84*
Total	54	73.75	6,383,533	49,893,448	56,276,971	76.31*

*18 Districts of the III Phase have so far been partially covered as the operations in these districts started only from August-September, 1964.

According to the objective of 'Eradication', an effective coverage by successful vaccination of nearly 100 per cent population has to be achieved with particular emphasis on cent-per-cent primary vaccinations, as infants and children are the most vulnerable group. Thus, even attaining 80-100 per cent overall coverage may not mean a biological protection against smallpox to the population in question to that extent, the fallacies involved being loss of potency of vaccine under field conditions, washing away or sucking the site of vaccination for fear of reaction, wrong entries, incorrect reading of results and the like. The aim, thus, being to achieve an effective coverage by ensuring successful vaccinations, much still remains to be done to reach the goal of eradication. All out efforts are to be made to cover the left-over population, particularly the way off. According to the standard prescribed by the WHO, eradication can only be said to have been achieved if no indigenous case of smallpox has occurred for three years in succession. This brings out the need of eliminating the disease first, not only from Uttar Pradesh but from other States as well. Since a contagious disease cannot be taken care of in one State in isolation, it has to be done simultaneously in other States as well and also from other neighbouring countries where the disease is endemic and which are contiguous with India.

Surveillance Phase

In view of the foregoing, there is an essential need for a "surveillance phase" under this National Programme. During this phase, which may be for at least three years, one has to be watchful that no

indigenous case occurs from any deficient pocket left out in the attack phase. This will perhaps be more scientific approach to the problem and should have been a part and parcel of the Master Plan formulated for this Programme.

Some Valuable Experiences

From the experience of executing this scheme so far and also from the findings of the evaluation and assessment, it has amply been proved that primary vaccination needed much more emphasis under this scheme. At the initial stages the target prescribed did not specify separately the primary vaccination component. It was only an overall target of 80 per cent. As a result of this the field staff kept themselves busy in completing the targets by re-vaccination, which evidently defeated the real objective.

Another point which has come to light is that while on the one hand, this crash programme envisages mass campaign, on the other family registers and other comprehensive records were also required to be maintained. As a result maintenance of family registers were not up to the mark. The field staff devoted more attention in completing their high targets and left the paper work for spare time, which never came. Comprehensive recording needed a different plan of operation. It required house to house visits and revisits till all records were completed and each and every member of a family vaccinated. To achieve this the target of daily vaccination would also have to be reduced.

Future Plans

In view of the above, it is proposed to undertake intensive mopping up operations in all the 54 districts up to the end of the Third Plan period after the attack phase operations in the III group of 18 districts are completed by 31 May, 1965. Every district would be provided 50 per cent of the staff available during the attack phase and a whole-time medical officer at each divisional level (10 in the whole State), besides the continuance of headquarter organization. The unit of operation will be a *Nyaya Panchayat* which are on an average 10-12 in number in a development block or a ward in an urban area. The vaccination teams will be required to comb each *Nyaya Panchayat* one by one to cover the left-overs, trace out missed primary vaccinations, newborns and vaccinate them. During the house to house visits from one end to other in a village or *mohalla* in a town, they will also complete and remove discrepancies, if any, in the family registers, which are going to be permanent records of the vaccinial status of a community. After a team declares cent-per-cent coverage of

TABLE 2

RESULTS OF EVALUATION AND ASSESSMENT IN CERTAIN DISTRICTS OF UTTAR PRADESH

Sl. No.	Name of Districts	Reported coverage by N.S.E.P. Units (Percentage)	Verified coverage by N.S.E.P. records (Percentage)	Estimated level of immunity in the population at the time of evaluation (Percentage)
1	2	3	4	5
		EVALUATION CONDUCTED BY STATE EVALUATION TEAMS		
1.	Dehra Dun	94.16	81.2	80.9
2.	Nainital	92.3	58.6	70.7
3.	Bara Banki	93.16	76.5	80.7
4.	Mathura	98.2	98.8	97.8
5.	Rae Bareli	100.0	83.8	91.7
		EVALUATION CONDUCTED BY N.I.C.D.		
6.	Varanasi	86.7	64.0	67.8

a *Nyaya Panchayat* or a *Mohalla*, a concurrent evaluation in a sample population will be carried out by the smallpox medical officers to confirm their achievement. Only thereafter, the teams will be permitted to leave that area and take up another *Nyaya Panchayat* or *Mohalla* and so on.

Maintenance Phase

There has been some consideration with regard to entering the maintenance phase immediately after completion of the attack phase. To my mind, this is a little premature because the State or the country as a whole is not yet prepared for the same. Even after attaining thoroughness in the attack phase so far conducted, a "surveillance phase" is essential, as mentioned earlier. During this period, the immunity level attained in the attack phase has to be raised further by covering the left-overs, if any, vaccination of all new-borns, immigrants and also re-vaccination of those who were vaccinated or re-vaccinated three years back. Besides this, a strict vigilance has to be kept for any smallpox outbreaks and all possible measures are to be taken to cordon off the disease. In this manner, after three years vigilance in the covered areas, if no indigenous smallpox cases occur, the criteria of eradication shall then only be deemed to have been achieved and the districts can be declared to enter into the maintenance phase. That will perhaps be possible sometimes towards the end of the Fourth Five year Plan and accordingly there should be no smallpox cases in the country during the next cyclic epidemic year, *i.e.*, in 1971-72. In other words, the objectives of eradication can only be expected to be achieved by that time.

TABLE 3

Country/State	1957-58 (Nov. May)	1963-64 (Nov.—May)
	Deaths	Deaths
INDIA	37,488	7124
U.P.	5,330	1668

HIMACHAL PRADESH

BY DR D.D. ARORA

HIMACHAL PRADESH consists of six administrative districts, *namely*, Mandi, Chamba, Bilaspur, Mahasu, Sirmur & Kinnaur. The people live some 13,000 villages and 11 towns.

The following table gives the incidence of smallpox cases and deaths in Himachal Pradesh from 1951 to 1965.

Year	*Cases*	*Deaths*
1951	45	7
1952	136	14
1953	100	28
1954	6	2
1955	5	1
1956	16	4
1957	12	2
1958	115	22
1959	26	4
1960	10	3
1961	113	24
1962	11	2
1963	101	21
1964	2	...
1965	18	6

The interesting feature is that in almost all the out-breaks where the source of infection was traced, it was found that the infection was imported from the neighbouring States, *e.g.*, Kangra in Punjab and Tehri Garhwal in U.P. because people of Himachal Pradesh maintain frequent social and cultural contacts with the above areas.

The National Smallpox Eradication Programme in the Pradesh was started in the year 1962 with the help of skeleton staff in the limited areas. It is a crash programme with the main objective to successfully vaccinate the entire population of the Pradesh within the stipulated period, *i.e.*, before March 1966.

Organizational Structure

The Programme is under the charge of the Deputy Assistant Director, Health Services (Smallpox) at the State level who works under the guidance of the Director of Health Services, and the Assistant Director of Health Services (Public Health).

The Government of India has sanctioned two N.S.E. Units each consisting of 12 superintendents vaccination, three health assistants and 60 vaccinators

and the ministerial staff. In the year 1965, two assistant unit officers for each Unit have also been sanctioned. In addition the headquarters staff consisting of assistant publicity officer, statistical and other ministerial staff has been provided. The regular public health vaccination staff has been involved in a co-ordinated way and at the district level the medical officer of health has the overall charge of the programme.

Organizational Procedures

At present we are engaged in the attack phase which is to be completed before the end of March 1966. Before the intensive vaccination is started in an area, the spade work consisting of providing supplies for two to three months in the headquarters of tehsil together with the advance publicity and health education is done. The publicity and education work is done by the assistant publicity officer and by the paramedical staff of primary health centres and hospitals and community development organizations.

The field staff of the eradication unit is also educated about the programme and towards the urgency of the programme. It is emphasized that in order to obtain the people's participation the details of the programme should be explained to them.

Intensive Vaccination Operations

Two to three tehsils in each district are taken at a time and that the smaller unit such as one panchayat consisting of 3000-5000 population allotted to each vaccinator. Each superintendent vaccination supervizes the work of five vaccinators in the adjoining panchayats. A time limit of 2 to 3 months is fixed for the completion of the first intensive vaccination sweep. It creates a sense of urgency amongst the workers. After the completion of work they are shifted to new tehsil. This has helped to ensure 75 per cent to 80 per cent coverage in the first sweep.

Mopping-up Operations

Mopping-up operations are part and parcel of the attack phase and immediately follow the intensive vaccination operation in the area. Two to three vaccinators are left in each tehsil under the guidance of the superintendent vaccination to attain 100 per cent effective coverage.

As the first round of intensive vaccination is being completed all over the Himachal Pradesh by March 1965, the permanent headquarters of the vaccination staff are being fixed and the definite areas allotted to them thus covering the whole State. It will be the sole responsibility of the worker to see that 100 per cent effective coverage is achieved in the area allotted to him by the end of March 1966 and thus take the attack phase to conclusion.

People's Participation

Health education is given more emphasis in the programme. It is to be started in the preparatory stage and intensified during the attack phase. Different Government departments such as Education, Community Development, Social Welfare, Panchayat Raj organization and village volunteer organizations like Bharat Sewak Samaj, Mahila Samities or Youth organizations are involved in the planning stage to enable them to participate actively during the execution of the programme. Before the work is actually started in the area the vaccinator is required to contact the Panchayat president or secretary, school teacher, local leaders, etc., to avail of their help in the programme. Most of the difficulties are removed if the local leaders are taken into confidence.

Achievements

The achievements of the National Smallpox Eradication Programme in Himachal Pradesh up to 30 November, 1964 are given in the following table*. The over-all effective coverage of Himachal Pradesh comes about 80 per cent.

District	Total Vaccination		Percentage of Coverage
	Primary Vaccinations.	Revaccinations.	
Bilaspur	22,646	1,91,508	100
Chamba	18,075	1,32,230	71.4
Mahasu	58,073	3,48,813	100
Mandi	38,097	2,77,651	82.2
Kinnaur	9.487	50,765	100
Sirmur	21,432	1,81,873	100
TOTAL	1,67,794	11,82,840	99.6

*The figures include epidemic and check-post vaccinations done since the starting of National Smallpox Eradication Programme.

NEFA

BY DR B. BHATTACHARJEE

NORTH-EAST Frontier Agency has an area of 31,438 square miles with a total population of about 3.5 lakhs living in 2,451 villages. For administrative purposes, the Agency has been divided into six Divisions, inhabited by various tribes and their sub-clans, who comprise mainly of Monpas, Daflas, Apatanis, Tagins, Gallongs, Adis, Mishmis and different clans of Nagas. They have their own dialects and traditions.

It is mostly a hilly tract, the altitude varying from 500 to 21,000 feet above sea-level. There are innumerable hill-streams in the hill-sector and foot-hill areas. During monsoon torrential flow of water floods the banks of the rivers. Some areas are cut off from the rest of the country for months together.

The foot-hill regions and the hills up to 3,000 to 4,000 feet are usually hot and humid during the most part of the year. The higher regions are cold. The rainfall varies from 150″ to 236″ approximately. Monsoon commences during the latter part of March and generally continues up to October.

Means of Communication

Prior to Independence, the means of communication had been extremely difficult. Most of the areas could be approached only through narrow bridle paths. Today most of the Divisional Headquarters and a number of outposts can be approached by jeeps. Moreover, important administrative stations have been air-linked where regular weekly, biweekly or triweekly Air Service exists. The transportation of various kinds of commodities are carried out with the help of porters and mules.

The NEFA has participated in the National Smallpox Eradication Programme launched in September 1962. In the first phase the work started in Tirap Frontier Division and Pasighat Division with 10 teams and three inspectors. The entire Agency has since been brought under the ambit of operation. Today we have three teams with adequate leave reserve working in the field. Each team comprises two health assistants (junior) assisted by a peon. One team has to cover approximately more than 70 villages. There are 77 health assistants (junior) to carry out the Programme throughout the Agency. Also there are 17 inspectors located in convenient places to supervise and guide their work. The health assistants and inspectors live in the tribal houses and march from village to village through bridle paths for the purpose of vaccination and supervision.

The Health Services of NEFA is an integrated one. Medical officers of health units and district medical officers incharge of the divisions also supervize the NSEP work and give necessary guidance. Smallpox officer at the Agency level conducts the whole Programme under the direct guidance of Director of Health Services.

Supply of Vaccine

Vaccine is supplied from Medical Stores Depot, Calcutta, by air to different towns in Assam State where from vaccine is transported to the different NEFA Divisional Headquarters by air or land route. From the Divisional Headquarters the vaccine is carried by special runners to the villages and different Health Units.

Programme and Achievement

Despite various handicaps like difficult terrain, difficult communication and long lasting monsoon NEFA has been able to ensure over 50 per cent coverage up to December 1964. NSEP teams have done 88,585 primary vaccinations and 88,564 re-vaccinations up to December 1964 with an average success rate of 71.79 per cent. There had been only two imported cases of smallpox in the whole Agency since the inception of the Programme. There had been no serious post-vaccinal complication so far.

The medical officers, NSEP workers and other para-medical staff do health education work by talks, exhibiting posters and showing health films. Smallpox Eradication Week is observed every year with great enthusiasm throughout the Agency.

The attitude and co-operation of the tribal people towards vaccination is generally satisfactory, though in some areas people were not coming forward for vaccination due to local taboos. The Health Service staff are doing their best to allay fear and to encourage people to accept vaccination.

The plan is to ensure complete coverage throughout the Agency by March 1966, when we shall enter into mopping up and maintenance phase. There is provision for increasing NSEP staff this year with a view to intensifying work.

Smallpox eradication in a difficult terrain like NEFA is a great challenge as we have to tackle the influx of refugees—Tibetans, Chakma, Burmese, etc. Import of labourers for various developmental activities in the Agency has also tangibly added to the work-load. Due to heavy rainfall throughout the Agency the working season is less than in other places. Even in normal season local people do not allow the NSEP staff to enter their villages in some of the areas for various reasons of religious nature. The operation has to be tailored to their convenience. This further minimizes the real working period.

DADRA AND NAGAR HAVELI

BY DR C.H. LALA

DADRA and Nagar Haveli Portuguese possessions liberated in 1954 consists of 72 villages covering 150 sq. miles. The population is mainly Adivasi people speaking Warli, Konkni, Dhodi languages.

The NSEP started in this area on 1 April, 1962. The staff unit governing at present is the unit officer who is the chief medical officer and one sanitary inspector and two vaccinators.

The whole area is divided in two sections, north section and south section. We have attempted to cover population of this area, *i.e.*, 57,932. We have completed the attack phase by 30 June, 1964 with 86 per cent coverage and 92.8 per cent up to 30 October, 1964.

Maintenance phase has been started from 1 July, 1964. There has not been any incidence of smallpox since 1961. It is proposed to have complete coverage during the current year.

The programme of vaccination follows the same old method, *i.e.*, Rotary lancet method—doing two insertions for primary in upper arm and two insertions for the re-vaccination in lower arm. Freeze-dried vaccine is being used at present.

PONDICHERRY

BY DR J. PONNOU

BEFORE the merger of the former French settlements of Pondicherry, Karikal, Mahe and Yanam with the Indian Union, the smallpox control was introduced by the then French Government more than 50 years ago and primary vaccination of the newborn before the age of six months was compulsory. Pondicherry territory is divided into 16 communes and each of them is having a municipality of its own. The registration of births and deaths is maintained by the respective municipality even today as it was during the pre-merger period.

During the times of epidemic, re-vaccination was conducted on a mass scale and the vaccination at the age of entering the primary school was also compulsory.

When the National Smallpox Eradication Programme was launched in this Territory in the beginning of 1963, we had to seek the assistance of Madras Government, for Pondicherry and Karikal areas, Kerala Government for Mahe area and Andhra Pradesh Government for Yanam area to facilitate the completion of the programme within a short time. This was necessary due to the fact that the areas of Pondicherry Union Territory are more or less enclaves in the adjoining districts of other States and also that the Health Services here are an integrated one doing side by side curative and preventive work and the staff thereof could not be mobilized for the National Smallpox Eradication Programme which was executed in the rest of the country only by the Public Health staff.

The respective State Governments who assisted in this Programme have withdrawn their staff as soon as 70 per cent of the population was covered and we have to complete this Programme with our own staff. This work has already been entrusted to 14 health inspectors. It has also been proposed to recruit 14 vaccinators shortly for the specific purpose of completing the re-vaccination of the entire population of this Territory and to have a vigil on the control of this disease. ●

EVALUATION OF SMALLPOX ERADICATION PROGRAMME *continued from page* 60

like clothing, bedding, etc. Nor was there any routine practice of vaccinating the contacts and the households of the cases admitted. Focal vaccination around the residence of cases would be an effective step for controlling an outbreak.

(*viii*) The planning for the maintenance phase should be drawn up sufficiently in advance and necessary sanctions obtained, so that the activities under this phase could closely follow the attack phase. Allowing any gap, however short, between the two phases is not desirable. ●

REPORT OF TECHNICAL DISCUSSIONS *continued from page* 72

aspects of the national smallpox eradication programmes should be planned and implemented, keeping in mind items such as the following:

(1) Programme objectives for each phase of operation.

(2) Health education objectives (what the people will have to do for implementation of different phases of the programme and after the attack phase).

(3) The health education programme as an integral part of the eradication programme.

(4) Personnel and their health education tasks, to carry out (3) above, specifying who will do what, how, where and when:

(a) Administrators and public health administrators.

(b) Eradication programme personnel.

(c) District and health centre personnel.

(d) Community development and other welfare department personnel.

(e) Community leaders, voluntary agencies and local bodies.

(f) Members of the medical, teaching and other professions.

Evaluation

The disappearance of the disease is the only final evidence of the success of the programme. Before this is achieved, the evaluation of the programme in the different stages was considered essential for detecting gaps and shortcomings, in order to remedy them promptly and thus keep improving the campaign at all times. To reach the final goal of eradication, it was recommended that:

(1) A built-in evaluation of the programme should be made by means of a uniform procedure, as laid down by, and under the direction of, the central authority;

(2) This evaluation should be concurrent, consecutive and terminal;

(3) It should have an independent element in the consecutive and terminal operations, whereas the concurrent ones would have to depend entirely on direct supervision of procedures at various stages;

(4) In the absence of any better practicable field method for an immunological appraisal of the herd immunity status at any given point of time, the present available method of challenge vaccination should continue:

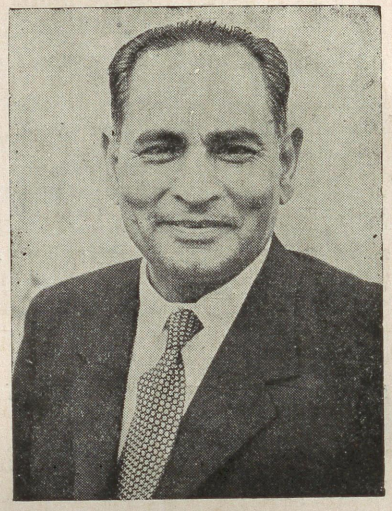
(5) The guidelines worked out as a result of evaluations made as part of the Indian national smallpox eradication programme should be considered as applicable to countries of the Region;

(6) A terminal evaluation should be made by an independent central organization to determine the readiness or otherwise of an area to enter the maintenance phase of the programme, as defined in the First Report of the WHO Expert Committee on Smallpox.

Legislation Against Variolation

Variolation was reported to be in practice in one area, and legislation to ban this dangerous procedure should be introduced.—*Excerpts from the Report of Technical Discussions on Smallpox Eradication.*

Dr K.M. Lal, Deputy Director General of Health Services (Smallpox Eradication), Ministry of Health, Govt. of India, New Delhi, visited Afghanistan, Burma, Nigeria, Congo and Mali as a member of a Committee appointed by the WHO to obtain first-hand information on Smallpox Eradication and Control Programmes. The Committee, appointed under a resolution of the 17th World Health Assembly, had two other members, *viz.*, Dr B. de Almeida Rodrigues (Rua Visconde Carandai 25, Rio de Janeiro) and Dr I. Arita (Virus Diseases, World Health Organization, Geneva). From the observations of this Committee in these countries, it will be possible for the WHO to make recommendations on their respective eradication programmes. This would assist the WHO in preparing the further plan for the world-wide eradication of the disease. The report of the Committee is under consideration of WHO.



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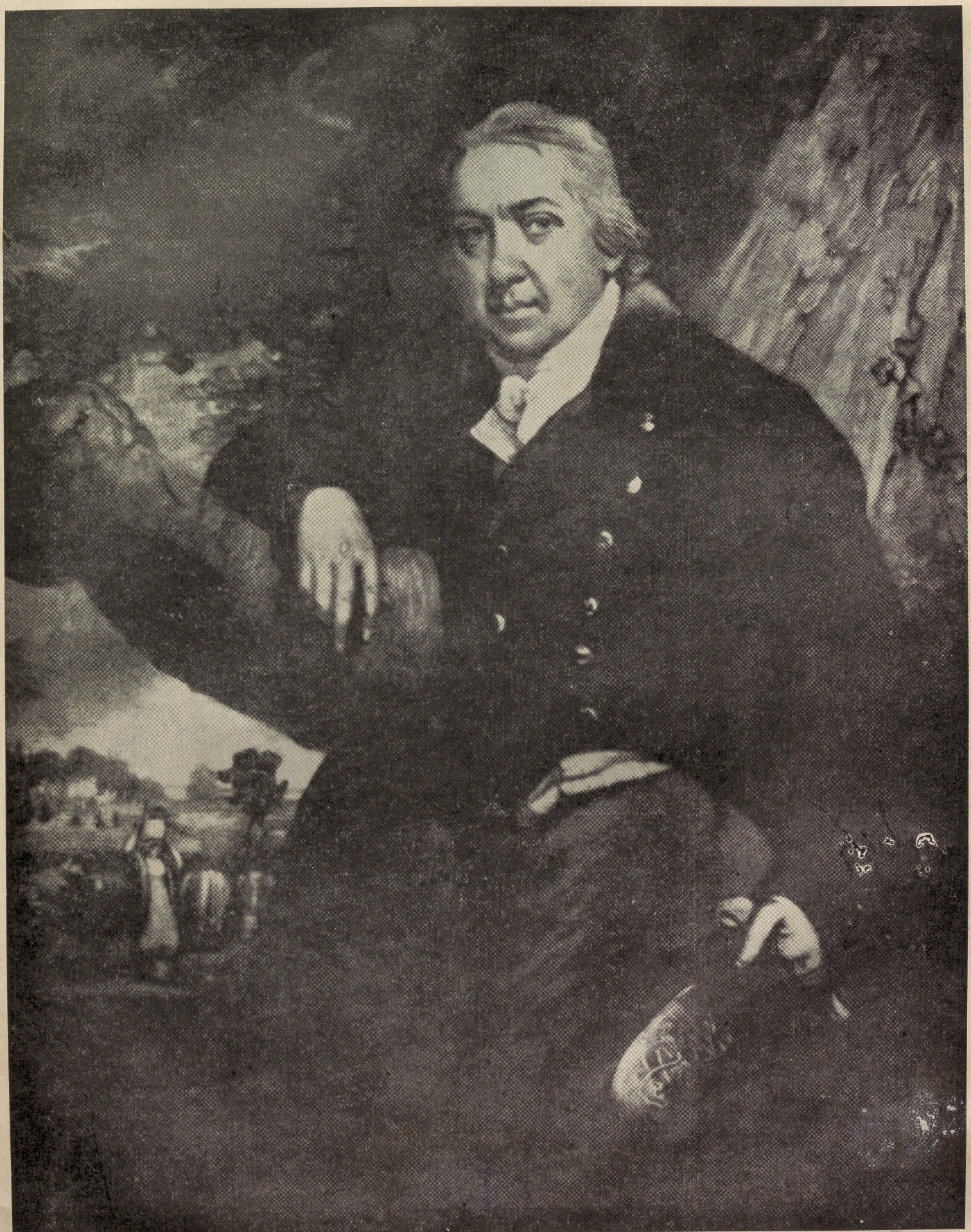
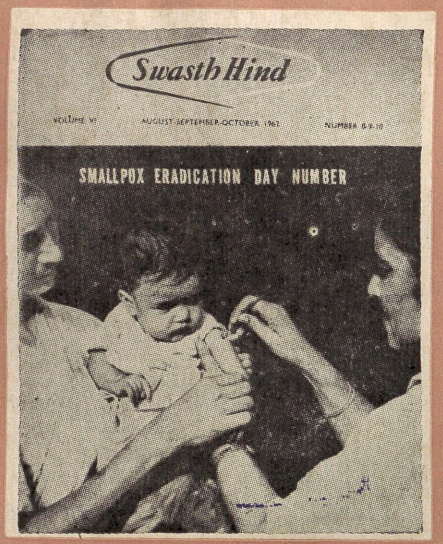
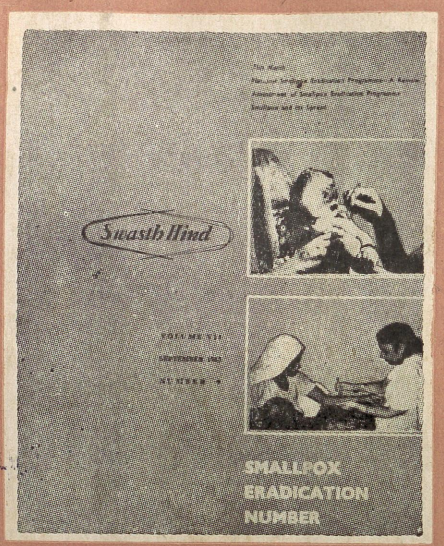
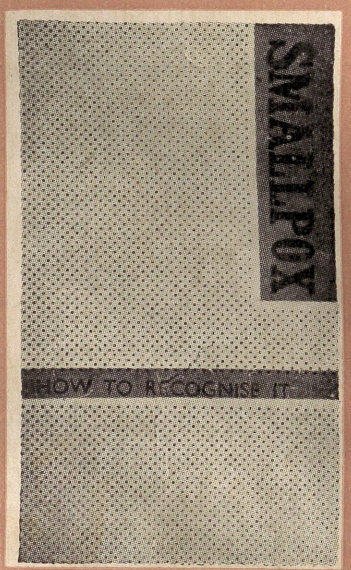


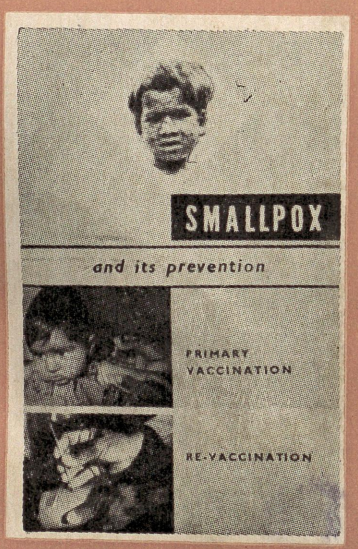


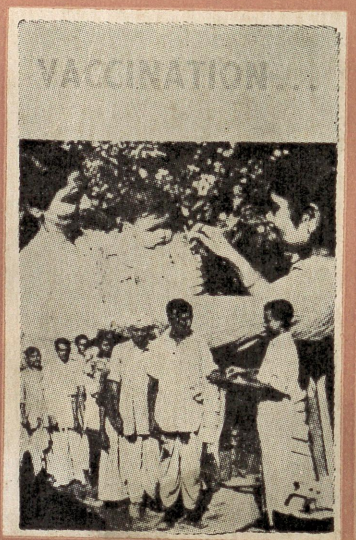


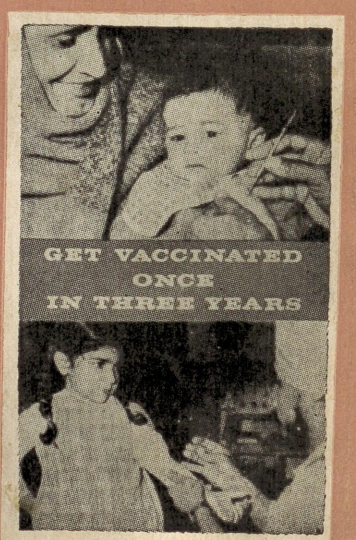
Special Numbers of Swasth Hind on Smallpox.

Some of the health education material brought out by the Central Health Education Bureau.









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