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# PROGRESS FROM ATTACK TO CONSOLIDATION PHASE IN THE MALARIA ERADICATION PROGRAMME OF INDIA

by

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As a rule a malaria eradication campaign is waged in four phases: preparatory, attack, consolidation and maintenance. While the successful launching of the attack phase from the preparatory is dependent to a large extent on the administrative machinery of a country, the decision to switch over from attack to consolidation is based primarily on technical considerations. The point at which this change can be effected is of vital concern for a number of reasons. Continuation of spraying operations for an unduly prolonged period involves not only heavy expenditure but at the same time may lead to the development of resistance in the vector to the insecticides in use. However, it is also necessary to ensure that interruption of spraying operations is not premature as this can render fruitless the entire effort and expenditure made so far. In such an event the administration cannot be blamed for losing confidence in the technical experts. Obviously, therefore, the switch over from the attack to the consolidation phase emphasizes the need for a cautious approach.

Naturally, the progress of the operation should be evaluated at periodic intervals and certain standards must be reached before any area is allowed to enter into the consolidation phase. Experience has shown that the earlier concept, based on malariometric data like spleen and parasite rates or infant parasite indices, is neither tenable nor provides the measure of safety for a switch over from attack to consolidation phase. A zero infant parasite index even for a period of two to three years is not considered to be a safe guiding factor for spray withdrawal. While a positive infant parasite rate determines the quantum of transmission in an area, a negative rate does not necessarily donote absence of

transmission. But in a malaria eradication programme it is essential to ensure complete interruption of transmission and also to obtain accurate information on the extent of residual malaria cases required to be dealt with in a particular community. This, therefore, emphasizes the importance of surveillance operations, which include both active and passive case detection, amongst the entire community, epidemiological investigation of positive cases to determine the source of infection, and the various remedial measures required. Thus it is evident that the necessary guidance for timing the switch over from attack to consolidation phase must be obtained from study of the data received from surveillance operations.

In the eighth report of the Expert Committee on Malaria, it was recommended that certain criteria should first be met before withdrawal of spray operations be permitted.[1] These refer to the status of malaria transmission, the proportion of residual malaria cases in the community, the adequacy of the case detection procedure as determined by the sample of collection of blood smears from the entire community, the efficiency of laboratory services, etc. Judged from all angles, the criteria prescribed provide a reasonable degree of safeguard; however, at the same time these permit some degree of flexibility in standards; for example: the rate of positive cases per thousand (up to 0.5 per thousand per year), the adequacy of sample of blood smears required to be collected (3 to 5 per cent. in respect of hypo-endemic and 5 to 10 per cent. for endemic areas), etc.

The Government of India has given serious consideration to these points, in relation to the manner in which assessment of its own programme should be undertaken. It was appreciated early in 1961 that although the basic criteria as recommended by WHO should be followed, some modifications were desirable to suit local conditions. The criterion relating to the permissible limits of residual cases was analysed carefully in the context of the local problems and it was considered that 0.1 case per thousand per year should be fixed as the maximum limit. Further, for various considerations, the minimum level of the sample of blood collection was fixed at 5 per cent. for hypo-endemic areas and 6 per cent. for the endemic areas.

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[1] Wld Hlth Org. techn. Rep. Ser. 1961, 205

Thus the criteria were made somewhat more rigid than those originally prescribed. It was also considered desirable that the programme should be subject to evaluation by independent appraisal teams before an area is allowed to enter into the consolidation phase from attack.

The National Malaria Eradication Programme was launched in 1958. In the first year provision was made to include the population residing in hyper- and meso-endemic areas of the country by the establishment of 230 units, each unit designed to protect about a million or a little more population. The following year (1959) another 160 units were established to include about 140 million population living under hypo-endemic conditions and about 20 million residing in meso-endemic areas. Thus by the second year, the entire population in the country (except for a small community living at high altitudes) was brought under the ambit of operation of the campaign. The preparatory phase was omitted in view of the data available and experience gained during the nation-wide malaria control programme operative in the country for five years from 1953 to 1957. Thus from the beginning all the units established were placed in the attack phase. According to the plan of operation of the campaign, surveillance operations were initiated from 1960, that is, during the third year of the attack phase in respect of units covering endemic areas and the second year in respect of the hypo-endemic areas.

Both active and passive case detection were employed in the surveillance operations. Special emphasis was laid on active case detection by domiciliary visits in view of the inadequate medical and health facilities in the rural areas. For passive case detection it was considered necessary that all static institutions should be involved from the beginning. Active participation of voluntary agencies would be sought only after stabilization of active case detection procedure and at a time when active participation of all static agencies like rural health centres, dispensaries, hospitals, etc. had been ensured. In urban areas, considerable stress was laid on passive case detection procedure not only through the static agencies but also through the medical practitioners. Assistance of the medical associations was also sought for a concentrated and vigorous drive to encourage medical practitioners to participate in passive case detection.

As withdrawal of spraying operations must be determined on the effective implementation of surveillance operations and not on epidemiological surveys, the original phasing had to be modified considerably, as by early 1961 no unit was in a position to meet the rigid criteria. This was due to the time lag involved between recruitment and training of about 47 000 surveillance staff, enumeration of houses and population, and stabilization of the active case detection machinery in 1960. However, at this stage it was considered desirable that preparations should be made a year ahead so that a maximum number of units could meet the criteria for withdrawal of spraying by early 1962. In other words, attempts had to be made to make up for the time lost and the additional expenditure incurred by continuing insecticide application in all units in 1961. Such a projection involved:

(a) demarcation of areas where there was a reasonable chance for withdrawal of spraying from 1962;

(b) focusing special attention to these areas so as to ensure a high standard of supervision;

(c) continuous appraisal by supervisory personnel of all echelons and to specify the tasks to be laid down for all levels of personnel;

(d) making provision for final evaluation by independent appraisal teams.

Accordingly, the areas from where withdrawal of spraying was envisaged during 1962 were clearly demarcated. This action was based on available epidemiological and surveillance data, field observations and by mutual consultations at all levels. It was also considered desirable that the smallest area for withdrawal of spraying should not be less than a sub-unit, that is, a quarter of a unit covering a population of about 250 000. Further, it was stipulated that such an area must be contiguous to other larger blocks projected for withdrawal of spraying. For convenience, the area projected for withdrawal of spraying in the following year was termed as the "pre-consolidation" area.[1] During the initial projection 200 units out of 390 were selected. The administration was kept informed about the progress made and of the financial implications in the event of any of these units failing to meet the criteria for withdrawal of spraying.

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[1] This useful term used by the National Malaria Eradication Programme of India, is not employed in the official malaria eradication terminology by WHO. /Editor/

The necessity of continuous appraisal by all those directly connected was fully appreciated. This was not only to determine the progress but at the same time to maintain increasing pressure in the areas selected. In the course of the year units and sub-units were retained or deleted from the list of those in the "pre-consolidation" period, depending on the ability of the particular unit to reach the desired standard within the time limit specified. By the end of 1961, 34 units were removed from the list of "pre-consolidation" units, and 4 more units were deleted just before the final appraisal.

It was felt that the final appraisal should be carried out by means of independent teams and that such teams should be advised by a panel of three consultants. It was considered desirable that none of the members of the team nor the consultants should be directly connected with the implementation of the programme. Accordingly, six appraisal teams were formed in early 1962, each comprising two members and a team leader. The team members were drawn from WHO, USAID, and those members of the India Defence Forces who had had considerable experience in the field of public health including malariology. Directors of health services from six States acted as team leaders, but the director of health services of a State did not carry out the appraisal in his own State. The panel of consultants was formed by the Director, Central Institute for Communicable Diseases (formerly Malaria Institute of India), the Regional Malaria Adviser, WHO South-East Asia Regional Office, and the Regional Malaria Advisor, South-East Asia, of the USAID. Neither the State malariologists nor any of the staff of the National Malaria Eradication Programme Directorate were permitted to play any part in the independent appraisal.

The appraisal was initiated in March 1962 and lasted for a period of three weeks, the number of units to be assessed by the teams being 163. Prior to the assessment, the teams were briefed by the panel of consultants on various aspects particularly related to the criteria recommended in the eighth report of the WHO Expert Committee on Malaria and their practical application in the field. It was also emphasized that technical considerations would have overriding priority over all other considerations. Besides providing opportunities to scrutinize all available data, facilities were extended to the teams to select areas of their choice which they

desired to visit with a view to substantiating claims made by units. On completion of the appraisal the findings of the teams were scrutinized and discussed by the panel of consultants who presented the final recommendations.

The recommendations made were that 140.47 (covering a population of 154 million) of the 163 units finally selected as being in the "pre-consolidation" period should be permitted to enter into the consolidation phase. The report also pointed out the various shortcomings found and the remedial measures recommended.

Immediately after the appraisal in March 1962, preparations were made for the next assessment to be undertaken early in 1963. The same policy was followed for selection of units to be placed in the "pre-consolidation" period. States were informed that 174 units were considered as likely to be suitable for entry into the consolidation phase during 1963. Supervision was intensified at all echelons and administrators were kept informed of the progress made; continuous appraisal of all activities through various echelons was the essential feature. In view of various shortcomings, 40 of the units were rejected at the end of six months, and another 19 by December 1962.

Seven independent appraisal teams were constituted in the same manner as in the previous year, though there were some changes in the members and team leaders. The number of personnel involved was 24, including the three consultants who were the same ones as were appointed in 1962. The appraisal was started on 15 January 1963, after the initial briefing of the teams by the consultants, and concluded on 7 February 1963. The consultants had made the criteria somewhat more rigid this year and laid special emphasis on the progress of the passive case detection procedure, efficiency of the laboratory services, accuracy of epidemiological investigations and the organizational maturity of the various echelons of the National Malaria Eradication Programme. Occurrence of P. falciparum cases was viewed with great concern. Much more weight was given to cases and their distribution than their actual classifications. The consultants also made independent observations in some areas after the appraisal by the teams.

As a result 88 units, covering a population of 97 million, were approved for entry into the consolidation phase from 1963. Thus 228 units covering a population of 251 million have now entered in the consolidation phase and of these 140.47 (with a population of 154 million) have already been in the consolidation phase for one year. Notice has now been served to a further 130 units in the late attack phase to prepare for appraisal in 1964. These units have been placed in "pre-consolidation".

The breakdown of the 390 units in the various phases of operations in 1963 is as follows:

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| Attack phase | 32 |
| "Pre-consolidation" | 130 |
| Consolidation phase (1st year) | 88 |
| Consolidation phase (2nd year) | 140 |

The total number of malaria cases detected under surveillance operations in 1961 was 49 151, out of 13.1 million blood smears examined. During 1962, with a much improved surveillance machinery, the total number of positive cases detected was 35 477, out of 19.3 million blood smears examined. Of these, 7.9 million smears were collected and examined from the 140.47 consolidation units and 2589 smears were found to be positive for malaria parasites. Study of these cases showed that over 90 per cent. of them were detected from a few focal outbreaks involving eight out of the 562 sub-units of the 140.47 units which were in the consolidation phase during 1962. Three of the foci were connected with tropical aggregation of labour in industrial developments, irrigation and other projects. Most of these cases were detected through mass blood surveys. The other five were of a localized nature. Necessary measures were taken to deal with all these foci.

A detailed analysis of the foci, relating to their genesis, the population involved, etc., is in progress and will be published elsewhere, as it is beyond the scope of the present paper.

In conclusion, it may be observed that in a large campaign like the National Malaria Eradication Programme in India, covering a population of 438 million, the plan of operation must receive periodical revision. However, even in such a large

programme, it is possible to maintain over-all control and regular progress if detailed operations are delimited every year assigning specific responsibilities to each echelon, and ensuring their implementation at every stage. Demarcation of areas and projection of units in "pre-consolidation" has also helped considerably in focusing the attention of the professional staff and the administrators on the goal to be achieved. The course of events also proved most forcefully the necessity of continuous appraisal of the programme at all levels and in all its activities so that prompt measures could be taken to remedy the defects. Explaining the financial implications to the administrators in the event of any unit placed in "pre-consolidation" failing to meet the criteria on account of administrative or operational defects, had given considerable dividends, as prompt action was taken in most instances by the local authorities. Above all, the appraisal through independent teams has had a particular significance as the members and consultants were able to review the progress in an objective manner and thus were able to make valuable constructive suggestions so necessary for the toning up of a campaign of such dimensions and complexities.

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