THE OPERATIONS RESEARCH APPROACH

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THE FRAMEWORK

THE National Sample Survey demonstrated that tuberculosis is one of India’s major public health problems. The most striking finding of that survey was that the disease is as prevalent in rural areas as in urban areas.

The existing health services, whether general or specialised, were to this date unable to deal with more than a small fraction of the problem; they are not likely to control tuberculosis without a considerable expansion. The Government of India’s health policy gives priority to developing the general health services to reach the remotest villages of the country through the Primary Health Centres. This policy makes it possible to expand tuberculosis control activities as an integral part of the general health services.

Within the framework of a National Tuberculosis Programme the Government has decided to establish a system of district tuberculosis centres which can assist the general health services in the planning, implementation, and evaluation of the control programme. The Government has also created the National Tuberculosis Institute to develop tuberculosis control programmes applicable to the community as a whole, and to train the required key personnel.

The programmes developed at the N.T.I. must have the following characteristics:

(1) They must bring about the reduction of the tuberculosis problem in a limited time; tuberculosis control consists in three kinds of intervention in the epidemiological chain: immunization of the uninfected; prevention of the infected becoming infectors; conversion of the infectors.

(2) They must be firmly rooted in the general health services and contribute to their development.

(3) They must be applicable in the large majority of the districts of India.
In choosing between various control programmes and in combining approaches and techniques within each of these, N.T.I. is governed by the above mentioned principles of problem reduction, integration in general health services and applicability.

The existing knowledge of tuberculosis is mostly clinical, i.e., has been collected with a view to diagnosing and treating the individual and not for disease control. To bring this clinical knowledge into the realm of public health application the N.T.I. must accumulate a body of knowledge on the efficiency of control programmes under field conditions and their operational (including financial) feasibility.

**OPERATIONS RESEARCH AT N.T.I.**

The Operations Research Programme consists of the following elements:

1. **Data Collection**

   (a) *Epidemiological factors.* N.T.I. is conducting baseline surveys for planning and evaluation of control programmes. But even more important is a longitudinal survey comprising approximately 50,000 population who are to be followed up year after year. This survey is to provide estimates of, e.g., age specific infection rates, incidence of cases among infected persons, incidence of sputum positivity among X ray cases.

   (b) *Operational factors.* In Tumkur District N.T.I. is conducting a programme studying various approaches to tuberculosis control, mainly under the headings Mass Campaign Approaches and Community Development Approaches. The object is to calculate the cost of various operations and their efficiency in terms of problem reduction potential.

   (c) *Sociological and economic factors.* The N.T.I. studies, mainly through interviewing by a team of social investigators, such problems as the awareness of symptoms among tuberculosis patients, the community awareness of tuberculosis problem, the economic consequences of tuberculosis, the acceptability of long term drug treatment, methods of motivation of patients.

2. **Construction and Solution of Models**

   Existing knowledge on tuberculosis and its control as well as the data collected by N.T.I. itself have to be systematised in the form of epidemetric and operational models which, at least to begin with, are sufficiently simple to be solved without expensive electronic machinery and yet give meaningful information on the efficacy of various tuberculosis programmes. N.T.I. has started such work, but is still at the stage of rather simple epidemetric models.
3. Test runs

In principle, the optimal solution of the operational model is tried out on a fairly large scale. N.T.I. at the moment operates a District Programme in Anantapur District, and a City Programme in Bangalore. These programmes have been formulated to a large extent on the basis of preliminary data not organised in model form. Later district programmes will increasingly be formulated on the basis of models fed with the constantly accumulating data.

4. Training Programme and Recommendation for National Application

N.T.I. trains key personnel for District Tuberculosis Centres which are being established by the State Governments with assistance from the Central Government and UNICEF. These District Centres are gradually to implement programmes tested out and recommended by N.T.I.

5. Feed back

A basic concept of all Operations Research is feed back of information from one link in the chain to the other. Evaluation data on district programmes all over India lead to further investigations of relevant factors and to continuous modifications of models and test runs.

SOME PROVISIONAL CONCLUSIONS

Most of N.T.I.’s programmes have now been operating for a year. This is not a long enough period to judge the results and evaluate N.T.I.’s contribution on the problems of tuberculosis control. However, some provisional conclusions are already beginning to emerge from the various elements of the Operations Research Programme.

(A) The general health services are proving capable of playing their essential role in the diagnosis and treatment of tuberculosis, provided they are assisted, at district level, by a special tuberculosis service for planning, partial supervision, evaluation, and for referral.

(B) With existing chemotherapy the treatment organisation is the most crucial part of the tuberculosis services, and the decisive role is played by the field organization engaged in preventing and curing treatment default.

(C) The most critical requirement of any control programme is an ample provision of drugs, to be supplied free of cost to the patients.
(D) Over half the X ray active cases (including more than three quarters of the sputum positive cases) are aware of symptoms of the disease, and case finding can therefore, for some time to come, be based on the self advertising attraction of a free treatment service within walking distance, associated with a simple sputum diagnosis at Primary Health Centre level and referral X ray diagnosis at taluk or district level.

N.T.I.’s task is formidable, its resources limited. We believe that through its Operations Research Approach N.T.I. utilises most effectively its limited facilities towards the solution of India’s tuberculosis problem.