

X-ray Case-Finding Programs in Tuberculosis Control

SINCE the 1940's, mass radiography of the chest has been a fundamental technique in the detection of tuberculosis in this country. In 1956 approximately 70,000 new active cases of tuberculosis were discovered, a substantial portion of the total by this means.

As originally constituted, mass X-ray surveys had communitywide application and were designed to reach from 70 to 80 percent of the adult population within a limited time. The rationale that motivated this method of attack was that most of the unknown active cases in the population would be discovered and eventually isolated, treated, and rehabilitated, and that presymptomatic disease would be discovered at a stage before irreparable lung damage had been done.

The only limitation or selection imposed upon these communitywide survey enterprises, in actual practice, was a minimum age. Persons younger than 15 years of age were usually excluded because of both the difficulty of obtaining satisfactory films and the low yield of cases among children. The working assumption was that tuberculosis was a problem of the general adult population and called for widescale intensified attack.

In the last 15 years the tuberculosis problem has changed radically. There are areas of the country where active tuberculous disease is almost nonexistent. And there are many other areas where tuberculosis continues to be a serious public health and medical problem. There are a number of special groups that carry a heavy burden of tuberculosis and constitute a fertile source of future cases. Thus, tuberculosis continues to be a stubborn problem, and X-ray case finding remains a primary factor in its solution. However, the emphasis has shifted

as the tuberculosis control challenge has changed.

Perceiving the nature of this change, the Public Health Service has been supporting for some time the selective use of mass X-ray survey facilities and has promoted their application in population groups at high risk of infection and disease, such as, hospital admissions, patients and employees in mental hospitals, inmates of correctional institutions, low economic groups, particularly those in slum areas, migrant laborers, alcoholics, and others. Contacts of open cases and persons with symptoms typical of tuberculosis constitute other groups that should receive prime attention in case-finding activities.

In applying the principle of selectivity, the yield of new cases should be a strongly influencing factor in establishing priorities for survey programs. Nevertheless, it is recognized that, within the identifiable types of population groups suitable for X-ray case finding, there are wide ranges in the number and rate of discoverable cases. Therefore, no nationwide priority can be established on the basis of gross categories of population. Necessarily, prior-

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ities should be determined by the epidemiological demands of the particular local situation. For example, the range of rates of newly discovered cases in correctional institutions indicates that this population group may deserve a very high or a very low priority, depending upon the particular local situation.

Selection of areas of case-finding activity should also be determined by the quantity and quality of available followup, diagnostic and treatment facilities, cost, availability of personnel, and by the community's potentiality for making the maximum utilization of survey findings. When X-ray screening is planned for any group, it is essential that facilities for differential diagnosis be provided so that virtually all clinically significant cases of tuberculosis will promptly come under medical care. Where such facilities are limited, X-ray screening programs should be so restricted as to insure adequate diagnosis and medical care of new cases found.

In low-prevalence groups, tuberculin skin testing is useful as a first step in case finding. X-ray activities could thus be restricted to reactors to tuberculin. As a result, the necessity of screening the whole population would be obviated.

In consequence, the Service proposes that every community evaluate on a continuing basis its tuberculosis problem, its specific needs and its resources, so that X-ray surveys may have maximum effect in terms of number of cases found, the reduction of the reservoir of unknown infectious cases, and, through adequate and enduring followup activities, the breaking of chains of infection.

For many years it has been known that there is a risk of excessive radiation exposure involved in the use of X-ray machines. Current findings in this field that emphasize the significance of relatively low-level radiation exposure now serve to focus attention on the need to maintain and operate X-ray equipment in such a way as to eliminate all unnecessary radiation.

To achieve this purpose, the Public Health Service recommends the following procedures: Systematic inspection should be made of all X-ray case-finding equipment, so that radiation exposure to the population may be reduced as

much as possible. Photofluorographic X-ray equipment should be inspected prior to the beginning of a survey and at frequent intervals thereafter. Of particular importance in this connection are: (a) permanent installation of the proper size cone, so as to limit the field of radiation to the area of the fluoroscopic screen of the photofluorograph; (b) the interposition of a filter of at least 2½ millimeters of aluminum in the useful X-ray beam to eliminate the soft radiation; (c) radiation levels at locations where technical and other personnel are situated and where incoming and outgoing examinees are stationed, consistent with the standards set forth in the National Bureau of Standards Handbooks 59 and 60.

A committee of experts has had under review for some time the problems associated with radiation exposure. It is their considered judgment that the risks inherent in such exposure, although important, are relatively small compared to the very great benefits to be achieved from chest X-ray case-finding programs when conducted within the principles set forth in this document.

Summary

The following, then, are the guiding principles that unify the policy of the Public Health Service as it bears upon tuberculosis X-ray case-finding activities:

1. Mass radiography of the chest, operated under competent auspices, is a fundamental technique in the detection of tuberculosis.
2. Mass X-ray case finding should be applied selectively in groups at high risk of tuberculosis infection and disease.
3. All tuberculosis X-ray survey programs should have the prior approval of the applicable State or local health department.
4. Consideration should be given to the tuberculin test as an initial screening device in low prevalence groups.
5. Every community should evaluate on a continuing basis its tuberculosis problem, needs, and resources, so that local X-ray surveys may have efficient use and maximum effect.
6. Adequate safeguards should be utilized to protect all persons from unnecessary radiation.