The relevance of studies of tuberculosis in Eskimos to antituberculous program planning

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Studies of tuberculosis among the Eskimo populations of three countries (Greenland, Alaska, and Canada) have certain general implications for tuberculosis control. In this presentation, a comparison has been made of the problem in these three populations, and the likely impact of the different control programs has been discussed.

THE SITUATION BEFORE THE INTRODUCTION OF COMPREHENSIVE ANTITUBERCULOUS PROGRAMS

Figure 1 is taken from a study on tuberculosis in the native population of Alaska in the late 1920s (1). At that time, mortality was extremely high - the over-all rate being 655 per 100,000 population. Almost exactly the same tuberculosis mortality rate, 653 per 100,000, was recorded in Alaskan natives in 1950 (5); thus there was no decline
between 1930 and 1950. The mortality rate in the 1920s did not differ substantially in different age groups. The lowest mortality was seen in females between 1 and 9 years of age, where the rate was 382 per 100,000, and the highest was 1,134 in women aged 20 to 29 years. When the present authors started their study, they also were struck by the fact that tuberculosis seemed almost equally frequent in all age groups. It was impossible to delineate the specific high and low risk groups so apparent among white North Americans.

Information on morbidity before the start of comprehensive control programs is scanty. Jensen (4) surveyed 3,400 inhabitants of the Julianehab District of Greenland and showed that 7 per cent of the population suffered from bacillary pulmonary tuberculosis. Johnson (5) found that the incidence of active tuberculosis in Alaska during the early 1950s was between 1.5 and 1.8 per cent. Wherrett (7) estimated the annual incidence rate in the Baffin Zone of the Northwest Territories was 2.9 per cent during the period 1955 to 1957.
In view of this high morbidity it is not surprising that infection rates among native children were extremely high. Figure 2 shows age-classified tuberculin sensitivity data for Alaskan Eskimo and Indian children (2, 6). During the 1949-51 period, well over 80 per cent of Eskimo children were infected by the age of five years; this implies an annual infection rate of 25 per cent, the highest ever recorded in the world.

Thus, prior to the institution of comprehensive antituberculous programs, tuberculosis was an extremely serious problem among Eskimos in all three countries - Greenland, Alaska, and Canada.
Figure 3  Tuberculosis death rates in arctic natives (Alaska, Greenland, and the Northwest Territories)

ANTITUBERCULOUS PROGRAMS AND THEIR IMPACT

In Greenland, a comprehensive program was started around 1950; the Alaskan program followed about five years later, while the one in Canada only became fully operational in the early 1960s. In all three countries, great emphasis was placed on the early diagnosis of cases of tuberculosis and their removal for treatment. Other aspects of the programs differed from country to country. Greenland emphasized BCG vaccination, while in Alaska BCG vaccination was used less frequently; very extensive chemoprophylaxis was used instead. In the Canadian program both BCG and chemoprophylaxis
Figure 4 Incidence of tuberculosis in arctic natives (Greenland, Alaska, Northwest Territories) and in Canada as a whole

were used. Establishment of these programs was followed by a decline in tuberculosis as measured by the three indices of mortality, morbidity, and infection rates.

Mortality declined very rapidly in all three countries (Figure 3). In Alaska, the mortality rate, which had been over 600 per 100,000 in 1950, dropped to about 10 per 100,000 by 1965 and there were no deaths from tuberculosis in 1968 or 1970. In Greenland, the mortality curve behaved in exactly the same way. Canada has been lagging somewhat behind - with rates around 250 in 1956, dropping to about 14 per 100,000 in 1969.

Incidence rates show a similar decline (Figure 4). In Greenland and in Alaska the respective incidence rates were 2,500 and 1,700 per 100,000 in 1955. Over the next ten years, there was a sevenfold decline to somewhere between
Figure 5  Mean annual incidence of tuberculosis (all forms) in Canadian Eskimos, Northwest Territories, 1960-73 (rates per 10,000)

Figure 6  Mean annual incidence of tuberculosis in Canadian Eskimos, classified by age, Northwest Territories, 1960-73 (rates per 10,000)
200 and 300 per 100,000 in 1965. In the Northwest Territories, the morbidity in the late 1960s was still extremely high, with an annual incidence rate of about 1 per cent; however, it had dropped to below 300 per 100,000 by 1973. Nevertheless, tuberculosis rates for Canada as a whole are still 40 times lower. On the other hand, the over-all Canadian rate is declining more slowly than that for Eskimos. Data for the years 1960-73 are analysed in more detail in Figure 5. The over-all mean annual rate was 123 per 10,000 in the early 1960s and a little higher, 126, in the late 1960s. The rates for the late 1960s reflect the intensification of case finding. A few years ago the apparent lack of progress in the fight against tuberculosis was disturbing. Then in the early 1970s came the sudden drop from 126 to 39 cases per 10,000. The proportion of bacteriologically confirmed cases increased over this period of study.

The decline in new cases is much more substantial in persons under the age of 25 than in those over 25 (Figure 6). One of the reasons for this is that primary tuberculosis has virtually disappeared. The rates during the three periods of the 1960s were well over 30 per 10,000, but they dropped to 0.1 per 10,000 in the early 1970s (Figure 7). This indicates a marked reduction in the risk of tuberculous infection, achieved by early diagnosis with cure by appropriate chemotherapy. There has been a parallel change in Alaska; Comstock and Philip (3) estimated the annual risk of infection
was about 25 per cent in 1950, but had diminished to about 0.3 per cent in 1970.

CONCLUSIONS

One may draw two conclusions of general interest from these studies. First, it is possible to diminish a tuberculosis problem rapidly by an antituberculous program. Secondly, the most important facet of such a program is the diagnosis of cases early enough to prevent them becoming important sources of infection. Such measures as chemoprophylaxis and BCG vaccination, although valuable, probably do not have a great immediate impact on the problem.

REFERENCES

4. Jensen, O., "Tuberkulosesituationen i Julianehab Distrikt, Grondland."