



Latent Tuberculosis Infection, its Treatment, and the Control and Elimination of Tuberculosis

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Eliminating tuberculosis should be a high priority for public health practice for several reasons: it represents a massive burden to global health in terms of costs; it is transmitted through the air we breathe, putting everyone at risk; and we have tools that are effective in targeting our activities [1]. Getting rid of latent infection must be a key component of any strategy aimed at the elimination of tuberculosis, since the largest burden of the causative microorganisms are carried by the high proportion of the world's population that is infected but does not (yet) have disease. This is particularly crucial because the microorganisms can cause a reactivation of disease, as well as potential new infection of others, many decades after the individual carrying the microorganisms has become infected.

There is no question that the intervention – i.e., medical therapy of latent tuberculosis infection – is efficacious [2]. Moreover, the objective of screening and of offering the intervention has great merit and meets the criteria of aiming "to detect unrecognized disease or its precursors in order that measures can be taken that will prevent or delay the development of disease or improve the prognosis" [3], as well as the ethical requirements for implementation [4].

In this issue of *IMAJ*, the article by Bibi and colleagues [5] on the compliance with drug therapy for latent tuberculosis infection touches on the key issue in considering the role of this intervention in the control, and elimination, of tuberculosis. Even if the intervention is efficacious and relatively safe, it cannot hope to have an impact on reducing the burden of disease unless it is applied to a large proportion of the target group. The study reports that in only 16% of the probable "actual" number of infected individuals (taking into account those who did not complete the examination) was the intervention applied fully (i.e., the course of treatment was completed). The main reason for this low figure was the fact that many did not return for a further examination after being informed that they had a significant reaction to the tuberculin skin test.

A closer examination of this figure shows that in one of the highest risk groups (children born in "other" locations who had a high prevalence of significant skin reactions), only 5.5% of

probable infected individuals completed the treatment. This low rate of adherence might reflect the fact that the screening was undertaken in a general population that did not have prior knowledge or reason to be concerned about the disease. However, even in locations where health services are highly focused on encouraging participation and adherence to the intervention, and where the individuals being examined are likely to be aware of and concerned about the risk (e.g., contact with cases of active tuberculosis), the rate of completion of treatment remains low. In the Province of Alberta, Canada, a routine report of treatment outcome offered to contacts revealed that the rate of completion of treatment among those detected to have a significant reaction to the tuberculin test was only 24% [6]. Even this is not sufficient to have an epidemiologic impact.

This is not even the whole story. In undertaking screening and preventive interventions for individuals who are not ill, it is important that the intervention itself not cause more harm than is prevented by the intervention. In an analysis of screening groups at risk of tuberculosis, we evaluated the probability of developing disease (and of developing the most infectious form, smear-positive pulmonary tuberculosis) in three groups that were required to undergo routine screening examinations – immigrants with and without radiographic evidence of healed tuberculosis, and healthcare workers [7]. We determined that in order to prevent a single case of smear-positive pulmonary tuberculosis it would be necessary to treat 30 immigrants who had a scar on their chest X-ray, 278 immigrants from high prevalence countries with normal chest X-rays, and 651 healthcare professionals. The cost of this intervention can be calculated in terms of potential toxicity [8]. In the groups evaluated, it was estimated that one of these adults would die of hepatitis for every 11 cases prevented in nurses, or every 233 cases prevented in immigrants with scars. Admittedly, these figures are not particularly relevant for the children in the study reported here by Bibi et al., but they do have relevance for the recommendations concerning rather aggressive treatment of latent tuberculosis infection among immigrants that are currently being proposed [9].

For all health-related activities, it is essential to maintain a

critical mind. In public health the lines of evidence required are even more stringent than those required in other fields. Not only should an intervention be efficacious but it must also be effective, efficient, feasible, sustainable, accessible and equitable. While treatment of latent tuberculosis infection is unquestionably efficacious, it still must meet the other criteria and we are not yet there.

References

1. Enarson DA. Why not the elimination of tuberculosis? *Mayo Clinic Proc* 1994;69:85–6.
2. Ferebee SH, Mount FW. Tuberculosis morbidity in a controlled trial of the prophylactic use of isoniazid among household contacts. *Am Rev Respir Dis* 1962;85:490–510.
3. Last J, ed. *A Dictionary of Epidemiology*. 3rd edn. Oxford: Oxford University Press, 1995:152.
4. Farmer R, Miller D, Lawrenson R. *Lecture Notes on Epidemiology and Public Health Medicine*. 4th edn. Oxford: Blackwell Science, 1996:203–14.
5. Bibi H, Weiler-Ravell D, Shoseyov D, Feigin I, Arbelli Y, Chemtob D. Compliance to treatment of latent tuberculosis infection in a region of Israel. *IMAJ* 2002;4:13–16.
6. Alberta Health. *Annual Report of Tuberculosis Services*. Edmonton, Government of Alberta, 1991.
7. Enarson DA. Screening for tuberculosis infection and disease. *Monaldi Arch Chest Dis* 1998;53:144–7.
8. Comstock GW, Edwards PQ. The competing risks of tuberculosis and hepatitis for adult tuberculin reactors [Editorial]. *Am Rev Respir Dis* 1975;111:573–7.
9. Institutes of Medicine. Committee on the Elimination of Tuberculosis in the United States. Ending neglect: the elimination of tuberculosis in the United States. In: Geiter L, ed. *Committee on the Elimination of Tuberculosis in the United States*, Division of Health Promotion and Disease Prevention, Institutes of Medicine. Washington DC: National Academy Press, 2000:97–100.

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