

## Prevention of tuberculosis transmission through medical surveillance systems



The increased flow of migrants from low-income to high-income countries in the past 5 years has raised the issues of migration-related social, economic, and health risks in many countries. Migrants are a vulnerable population who could be at risk of developing infectious and non-infectious diseases, or who could transmit pathogens to autochthonous populations.<sup>1,2</sup> Thousands of people have migrated from low-income countries, where the tuberculosis incidence is high, to high-income countries, where the incidence is low. Although the mass transmission of mycobacterial strains from migrants has not been proven scientifically, owing to the limited relationships between migrant and autochthonous people, migrants are currently one of the most important population groups contributing to the national tuberculosis burden in western European and other developed countries.<sup>3,4</sup> This epidemiological scenario implies social, health care, economic, financial, and public health consequences.

The annual national tuberculosis incidence is proportionally attributable to migrants in half or more cases.<sup>3,4</sup> This increasing burden of disease and the risk of transmission to susceptible population groups can hinder the path towards tuberculosis elimination targets. Most high-income countries have a tuberculosis incidence lower than 10 cases per 100 000 inhabitants; systematic implementation and scale-up of clinical (eg, appropriate diagnosis and treatment) and public health (eg, infection control measures) interventions can have a crucial role towards achievement of elimination. However, the increased pool of individuals with latent *Mycobacterium tuberculosis* infection represents a continuous source of new tuberculosis cases, reducing the pace towards a major reduction in tuberculosis incidence.<sup>2,5-10</sup>

As underscored by the WHO guidelines on the management of latent tuberculosis infection,<sup>11</sup> it is important to detect the population groups at highest risk of developing tuberculosis disease to decrease disease incidence and protect close contacts from infection. Implementation and appropriate functioning of national surveillance systems, integrated in the framework of national tuberculosis programmes, are core elements of effective tuberculosis control policies.

In *The Lancet Public Health*, Leyla Asadi and colleagues<sup>12</sup> present useful scientific evidence proving the clinical and public health importance (and utility) of the national surveillance systems, particularly those focused on the migrant population. In a retrospective cohort study, the investigators describe the experience of the national tuberculosis medical surveillance programme in Alberta, Canada, in a sample of roughly 220 000 migrants recruited between 2002 and 2013. Foreign-born migrants represent the most important population group at risk of tuberculosis disease; the Canadian public health authorities have placed a special focus on this group to achieve the elimination targets. People who request to stay permanently in Canada undergo a pre-entry immigration medical examination. If diagnosis of culture-proven disease is made, the candidates should complete an entire course of anti-tuberculosis treatment in the country of residence. If positive inactive or old pulmonary tuberculosis is identified (at medical history or physical examination), individuals are referred (referrals) to the local public health services for an annual medical check (wait-and-see approach), which might include treatment of latent tuberculosis infection. Non-referrals are not included in the surveillance system.

Asadi and colleagues found that referrals had a higher incidence of culture-positive pulmonary tuberculosis than did all non-referrals (incidence rate ratio 9.1, 95% CI 6.7-12.5), but a lower probability of transmitting *M tuberculosis* (71 total transmission events arose from the individuals with culture-positive pulmonary tuberculosis: three [4%] from referrals and 68 [96%] from non-referrals). The index referral cases did not cause secondary cases of disease, being less frequently sputum smear-positive. The investigators gave two possible reasons explaining the lower risk of *M tuberculosis* transmission: (1) the referrals' shorter stay in Canada, and (2) the lower rate of sputum smear-positivity following a rapid bacteriological or radiological diagnosis (the time lag from symptom onset to diagnosis is less than 2 weeks<sup>13</sup>) or a different phenotype.

The present study has several merits: the findings can be inferred to countries with a tuberculosis epidemiology similar to Canada, being based on a solid methodology

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(study design and analysis), a large sample size, and a rigorous epidemiological system to capture information about *M tuberculosis* transmission (ie, conventional epidemiology based on contact tracing and molecular epidemiology based on DNA fingerprinting). The investigators have shown that the migrant population is a heterogeneous group, with some individuals at high risk of developing tuberculosis and deserving strict surveillance. A cost-effectiveness analysis of this public health approach is missing, but the findings are sufficiently strong to support the utility of this approach. The Canadian model is an example that could be implemented in other high-income countries.

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