

Piliriqatigiingniq: Working Together to Stop Tuberculosis in Northern Canada

Authors:

Andrew Bresnahan MSc, MPH

¹Michael G. DeGroot School of Medicine, McMaster University, Hamilton, ON

Author for Correspondence:

Andrew Bresnahan

Email: andrew.bresnahan@medportal.ca

Every clinical story has a social story. It is Christmas, and I am visiting friends and family in my hometown, an Inuit community on the north coast of Labrador. Packing my computer into my favourite gift, a sewn sealskin case, I explain that I am heading up to the school to write about tuberculosis (TB). “There’s lots of TB here”, one of my friends shares, and she’s right. In 2009, Nunatsiavut experienced its third TB outbreak of the decade, with incidence rates peaking at 550 new cases per 100,000 people (1). As I listen to my friends share stories of their experiences with infection and treatment, it becomes clear that outbreaks like these are more than acute public health crises; they reveal chronic patterns of overcrowded housing, poor nutritional status, and low incomes that shape patterns of risk. These patterns can teach us a lot about how our communities and health systems are organized, and the paths from here to a more just and healthy society.

TB is a communicable disease caused by *Mycobacterium tuberculosis*, an almost exclusively human pathogen spread by the aerosolization and respiration of droplet nuclei. Communicability is determined by the intimacy and duration of exposure to an infected person, the number of bacilli discharged, adequacy of ventilation, and exposure of bacilli to sun or UV light (2). Host susceptibility to infection and disease is heightened with immunodeficiency, poor nutritional status, diabetes mellitus, renal disease, HIV/AIDS, or a history of TB infection (4). Keeping these factors in mind, exposure to an infectious case of TB may lead to initial infection, with approximately 5% of infections developing into primary TB disease and 95% into latent TB infection (LTBI). The risk of LTBI progressing to secondary (or reactivation) TB is closely related to immunocompetence, with immunocompromised people at higher risk of reactivation (3). The Canadian Tuberculosis Standards provide an excellent evidence-based approach to screening, diagnosis, and treatment, and should be reviewed by all health professionals working with Canadian populations at high risk of TB (3).

Global Health and Circumpolar Health

TB remains a major global health challenge. The WHO estimates that more than 2 billion people, fully one third of humanity, are infected with *M. tuberculosis*. In 2013, 9 million people developed active TB, a global incidence rate of 126 new cases per 100,000 people (5). While incidence has been falling since 2002 due to improved living conditions and the efforts of the WHO Stop TB Strategy (3), we also know that 1.5 million people died from the disease in 2013 alone (5). Such avoidable deaths, and their concentration among the poor, are an injustice on a grand scale. As the WHO Commission on Social Determinants of Health put it, “social justice is a matter of life and death” (6).

In Circumpolar countries, tuberculosis reached a global peak in the 1950s. In 1955, Greenland reported an incidence of 2,300 new cases per 100,000 people, the highest incidence anywhere in the world, with similar numbers reported across northern Canada and Alaska (7). Canada’s overall TB incidence has declined since the 1950s to an all-time low of 4.6 per 100,000 people in 2010, but this promising pattern has not been shared equally by all populations (3). New cases of active TB remain concentrated among foreign-born Canadians and Indigenous populations, especially Inuit (3).

A look at the average annual TB incidence rate in Canada’s four Inuit regions between 2001 and 2011 reveals a disturbing picture, with 17.7 new cases per 100,000 people in the Inuvialuit Settlement Region (northern Northwest Territories), 151 new cases per 100,000 people in Nunavut, 107 new cases per 100,000 people in Nunavik (northern Quebec), and 129 new cases per 100,000 people in Nunatsiavut (northern Labrador) (1). These active cases are potentially the tip of the iceberg of endemic TB infection in the North. Finding and treating these hidden cases is an important part of any effective strategy of TB prevention and control, just as contact tracing, prophylaxis, and disease treatment are core tasks of outbreak response (3).

Outbreaks of this preventable and curable disease are more than acute public health crises. They reveal chronic patterns of food insecurity, overcrowded housing, and income disparity that challenge our idea of Canada as a just society, and call on us to think upstream. Upstream thinking draws on a helpful metaphor – instead of standing downstream trying to help all those drowning in a river, why not head upstream to find out why people fall in, and work together to solve problems at their source? This is what public health and community medicine is all about. So what can TB in northern Canada teach us about thinking upstream?

Partnerships

Healthy partnerships are part of decolonizing public health practice in the North. For many Inuit, TB has too often meant a loss of control over their lives. Early TB control efforts were governed from Ottawa, with Inuit quarantined and evacuated to southern sanatoria thousands of kilometres from their families. This trauma continues to inform how many Inuit think about TB, and makes an ethic of partnership all the more important (1). Canada's national Inuit organization, *Inuit Tapiriit Kanatami* (ITK), representing 55,000 Inuit living in 53 communities across the four Inuit regions, has developed a *Inuit-specific TB Strategy* with five priorities for action: 1) community education and mobilization, 2) intersectoral partnership towards addressing social determinants of Inuit health 3) evidence-based, Inuit-appropriate TB prevention, control, and care programs, 4) improved surveillance and research, and 5) better evaluation and reporting (1). ITK's emphasis on community engagement and Inuit-appropriate practice are important signals in the context of decolonization (8). *Piliriatigiingniq*, the Inuit principle of working together for a common purpose (9), is an important guiding ethic for public health practice and TB prevention and control in the North.

Health Systems

Strengthening our public health and primary care systems is key to stopping TB. While access to TB treatment in the North is excellent overall, epidemiological trends affirm the need to keep improving our prevention efforts. Nunavut's *Taima TB* project, which means "Stop TB" in Inuktitut, offers valuable lessons to TB prevention. *Taima TB* is a partnership between Inuit through Nunavut Tunngavik Inc, the Government of Nunavut, and scholars from the University of Ottawa. It included an awareness campaign followed by door-to-door in-home testing and treatment for people living in areas with high rates of TB, and resulted in a 33% relative increase in treatment completion for latent TB infection in the community (10). This project shows that participatory design, community mobilization, and case finding can complement existing contact tracing efforts and improve TB prevention.

Housing

Built environments shape our everyday lives, creating spatial and social patterns of risk. Ventilation, exposure to sunlight, and crowding are especially important indicators of risk for TB exposure, presenting an important design challenge for TB prevention (11). During the 1950's, the Canadian government began settling Inuit into prefabricated

housing not designed for large intergenerational families or Inuit hunting and harvesting activities (12). Today, 31% of Inuit live in crowded homes compared with 3% of Canadians, while 21% of Inuit live in houses needing repair compared with 8% of Canadians (13). ITK's Inuit-specific TB strategy proposes improved housing quality and increased housing units as key solutions for reducing TB across the North (1). Improving access to adequate and affordable housing is a smart, upstream approach to TB prevention in the North.

Nutrition

Nutritional status is an important indicator of host susceptibility to infection. The high price of market food and the high cost of access to country food mean that too many people in the North do not have adequate access to healthy food. Statistics Canada estimates that the cost of providing a nutritious diet for a family of four in the North ranges from \$350-400/week, compared to about \$200/week in southern Canada (14). The 2007-2008 Inuit Health Survey found that 62.7% of Inuit households are food insecure, a rate six times higher than the Canadian average (15), and the highest rate among any indigenous population in the world living in a high-income country (16). The Inuit Health Survey also found that people living in food insecure homes had a significantly lower Healthy Eating Index, eating less vegetables, fruits, grains, and dairy products, and more high sugar foods compared to food secure homes (15). ITK's Inuit-specific TB strategy notes that expanding and improving nutrition education, food subsidy, and harvester support programs is an important way to improve food security and nutrition, and could have "a substantial impact on improving Inuit health and the number of Inuit who develop TB disease" (1).

Income

Income is an important indicator of people's control over their lives (17). It shapes people's ability to pay for expenses like housing, clothing, food, and supplies for harvesting country food. Recognizing the importance of income as a social determinant of health, physicians and allied health professionals are increasingly exploring ways to coordinate with public services to improve income security for patients living in poverty (18). In 2005, Inuit median income was \$16,699, markedly less than the \$25,955 median income reported by non-Aboriginal Canadians or the \$60,047 median income of the non-Aboriginal population living in Inuit communities across the North (14). Improving income security is an important part of addressing the social determinants of health, and may lead to improved tuberculosis prevention and control outcomes (11).

Conclusion

The challenge of stopping TB is also an invitation to think upstream and work together to build more healthy communities. Inuit are leading the way in designing upstream solutions to improve Inuit health and protect Inuit communities from TB. An upstream approach to TB prevention and control includes intersectoral action to improve health systems, housing, nutrition, and income security. This approach transcends a

focus on any single disease, reducing risk for a broad assortment of communicable and non-communicable diseases, and creating the conditions for healthy communities. Just as tuberculosis shows how conditions of everyday life are embodied as disease, it can also teach us to think upstream and work together to build a more just and healthy society.

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