



Inuit research raises concerns about tuberculosis eradication

Although Canada is on track to meet the eradication goals for tuberculosis set by the high-level meeting, Indigenous communities are still disproportionately affected. Paul Webster reports.

New research on tuberculosis among Inuit people in Canada, Greenland, and Russia indicates that efforts to eradicate a disease that kills 1.6 million people worldwide every year could falter without sustained community-based surveillance and eradication programmes that are rooted in quality-of-life improvements.

In 2016, the tuberculosis incidence among Canada's Inuit people in Ottawa was approximately 300 times higher than among the Canadian-born non-Indigenous population, according to Elaine Kilabuk, an Inuit physician and researcher. A study led by Kilabuk and published earlier this year, which was based on a survey of 295 Inuit people living in 162 households in Iqaluit—the capital of the Nunavut territory in Canada's eastern Arctic—linked overcrowded housing with Nunavut's high incidence of tuberculosis; in recent years, these incidence findings have matched those in some of the countries with the highest burden of tuberculosis, including Afghanistan and Nigeria.

"Overcrowded housing was the most poignant and strongest association with tuberculosis that we found in our study", Kilabuk says, while noting that poverty, inadequate education, poor food quality, and the consumption of alcohol, cannabis, and tobacco were also found to be associated with tuberculosis in Nunavut. Housing construction costs in Nunavut are three times higher than those in southern Canada. "A possible explanation for crowding being a consistent variable associated with tuberculosis in this part of Canada may be related to the severe climate conditions experienced in the Arctic, where people cannot live outside as they do in southern urban cities", Kilabuk and her co-authors suggested.

Karen Bjørn-Mortensen, a specialist on tuberculosis among Inuit people in Greenland, who is based at the Statens Serum Institut in Copenhagen, says that a notable increase in tuberculosis prevalence in east Greenland in recent years after the near-elimination of

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the disease in the 1980s suggests that a tuberculosis strain introduced into the region about a century ago was reactivated and expanded during a period of lowered awareness of tuberculosis in the 1990s. This indicates that the consequences of even small interruptions in the control of tuberculosis in remote settings can be severe, she warns.

It is an important message for Greenland and for other tuberculosis-affected communities worldwide, Bjørn-Mortensen says. "Tuberculosis has proven very enduring in the Arctic, despite efforts to control it", she adds. "Once control efforts were lowered due to the belief that tuberculosis had been successfully fought, tuberculosis simply started to spread again."

New tuberculosis data from Chukotka, an area of the Russian eastern Arctic where most people are Chukchi—an Inuit ethnicity—sends a similar message, says Karina Shahgeldyan, an epidemiological data specialist at the Federal State Budget Educational Institution of Higher Education, in Vladivostok, on Russia's Pacific coast. As in Greenland and Arctic Canada, tuberculosis incidence in the Chukotka region in recent years

has spiked to be among the highest in the world.

"An important factor to protect against tuberculosis is the consumption of protein", Shahgeldyan explains.

"Chukchi traditionally eat venison and fish. Over the past years, they have [fewer] opportunities to hunt deer and fish. The consumption of these traditional foods is decreasing. The money intended to support the standard of living among the Chukchi is stolen. As a result, despite the formally high quality of life in Chukotka, in fact it is decreasing for the Chukchi...Increasing alcohol intake, including beer, also contributes to an increase in the incidence of tuberculosis. In recent years, the number of tuberculosis doctors in Chukotka has been decreasing. Therefore, we see an increase in tuberculosis in Chukotka."

In Montreal, QC, Madhu Pai, director of the McGill International Tuberculosis Centre, says that the high incidence of tuberculosis among Inuit people in the Arctic is "a clear sign of neglect for issues—such as food scarcity and inadequate housing—that should have been addressed decades ago".



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The situation in the Canadian Arctic, Pai stresses, “tells us that addressing social determinants of health is crucial. As in the high-burden countries like India, which accounts for 25–30% of the total global tuberculosis burden, this is a disease of poverty.”

Although Pai is confident that Canada can achieve total tuberculosis elimination by 2030, in keeping with commitments it made at a 2018 UN high-level summit on tuberculosis, he worries that India might not be able to do so, in part because new research from Canada and Greenland suggests that tuberculosis is a disease that can appear to have been eradicated and then aggressively resurface. “Although we know exactly what to do”, says Pai, “complete eradication will not be possible without far greater investment in global control efforts.”

Marcel Behr, a molecular epidemiologist at McGill University in Montreal, says data from a close investigation of a 2012 tuberculosis outbreak in Kangiqsualujjuaq, an Arctic village in Nunavut, QC, suggests a similar pattern to that seen by Bjørn-Mortensen in Greenland. During the 2012 outbreak in Kangiqsualujjuaq, Behr explains, 50 cases of tuberculosis were identified among a total population of only 933 people. This extremely high tuberculosis incidence was driven by an “epidemiologic amplification” of a largely dormant tuberculosis strain, “leading to a multipronged outbreak”, Behr explains.

In a study published in 2015, Behr’s group recommended public health officials in the Canadian Arctic overhaul protocols governing tuberculosis surveillance, diagnosis, and treatment. Like Kilabuk, Behr highlights overcrowded housing as a key driver of tuberculosis. “Why the disease spread so rapidly within the community is still not entirely clear to us”, he adds, “but we think it could be due to delayed diagnosis. And we also think that the force

of the disease epidemic has to do with exposure to multiple infected people. Having a high intensity of the disease in an area of poor housing risks becoming explosive.” Behr and Kilabuk both call for more research.

In Toronto, Anna Banerji, who leads continuing professional development

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in Indigenous health at the University of Toronto’s Faculty of Medicine, says training for Inuit health professionals and medical researchers continues to be overlooked by the Canadian Government, which is legally responsible for funding and delivering health services for Indigenous people.

Banerji, who coordinates the world’s largest Indigenous health research conference biannually in Toronto and is a specialist in respiratory diseases among Inuit children, sees the abiding problem with tuberculosis in the Canadian Arctic as partly driven by the exclusion of Inuit people from their own health-care services. “They don’t have a comparable education system, and partly as a result of that, there are very few Inuit health-care providers and researchers”, she explains. “The jobs often go to people from elsewhere who fly in for short durations and don’t speak local languages. Not surprisingly, often they aren’t trusted.”

Canadian officials acknowledge that Arctic tuberculosis control efforts remain inadequate, and they have belatedly intensified efforts. In early March, Canadian Prime Minister Justin Trudeau flew to Nunavut to offer a formal apology to the Inuit for “a shameful chapter in Canada’s history” while repeating his government’s pledge to eliminate tuberculosis across the north by

2030. Trudeau acknowledged that tuberculosis “cannot be cured by medicine alone”; in addition to committing US\$20 million over 5 years to expand tuberculosis control efforts, Canada is also investing in new housing construction. The premier of Nunavut, Joe Savikataaq, praised Trudeau’s efforts but called for additional increases in “funding and capacity for health programming and treatment, adequate housing, community wellness, education, and trauma response”.

Natan Obed, the president of Inuit Tapiriit Kanatami, a political lobby group representing Canada’s 65 000 Inuit people, says an *Inuit Tuberculosis Elimination Framework*, published by the Inuit Tapiriit Kanatami in 2018, calls for Inuit-led innovations, including the development of pop-up community screening clinics, the deployment of portable gene sequencing machines during contact investigations, and experimentation with virtual clinic models to overcome geographical and health and human resourcing challenges.

An Inuit Health Survey published in 2004, which is currently being updated, revealed that the Inuit people are more likely than the rest of the Canadian population to have experienced physical or sexual abuse, or both, during childhood, to suffer from depression, and to have seriously considered or attempted suicide at some time. 70% of Inuit households are food insecure, the survey showed.

“There is still really no functioning child health surveillance for the Inuit today—although not for lack of trying—so we still use it when we talk to the federal government about food security, child sexual abuse, suicide, oral health, tuberculosis, and for everything else involved in the holistic way we advocate for change”, Obed says.

Paul Webster