Recommendations for TB Management among Populations Experiencing Homelessness

Fraser Health Population and Public Health

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Introduction

Tuberculosis (TB) is still the second largest bacterial/ viral killer in the world, despite medical advancements[i]. Globally, approximately one third of the population is infected with TB; people infected with the TB bacteria have a 5-15% chance of TB becoming active[ii,iii]. In Canada, active TB infections occur in people experiencing homelessness at much higher rates than the general population for a number of reasons including greater exposure to the pathogen owing to overcrowded conditions where there is poor ventilation. While initial infection can often remain dormant in people who have healthy immune systems, malnutrition, intravenous substance use, and pre-existing conditions such as HIV infection weaken the immune system, making it more likely that these individuals will experience active TB[iv,v].

In 2018, Fraser Health Authority became aware of several cases of TB in people experiencing homelessness who resided in shelters. It was recognized that across Canada, there have been outbreaks in people experiencing homelessness that other health authorities have managed and mitigated; however, there is not a comprehensive central document on the multifactorial approach that is needed to control and manage TB outbreaks among people experiencing homelessness. Developing a response to the outbreak required extensive literature review and consultation with public health partners across the country.

This document is intended to provide guidance on promising practice for local public health practitioners who are managing or preventing outbreaks in homeless/under housed populations. This is to be used as complement to the Provincial TB Response Plan and the Canadian TB Standards. We acknowledge that every outbreak is a unique situation with site-specific considerations and that recommendations reflect the BC experience.

Methods

Process for Gathering Evidence

Literature scans were carried out using EBSCO Host and PubMed with additional articles identified using Google Scholar. Several jurisdictions in North America have experienced TB outbreaks among the homeless population in recent years and have developed guidelines for preventing TB among these populations. Twelve guidelines or standards from jurisdictions within North America were reviewed to identify common recommendations. Additional information on implementation and stigma reduction measures was gathered from six key informants representing four Canadian communities that had experience managing TB among people who are homeless or precariously housed.

For *Section 7: Recommendations for Stigma Reduction*, most of the literature reviewed did not give specific recommendations on measures to reduce stigma; therefore, the information gained from jurisdictions that had recently experienced outbreaks was the most informative in terms of identifying promising practices for stigma reduction.

Section 1: Building Partnership with Housing/Shelter Providers

The Need for Partnerships

Partnerships amongst service providers are critical for the detection, treatment, and prevention of TB in populations experiencing homelessness, as people experiencing homelessness may not readily engage with the health care system. Partners can also inform health care providers about community dynamics or barriers faced by individuals who are homeless and can also provide individuals affected by TB with social supports which are outside of the scope of the health authority.

In the event of an outbreak, the first step for Public Health is to reach out to shelter providers and healthcare service providers to people experiencing homelessness where cases and/or contacts have been known to frequent. These organizations may be key partners in early detection of TB cases, encouraging people to get tested and/or providing spaces to do so. In some cases peers with lived experience can be employed or enlisted as partners to help identify contacts, support treatment, and/or combat stigma (these topics are covered in subsequent sections).

Recommendations

First Steps

- Identify shelter and service providers who are in regular contact with those who are underhoused. (See Appendix A for a list of potential collaborators and the strengths or contributions that they may bring to the partnership).
- Ideally, partnerships should be established prior to outbreaks through intersectoral tables or regular public health programming. If TB has already begun to circulate, those shelter or service providers which TB cases are known to have frequented should be prioritized for partnership building.

Recruit engaged partners/ leaders of the community

- Whenever possible, it is helpful to have a face-to-face meeting to recruit potential partners.
- Be prepared to answer questions including:
    - Purpose of the partnership
    - How much of their time is required and for how long
    - Resources available to the partnership to carry out its work
    - Rights and obligations of partners

- When meeting with service providers or leaders who come from or work with marginalized populations, the following approach may be helpful:
    - Talk with the partner to get a better understanding of the population they work with and their primary health care concerns
    - Investigate whether there is stigma towards TB among the service providers or in their client community
    - Explain how TB is impacting the population, including the problems people may encounter if active TB disease is not quickly identified and treated. Identify and provide education on TB to dispel misconceptions
    - Understand the leader's perspective on the main barriers to addressing TB in the population and any current practices that are in place

    - Understand the concerns their staff may have with being potentially exposed to TB
    - Discuss whether the leader would be willing to work with you to address these barriers, including working with the partnership
    - Explain why the leader's participation is important
- For community partners (nonprofits, community based organizations, peers), be prepared to meet outside of regular health authority work hours.
- Cultural competence is a precursor to working effectively with partners from diverse cultures. Partnership cultural competence can be defined as a set of consistent behaviors, attitudes, and policies that enable diverse members to work effectively in multicultural or otherwise diverse settings. Nurses who have experience working with people experiencing homelessness are considered valuable partners because they may already have relationships with individuals at risk of contracting TB, may understand the socio-political or systemic dynamics in the populations with whom they work, and may understand cultural sensitivities other partners may not be privy to.

Things to Keep in Mind

- Do not underestimate the leadership skills and abilities of TB partners and key stakeholders. It is important to accurately assess their leadership skills and abilities, as well as your own, and to encourage all partners to effectively use their leadership capabilities. Effective leadership qualities when working with TB stakeholders are outlined in Pryor and Walton (2007). If information about the history or success of previous partnerships among stakeholders is available, this may provide insight into gaps that need to be addressed. Some of organizations may have resources and capacity to train staff, while others may have more constraints or require more support.
- Partnering is an emergent process, which means that partnerships are not static; they grow and develop over time. At their best, TB partnerships are co-learning experiences where all participants learn and grow.
- The skills and talents required for partnerships to operate effectively may change over time. Productive partnerships accurately evaluate and monitor their competencies, talents, skills, and limitations. They build on their strengths and seek new recruits and/or training to overcome their limitations.

For a Checklist on communication with for partners and other stakeholders, see Appendix B.

Section 2: Recommendations for TB Prevention in Housing Facilities

Findings from Evidence Review

All three sources of evidence (peer-reviewed articles, existing guidelines, and key informant interviews) provided similar categories of recommendations for TB prevention. This first category included interventions related to education and hygiene (e.g., promoting proper hand washing and cough etiquette)[vi]. The second category included interventions related to the physical space, including how beds were positioned within a shared room and ventilation systems within the facilities[vii,viii,ix]. Toronto Public Health developed in-depth guidance on ventilation requirements[x] and their recommendations were echoed in other guidelines that addressed ventilation. The third category consisted of staffing and administrative tools. Many guidelines recommended that a health care liaison be appointed to ensure clear communication with health authorities and key records and policies were identified that would assist with active case findings and contact tracing (e.g., symptom screening, cough logs, registration, bed logs).

The final recommendations selected and shared with housing facilities in Fraser Health region are summarized below. Subsequent conversations with other Canadian jurisdictions confirmed that many of these recommendations were applied during their own outbreaks.

Recommendations

To Begin

- Develop a written TB infection control plan (see content checklist in Appendix C)

Staffing

- Appoint a Health Care Liaison to oversee activities that control the spread of TB and other airborne infections. The Health Care Liaison does not need to be a health professional such as a nurse (See Appendix D for sample Health Care Liaison responsibilities).

Sleeping Arrangements

- Maintain as much space as possible between beds, ideally at least 0.9-1.2m apart[xi,xii].
- Position beds head-to-toe, rather than head-to-head.

Ventilation

- Ensure that ventilation systems (mechanical or natural) provide a minimum of 6 total air changes per hour (TACH) year round in all rooms or areas where staff and/or clients spend time.
- If ventilation systems are inadequate and upgrades are not possible, install upper-room ultraviolet germicidal irradiation (UVGI) units to achieve the equivalent of 6 TACH.
- If upper-room UVGI is not feasible, use in-room disinfection units (i.e., portable or free-standing units with enclosed UVGI or HEPA filtration).

Hygiene

- Provide hand sanitizer, liquid soap, paper towel, facial tissues, trash cans, gloves, and disposable surgical masks[xiii].

Screening

- Require proof that active TB has been ruled out by testing for all staff and volunteers, including base-line and annual testing.
    - Section 4 of the BCCDC TB Control Manual[xiv] recommends all employees/volunteers at shelters, drop-in centres, etc. are screened for TB with a Tuberculin Skin Test (TST) upon starting employment or at the discretion of the employer/institution
- Ensure that all staff/volunteers who screen positive for latent TB infection (LTBI) have been offered LTBI treatment; however, so long as active TB disease has been ruled out, staff/ volunteers can work whether they take treatment or not.
- Implement standardized symptom screening questionnaire for all clients at intake. (See sample in Appendix E).

Education

- Provide regular education for staff and volunteers about TB infection and control, particularly in times of high staff/volunteer turnover.
- Provide education for clients about TB infection and control with an emphasis on stigma reduction. Education for clients should be as accessible as possible, such as holding in-person sessions in formats and settings where clients feel most comfortable, though simple written materials may also be useful.

Administration/Record Keeping

- Conduct a TB risk assessment of each facility.
- Establish clear communication pathways with medical providers.
- Maintain registration of clients, staff, volunteers and guests in the facility.
- Maintain bed maps and track bed assignments within the facility.
- Implement a Cough Alert Protocol (see sample in Appendix F) and use a cough log (see sample in Appendix F) to document which persons are coughing, particularly at night, so they can be referred for medical evaluation.
- Maintain records of training.

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Section 3: Recommendations for Contact Investigations

Findings from Evidence Review

An evidence synthesis by Baxter et al (2017)[xv] found that there are significant limitations to contact naming among people experiencing homelessness. Individuals in this population may have a small number of friends or family with whom they are in regular contact and can name; however, they often find themselves in facilities where they experience close contact with people they do not know (e.g., mat rooms in shelter facilities) or know only by their street name or nickname. This can create significant challenges when employing traditional contact investigation methods.

Baxter et al (2017) found evidence for the following during contact investigations involving populations experiencing homelessness: the value of a location-based approach, working with local communities and the media, working in strategic partnerships, using molecular epidemiological testing, ensuring adequate systems are in place for carrying out investigations, and addressing fear and stigma. An earlier article by Cook et al (2011)[xvi] also described contact investigation methods that may help to overcome challenges faced during investigations with people experiencing homelessness. These methods included molecular epidemiology (the use of special tools to study some biologic factors such protein profile, metabolites or genes to investigate disease outcomes and interventions), social network analysis, geographic information systems (GIS), and genomics[xvii].

All of our key informants spoke of adopting a location-based approach to contact investigations. This typically involved working with local shelters or services that the case may have accessed to determine who else was in the facility and came into extended contact with the case.

An article by Gardy et al (2011)[xviii] describes one Health Authority's approach to contact investigations. Cases were asked to complete a social network analysis questionnaire by an interviewer (see Appendix H). This information helped to identify locations that the case frequented, including shelter facilities. Where possible, bed maps were reviewed for each night the case stayed at a shelter to identify additional contacts. Close contacts were considered to be those who stayed in the beds immediately surrounding the case's bed for $\geqslant$5 nights. If there was evidence of transmission between close contacts, the circle of contact tracing was widened to include those who stayed in more distant shelter beds until there was no evidence of further transmission. The health authority also carried out whole-genome sequencing and paired the genomic data with the social network analysis to develop a clearer picture of how TB spread through the community.

All of our key informants spoke of working in partnership with the community. One Health Authority hired people with lived experience of TB to work as TB Wellness Champions. The TB Wellness Champions were provided with training and support so that they could share their experience with clients, reduce the stigma related to TB, empower clients to take ownership of their health journey, and offer support during screening or treatment. The TB Wellness Champions were particularly helpful during contact investigations as they were more likely to know where people gathered and where clients could be found when they were not at a fixed address.

Recommendations

Nominal Contact Tracing

- Continue with nominal contact tracing to ensure family, friends or other acquaintances that may have been exposed are offered appropriate screening.

Engage Peers in Support Roles

- Identify people from the community who may act as peer support during TB outbreaks.
- Provide training and support to peer support workers to engage in peer education, stigma reduction, and social support. Provide compensation for their work in these roles[xix].
- Have peers assist with finding contacts and encouraging contacts to come in for screening.

Social Network Analysis[xx]

- Complete a social network questionnaire (see sample in Appendix H) with cases to identify casual contacts who may have been exposed and to determine any settings or programs a case attended where they may have been in prolonged contact with others.
- Map out the social network of all cases to determine how cases may be connected and to identify locations or programs that should be prioritized for location-based contact tracing.

Location-based contact tracing in housing/shelter facilities[xxi]

- If bed logs and user registries are not already in place, work with housing/shelter facilities to implement a system to track daily attendance at their facility and bed assignment. (This will be helpful in future contact investigations).
- Gather bed logs for each night a case spent in a housing/shelter facility. Follow up with those people who stayed in the beds immediately surrounding the case's bed for ⩾5 nights.
- If there is evidence of transmission to close contacts, widen the circle of contact tracing to include those who stayed in more distant shelter beds until there was no evidence of further transmission.

Location-based contact tracing in other facilities

- When possible, work with program or facility management to identify people who may have been present at the same time as the case and who would have had prolonged contact with a case. Follow up with those contacts for routine screening.
- When contact identification is not possible (i.e., records of program or facility users do not exist) consider implementing a screening clinic on-site to reach as many people as possible who attend the program or facility on a regular basis and who may have been present at the same time as the case (see Section 5: Recommendations for Long-Term Management).

Molecular genotyping

- Work closely with the molecular laboratory experts on these investigations, as interpretation is complex and still an evolving science.

- Where possible, conduct molecular genotyping using the Mycobacterial Interspersed Repetitive Units – Variable Number of Tandem Repeats (MIRU-VNTR). MIRU-VNTR can quickly detect potential clusters of TB cases.
- NOTE: TB cases sharing the same characteristic MIRTU-VNTR genotype can be considered as belonging to the outbreak cluster and can link previously genotyped TB cases that were reported. As TB cases may be unwilling to share personal details, molecular genotyping can link individuals with limited epidemiological information to the outbreak. In conjunction with available epidemiological data, molecular genotyping can also help identify potential or ongoing TB transmission patterns between cases and within the homeless population and confirm that an outbreak is due to recent transmission and not reactivation of TB.

Genomics

- Genomic data obtained through whole-genome sequencing of isolates from epidemiologically linked TB cases can provide higher resolution of the genetic diversity within a single genotype or cluster of *M.tuberculosis*. In conjunction with social network and clinical data, this can enable the identification of specific sub-networks within the community or individual transmission events associated with specific genetic lineages of disease.

Section 4: Recommendations for Screening Modalities

Findings from Evidence Review

Four screening modalities were commonly explored in the literature: the Tuberculin Skin Test (TST), Interferon Gamma Release Assays (IGRA), chest X-ray, and sputum collection. Key considerations to determine the preferred screening modality for a given situation include: the burden on the population being screened (e.g., time or effort required to complete screening); the resources required for screening (e.g., cost); the predictive value of the screening; and whether the goal of screening is to identify active TB cases, LTBI, or both.

Tuberculin Skin Test (TST)

TST is a well-studied and inexpensive test used to detect infection with TB bacteria. Both the BCCDC and the US CDC Division of Tuberculosis Elimination recommend use of TST unless persons are at risk of inability to follow up, as may be the case among people experiencing homelessness[xxii,xxiii]. The requirement to return for a reading 48-72hrs after the initial appointment may be challenging in a more transient population and this can lead to fewer people completing screening. Key informants echoed this caution with their own experience. According to key informant interviews, TST was the most common screening modality for TB infection; however, it did not have a high completion rate, likely due to the need for the client to return for a second reading.

TSTs may also give false positives if there is a history of BCG vaccination or tuberculosis mycobacterial infection and false negatives if the client is immunocompromised. A positive TST will prompt further investigation with chest X-ray and sputum samples, which can lead to a longer time passing before treatment begins.

Furthermore, in areas where a large proportion of those being tested are foreign-born persons from high TB risk countries, positive TSTs may be due to previous exposure in their country of origin rather than exposure during the local outbreak. In these cases, TST screening may not be the screening tool of choice if there is another testing option that can differentiate strains.

Interferon Gamma Release Assays (IGRA)

Similar to TST, IGRA is a blood test used to detect infection with TB bacteria. Unlike TSTs, IGRA results are not influenced by cross-reactivity from BCG vaccination or exposure to most nontuberculous mycobacteria (NTM), and can be done relatively quickly if laboratory supports are in place. IGRA can be completed in a single session, meaning that clients do not need to return for screening to be completed. The main drawback for health authorities is that IGRA is more costly per test.

IGRA was mentioned as a desirable screening modality by two key informants; however, neither employed IGRA on a broad scale in their screening programs. This was due to the greater resources required to carry out IGRA testing in a community setting and the fact that IGRA was not funded for general TB testing through provincial health programs. In general, IGRA was used for high-risk clients (e.g., those who are known to be HIV positive) while TST was used for the general population who are experiencing homelessness.

Chest X-ray (CXR)

The National Institute for Health and Care Excellence 2012 guidance and a 2014 systematic review and meta-analysis from Paquette and colleagues[xxiv] both recommend use of a mobile chest x-ray unit for active case finding among the homeless. A review of studies by Heuvelings et al. (2017)[xxv] across low-incidence countries, such as Canada, the Netherlands, Denmark, and others, found that screening for active cases by mobile CXR was effective among hard-to-reach populations. CXR was especially useful for diagnosing TB among people who may not be apparently symptomatic. Mobile CXR carries a significant cost for the initial equipment purchase; however, the burden on the client is lower with no need to return for the test to be read and active cases can be found sooner than with TST or IGRA, allowing for earlier intervention. CXR is also more effective for diagnosing TB among those living with HIV[xxvi].

The effectiveness of CXR is increased if paired with sputum sampling. Those findings were echoed by studies on active screening in the homeless population, where 22% of active cases would not have been found by X-ray alone[xxvii, xxviii] .

Sputum Testing

A study by Jensen and colleagues (2015)[xxix] confirmed that sputum is a promising alternative to CXR for TB testing in high-risk groups. According to key informants, sputum collection was used most often for active case finding due to a lack of access to mobile CXR machines and concerns that clients would not return for TST results to be read.

Recommendations

- In the initial stages of an outbreak, the focus should be on finding cases of active TB to prevent further spread of the disease. (See Section 5: Recommendations for Long-Term Management for information on screening for LTBI).
- Mobile chest x-ray is the recommended screening modality for finding active TB among the populations experiencing homelessness, optimally in conjunction with other screening methods; however, in communities where mobile chest x-ray is not available or practical, sputum sampling is the recommended alternative for quickly and efficiently finding active TB cases among the homeless population.
- As the number of cases declines, TST may be used as an initial screening for possible TB with a positive result prompting further investigation through chest x-ray or sputum sampling.
- Where possible, use IGRA for clients who will be difficult to assess by TST or for those who may be co-infected with HIV.

Section 5: Recommendations for Long-Term Management

Findings from Evidence Review

Routine Screening for Active Cases

In 2012 the National Institute for Health and Care Excellence[xxx] issued a Public Health Guidance on identifying and managing tuberculosis among hard-to-reach groups. This guidance directs public health to make sure that active case-finding occurs at locations where vulnerable populations, including people experiencing homelessness, find collective refuge. A 2018 systematic review of active case-finding strategies found that the incidence and/or prevalence of active TB declined in the screened populations experiencing homelessness following implementation of routine screening programs and two of the studies reviewed also demonstrated a reduction in clustering of cases in the screened population[xxxi] . A 2018 review by Gupta et al.[xxxii], suggested that integrating outreach services to include both case detection and case-management interventions that share a resource infrastructure may allow for the most cost effective treatment, particularly if screening and treatment for other diseases that are prevalent among risk groups are integrated into TB outreach interventions.

Three of the jurisdictions which we consulted informed us that they adopted routine screening programs following the start of a tuberculosis outbreak among the people experiencing homelessness. At the peak of the outbreak, one Health Authority reported holding screening clinics four times per year in priority settings where homeless people congregate (e.g., shelters). Gradually, as the number of active cases being found declined, the frequency of screening clinics was reduced to three times per year, twice per year and then once per year before being ended entirely eight years after the start of the outbreak. The National Institute for Health and Care Excellence (2012) guidelines recommend that frequency be based on population turnover within the priority settings. Another Health Authority noted that some of this population turnover could be predicted. Large moves are anticipated at certain times of the year (i.e., at the start of winter as people move indoors and in the spring as they move outdoors), so the Health Authority made sure that screening clinics were scheduled to occur around these times.

Routine screening for LTBI

In addition to discussing the need for ongoing active case finding, key informants spoke about treatment for latent TB infections as an important component of managing, and ultimately ending, a TB outbreak among the people experiencing homelessness. People with latent TB do not have symptoms and cannot spread TB; however, the person will get sick and become contagious if the bacteria becomes active. Marginalized populations with untreated LTBI are more likely to progress to active TB than the general population due to poorer health status and chronic conditions; therefore, screening and treatment of LTBI should be considered a preventative measure for further outbreaks.

LTBI screening may not be possible if resources are limited during the initial stages of an outbreak; however, as the response shifts to long-term management it would be beneficial to incorporate LTBI screening into the routine screening program. Screening for LTBI could be carried out with each new person who is moving into a shelter and may occur on a larger scale across all residents when there are significant movements of people in to or out of shelters, for example, when the seasons change.

Screening Modalities

Sputum collection was employed by two of the jurisdictions during routine screening. A study by Jensen and colleagues (2015)[xxxiii] confirmed that sputum is a promising alternative to chest x-ray for TB testing in high-risk groups. As the number of cases identified through routine screening declined, some jurisdictions switched back to TSTs as a more economical option that had the benefit of contributing to both active and latent TB detection. For more detailed information on screening modalities, see Section 4: Recommendations for Screening Modalities.

LTBI Treatment Considerations

The WHO (2015) LTBI Management Guide[xxxiv] suggest that persons who are immunocompromised and vulnerable should be prioritized for LTBI treatment, including those people experiencing homelessness.

Treatment for LTBI is not mandatory[xxxv]; therefore, key informants spoke to us of the importance of building relationship with clients and communicating that it was their right to receive treatment, as opposed to being required of them. Social supports and peer supports were often employed to assist with uptake of and adherence to LTBI treatment.

One Health Authority spoke of success engaging friends or family members to provide direct observation therapy (DOT) to clients undergoing treatment. Friends or family members who were selected by the client to provide DOT received training and support from a nurse or other health worker to ensure they were prepared to provide DOT and remained supported in their role throughout the course of treatment.

For those who cannot tolerate LBTI treatment, such as those living with Hepatitis C or HIV, or refuse for various reason, where possible, CXR surveillance should be undertaken[xxxvi]. This consists of taking CXR every six months for 2 years; however, according to key informants, because of the transient nature of their clients some patients may be lost to follow up. Therefore, monthly screens for symptoms, as well as generally monitoring the social determinants of health, were implemented. This helped build connections, reduced loss of follow up and resulted in a high rate of surveillance completion. Furthermore, it gave clients the opportunity to reconsider treatment options, and/or undertake sputum sampling and treatment if symptoms were emerging. Additionally, if the TB strain that is prevalent is drug resistant, key informants recommend extending the 2 year surveillance regimen to 3 years.

Recommendations

Routine Screening

1. Locations for Screening Clinics
    a. Provide regular screening clinics in places where people who are homeless congregate (e.g., drop-in centres, shelters).
2. Frequency and Timing of Screening Clinics

   a. Routine screening clinics may be offered multiple times in the first year of an outbreak (e.g., quarterly). In subsequent years, the frequency of routine screening clinics may be reduced.
   b. Consider population turnover when determining appropriate frequency for each site. Some sites with higher population turnover may benefit from more frequent screening clinics.
   c. Plan clinics to coincide with large moves of the homeless population (e.g., moving indoors to shelters at the start of winter, moving outdoors to encampments at the start of summer, or large moves that occur when a new facility opens).
   d. Consider planning clinics for the week before people receive social assistance cheques when people are looking to access social supports; they may be harder to contact the week after cheques come out.
   e. The timing for scaling back or ending routine screening clinics should be determined based on the frequency of new cases being identified. Public health units should be prepared to operate screening clinics for several years after the start of an outbreak.
3. Promotion of Screening Clinics
   a. Use peer educators and trusted shelter staff to promote uptake of routine screening.
   b. Combine TB screening with other health promotion initiatives or health services to encourage attendance by a broader range of people within the facility.
4. Screening Modality
   a. Use sputum collection during routine screening clinics.
   b. As the number of cases identified through routine screening declines, TST may be an acceptable screening modality, provided that a significant number of clients are returning for a read of the test and that resources are available for follow-up LTBI treatment.

LTBI Treatment

1. If resources are available, screen for and treat for LTBI among the homeless population.
2. Employ Direct Observation Therapy (DOT) to ensure completion of LTBI treatment.
3. Provide support for peers and family members who can assist in engaging with the client and completing the course of treatment.
4. For those who cannot undertake treatment, do 2 years of CXR surveillance (3 years in outbreaks of drug-resistant TB), including monthly symptom screening and social determinants of health check-ins with clients.

Section 6: Recommendations on Use of Incentives and Enablers

Findings from Evidence Review

A recent systematic review by Hamilton et al (2018)[xxxvii] on practices to increase uptake of TB screening found that the strongest evidence was for incentives. A second systematic review by Heuvelings et al. (2017)[xxxviii] confirms that monetary incentives improve TB identification and management among people who use drugs and people who are experiencing homelessness. Similar guidance was provided in resources by Michigan Department of Health and Human Services Tuberculosis Control Unit[xxxix]. Given evidence of effectiveness for incentives, we sought more information on implementation based on the experiences of other jurisdictions.

All four jurisdictions interviewed confirmed that they have used incentives and enablers to increase uptake of and adherence to screening and treatment. All four also made a clear distinction between when incentives were being offered and when enablers were being provided. The items to be given as incentives were always determined in consultation with service providers and clients and were typically of small monetary value (between $5 - $10 CDN). Some of the incentives mentioned were gift cards, socks, rain ponchos, or food provided during screening clinics. The small monetary value helped to ensure that the incentive was beneficial to the client but would not create a significant gap between the resources of those who received the incentive and those who did not. The smaller monetary value also supported sustainability over the long-term. One jurisdiction which ran quarterly screening clinics confirmed that if a client presented each quarter then the person would receive the incentive each time they came. This was in recognition of the need for regular, repeated screening as part of long-term management. A final consideration which was mentioned by two jurisdictions was the increased effectiveness of incentives when offered in the week prior to “cheque day” – the day of the month when social assistance cheques were distributed. Clients were often short of resources prior to cheque day and incentives were seen as more valuable; whereas, they may not be seen as particularly valuable when clients have more resources.

When jurisdictions reported using enablers, they were speaking specifically of those goods or services without which the client would not be able to adhere to screening or treatment. Low-cost enablers could include bus passes or food, while more costly enablers included purchasing a pre-paid phone for a client so that health workers could reach them or renting motel rooms to provide housing to clients who were experiencing homelessness while undergoing treatment. One Health Authority also described enablers that were provided to a client to make stays in isolation during treatment more tolerable, including access to TVs, radios or laptops, magazines, and facilitating visits by friends and family members.

A final source that was recommended to us was work by Silva et al.[xl] on ethical tuberculosis treatment (2016). This article emphasized that compensation for participation in tuberculosis treatment is ethical both in terms of compensating a participant for their time and energy to comply with measures to protect public health but also in an attempt to rectify the systemic inequities (e.g., poverty) that place those who are homeless at an increased risk of contracting and developing tuberculosis.

Recommendations

1. Use incentives and enablers to increase uptake of and adherence to TB screening and treatment among hard to reach populations.
2. The items provided as an incentive or enabler should be determined in consultation with service providers and clients.
3. Incentives and enablers should be identified in advance and the parameters of their distribution or use established prior to developing contracts with clients.
4. Incentives should have a small monetary value (approximately $5 - $10 CDN) but a larger functional value to the client (e.g., socks, food).
5. Incentives should be provided to everyone who attends screening. As long as a few months have passed between screens, repeat clients should be given the incentive each time.
6. Use of incentives should be timed to coincide with periods when the incentive will be most valuable for the client (e.g., the week before “cheque day”).
7. Enablers may be of larger value and are determined based on what is required for the client to adhere to screening or treatment.
8. Enablers may also be actions taken to make TB/LTBI care as realistically accessible as possible, such as bringing services on-site rather than requiring people go to an intimidating hospital clinic at a distant location, ensuring services and staff are welcoming for individuals experiencing homelessness, thinking through issues such as drop-in versus appointments, and attempting to streamline as much as possible to keep wait-times to a minimum as people may have limited frustration tolerance.

Section 7: Recommendations for Stigma Reduction

Findings from Evidence Review

Stigma may be a factor in TB prevention and treatment among people experiencing homelessness due to both stigma directed at those with the infection and stigma directed at people experiencing homelessness more generally[xli,xlii,xliii,xliv,xlv].

There is a paucity of research on which interventions work to reduce stigma related to TB and there does not appear to be a marked difference in practices for reducing stigma related to identification and treatment of LTBI or active TB. One report found peer support groups help decrease stigma and increase treatment adherence[xlvi] . Smith (2002) proposes a rights-based approach that counters stigma and discrimination by monitoring and enforcing equal access to health care, housing, employment and justice[xlvii].

All jurisdictions we spoke to mentioned that stigma was taken into consideration; however, each jurisdiction described different experiences. Interviews with one jurisdiction reported that there was significant stigma in the First Nation community in which they had been working. This was likely at least in part due to the association between TB and residential schools and the fear of isolation or forced treatment. In this jurisdiction, they emphasized the importance of good communication with clients to dispel myths about whether the clients who tested positive would be forced into treatment and/or segregation. The clients seemed to respond best when treated as a partner in their own treatment plan and told that their help was needed and important. TB Peer Wellness Champions were also hired to help clients feel more accepted and empowered through treatment.

The second jurisdiction found high levels of stigma from both service providers and other shelter clients. In some instances, active cases were not detected early because clients were frequent users of the hospital and drug and alcohol services, leading to assumptions about their health concerns that caused symptoms to be missed. Service providers may also be wary of working with possible cases because of misperceptions of TB. Additionally, there were concerns that fellow shelter clients might become aggressive if they blamed another client for potential illness. Education and engagement with shelter staff and shelter clients helped to address misperceptions about TB.

In a third jurisdiction education was given such that nurses could be comfortable working with the homeless population. They tried to engage nurses with strong backgrounds in mental health and addictions. They found it was important to have consistency of health care staff going in to provide clinics in order to build rapport and trust with clients. They also tried to build compassion around the social determinants of health and supported health care staff to connect clients to the services they needed.

Finally, in the fourth jurisdiction, staff did not encounter as much stigma in or towards the population experiencing homelessness, possibly because of other stigmatizing issues impacting the population. Repeated screening clinics at shelters helped to normalize testing and treatment, and education and engagement with shelter staff helped dispel misperceptions about TB, which may have decreased fear

of diagnosis. Repeated screenings also made people familiar and comfortable with the individual TB nurses, which may also have decreased fear of diagnosis.

Recommendations

1. Explore current level of stigma and knowledge of TB among people experiencing homelessness, health care staff and the broader community.
2. Provide education about TB for shelter clients and service providers to build understanding.
3. Inform and counsel patients about TB transmission risks and measures to reduce these risks.
4. Advise patients of their right to access screening/treatment as opposed to just their mandate to be screened or initiate and adhere to therapy.
5. Address misperceptions in the community and develop communication regarding mandated treatment.
6. Institute safeguards to ensure that TB test status does not affect a person's employment status, immigration status or qualification for other government benefits or services (e.g., implement firewall policies between public health services and other state functions such as immigration and border control).
7. Where possible, have consistency in health care staff attending shelters to build relationships and trust.
8. Carry out repeated screenings to normalize practice.
9. Normalize face mask use and emphasize its capacity to protect patients in addition to contacts. *This is a widely held recommendation; however, exact guidelines are not readily available.*
10. Where possible identify safe peer and social support networks to mitigate social isolation and empower treatment adherence.

Section 8: Declaring an Outbreak Over

An outbreak is considered over when a community returns to the expected number of cases and when observed spread is interrupted[xlviii] . TB outbreaks in the homeless population can last for several years owing to ongoing transmission and active cases; therefore maintenance of rigorous epidemiological data such as line list and epidemiological curves is imperative.

Partners from the BC Centre for Disease Control and Interior Health Authority shared their experience of using genomic epidemiology to determine when an outbreak among the homeless population could be declared over.[xlix]

Epidemiologic data allowed for transmission timing inference. This made it possible to determine when the last transmission occurred and the outbreak was declared over when two years had passed since a transmission.

See reference article from Hatherall et al. (2016) for description of methods.

Appendix A: Partnership Considerations Table[1]

This check list may help public health practitioners to identify partnerships needed for a comprehensive approach to TB management. The top row in the worksheet lists several skills and abilities that a partnership may need its partners to possess if it is to accomplish its goals; the left column lists several TB stakeholder groups from which partners can be recruited. Neither list is exhaustive but provides a basis to begin.

Stakeholder groups	TB medical expertise	Cultural Competency	Respected by peers	Influence with TB stakeholders	Decision maker in their organization	Stakeholder access	Potential partner access	Health program development experience	Financial resources or fundraising ability	Influence with high-level policy makers	Knowledge of TB programs and services	Knowledge of TB rules and regulations	Social marketing media experience	Meeting facilitation	Leadership skills
TB Program Staff															
BC Centre for Disease Control Physicians/ Outreach teams															
Leader of at-risk population															
Professional Organizations															
Community-based organizations															
Advocacy groups															
Non-profit agencies															
Employer of At-risk Populations															
Health care Providers															
Managed care providers															
Academia															
Residential facilities															
Media															
Policy Makers															
Foundations															

[1] Pryor, J., & Walton, W. (2007). Forging partnerships to eliminate tuberculosis; a guide and toolkit

General Public															
Local businesses (incentives)															
Other															

Appendix B: TB Outbreak Communication Needs Assessment Messages and Audiences[2]

	Yes	No	Not Needed
Are any other types of incidents (e.g., a high-profile case) likely to require intense public information, media, and partner communication responses by your TB partnership?			
Have you **identified special populations** (e.g., elderly, first language other than English, Indigenous communities, and border populations)? List any specific subpopulations that need to be targeted with specific messages during a TB outbreak.			
Have you **identified the TB partners** who should receive information and updates directly from (not solely through the media) the TB control program during an outbreak?			
Have you **identified all stakeholder organizations** or populations (groups or organizations that have an active interest in monitoring activities—to whom you are most directly accountable, other than official chain of command) who should receive direct communication during an outbreak?			
Have you developed the following **topic-specific pre-outbreak materials** for TB-related issues, or identified sources of these materials (if needed):			
Topic fact sheet (e.g., description of active TB disease, latent TB infection, and treatment)?			
Public Questions/Answers?			
Partner Questions/Answers?			
Resources for media/public/partners to obtain additional information?			
Web access and links to information on TB?			
Recommendations for affected populations?			

[2] Pryor, J., & Walton, W. (2007). Forging partnerships to eliminate tuberculosis; a guide and toolkit

Background beta video (B-roll) for media use on the topic?			
List of subject matter experts outside your partnership who would be effective validators to public/media regarding your activities during an outbreak?			

Appendix C: TB Infection Control Plan

This checklist provides guidance on what an organization might include in a TB infection control plan.

		Included in plan? Yes/No
Screening	• Require proof of TB diagnostic evaluations for all staff and volunteers (e.g., annually).	
	• Implement standardized TB symptoms screening questionnaire for all clients at intake (see Appendix E). Try to engage in such a way that emphasizes that it is for their health and protection, in order to reduce stigma.	
	• Where possible implement screening for LTBI for client during times when there is a large fluctuation in clientele, i.e.: during seasonal changes when people are moving in our out of shelters.	
Administration/Record Keeping	• Maintain registration of clients, staff, volunteers and guests in the facility.	
	• Maintain bed maps and track bed assignments within the facility.	
	• Develop a Cough Alert Policy/Protocol (see Appendix F) and use a cough log (see Appendix G) to document which persons are coughing, particularly at night, so they can be referred for medical evaluation.	
Sleeping Arrangements	• Maintain as much space as possible between beds.	
	• Position beds head-to-toe, rather than head-to-head.	
Ventilation	• Ensure that ventilation systems (mechanical or natural) provide a minimum of 6 total air changes per hours (TACH) year round in all rooms or areas where staff and/or clients spend time.	

	• If ventilation systems are inadequate and upgrades are not possible, install in-room ultraviolet germicidal irradiation (UVGI) units to achieve the equivalent of 6 TACH.	
	• If upper-room UVGI is not feasible, use in-room disinfection units (i.e., portable or free-standing units with enclosed UVGI or HEPA filtration).	
Hygiene	• Provide hand sanitizer, liquid soap, paper towel, facial tissues, trash cans, gloves, and disposable surgical masks.	
	• Clean and sanitize frequently touched surfaces several times per shift. Clean all common areas within the facility daily.	
Staffing	• Appoint a Health Care Liaison to oversee activities that control the spread of TB and other airborne infections. Does not need to be a clinician. (Appendix D)	
	• Provide education for staff and volunteers about TB and infection control.	
Education	• Provide education for clients about TB infection and control.	

Appendix D: Sample Health Care Liaison Activities[3]

Key Areas	Activities
Shelter duties	- Coordinates referrals for clients that need a TB evaluation - Assists clients that need a TB evaluation with their transportation needs - Maintains medical confidentiality policies and procedures

[3] Georgia Department of Public Health. (2014). *Guidelines for Preventing and Controlling Tuberculosis in Atlanta Homeless Housing Facilities.*

Health Department Liaison duties	- Serves as a liaison to the Fulton County Department of Health TB Clinic - Coordinates screening activities and referrals to Fulton County. - Send Release of Information Letter from Shelter - Assists health department to conduct infectious disease contact investigations - Coordinates communication with the health department local health officer - Maintains confidential records
Compliance	- Establishes, implements, maintains, and posts written procedures - Ensures staff adheres to TB/Airborne diseases prevention procedures - Ensures staff adheres to TB Cough Alert and documentation procedures - Ensures staff and clients receive mandatory TB prevention education - Ensures that identified medical providers maintain confidential medical records - Maintains other required records

Appendix E: Sample Symptom Screen Form[4]

Instructions for Shelter Staff:

The purpose of this symptom screening form is to help identify clients who may have infectious TB. Please complete this form as part of the initial intake process.

Note to Shelter Staff: Please begin with this statement before asking questions:

"We are asking you a few quick questions because we are concerned about an infection that we know is spreading in our community here in (insert community). We don't want this germ to spread to you or anyone else, so please be honest with your answers."

HISTORY/SYMPTOMS	yes	No
• Do you have a cough that has lasted 3 weeks or more?		
• Have you had contact with person(s) with chronic cough recently?		
• Have you lost weight without explanation during the past month?		
• Have you coughed up blood in the past month?		
• Have you been more tired than usual over the past month?		
• Have you had fevers almost daily for more than one week?		
• Have you sweated so much during the night that you've soaked your sheets or clothes during the past month?		
• Do you have children with any of the above symptoms?		

Does the client have a cough that has lasted 3 weeks or more **AND** has answered "yes" to at least one other question above?

☐ **Yes** ☐ **No**

If you marked "Yes" above, or have identified a child with symptoms, immediately refer the client to your Health Case Liaison.

[4] Georgia Department of Public Health. (2014). *Guidelines for Preventing and Controlling Tuberculosis in Atlanta Homeless Housing Facilities*

Appendix F: Sample Cough Alert Policy[5]

COUGH ALERT POLICY AND PROCEDURES
For Homeless Service Providers in King County

Purpose: For the early identification of active TB cases and the prevention of TB transmission in emergency shelters, day centers, transitional housing programs, SROs, safe havens, supportive housing, and other social service programs.

Problem: Unsuspected active TB can result in extensive spread to agency staff and clients. In Seattle-King County, homeless TB cases increased by 65% in 2002 and approximately 30% of all homeless TB cases were HIV infected. Malnutrition and other debilitating medical conditions are common among the homeless and substance users entering shelters and the sobering centers, putting them at increased risk of TB exposure and progression to active TB disease.

The "cough alert" policy has been developed to protect the safety of homeless agency clients and staff from tuberculosis. Homeless agency employees play a key role in detecting communicable diseases because of familiarity with the clientele and facilities. This policy is to be implemented by facility staff working closely with clients. The cough alert should be instituted as defined below:

Definition:
1. Individuals coughing throughout the night **or**
2. Patient coughing for more than 2-3 weeks without improvement (especially if [1] the cough is accompanied with weight loss, night sweats and fever or [2] patient coughing up blood)

Procedures:
1. Instruct the client to cover nose and mouth when coughing and offer a mask or tissue to use.
2. Record the date, client name, dates served and give the information to assigned supervisor.
3. Assigned agency staff will notify the coughing client confidentially that a medical evaluation is needed within 48 hours, and will assist the client in arranging an evaluation with their primary care provider or community clinic.
   - Evaluation should occur ASAP through one of the following mechanisms:
     - Client's own primary care provider
     - Health Care for the Homeless Nurse (if program has one on-site)
     - Community clinic or public health clinic (for example: Pioneer Square Clinic (206) 744-1500)
     - TB Control Program triage nurse: 206-744-4579
     - Harborview Urgent Care: 206-744-3074 (especially if client is coughing up blood)

4. [Agency should insert specific procedure here, or replace above as appropriate]

[5] Seattle-King County Public Health. (2015). *Tuberculosis Prevention and Control Guidelines for Homeless Service Agencies in Seattle & King County, Washington.*

Appendix G: Sample Cough Log[6]

Instructions for Shelter Staff:

Please give this log to your homeless housing facility Health Care Liaison if you have a client that has a constant cough. The Health Care Liaison is responsible for (1) assessing the client for signs of active TB/ Airborne diseases and (2) determining if the client needs a referral for a medical evaluation.

Name of Shelter: _____

Date Health Care Liaison received copy of log (MM/DD/YY): _____

Client Name (Last, First)	**Date of Birth (MM/DD/YY)**	**Bed Location/#**	**Date(s) client observed to be coughing (MM/DD/YY)**	**Name of staff members who observed client coughing (Last, First)**	**Medical facilities client was referred to**

[6] Georgia Department of Public Health. (2014). *Guidelines for Preventing and Controlling Tuberculosis in Atlanta Homeless Housing Facilities*

Appendix H: Sample Social Network Analysis Questionnaire[7]

Interviewer: This questionnaire is so we can figure out how you might have gotten sick with TB and to help us find other people who might be sick as well, so we can help them get better. Your name will not appear on this questionnaire and the information you give us will be kept completely confidential. If you need to take a break just let me know. If there is a question you don't want to answer you don't have to.

Identifying Data

Interviewer: The first few questions are general questions about you and your background.

1. Interview date and time
2. Interviewer
3. Interview location
4. Case ID and TB number
5. Postal code at time of diagnosis
6. Date of birth
7. Gender
8. Birthplace
9. Ethnicity

Medical History

Interviewer: Now I would like to ask you some questions about your health before you got sick with TB. Some of these questions might seem a little personal but we ask them because people who already have some kinds of sicknesses catch TB more easily.

1. Have you ever been diagnosed with a serious illness? (If yes, specify)
2. Do you have any chronic illnesses? (If yes, specify)
3. Are you infected with HIV?
4. Are you infected with Hepatitis C?
5. Have you ever been told you have a sexually transmitted infection?
6. Are you on any medications other than for TB? (If yes, specify)
7. Before this TB sickness, did you ever have a positive skin test? (If yes, when)
8. Have you ever had TB before? (If yes, when)

Onset of Symptoms

Interviewer: Now I would like to ask you some questions about your TB illness and when you first got sick.

1. Thinking back, when did you first begin to feel ill? (If patient cannot remember, prompt with specific times of year – seasons, holidays, special occasions)
2. Can you remember when you first began to cough?

[7] Gardy, J.L., Johnston, J.C., Sui, S.J.H., Cook, V.J., Shah, L., Brodkin, E. … Tang, P. (2011). Whole-genome sequencing and social-network analysis of a tuberculosis outbreak. *New England Journal of Medicine, 364*(8), 730-739.

3. At the time when you got sick, do you remember being around anyone who had a cough and who had lost a lot of weight?
4. If yes, can you tell us who those people were and when you had contact with them?
5. Have you ever known anyone who had TB? If yes, who?
6. Who have you been in contact with in the last year who had TB and when was the contact?
7. Do you know when they began to cough and lose weight?
8. Can you think of anyone who is sick now with cough and weight loss, either your friends, family or an acquaintance? If yes, who?
9. What is the nature of the contact you have had with them?

Drug and Alcohol History

Interviewer: I would like to ask you some questions about alcohol and drug use. The reason why we ask these questions is because using some kinds of drugs can make it easier for a person to get TB. Again, this information will be kept completely confidential and we are only asking about it to try and figure out how you got sick.

1. Do you smoke cigarettes?
2. If yes, what age did you start?
3. If yes, how much do you smoke a day?
4. In the past year have you taken any of the following drugs?
    a. Alcohol
    b. Marijuana (pot)
    c. Crack cocaine (rock)
    d. Smoked heroin (chased the dragon)
    e. Sniffed gasoline/other solvents
    f. Smoked crystal meth
    g. Injected any drugs (If so, which ones)

For each yes answer in 4 a through g, proceed to the following questions:

1. Have you used it in the past year? (Yes/No)
2. How often did you use it? (Less than once/week, 1^2 times/week, 3+ times/week, every day)
3. Daytime, nighttime or both?
4. Weekdays, weekends, or both?
5. Where do you do it?

Residence

Interviewer: I would like to ask you about the places you lived in during the year before you got sick. We are interested in this information because some kinds of housing, like places that are mouldy or that have little fresh air circulation can make it easier to get sick with TB.

1. Including your current residence, how many places have you lived in the past year?
2. Starting with the most recent, list as many as you can.

For each residence, proceed to the following questions:

1. What city/town?
2. What type of residence?
3. How many people lived there (including you)?
4. When did you live there (dates)?

5. How many rooms?
6. How many toilets?
7. Did it have heating?
8. Did it have hot water?
9. Did the windows open?
10. Did it have running water?
11. Were there problems with dampness and mold?
12. Was there a smoker in the house?

Travel

Interviewer: I am going list a number of cities and ask you if you visited any of them during the past year. We know that there have been other people with TB living in some of these cities.

1. Have you lived in or visited in the following places in the last year? If yes, when?

List cities and towns in the vicinity of the outbreak community, as well as larger centres within the province.

Places of Social Aggregation

Interviewer: Now I am going to ask you to try and name all the places where you hung out in the last year. We are interested in places you went to visit friends, places where you socialized, places where you ate or had coffee and places where you just hung out. These might be the homes of friends and acquaintances, restaurants, coffee shops, bars, lounges or even meeting places on the street.

For each named place, proceed to the following questions:

1. What city/town?
2. What time period?
3. What type of place is this?
4. How often did you hang out there? (Less than once/week, 1^2 times/week, 3+ times/week, every day)
5. How long did you stay there? (Less than 2 hours/week, 2^4 hours/week, 4+ hours/week, all day)
6. Did you ever spend the night there?
7. Daytime, nighttime or both?
8. Weekdays, weekends, or both?

Prompt the patient by asking specifically about bars, pubs, hotels, friends' places, family homes, crack houses, shooting galleries, the street, shelters and hostels, including places that have been specifically named by other patients.

Interviewer: Now let's talk some more about the places you have named. Let's start with home.

1. Name of establishment. (From above)
2. Who else hangs out there?
3. Do you drink alcohol with them?
4. Do you share drugs with them? (If yes, which drugs and how are they shared?)
5. Do people smoke in this place?
6. Where else do these people hang out a lot?

Social Networks

Interviewer: I would like to ask you about some of the people you are closest with, and by this I mean the friends, family and acquaintances you spent the most time with over the last year. Please remember that legally we cannot tell any of these people that you named them in this questionnaire and your name will never be given to any of them. We can only tell them that they may have been in contact with someone who has TB and to get tested.

1. Who are your closest family members (the ones you spend the most time with)?
2. Who are your closest friends or the people you hung out with the most in the last year?

Interviewer: Now I would like to ask you about how much time you spent with the people you have listed and where you visited with them.

1. Person/Relationship. (From above)
2. What time period?
3. Where do you hang out with this person?
4. How often did you hang out with them? (Less than once/week, 1^2 times/week, 3+ times/week, every day)
5. For how long did you hang out with them? (Less than 2 hours/week, 2^4 hours/week, 4+ hours/week, all day)
6. Did you ever spend the night with them?
7. Do you drink alcohol or share drugs with this person?

Interviewer: I want to thank you for helping us and for sharing your time and information with us. The information you have given will help us understand how you got TB and stop more people from getting sick. I want to remind you that your name does not appear on this questionnaire and none of the information you have given to us will ever be linked back to you.

Key Informant Interview and References

- Toronto Public Health
- First Nations Health Authority
- Interior Health Authority
- Thunder Bay District Public Health

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