

Responding to pandemics and other disease outbreaks in homeless populations: A review of the literature and content analysis

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Abstract

Considering the recent COVID-19 pandemic, we recognised a lack of synthesis amongst the available literature pertaining to the intersections of homelessness and pandemic response and planning. Therefore, the purpose of this review was to identify relevant peer-reviewed literature in this area to thematically produce evidence-based recommendations that would inform community planning and response amongst homeless populations. Although this review is inspired by the COVID-19 pandemic, our intention was to produce relevant recommendations to for all current and future outbreaks and pandemics more generally. Our search criteria focused on pandemics and rapid-spread illnesses such as contagious respiratory diseases with contact spread and with an emphasis on individuals experiencing homelessness. Content analysis methods were followed to extract and thematically synthesise key information amongst the 223 articles that matched our search criteria between the years of 1984 and 2020. Two reviewers were assigned to the screening process and used Covidence and undertook two rounds of discussion to identify and finalise themes for extraction. This review illustrates that the current breadth of academic literature on homeless populations has thus far focused on tuberculosis (TB) rather than diseases that are more recent and closely related to COVID-19—such as Severe Acute Respiratory Syndrome (SARS) or H1N1. Our thematic content analysis revealed six themes that offer tangible and scalable recommendations which include (1) education and outreach, (2) adapting structure of services, (3) screening and contract tracing, (4) transmission and prevention strategies, (5) shelter protocols and (6) treatment, adherence and vaccination. The breadth and depth of reviews such as these are dependent on the quantity and quality of the available literature. Therefore, the limited existing literature outside of tuberculosis specific to homelessness in this review illustrates a need for more academic research into the intersections of pandemics and homelessness—particularly for evaluations of response and planning. Nonetheless, this review offers timely considerations for pandemic response and

planning amongst homeless populations during the current COVID-19 pandemic and can facilitate future research in this area.

KEYWORDS

COVID-19, emergency planning, homelessness, literature review, outbreak, pandemic, public health

What is known about this topic

- The arrival of the COVID-19 pandemic requires an assessment of outbreak response and planning amongst vulnerable groups.
- Those experiencing homelessness do not fare well in terms of general health, providing them with compounded risks in the face of public health outbreaks.
- The transient characteristics of homelessness provide unique challenges for planning, implementing and communicating any pandemic associated public health response.

What this paper adds

- A synthesis of the available literature surrounding the intersections of homelessness and pandemic planning and response that include shelter protocols, preventative strategies, and education and outreach.
- A range of best practices for the vaccination, treatment and adherence amongst homeless populations.

- Recommendations for evaluation research into the implementation and success of the various homelessness outbreak responses, especially in relation to COVID-19.

1 | INTRODUCTION

At the time of writing this manuscript, there were over 60 million global cases of COVID-19 with almost one and a half million deaths (World Health Organization, 2020a). The World Health Organization (2020b) recommends that all member nations need to administer a thorough public health response to COVID-19 to control the spread and interpersonal transmission of the virus. Whilst various global measures have been essential to preventing COVID-19, they do not account for the unique susceptibilities of vulnerable groups. In addition to the development of general guidance and public health measures, the Inter-Agency Standing Committee (2020) suggests that '... extra care should be taken to assess their possible impact on the most vulnerable amongst populations to avoid disproportionate or discriminatory impacts' (p. 4). Homeless populations are categorised as vulnerable groups (Inter-Agency Standing Committee, 2020), and public health outbreaks create additional negative impacts and outcomes that are not addressed or easily solved by measures implemented for the general population (Tsai & Wilson, 2020). Furthermore, those experiencing homelessness are often neglected by public health policies and their health and societal inequalities become an 'invisible burden' for many developed countries (Banerjee & Bhattacharya, 2020).

Those experiencing homelessness do not fare well in terms of general health, providing them with the likelihood of compounded risks in the face of public health outbreaks. Research has shown that those under the age of 65 who are experiencing homelessness have a mortality rate 5–10 times higher for all causes in comparison to the overall population (Baggett et al., 2013). Those experiencing homelessness often live in low-capacity shelters or transient locations that likely have no access to hygienic resources which places them at increased risk of obtaining and spreading viruses in comparison to the general population (Leung et al., 2008; Tsai & Wilson, 2020). The previous SARS (Severe Acute Respiratory Syndrome) outbreak has already illustrated this in how homeless populations are more likely to contract, spread and succumb to viruses and provide challenges for detection and tracing (Leung et al., 2008). Leung et al. (2008) suggest that shelter overcrowding, poor ventilation and an accumulation of clients with predispositions to infection increase the risk factors for virus outbreaks. These concerns provide extraordinary considerations for developing and implementing pandemic and outbreak response planning and protocols.

1.1 | Rationale and objectives

The goal of this review was to identify the scope of literature at the intersection of homelessness and pandemic response and to synthesise available evidence in these areas to inform community planning and response. This is in line with the Inter-Agency Standing Committee (2020) recommendation to develop pandemic planning

that identifies and addresses the unique circumstances of vulnerable homeless populations. For the public health and homelessness sectors to formulate a pandemic response to the homelessness population, there needs to be accessible evidence to inform a reasonable emergency planning that can cover a variety of potential health threats. This outcome is accomplished by identifying and categorising disease responses and impacts specific to homeless populations through the examination of English language peer-reviewed publications. Conclusively, this review can set up a baseline to structure future research on the COVID-19 response and for subsequent efforts in emergency preparedness and planning updates in response to future pandemic crises.

2 | METHODS

2.1 | Protocol

This study followed a search protocol that was guided by the guidelines established by the PRISMA-ScR (Tricco et al., 2018) and the ECLIPSE model of search development (Wildridge & Bell, 2002). Several analyses were conducted on data charted from the finalised collection of articles to provide both a quantitative overview of relevant authorship information, as well as a content analysis to identify themes. Both aspects followed the approach of prior reviews conducted by Bradshaw and Graham (2007) and Shier et al. (2011).

2.2 | Search strategy

An extensive literature search took place on 18 June 2020 using seven electronic databases (refer to Table 1). The search strategy structure and database selection were advised by an experienced librarian and then further drafted and refined through team discussion.

Our focus was pandemics and rapid-spread illnesses such as contagious respiratory diseases, with contact spread [i.e. including tuberculosis (TB) but excluding human immunodeficiency virus (HIV)]. We did not seek out interventions for stable, endemic diseases, out of a desire to capture responses in face of increasing and/or

emerging transmission. Search terms reflected a focus on individuals experiencing homelessness within communities and did not intentionally seek out literature on those at risk of homelessness or other unsheltered groups (e.g. refugees). Terms related to prison populations were considered but were removed for being too far afield but likely merit separate analysis and discussion. Search terms were also guided by prior reviews on environmental health conditions and hygiene behaviours in homeless shelters (Moffa et al., 2019), the effectiveness of interventions to reduce homelessness (Munthe-Kaas et al., 2018), as well as a summary on respiratory infections with people experiencing homelessness (Wrezel, 2009). The resulting base search was as follows:

('coronavirus*' OR 'COVID' OR 'pandemic*' OR 'outbreak*' OR 'communicable disease*' OR 'wuhan virus' OR 'corona virus' OR 'H1N1' OR 'H3N2' OR 'H2N2' OR 'SARS' OR 'Severe acute respiratory syndrome' OR 'Zika' OR 'Ebola' OR 'MERS' OR 'Middle East respiratory syndrome' OR 'tuberculosis' OR 'TB' OR 'influenza' OR 'flu' OR 'pneumonia').

AND

('homeless*' OR 'unhoused' OR 'unsheltered' OR 'roofless*' OR 'houseless*' OR 'sleeping on the street*' OR 'living on the street*' OR 'sleeping rough' OR 'living rough' OR 'addiction treatment*' OR 'domestic violence shelter*' OR 'women's shelter*' OR 'abuse shelter*' OR 'night shelter*' OR 'no fixed abode' OR 'no fixed address' OR 'couch surf*' OR 'transition hous*' OR 'halfway hous*' OR 'supported hous*' OR 'emergency hous*' OR 'emergency shelter*' OR 'adequate housing' OR 'inadequate housing' OR 'street dwell*' OR 'improvised dwell*' OR 'shelter dwell*' OR 'street liv*' OR 'marginally housed' OR 'precarious housing' OR 'precariously housed' OR 'without a roof' OR 'without shelter' OR 'temporary accommodation' OR 'emergency accommodation' OR 'insecure accommodation' OR 'overcrowded accommodation' OR 'street person' OR 'street people' OR 'sleeping out*' OR 'rough sleep*').

The search parameters and limiters varied based on their availability within the searched databases. Our search terms applied to the abstract in each examined database. The timeframe of publication was defined as January 1984 to 2020. Language was limited to only include items in English. Limits of space precluded all genres from being analysed, and we therefore had peer review as an inclusion criterion. Therefore, conference papers, dissertations, manuscripts or additional grey literature were removed—and could be subject to a further analysis, beyond the scope of the present manuscript. See Supporting Information S1 for an example of a full search.

2.3 | Inclusion and eligibility criteria

The database searches identified a total of 1,959 articles. These items were uploaded into Covidence for screening. This study took a linear process of reviewing articles. Two reviewers attended to the review process, and an experienced librarian was consulted and involved throughout the review. Initial steps were taken to electronically deduplicate, resulting in 1,001 removals. Reviewers discussed the screening criteria and amended the screening and data extraction process before screening for this review. Inclusion and exclusion

TABLE 1 Databases searched

Databases	Provider
PubMed	National Library of Medicine
CINAHL Complete	EBSCO
Embase	Ovid
Social Work Abstracts	EBSCO
Sociology Collection	ProQuest
APA PsycInfo	EBSCO
Web of Science Core Collection—Emerging Sources Citation Index (ESCI)	Clarivate

criteria were developed iteratively as questions and conflicting decisions arose (see Table 2). The remaining 958 abstracts were reviewed in a linear process by two reviewers. In total, 684 items were excluded during screening for being out of scope. The remaining 274 articles were exported for synthesis and thematic coding following the screening process. During data extraction, an additional 50 items were removed, with 7 identified as additional duplicates and 43 deemed out of scope upon further discussion. A total of 223 articles were reviewed for the final trends and thematic summary presented below (for the full PRISMA flow diagram refer to Figure 1).

2.4 | Data charting process

Content analysis methods were followed to extract and synthesise key information (Markoff et al., 1975; Neuendorf, 2002; Weber, 1990). All data were charted in Microsoft Excel. One reviewer independently charted the data for quantitative analysis. The general data items recorded included the following: first author (last name, first initials), year of publication, first author institution, first author country of study and journal of publication. During the charting and screening process, notes were taken on trends and potential themes within abstracts. An initial set of themes was discussed and finalised by reviewers. A similar charting process was then used for thematic coding, with individual charting in Microsoft Excel and subsequent discussion with a second reviewer to establish consensus. Articles coded to a particular theme were then reviewed and summarised in terms of trends and notable details.

TABLE 2 Inclusion and exclusion criteria

Include if article:	Exclude if article:
- Identifies or supports a particular response to a potentially transmissible disease - Is related or potentially applicable to homeless settings or populations - Identifies a need/consideration applicable for homeless - Is related to services/interventions (incl. screening/protocols/programmes, but not tests/diagnostics for a specific disease) - Related to supporting vulnerable pop health (or secondary impacts, like mental health) - Additional diseases beyond search terms may fit (e.g. Hepatitis A)	- Does not identify or support any particular health response (exclude if only a vague need is posited) - Cannot be clearly applied to homeless settings (i.e. focus is addictions or mental health broadly) - Reviews drug or test efficacy only (and not a broader treatment or vaccination approach) - Is related to prevalence/risk only - Is specific to is HIV/AIDS (and sexually transmitted diseases broadly), Hepatitis C in most cases, mites/bugs, or gastrointestinal diseases

Abbreviation: HIV, human immunodeficiency virus.

3 | RESULTS

Abstract screening identified that the overwhelming majority were related to TB, with 137 of the 223 included items mentioning 'TB' in the title or abstract and 178 mentioning 'tuberculosis'. Only three mentioned 'H1N1' (subtype of Influenza A), four mentioned 'SARS' and 12 mentioned 'COVID'. Excluded items frequently identified disease prevalence within homeless populations without analysis of a particular response or were discussions of screening or treatment options specific to tuberculosis. Many included items evaluated a particular response or set of responses, with some lengthier case studies such as Leung et al.'s (2008) overview of lessons from SARS. Some included items were themselves reviews on more specific intersections within this literature. See Supporting Information S2 for a full list of retained items.

3.1 | Quantitative findings

Figure 2 shows a rise in 5-year aggregated rates of article publication between 1986 and 2020. We additionally explored the countries of origin of the first authors (see Figure 3). It identified that contributors to English-language research in this field are, unsurprisingly, typically based in English-dominant developed countries, producing articles at a respective rate that is roughly proportionate to overall national scientific and technical publication trends available up until 2018 (World Bank, 2020), though Australian first authors were

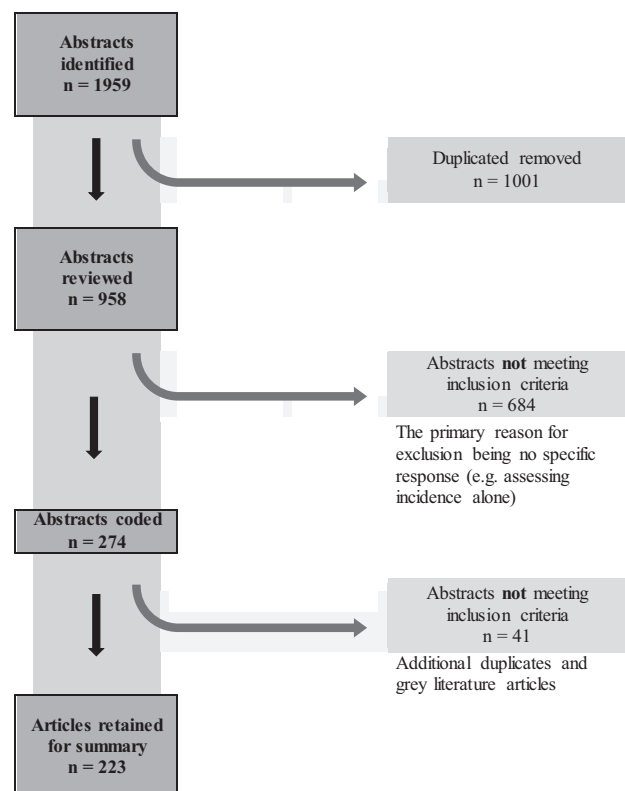


FIGURE 1 Flow chart of the abstract selection process

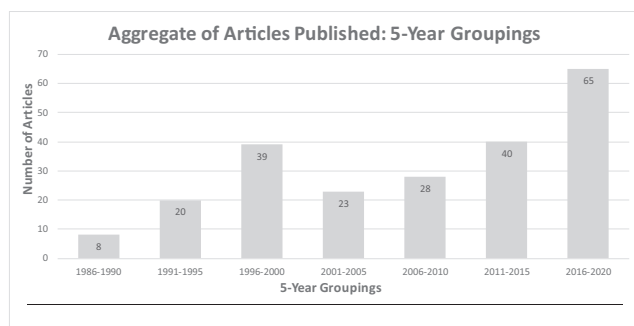


FIGURE 2 Aggregate of articles published: 5-year groupings

featured less than would be expected. However, first authors overall were based across a diverse mix of 28 nations.

Journals were ranked according to their SCImago Journal Rank (SJR) indicator to broadly understand the value of this topic amongst the research community. The SCImago Journal and Country Rank is a publicly available portal developed from the Scopus® database (Elsevier B.V.) (SCImago, n.d.). Results from the portal are drawn from over 34,100 titles, from more than 5,000 international publishers and country performance metrics from 239 countries worldwide (Leydesdorff et al., 2009). The SJR measurement allows for a more robust understanding of the impact of where the literature is being published in terms of rank and reach (Guerrero-Bote & Moya-Anegón, 2012). A total of 124 journals appeared in our final list of retained items, with 37 journals having two or more articles fitting the search criteria, as can be seen in Table 3.

Overall, articles were published in journals primarily related to the SJR category of 'Medicine' ($n = 64$), followed by 'Infectious Disease' ($n = 40$) and 'Public Health, Environmental and Occupational Health' ($n = 40$). As can be seen in Table 3 journals frequently publishing on this topic tend to be in the top quartile of their respective categories. There was no obvious trend in rankings over time.

3.2 | Qualitative findings

Six major themes were identified within the 223 retained items. Through summation, we sought to circulate relevant information that can inform planning for outbreak-style diseases, such as the ongoing COVID-19 crisis. Whilst many interventions were designed specifically for TB or other individual diseases, our focus was to present scalable and generalizable sectoral responses. Themes are presented within distinctive summarised categories, although all individual interventions are best conceived as intersectional and corresponding.

3.2.1 | Theme 1: Education and outreach

The Outreach and Education theme served to collect information about how previous efforts were successful in reaching and

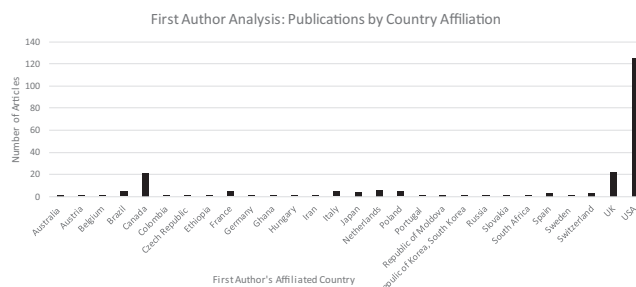


FIGURE 3 First author analysis: affiliated country

educating individuals in the homeless sector about COVID-19 and relay pertinent information about procedures and safety with previous success (Falchook et al., 2000). Articles recommended electronic (e.g. notification systems and emergency numbers), hard copy (e.g. pamphlets, leaflets and letters; Roy et al., 2008) and media (Kitazawa, 1995; Ohtsu et al., 2011) methods of delivering information or a mixture of methods (Filler et al., 2006). With the help of social outreach, another viable method of delivering information was through word of mouth from service providers to clients who are homeless (Craig et al., 2007, 2014). It may also be worthwhile to provide information via newspapers or magazines as these are prominent avenues by which information is accessed by individuals who are homeless (Ohtsu et al., 2011).

Urban TB control may benefit from 'a coordinated programme of education and training to raise and sustain awareness amongst affected risk groups and communities, front-line professionals working with high-risk groups and health and social care professionals' (van Hest et al., 2014, p. 4) that involves the impacted community in the design and delivery (Joint Tuberculosis Committee of the British Thoracic Society, 2000; van Hest et al., 2014). Education programs can be supported by community health workers (Heuvelings, de Vries, Greve, et al., 2017) or by a peer educator with homelessness experience (Croft et al., 2013). There are suggestions for information to be delivered in a simple, clear and targeted fashion (Roy et al., 2008) and for public health agencies to provide explicit guidelines for service providers to follow (Leung et al., 2008; Mayo et al., 1996). Furthermore, there were recommendations for information and programs to be delivered in a variety of languages to decrease stigma and improve access to services (Hernández Sarmiento et al., 2013; Murti et al., 2015).

At the provider level, detection and management of diagnosed cases of disease can be improved by providing staff with adequate knowledge and education about what to do and who to contact if a case has been diagnosed or suspected (Joint Tuberculosis Committee of the British Thoracic Society, 2000; Leung et al., 2008). Education programs informing case management and care protocols are recommended for front-line professional working with the homeless sectors and related health and social care professionals (Cousineau, 1997; Hutchison & Quartaro, 1993; Uchimura et al., 2013; van Hest et al., 2014). Specifically, programs should educate providers on

TABLE 3 Journals with multiple included items, with associated SJR ranks

Journals with multiple included items ^a	No. of Incl'd Items	Avg SJR indicator ^b	SJR quartile range (Avg) ^c
American Journal of Infection Control	4	1.223	1.375
American Journal of Preventive Medicine	2	1.541	1.250
American Journal of Public Health	4	2.363	1.000
American Journal of Respiratory and Critical Care Medicine	7	3.204	1.000
<i>Formerly: American Review of Respiratory Diseases</i>	2		
Archives of Internal Medicine	4	3.539	1.000
Australian and New Zealand Journal of Public Health	2	/	/
BMC Infectious Diseases	2	1.574	1.000
BMC Public Health	2	1.319	1.000
British Medical Journal Open	3	1.390	1.000
Canadian Journal of Public Health	4	0.537	2.000
CHEST	3	0.621	1.000
Clinical Infectious Diseases	2	4.396	1.000
Clinical Social Work and Health Intervention	3	/	/
Emergent Infectious Diseases	4	2.798	1.000
Epidemiology and Infection	2	1.349	1.500
European Journal of Public Health	2	1.078	1.000
International Journal of Infectious Diseases	2	1.354	1.333
International Journal of Tuberculosis and Lung Disease	23	1.314	1.076
Journal of the American Medical Association	3	5.290	1.000
Journal of Addiction Medicine	2	/	/
Journal of Advanced Nursing	2	0.959	1.000
Journal of Community Health Nursing	3	0.334	2.500
Journal of Health Care for the Poor and Underserved	5	0.578	1.750
Journal of Public Health	2	0.905	1.500
Journal of Public Health Management and Practice	2	0.714	1.000
Journal of Urban Health	3	1.175	1.000
Lancet Infectious Diseases	2	9.963	1.000
Morbidity and Mortality Weekly Report (MMWR—CDC)	6	4.996	1.000
MMWR—Recommendations and Reports (CDC)	2	9.861	1.000
New England Journal of Medicine	3	11.976	1.000
PLoS One	7	1.643	1.000
Pneumonologia i Alergologia Polska	2	/	/
Public Health Action	2	0.743	2.000
Public Health Nursing	5	0.462	1.500
Public Health Reports	5	1.120	1.000
Seminars in Respiratory Infections	3	/	/
Thorax	2	1.010	1.000
AVERAGE		1.778	1.378

Abbreviation: SJR, SCImago Journal Rank.

^aJournals with only one included article have been omitted.; ^bFor available years with included items (SJR scores can vary over time); ^cFor available years with included items (ranks can vary over time and differ across associated categories).

how to encourage treatment and immunisation and how to improve patient-provider alliances (Kong et al., 2020; Metcalfe & Sexton, 2014; Moreau et al., 2012; Peterson Tulskey et al., 1999; Tankimovich, 2013; Vlahov et al., 2007).

3.2.2 | Theme 2: Adapting structure of services

Some articles advanced recommendations on shifting the ingrained structures at different levels of societal constructs to facilitate

collaboration between institutions, organisations, government and service providers. Literature indicates that communication and collaboration between common goal-oriented organisations resulted in improved service delivery, access for individuals in the homeless sector (de Queiroga et al., 2018; Brickner et al., 1986; O'Connell, 1991) and that 'planning for future outbreaks should take into account the need to develop systems that enable rapid two-way communication between public health officials and homeless service providers' (Leung et al., 2008, p. 402). An investigation by Dohoo et al. (2020) in one shelter demonstrated the need for a comprehensive, integrated electronic information system. Lashley (2007) discussed the expansion of clinic hours to include evenings and weekends but also touched on a partnership between faith, academic, and governmental institutions: 'in an environment of scarce resources, such creative and innovative partnerships can improve access to care, remove barriers to treatment, meet the needs of underserved populations and have a positive impact on promoting community health and well-being' (p. 38).

Existing infrastructure and systems can be modified to improve continuity of care for homeless individuals, from toll-free numbers for outreach workers to report and triage people in need (Barbieri, 2020). Barbieri also advocates for an 'agile referral system' and a 'safe transportation system (i.e. equipped vehicle, trained staff with personal protective equipment)' (p. 296). Harris et al. (2020) and Samuels et al. (2020) both noted a transition of many substance use disorder treatment programs to telemedicine. A frequently raised alternative (or supplement) was mobile services, typically in reference to mobile x-rays for TB detections, and also mobile health units (Lau & Ferson, 1997; Silva et al., 2018). Badiaga et al. (2008) further posit that 'street- or shelter-based interventions for targeted populations are the most efficient methods' (p. 1353), offering specific options that are further discussed in Theme 5: Shelter Protocols.

3.2.3 | Theme 3: Screening and contact tracing

Numerous articles identified successful practices in screening and contact tracing for individuals in the homelessness sector, which often adapted to the needs and challenges of a transient and hard to reach population (Janssens et al., 2017; Kong et al., 2002; Li et al., 2003; Macnee et al., 1996; Schieffelin & Snider, 1988; Southern et al., 1999; Tobolowsky et al., 2020). Unfortunately, those who are most likely to test positive for a disease are those who are least likely to be screened (Hamilton et al., 2018), and screening questionnaires may not be useful for this population (Forman & Kinney, 2003). Symptom screening through a verbal questionnaire has not shown to be promising in the homelessness sector; rather, active screening methods (Barbieri, 2020) such as temperature and other objective measures of screening may be recommended (Baggett et al., 2020; Forman & Kinney, 2003). Baggett et al. (2020) and Kong et al. (2002) recommend screening for all members of shelters and homelessness service organisations for outbreaks where expedited testing and results are encouraged. Offering incentives for screening is also encouraged (Heuvelings, de Vries, Greve,

et al., 2017; Heuvelings, de Vries, Grobusch, 2017; Schluger et al., 1995; Southern et al., 1999; Tankimovich, 2013) whilst cooperation between service providers such as street teams and drugs and outreach services improves screening uptake (Alecim et al., 2016; Badiaga et al., 2008; Heuvelings, de Vries, Greve, et al., 2017). However, an important consideration of screening procedure is confidentiality of the results. One study of TB testing indicated that young women with children did not want to be seen accessing services out of fear that it could impact their custody (Swigart & Kolb, 2004). It has further been outlined that geographically-informed mobile screening units (Janssens et al., 2017) and screening of homeless individuals presenting to emergency rooms and primary care (Bothamley et al., 2002) may be functional avenues by which to access this hard to reach population (Asch et al., 1998; Goswami et al., 2012; Potter et al., 2016). Similar adaptation may be considered for contact tracing, specifically contact tracing in small group in which many typically reside (Althomsons et al., 2012). Furthermore, contact tracing in the homeless sector may be better served focusing on the locations of the homeless individual, rather than specific names of contacts (Barnes et al., 1997; Li et al., 2003).

3.2.4 | Theme 4: Transmission prevention strategies

Transmission can be a result of both environmental and behavioural factors and includes the occupational exposure of staff (Schieffelin & Snider, 1988; Wurtz et al., 1996), due to its congregate nature (Munn et al., 2015). Bodkin et al. (2020) note the necessity during COVID-19 for shelter restructuring to allow physical distancing, testing and isolation—items further discussed in Theme 5. Prevention of spread may also be benefitted through directly observed treatment, the use of masks, hygienic bedding (Badiaga et al., 2008; Moffa et al., 2019), improved ventilation in crowded spaces and engineering control strategies for airborne infectious diseases (Babatsikou & Zavitsanou, 2009; Barbieri, 2020; Brickner & McAdam, 1995; Doshani et al., 2019; Nardell, 1989).

Engineering strategies include the use of ultraviolet light germicidal irradiation and ultraviolet light germicidal irradiation of upper room air, filters and consideration of factors including aerosol generation, particle size and concentration, organism viability, infectivity and virulence, airflow and climate (Azevedo et al., 2015; Centers for Disease Control, 1992; Coffey et al., 2009; Cole & Cook, 1998; McMillan Jackson, 1996; Moffa et al., 2019; Moreau et al., 2012; Nardell, 1989; Schieffelin & Snider, 1988). The mobility of the homeless populations creates conditions that are conducive to the spread of TB and all other easily communicable diseases, related to both the dynamic and changing nature of contacts as well as one's control over contact (Ali, 2010).

Existing health disparities may also be linked to risk, and collaboration between health services and shelter is encouraged (Schieffelin & Snider, 1988). Accordingly, both Amiri et al. (2018) and Torres (1990) advocate for special programs to improve the healthy behaviour of the homeless population, such as where Uchimura et al. (2013) observed that programs to

enhance health and nutrition status may benefit TB prevention amongst the elderly. However, another identified factor was personal responsibility, with Rayner (2000) noting that 'healthcare professionals are becoming more prescriptive in their approach which is relinquishing the homeless population from taking responsibility for their own health care' (p. 871). The need for 'prompt and adequate treatment' is balanced with a need for adherence when it comes to issues of drug resistance (Carnie et al., 1998)—both aspects are discussed in Theme 6: Treatment, adherence and vaccination.

3.2.5 | Theme 5: Shelter protocols

The included items relayed pertinent, detailed recommendations for maintaining health and safety in shelters related to both patrons and staff. The main tangible recommendations relevant to shelters included topics such as service provision, environment, education, staff and planning (Please refer to Supporting Information S3). Bodkin et al. (2020) offer a case review of the actions taken in Hamilton, Canada, where collaboration actually increased the number of beds during COVID-19 (i.e. across pre-existing shelters, an additional temporary shelter and three hotel sites), as well as using existing space for short-term isolation during testing and testing on-site for everyone who failed the symptom screener. Shelters should have plans in place for staff surveillance (Di Renzi et al., 2012), staff shortages (Leung et al., 2008), screening and preventive therapy for eligible persons (Curtis, 2016).

Hwang et al. (2008) advocate that policies be implemented following an outbreak to 'strongly encourage' individuals to remain at their current shelter until the situation has been managed. Further recommendations are for public health agencies to work with shelters to ensure that clients' attendance records contain the necessary information to facilitate contact tracing during public health investigations (Munn et al., 2015). Badiaga et al. (2008) advocate for a variety of street or shelter based interventions, including, as needed and relevant, 'education, free condom distribution, syringe and needle prescription programs, chest radiography screening for tuberculosis, directly observed therapy for tuberculosis treatment, improvement of personal clothing and bedding hygiene and widespread use of ivermectin for scabies and body louse infestation' (p. 1353). Moreover, the authors support an inclusion of a holistic vaccination program and encourage systematic vaccination against hepatitis B virus, hepatitis A virus, influenza, streptococcus pneumoniae and diphtheria (Badiaga et al., 2008). However, such efforts must be mindful of health-seeking behaviors and the possibility of minimal engagement amongst target populations (see Connors et al., 2017 for one example and associated recommendations).

3.2.6 | Theme 6: Treatment, adherence, and vaccination

A key goal of this review was to highlight protocols to inform best practices surrounding access to treatment, treatment itself and adherence

to treatment of pandemic-related diseases. Often, individuals who are homeless will wait till the disease is in advanced stages prior to seeking treatment (Moreau et al., 2012). Incentives are understood to be beneficial for treatment (Ciobanu et al., 2014; Nyamathi et al., 2008) and management (i.e. screening and follow up appointments) of pandemic-related disease in the homeless population, which could include monetary (Heuvelings, de Vries, Greve, et al., 2017; Hwang et al., 2005) and simple low-cost incentives or compensation such as food, lodging (Kim et al., 2019; Lo Bue et al., 1999; Tulsy et al., 2000) and care (Diez et al., 1996; Gärden et al., 2013; Kim et al., 2019; Pilote et al., 1996; Riquelme-Miralles et al., 2019; Tankimovich, 2013; Tulsy et al., 2004). Directly observed treatment short-course (DOTS) could be a useful program that has been successfully implemented in the homeless sectors, particularly noncompliant individuals (Barclay et al., 1995; Gasner et al., 1999; Gupta et al., 2015; Kawatsu et al., 2013; Onwubiko et al., 2019). Rendleman's (1999) study examined a community program requiring users of public facilities to carry cards certifying their compliance with a tuberculosis program, resulting in a large reduction in both TB as well as in cost.

The competing demands in the day to day life of a homeless individual can be exacerbated by additional issues concerning money, immigration and the law and substance use (Onwubiko et al., 2019; Potter et al., 2016). Mandated treatment in past pandemic-related illness has only been possible when the individual is actively infectious and will repeatedly not abide by social policy, health care directives or authority (Miller et al., 2006; Rendleman, 1999). Evidently, the denial of personal freedom is not to be taken lightly (Joint Tuberculosis Committee of the British Thoracic Society, 2000), and mandated treatment should only be enforced if it is absolutely necessary (Lerner, 1996).

A collaborative, multi-agency approach (Buechler et al., 2020), including authorities and public health officials, community partners (Doroshenko et al., 2012) and peer mentors (Heuvelings et al., 2018; Pilote et al., 1996), could facilitate treatment uptake and adherence and enhance the crucial continuity of care (de Vries et al., 2017; Heuvelings, de Vries, Greve, et al., 2017; Joint Tuberculosis Committee of the British Thoracic Society, 2000; Potter et al., 2016). Brainard et al. (1997) comment that 'raising therapy completion rates to acceptable levels may require additional social services ... and enforceable legal remedies for noncompliance' (p. 381). Recent literature has highlighted the success and need for a shift to a holistic model which takes into consideration not only the imminent threat of the diagnosed pandemic-related disease but also of comorbid factors such as substance misuse (Brudney & Dobkin, 1992; Lesnic et al., 2016), mental health (Lau & Ferson, 1997) or HIV (Auer et al., 2020; Berg et al., 2005; Craig et al., 2007; Herdics et al., 2017; Hirsch-Moverman et al., 2010). This may promote compliance and can serve to decrease the risk of transmission or reinfection and improve treatment outcomes overall. Tankimovich (2013) further comments on targeting cultural values for homeless and immigrant populations.

There are some recommendations for the successful administration of vaccination to homeless populations. First, and

foremost, vaccinations should be free of charge, as this has been noted as one of the biggest barriers to uptake in the homeless sector and facilitated by improved access to care (Rendleman, 1999), drop-in clinics in shelters (Buccieri & Gaetz, 2013; Kaplan-Weisman et al., 2018) and good case management (Haddad et al., 2005). It is important to note that some individuals may be resistant to vaccination (Nwana et al., 2019); thus, incentives and education program for both service providers and patrons are encouraged to facilitate alliance (Kaplan-Weisman et al., 2018; Kawatsu et al., 2013). Vaccination strategies such as 'blitzing' or offering a large cohort of homeless individuals the vaccination have been successful in decreasing diseases incidence such as influenza (Weatherill et al., 2004). Systematic vaccination against hepatitis B, hepatitis A, influenza, pneumococcus and diphtheria is strongly recommended for homeless individuals who are receiving outbreak related vaccinations (Badiaga et al., 2008). The Advisory Committee on Immunisation Practices Hepatitis Vaccines Work Group likewise recommends routine immunisation for all persons experiencing homelessness aged 1 year and older (Doshani et al., 2019). Partnerships to administer vaccinations have shown to be successful, such as in Metcalfe and Sexton's (2014) study of a social marketing education program developed by nursing students, and Lashley (2007) on a joint program between faith-based organisation, an academic institution and local government. The latter, however, highlighted the importance of sharing proper documentation and records to accurately track health progress.

4 | DISCUSSION

This review illustrates that the current breadth of academic literature on homeless populations has thus far focused on TB rather than diseases that are more recent and closely related to COVID-19—such as SARS or H1N1. However, the similarities within the mode of transmission from TB and susceptibility of outbreak amongst homelessness populations make it a viable health crisis to learn from. As the World Health Organization (2020c) explains, 'people ill with COVID-19 and TB show similar symptoms such as cough, fever and difficulty breathing. Both diseases attack primarily the lungs and although both biological agents transmit mainly via close contact' (p. 2). Certainly, as further publications on COVID-19 pandemic response become available, future reviews of this nature may shift or find further support for the themes addressed here. Additionally, whilst many of the articles reviewed here outline possible routes for pandemic response amongst homeless populations, we only uncovered a few that formally evaluated the implementation and success of such practices (e.g. Leung et al., 2008). In which case, this review provides further guidance in relation to the existing broad suggestions from global agencies such as the World Health Organization (2020b) or the Inter-Agency Standing Committee (2020), although further research would be required to evaluate best practices and planning.

4.1 | Outbreak and pandemic response and planning

The Inter-Agency Standing Committee (2020) suggests that special attention needs to be paid for communicating pandemic guidelines and response to vulnerable populations and that clear and continued two-way communication is key. The Inter-Agency Standing Committee (IASC) nonetheless provides this recommendation without any particular strategies to accomplish this task amongst homeless populations. This review supports the IASC's suggestion for communication and begins to expand on it by offering some tangible routes to accomplish this. Authors have identified that there is a need to extend outreach to identify, educate and communicate with hard-to-reach groups (Craig et al., 2014; Vlahov et al., 2007), which can possibly be accomplished through community posters and public announcement at homeless shelters (Filler et al., 2006), small educational groups using a combination of video and written learning tools (Kitazawa, 1995) and the creation of simple language leaflets (Samuels et al., 2020). However, to establish the best routes of communication amongst various communities, there needs to be some knowledge of, and collaboration with, the local homeless populations. In principle, all communication should consider cultural, language and literacy issues (van Hest et al., 2014) and should be directed in a clear and targeted manner (Roy et al., 2008).

Outbreak planning and response cannot ignore issues with comorbidity amongst the homeless. There were quite a few articles that discussed the issue of comorbidities during an outbreak and often included HIV or diabetes intersections with tuberculosis. Whilst articles that had a primary focus on HIV outbreaks were excluded from this review, we found that several articles concerned with tuberculosis also discussed HIV (Amiri et al., 2018; Azevedo et al., 2015; Bernardo, 1991; Tulskey et al., 2000). For example, both Tulskey et al. (2000) and Bernardo (1991) discuss HIV and tuberculosis in relation to comorbidity and found that comorbidity is much higher for those experiencing homelessness in comparison to the general population. It is not unusual for homeless individuals to maintain an underlying myriad of illnesses, which could leave them more susceptible to virus obtainment, transmission and mortality (Leung et al., 2008). This only further supports the recommendation from Tulskey et al. (2000) that homeless populations should be screened for comorbidities when treated concurrently. Additionally, because people experiencing homelessness are at increased risk of infection, there needs to adequate plans for tracing, prevention and intervention that are specific for these populations.

Prevention, intervention and tracing becomes difficult for transient groups, as there is no easy route to contact them and their lack of permanent housing creates barriers for public health strategies that would more readily apply to the general population. Therefore, pandemic planning considerations for such groups need to include flexible methods for screening, communication and intervention. Harris et al. (2020) identify telemedicine as a valuable route to providing health and addiction services to homeless groups during a pandemic; Badiaga et al. (2008) suggest that interventions and services should be street or shelter based, whilst Brickner et al. (1986)

showed support for the use of healthcare outreach teams made up of physicians and nurses that provide on-site services. These forms on site healthcare have the potential to address other health issues and comorbidities, especially in relation to mental health and addictions as found by Harris et al. (2020). Our position supports Lashley (2007), in that successful pandemic planning and services will require great collaboration amongst healthcare workers, government and service agencies.

The World Health Organization (2003) early on pointed to the difficulty with treatment adherence generally, although especially amongst those experiencing homelessness. This problem is still appropriate since a current lack of understanding for successful treatment delivery and adherence strategies amongst homeless populations still exists (Johnson et al., 2020). The suggestions for adherence outlined in this review further contribute to mitigating the current lack of understanding in this area, particularly the support for the use of monetary or housing incentives to encourage and improve public health program adherence (Pilote et al., 1996; Tulskey et al., 2000) and the offering of peer health advisors, which showed promise in supporting treatment obedience within homelessness groups (Pilote et al., 1996).

Whilst policy considerations were not the express focus of this review, they did come up and represent a key enabling and/or inhibiting factor at regional (Bartels et al., 2020; Harris et al., 1994; Mayo et al., 1996), national (Bloch et al., 1996; Gupta et al., 2015; Miller et al., 2006; Ohkado et al., 2005) and international (Campbell et al., 2019; Corburn et al., 2020; Rimawi et al., 2014) levels. A policy shift allowing the integration of drug, alcohol and HIV services within existing homelessness services may address complex and the co-morbid needs that can impact treatment (Craig & Zumla, 2015). Furthermore, housing and relevant support services may not only impact therapy completion rates but may also reduce hospital utilisation (Marks et al., 2000). Overall, Alberti et al. (2020) argue for a health equity framework to pandemic preparedness, grounded in meaningful community engagement that, whilst recognising the fundamental causes of social and health inequity, has a clear focus on upstream and midstream preparedness and downstream rapid response efforts that put social and health equity at the forefront (p. 4).

4.2 | Brief considerations for COVID-19

Whilst the goal of this study was to focus on uncovering useful practices and guidance for pandemics and outbreaks, in general, this review does contain relevant considerations for COVID-19. Canadian governments at all levels have been using hotels as temporary emergency shelters for people experiencing homelessness, which has seen some great success (Lupton, 2020). Not only could other national government implement similar practices, but we would also stress that this continues to be offered until the pandemic is settled. As vaccines become available, continual monitoring, testing and vaccination of homeless groups will become difficult if

they face housing instability and associated increases in transience. Furthermore, housing has shown to be an effective incentive for health program and vaccination adherence (Pilote et al., 1996; Tulskey et al., 2000), and as such, continuous offering of temporary hotel housing likely offers increased success for tracing, vaccination and public health adherence.

The continued use of hotels would also free up much needed space for shelters to adapt to public health guidelines set out by the World Health Organization (2020b), such as creating space for safe social distancing and the isolation of positive or suspected cases. More specifically to shelter space, engineered controls also need to be considered. Shelters are often crowded spaces with poor ventilation, with residents that often hold poor hygienic practices. Therefore, COVID-19 planning should include provisions for the unique characteristics of shelters and its users. Some methods identified within this review include the installation of adequate ventilation and ultraviolet light (Moffa et al., 2019), providing clean cloths, hygienic bedding (Badiaga et al., 2009) and masks (Brickner & McAdam, 1995). Public health planning and pandemic response need to consider the barriers to implantation amongst shelters and the homeless population. Furthermore, as many of these changes and considerations are costly, there needs to be consistent and accessible funding available to those who need it.

This review presents a need for future studies to evaluate the implementation and success of current pandemic response practices in relation to people experiencing homelessness. As governments and organisations plan for the current and future pandemics, they will need social scientists to engage in these facets to provide evidence-based policy and best practices. The scope of the current literature offers plenty of methods for pandemic response and planning, although there are insufficient evaluative and assessment studies that identify the effectiveness of such suggestions. Therefore, research to address this gap is both paramount and opportune considering the future developments and policies to come.

4.3 | Limitations and delimitations

This review was designed to provide a snapshot of academic literature pertaining to the intersections of people experiencing homelessness and pandemic response and planning. This was accomplished through the use of terms specific to homelessness, pandemics and rapid-spread illnesses such as contagious respiratory diseases with contact spread. Abstract-based reviews carry potential limitations in their capacity to fully capture concepts as well as the capacity to synthesise knowledge into a cohesive and usable format. The inclusion of other terms may alter the identified literature and reshape implications for practice and research (i.e. policy, intervention, HIV/AIDS and vulnerable groups). There is also the possibility that expanding the search fields to include titles, keywords and/or full text would provide additional context, but we believe the abstract-level search was enough to identify our high-level themes. Additionally, an inclusion of other forms of literature (e.g., government documents

and NGO reports) would provide supporting information pertaining to the discussions offered in this review. In terms of methodology, we also realise that qualitative thematic analysis is subjective, which leaves room for bias, missed areas of importance or differences of interpretation. Lastly, a broader—or narrower—range of databases may be considered for future systematic reviews, depending on the scope and intent. Furthermore, since our search was initiated in June 2020, additional articles related to COVID-19 will continue to be produced and may offer additional support or new avenues for pandemic response as it relates to the homelessness response literature outlined in this review. This may warrant a review of its own, particularly on the current, and largest, vaccination campaign in history. We invite researchers to replicate or advance the findings presented in this review.

5 | CONCLUSION

Generally, past outbreaks and the current COVID-19 pandemic illustrate the various public health response challenges—especially amongst vulnerable groups. Whilst this review engages with the Inter-Agency Standing Committee (2020) recommendation to develop pandemic planning that identifies and addresses the unique circumstances of vulnerable homeless populations, the breadth and depth of reviews such as this are dependent on the quantity and quality of the available literature. Therefore, the limited existing literature specific to homelessness in this review illustrates a need for more academic research into the intersections of pandemics and homelessness—specifically a call to social scientists to conduct studies that evaluate pandemic response and planning. Nonetheless, this review offers timely considerations for pandemic response and planning amongst homeless populations during the current COVID-19 pandemic and can facilitate future research in this area. Furthermore, as COVID-19 vaccinations become available, the included discussions of treatment delivery and adherence will become more relevant.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analysed in this study. For further data inquiry, please contact the corresponding author.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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