

**ONTARIO
SUPERIOR COURT OF JUSTICE**

B E T W E E N:

MICHAEL NANOS and JOSEPH MICALLEF

Plaintiffs/Moving Parties

and

THE CORPORATION OF CITY OF CAMBRIDGE

Defendant/Responding Party

MOTION RECORD – VOLUME I

**WATERLOO REGION COMMUNITY
LEGAL SERVICES**

450 Frederick Street, Unit 101
Kitchener, ON N2H 2P5

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Lawyers for the Plaintiffs

**TO: The Corporation of the City of
Cambridge**

Cambridge City Hall

50 Dickson Street

P.O. Box 669

Cambridge, Ontario N1R 8S1

Fax: 519-740-4637

Danielle Monton, City Clerk

Email: mantond@cambridge.ca

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TAB 1

Court File No. CV-24-00000526-0000

**ONTARIO
SUPERIOR COURT OF JUSTICE**

B E T W E E N:

MICHAEL NANOS and JOSEPH MICALLEF

Plaintiffs/Moving Parties

and

THE CORPORATION OF CITY OF CAMBRIDGE

Defendant/Responding Party

NOTICE OF MOTION

The Plaintiffs, Michael Nanos and Joseph Micallef, will make a Motion to a Judge on **March xx, 2024 at xx:00pm** or as soon after that time as the Motion can be heard.

PROPOSED METHOD OF HEARING: The Motion is to be heard (*choose appropriate option*)

In writing under subrule 37.12.1(1) because it is
[insert on consent, unopposed or made without notice];

In writing as an opposed motion under subrule 37.12.1(4);

In person;

By telephone conference;

By video conference.

at the following location

Waterloo Region Courthouse, 85 Frederick Street, Kitchener, ON N2H 0A7

THE MOTION IS FOR *(State here the precise relief sought)*

- (a) An ex parte interlocutory Order or interim injunction restraining the Defendant, its servants, employees, agents, assigns, officers, directors and anyone else acting on its behalf from:
 - (i) directly or indirectly evicting the Plaintiffs' from the Branchton Encampment;
 - (ii) preventing the Plaintiffs' entry to or use of the Branchton Encampment site;
 - (iii) disposing of or removing any personal belongings, real or personal property belonging to the Plaintiffs and located at the Branchton Encampment; and
 - (iv) engaging in any harassing behaviour towards the Plaintiffs;
- (b) An Order regarding the procedural aspects of this Motion, including, but not limited to, waiving or dispensing with the time for delivery of the Notice of Motion and Motion Record, or waiving, shortening, validating or dispensing with the service of the Statement of Claim herein, the Notice of Motion and Motion Record on any party, and directions with regard to the procedural aspects of this Motion, including, but not limited to, a timetable, delivery of

responding materials, scheduling of cross examinations, a hearing in person or by video attendance or trial of the issues as counsel may advise and this Honourable Court permit;

- (c) An Order abridging the time for service and filing of this motion, further supporting affidavit(s) and factum, if necessary;
- (d) An Order approving service of the Statement of Claim, Notice of Motion, and Motion Record by use of the following email address:
mantond@cambridge.ca
- (e) An Order granting leave to bring this motion, if necessary;
- (f) Costs of this motion on a substantial indemnity basis; and
- (g) Such further and other relief as to this Honourable Court may seem just.

THE GROUNDS FOR THE MOTION ARE *(Specify the grounds to be argued, including a reference to any statutory provision or rule to be relied on)*

- (a) The Plaintiffs are two homeless individuals who are living in a small encampment in the Branchton area of the City of Cambridge near the intersection of Branchton Road and Dundas Street South behind the Petro-Can station (the “Branchton Encampment”).

- (b) City By-law Officers acting on behalf of the Defendant have posted a notice on the tents belonging to the Plaintiffs indicating that they will be evicted on Thursday, March 28, 2024.
- (c) City of Cambridge By-law Officers have already disposed of items belonging to the Plaintiffs and will dispose of any property belonging to the Plaintiffs that the Plaintiffs cannot carry with them when evicted.
- (d) The Plaintiffs seek declarations in the action that;
 - (i) the proposed evictions breach their Charter rights specifically sections 7, 8 and 12;
 - (ii) the provisions of the Defendants' By-law No. 162-10 authorizing the proposed eviction and/or the provisions of the *Trespass to Property Act*, R.S.O. 1990, c. T.21 be declared inoperative pursuant to section 52 of the Constitution Act insofar as they are relied upon as lawful authority to evict the Plaintiffs from the encampment located at in the Branchton Encampment;
 - (iii) the Defendant has taken the Plaintiffs' personal property without;
 - (1) the consent of the Plaintiffs;
 - (2) lawful authority for doing so; and
 - (3) compensating the Plaintiff's for their lost property;

all of which constitutes the tort of conversion and trespass to chattels and is a breach of the section 8 Charter rights of the Plaintiffs;

- (e) The Plaintiffs state that the test for an interim injunction is met:
 - (i) there is a serious issue to be tried;
 - (ii) the Plaintiffs will suffer irreparable harm if the injunction is not granted; and
 - (iii) the balance of convenience favours the Plaintiffs (*RJR-MacDonald Inc. v. Canada (AG)*, [1994 1 S.C.R. 311 at 334]).
- (f) The serious issue to be tried is the constitutional challenge to By-law 162-10, and the *Trespass to Property Act* insofar as they are relied upon as legal authority for the eviction (*The Regional Municipality of Waterloo v. Persons Unknown and to be Ascertained*, 2023 ONSC 670).
- (g) The Plaintiffs will suffer irreparable harm, including but not limited to psychological and physical effects of displacement as well as a loss of property including essential survival items, if evicted from the Branchton Encampment. The Plaintiffs have no where to go if evicted and will suffer from adverse effects on their physical and mental health if forced to be unsheltered. These harms cannot be adequately remedied through an award of damages or the eventual disposition of the case.

- (h) The balance of convenience favours granting the injunction because the Plaintiffs will suffer greater harm if the injunction is refused than the City will if the injunction is granted.
- (i) The Plaintiffs are not asking this Honourable Court to decide the constitutional arguments on the merits or the issue of damages within this motion. Rather, the Plaintiffs request that they be provided interim interlocutory relief so they are not forced to leave the Branchton Encampment, while they wait for the action to be decided.
- (j) The Plaintiffs seek relief from the need to file an undertaking regarding damages given the *Charter*-based nature of the relief sought by the Plaintiffs and their indigence (see eg. *Poff v. City of Hamilton*, paras 46-51). The Plaintiffs also seek relief, if required, from Rule 53.03 of the *Rules of Civil Procedure* due to the urgent nature of this motion.
- (k) Rules 1.03, 1.04, 1.05, 3, 37, 40, 45, and 57 of the *Rules of Civil Procedure*, R.R.O. 1990, Regulation 194;
- (l) Section 101 of the *Courts of Justice Act*, R.S.O. 1990, c. C.43.;
- (m) Section 52 of the *Constitution Act*, 1982;
- (n) Sections 7, 8 and 12 of the *Charter of Rights and Freedoms*;
- (o) Such further and other grounds as the lawyers may advise.

THE FOLLOWING DOCUMENTARY EVIDENCE will be used at the hearing of the Motion:

- (a) The Affidavit of Michael Nanos, sworn on March 24, 2024;
- (b) The Affidavit of Joseph Micallef, sworn on March 24, 2024;
- (c) The Affidavit of Dr. Stephen Hwang, sworn on March 23, 2024;
- (d) The Affidavit of Dr. Erin Dej, sworn March 26, 2024;
- (e) The Affidavit of Jesse Burt, sworn March 25, 2024;
- (f) The Affidavit of Lindsay Sprague, sworn March 25, 2024;
- (g) The Affidavit of Marjorie Knight, sworn March 25, 2024;
- (h) The Affidavit of Shawna Bator, sworn March 25, 2024;
- (i) The Affidavit of Lesley Crompton, sworn March 25, 2024;
- (j) The pleadings, as filed; and,
- (k) Such further and other evidence as the lawyers may advise and this Honourable Court may permit.

March 25, 2024

**WATERLOO REGION COMMUNITY LEGAL
SERVICES**

450 Frederick Street, Unit 101
Kitchener, ON N2H 2P5

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Lawyers for the Plaintiffs,
Michael Nanos and Joseph Micallef

TO: Defendant
The Corporation of the City of Cambridge
Attention: Danielle Manton, City Clerk
Cambridge City Hall
50 Dickson Street
P.O. Box 669
Cambridge, Ontario N1R 8S1

Tel: 519-623-1340

Fax: 519-740-4637

Email: mantond@cambridge.ca

RCP-E 37B (February 25, 2022)

Michael Nanos and Joseph Micallef
Plaintiffs

-and- THE CORPORATION OF THE CITY OF CAMBRIDGE
Defendant

Court File No. CV-24-00000526-0000

**ONTARIO
SUPERIOR COURT OF JUSTICE**

PROCEEDING COMMENCED AT
WATERLOO REGION

NOTICE OF MOTION

**WATERLOO REGION COMMUNITY LEGAL
SERVICES**

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Kitchener, ON N2H 2P5

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Lawyers for the Plaintiffs,
Michael Nanos and Joseph Micallef

TAB 2

Court File No. CV-24- 0000526-0000

**ONTARIO
SUPERIOR COURT OF JUSTICE**

BETWEEN:

MICHAEL NANOS and JOSEPH MICALLEF

Plaintiffs

and

THE CORPORATION OF THE CITY OF CAMBRIDGE

Defendant

STATEMENT OF CLAIM

TO THE DEFENDANT

A LEGAL PROCEEDING HAS BEEN COMMENCED AGAINST YOU by the Plaintiff. The Claim made against you is set out in the following pages.

IF YOU WISH TO DEFEND THIS PROCEEDING, you or an Ontario lawyer acting for you must prepare a Statement of Defence in Form 18A prescribed by the *Rules of Civil Procedure*, serve it on the Plaintiff's lawyer or, where the Plaintiff does not have a lawyer, serve it on the Plaintiff, and file it, with proof of service in this court office, WITHIN TWENTY DAYS after this Statement of Claim is served on you, if you are served in Ontario.

If you are served in another province or territory of Canada or in the United States of America, the period for serving and filing your Statement of Defence is forty days. If you are served outside Canada and the United States of America, the period is sixty days.

Instead of serving and filing a Statement of Defence, you may serve and file a Notice of Intent to Defend in Form 18B prescribed by the *Rules of Civil Procedure*. This will entitle you to ten more days within which to serve and file your Statement of Defence.

IF YOU FAIL TO DEFEND THIS PROCEEDING, JUDGMENT MAY BE GIVEN AGAINST YOU IN YOUR ABSENCE AND WITHOUT FURTHER NOTICE TO YOU. IF YOU WISH TO DEFEND THIS PROCEEDING BUT ARE UNABLE TO PAY LEGAL

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FEES, LEGAL AID MAY BE AVAILABLE TO YOU BY CONTACTING A LOCAL LEGAL AID OFFICE.

TAKE NOTICE: THIS ACTION WILL AUTOMATICALLY BE DISMISSED if it has not been set down for trial or terminated by any means within five years after the action was commenced unless otherwise ordered by the court.

Date

March 26, 2024

Issued by


Local Registrar

Address of 85 Frederick Street
court office: Kitchener ON N2H 0A7

TO:

The Corporation of the City of Cambridge
Attention: Danielle Manton, City Clerk
Cambridge City Hall
50 Dickson Street
P.O. Box 669
Cambridge, Ontario N1R 8S1

Tel: 519-623-1340
Fax: 519-740-4637

Email: mantond@cambridge.ca

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CLAIM

1. The Plaintiffs, Michael Nanos and Joseph Micallef, seek:
 - (a) General damages in the amount of \$10,000.00 for the loss of property of the Plaintiffs;
 - (b) A declaration pursuant to section 52 of the *Constitution Act, 1982*, that subsections 3 (b), (j), (m), (n), and section 10 of The Corporation of the City of Cambridge By-law No. 162-10, section 2 (1) of the *Trespass to Property Act*, R.S.O. 1990, c. T.21 violate section 7 and 12 of the *Charter of Rights and Freedoms* (the "*Charter*") in a manner that cannot be justified under section 1, and are inoperative insofar as they are relied upon as lawful authority to evict the Plaintiffs from the encampment located at in the Branchton area of Cambridge, Ontario near the intersection of Dundas Street and Branchton Road (the "Branchton Encampment") under circumstances where the Plaintiffs have no available and accessible alternative housing or accommodation;
 - (c) A declaration pursuant to section 24(1) of the *Charter* or the common law that the proposed eviction of the Plaintiffs from the Branchton Encampment would breach the Plaintiffs' rights under sections 7, 8 and 12 and are not justified under section 1;

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- (d) An interlocutory, interim and permanent injunction Order restraining the Defendant, and its servants, employees, agents, assigns, officers, directors and anyone else acting on its behalf from:
- (i) directly or indirectly evicting the Plaintiffs' from the Branchton Encampment;
 - (ii) preventing the Plaintiffs' entry to or use of the Branchton Encampment site;
 - (iii) disposing of or removing any personal belongings, real or personal property belonging to the Plaintiffs and located at the Branchton Encampment; and
 - (iv) engaging in any harassing behaviour towards the Plaintiffs;
- (e) A Declaration that the Defendant has taken the Plaintiffs' personal property without;
- (i) the consent of the Plaintiffs;
 - (ii) lawful authority for doing so; and
 - (iii) compensating the Plaintiff's for their lost property;
- all of which constitutes the tort of conversion and trespass to chattels and is a breach of the section 8 Charter rights of the Plaintiffs;

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- (f) punitive damages in the amount to be determined this Honourable Court;
- (g) prejudgment interest in accordance with section 128 of the *Courts of Justice Act*, R.S.O. 1990, c. C.43, as amended;
- (h) postjudgment interest in accordance with section 129 of the *Courts of Justice Act*, R.S.O. 1990, c. C.43, as amended;
- (i) the costs of this proceeding and all motions payable on a substantial indemnity basis together with applicable taxes and disbursements; and
- (j) such further and other relief as to this Honourable Court may seem just.

The Parties

2. The Plaintiff, Michael Nanos, is a 52 year old man who is homeless and is living in a tent in the Branchton Encampment.

3. The Plaintiff, Joseph Micallef, is a 68 year old man who is homeless and is living in a tent in the Branchton Encampment.

4. The Defendant, The Corporation of the City of Cambridge (the "City"), is a lower-tier municipality located within the Regional Municipality of Waterloo and is the owner of the land upon which the Branchton Encampment is located.

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The Encampment and the Proposed Eviction

5. The Branchton Encampment is located in a field a few hundred yards behind a Petro-Canada gas station at the civic address of 1071 Dundas Street South, Cambridge. This property is owned by the City of Cambridge and at all material times was an unused, vacant grassy field.

6. The Plaintiffs have both lived at the encampment for approximately eight months. They moved to the Branchton Encampment after they were evicted from an encampment at 150 Main Street, Cambridge in and around August of 2023.

7. Since August of 2023, approximately thirteen individuals have stayed at the Branchton Encampment for various periods of time.

8. The Branchton Encampment is regularly visited by local agencies providing health and social supports to the encampment residents.

9. On March 18, 2023, bylaw officers arrived at the property to clear the Branchton Encampment. Outreach workers for the Aids Committee of Cambridge, Kitchener, Waterloo and Area ("ACCKWA") worked with bylaw to request an extension of the eviction until Thursday, March 28, 2024. Eviction stickers were placed on the tents at the encampment with an eviction date of March 28, 2024.

10. When bylaw officers attended at the property on March 18, 2023, various items of Plaintiffs personal property were removed and disposed of by the bylaw officers.

11.

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Homelessness in the City of Cambridge

12. There are approximately 1,700 people without permanent housing in Waterloo Region. Of those, 579 people are chronically homeless.

13. Waterloo Region's emergency shelter system is consistently operating at or above capacity. The Bridges Shelter, operated by the Cambridge Shelter Corporation, is the only emergency shelter in Cambridge and it regularly operates at capacity.

14. The Bridges emergency shelter operates as an abstinence only shelter, which excludes people that are suffering from substance use disorder. It does not allow women, couples or people with pets.

15. People living unhoused in the Region of Waterloo, and particularly those living in the City of Cambridge have no where to go.

Encampment Displacements in Cambridge

16. In and around August of 2023, The Region of Waterloo cleared an encampment at 150 Main Street, Cambridge. At certain points, this encampment housed approximately 50 people.

17. In and around September of 2023, the City of Cambridge cleared an encampment at Soper Park, Cambridge that was housing approximately 30 people.

18. In and around December of 2023, City of Cambridge bylaw attended at the Branchton encampment and issued eviction notice stickers to the residents living there.

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Although a formal eviction process did not take place, a number of residents scattered and relocated to other encampments in Cambridge.

No available and accessible shelter space

19. There are no available or accessible shelter spaces in the Region of Waterloo to accommodate the Plaintiffs.

20. The Plaintiff, Michael Nanos, has previously accessed the Bridges shelter and was violently assaulted while living there. He experienced theft, sleep deprivation and an increase in mental health symptoms while staying at Bridges. He has not been offered a space at Bridges, but even if there was a space he is reasonable fearful about returning there.

21. The Plaintiff, Joseph Micallef, has not been offered a space at Bridges, but even if there was a space he does not believe it is accessible for him. The Plaintiff has substance use disorder and is a senior. He has reasonable fears about assault, violence and theft that is known to take place at Bridges.

22. An eviction from the Branchton encampment will constitute a breach of the Plaintiff's section 7 and 12 *Charter* rights.

Conclusion

23. As a result of the Defendant's proposed eviction, the Plaintiffs will suffer physical and psychological harm. The Plaintiffs will also suffer property loss. The Plaintiffs therefore claim that their Charter rights are being infringed and accordingly Charter

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declarations are being sought as remedies as well as monetary damages and permanent injunctive relief as claimed above.

24. The Plaintiffs propose that this action be tried in the City of Kitchener.

March 25, 2024

WATERLOO REGION COMMUNITY LEGAL SERVICES

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MICHAEL NANOS AND JOSEPH MICALLEF
Plaintiffs and **THE CORPORATION OF THE CITY OF CAMBRIDGE**
Defendant

Court File No.: CV-24-0000 526-0000

ONTARIO
SUPERIOR COURT OF JUSTICE
Proceeding commenced at KITCHENER

STATEMENT OF CLAIM

WATERLOO REGION COMMUNITY LEGAL SERVICES
450 Frederick Street, Unit 101
Kitchener, Ontario N2H 2P5

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Lawyers for the Plaintiffs, Michael Nanos and Joseph Micallef

TAB 3

Court File No. CV-24-00000526-0000

**ONTARIO
SUPERIOR COURT OF JUSTICE**

B E T W E E N:

MICHAEL NANOS and JOSEPH MICALLEF

Plaintiffs

and

THE CORPORATION OF THE CITY OF CAMBRIDGE

Defendant

AFFIDAVIT OF MICHAEL NANOS

I, **Michael Nanos**, of the City of Cambridge, in the Province of Ontario, AFFIRM AND SAY:

1. I have personal knowledge with respect to the facts set out below, except where stated otherwise. Where the information is not based on my personal knowledge, it is based upon information provided by others which I believe to be credible and true.
2. I am a 52 year old male.
3. I currently reside at an encampment located on City of Cambridge property (the "Branchton Encampment"). This encampment is on an open field that is located a few hundred yards behind a Petro-Canada gas station at the civic address of 1071 Dundas Street South, Cambridge.
4. I receive Ontario Disability Support Program benefits but I have child support deductions taken from these benefits so I only receive \$680 per month.

5. It would be impossible for me to obtain housing in the private rental market because my Ontario Disability Support Program benefits are so low. I have been on the waiting list for subsidized housing for fifteen (15) years on and off.
6. I suffer from disabilities including, drug addiction, anxiety, depression and Attention-Deficit/Hyperactivity Disorder ("ADHD"). I am addicted to crystal meth. I was court-ordered to take part in drug counselling at 150 Main St., Cambridge. I have attended eight (8) sessions of drug counselling over several years (since 2020). Unfortunately I have not found this counselling to be ~~effective~~^{enough}. However, I would still like to continue drug counselling, but I do not have the money to continue with any private services.
7. I have a grade eight (8) education and have worked in construction, janitorial services and as a glazer approximately five years ago. I am volunteering at the Cambridge Vineyard Church to pack food and assist with moving furniture. I also help load and unload boxes at Food Basics for the Vineyard Church.
8. I moved to Cambridge in and around eighteen years ago to support my daughter who was pregnant.
9. I have been homeless on and off for many years, the last time I had stable and consistent housing was approximately eighteen (18) years ago when I lived with my partner for a four (4) years.
10. I have resided at the Branchton encampment for eight (8) months. Previously, I was living at an encampment at 150 Main Street, Cambridge for four (4) months. I was evicted from there in August of 2023, along with many other residents. By-law officers at the 150 Main Street encampment were verbally abusive and manipulative. They would give me and other residents ultimatums to either move or have our belongings

thrown out. Some of the residents at this encampment were offered a space in a motel, but I was not offered that.

11. When I was evicted from the 150 Main Street encampment, and most of my belongings were taken away, including my ~~tools, money and drugs~~ ^{tent and clothing}. At that time I moved to the Branchton encampment and I have been here ever since.

12. In the past I have spent nights at McDonalds or Tim Hortons when I had no where to go. Many of these restaurants no longer have overnight access due to regular overdose incidents in the bathrooms.

13. During the COVID-19 pandemic I was ~~offered~~ ^{required to move to} a motel room for a short period of time after I was released from jail. Due to a recent COVID outbreak at the jail, I was taken to a Super 8 motel for quarantine. Afterward, I went to Cambridge Shelter Corporation - The Bridges.

14. Previously I have lived at an encampment behind the Pickle Barrel restaurant on Hespeler Road in Cambridge. I lived at that encampment for approximately two (2) years and felt that I had stability. I was placed in custody for six (6) days and went to access shelter at Bridges when I was released. I was assaulted at Bridges and decided I needed to leave and return to my site behind the Pickle Barrel. When I returned all my belongings were gone which caused me to fall into a deep depression. I had put a lot of work into making that space feel safe and feel like a home and it was quickly taken from me.

15. After that, I moved to another encampment at Franklin Boulevard and Champlain Boulevard in Cambridge for a short time, before moving to the 150 Main Street encampment.

16. I have also resided at the Bridges Shelter in Cambridge on and off, and have stayed there several times, for approximately one (1) year in total. I have experienced many incidents of assault, violence and theft while staying at Bridges. The last time I stayed at Bridges was three years ago, where I was assaulted by another resident. The police came briefly and then left. The shelter forced my attacker to leave. I then contacted my bail officer and told them that I could not stay at Bridges any longer due to safety concerns. I cannot tolerate violence, so I felt that it was a better option to go back to my tent.
17. There are serious issues with how the staff at Bridges treat people. The staff often treated me and others with disrespect and I was often made to feel like an idiot. I never felt like I was treated with dignity there. I was not able to access Bridges with my partner, as the Bridges shelter did not have space for couples. My partner stayed at Bridges for a short time but left because we had no privacy. We moved to a secluded area. Shortly after I caught pneumonia and was hospitalized for three days.
18. There was no privacy at Bridges and the staff would do very little to respect my privacy. I was not permitted to keep most of my belongings. If my belongings did not fit within a tote bag, I could not keep them. I lost many of my valuable possessions over the year that I was accessing Bridges, including clothing, money and tools.
19. Bridges is considered a 'drug free' facility but many people there use drugs. I was told by staff that I needed to leave the property to use substances. This felt very hypocritical, as it was clear the staff did not care if I used drugs, they just wanted it out of sight so it was not their problem to deal with. However, people did frequently use substances on the property including in the bathrooms. Things often felt tense,

anxious, and toxic at Bridges and my mental health symptoms significantly increased while I was staying there.

20. After waking up, I was told to leave Bridges until lunch so that the staff could clean. In the evening, I had to return by 10:00 pm or I would lose my bed and have to restart the process of waiting signing up for a new bed.

21. The Branchton encampment feels safe and I get along well with the other residents. I have spoken briefly with Nicole Hollingworth, an Unsheltered Support Worker from Region of Waterloo. She came to the Branchton encampment in August 2023 and December 2023. She told me that I would be housed soon, but I have not heard anything since.

22. I feel drained and exhausted by my situation as a result of being displaced from other encampments and having the threat of being evicted hanging over my head. I am tired and lack the motivation to try to fight for a housing spot. I have heard about places becoming available and I have asked to be put into housing, but those with higher priority were put in before me. I know several people who have been provided motels and have been there for months. This offer has never been made to me. I have only been offered a space at the Bridges shelter but I am not willing to go back there.

23. From the Branchton Encampment location I sometimes access services at Cambridge Vineyard Church (a 37 minute walk), Trinity Community Church (a 45 minute walk) and the Cambridge Food Bank (a 49 minute walk). Sometimes I am unable to reach those places because of fatigue or weather. When I am able to walk to the Cambridge Vineyard Church I can access meals, showers, laundry, essential needs and community support. I also volunteer at the Cambridge Vineyard Church as

much as possible and assist others there that are moving/carrying furniture. I am not always able to access meals because of the walking distance to these organizations.

24. I can be very self-sufficient. However, I also receive support from some outreach workers and community volunteers. I receive support from The AIDS Committee of Cambridge, Kitchener, Waterloo and Area (“ACCKWA”) when they come by to help with specific issues and general support. I can seek support from their team at 150 Main Street (a 45 minute walk). I also receive support from the 519 Collective when they come to the encampment on Thursdays and Sundays when they drop off food and supplies and clothing.

25. I do not sleep well at night and often experience fatigue and exhaustion during the day. I need a place during the day to sleep, rest, and shelter from the weather. My tent at the encampment provides me with a place to rest during the day and also provides a sense of privacy and safety during the day and night. There are only a few spaces that offer indoor services during the day time and sometimes I am too tired and exhausted to walk to those locations. None of those locations allow for me to lay down or rest, they just offer food and other services and they are often quite busy, crowded and noisy.

26. I have not had any conflicts with the neighbouring gas station or any issues with fires or pests at this encampment.

27. I am worried about having to move to another encampment. I know it will only be temporary and I have concerns about potential conflicts I could have with other residents as I have poor relationship-building skills due to my mental health


disabilities. At this encampment, I do not experience harassment from the public, as I am a distance from the main road. People who pass by us have been kind.

28. I am concerned that I will lose belongings that I have accumulated to help me survive if I have to move to another encampment. I have clothes, blankets, tools and equipment for cooking here which are essential supplies for me to be able to keep warm, fix my shelter and prepare food for myself.

29. I cannot fathom another eviction and I do not know what I would do. Each eviction takes such a toll on my mental health. I feel unwelcome everywhere I go and I feel that the message from our local government is that they want me to just go away and die. People who are homeless are constantly treated inhumanely and the government does not care about us at all.

30. I make this affidavit in support of a motion for an injunction and for no other purpose.

AFFIRMED BEFORE ME in the)
City of Cambridge, this 24th day of)
March, 2024)
In the Regional Municipality of Waterloo)


Ashley Schmitz


MICHAEL NANOS

31. In the past when I've been evicted,
my anxiety symptoms and my
substance use increases.

→ A Commissioner, etc.
Province of Ontario
while a Barrister & Solicitor
LSO # 68257 G

**MICHAEL NANOS AND JOSEPH
MICALLEF**
Plaintiffs

and

**THE CORPORATION OF THE CITY OF
CAMBRIDGE**
Defendant

**ONTARIO
SUPERIOR COURT OF JUSTICE**

Proceeding commenced at KITCHENER

AFFIDAVIT OF MICHAEL NANOS

WATERLOO REGION COMMUNITY LEGAL SERVICES
450 Frederick Street, Unit 101
Kitchener, Ontario N2H 2P5

Shannon K. Down LSO #43894D,
Tel: 519.743.0254 x 20
Fax: 519.743.1588
Email: shannon.down@wrcls.clcj.ca

Ashley Schuitema LSO #68257G
Tel: 519.743.0254 x 17
Email: ashley.schuitema@wrcls.clcj.ca

Lawyers for the Plaintiffs, Michael Nanos and
Joseph Micallef

TAB 4

Court File No. CV-24-00000526-0000

**ONTARIO
SUPERIOR COURT OF JUSTICE**

B E T W E E N:

MICHAEL NANOS and JOSEPH MICALLEF

Plaintiffs

and

THE CORPORATION OF THE CITY OF CAMBRIDGE

Defendant

AFFIDAVIT OF JOSEPH MICALLEF

I, **Joseph Micallef**, of the City of Cambridge, in the Province of Ontario, AFFIRM AND SAY:

1. I have personal knowledge with respect to the facts set out below, except where stated otherwise. Where the information is not based on my personal knowledge, it is based upon information provided by others which I believe to be credible and true.
2. I am a 68 year old male.
3. I currently reside at a small encampment located on City of Cambridge property (the "Branchton Encampment"). This encampment is on an open field that is located a few hundred yards behind a Petro-Canada gas station at the civic address of 1071 Dundas Street South, Cambridge. The Branchton Encampment is not visible from the public roadway or close to any private property.
4. I receive Canada Pension Plan benefits of \$1650 per month.

5. I am not on the waiting list for subsidized housing because I have been told it will take ten (10) years and at that point I'll be 78 and I cannot put up with living like this until then.
6. I have high blood pressure and was hospitalized in August of 2023 for a severe infection in my leg. I use marijuana and crystal meth about three to four times a week if it is available.
7. I previously owned a business called Century Printing which I sold to my business partner approximately ten (10) years ago. I have not worked since.
8. I moved to Cambridge a number of years ago to ^{buy a house} ~~be closer to my daughter~~. I have an adult daughter that lives in Cambridge but we do not speak often.
9. I have been homeless on and off for approximately eight (8) years. I became homeless after my divorce. My ex-wife ran up debts and when our house was sold there was very little money left. I couch surfed at my friend's houses for a while and then became homeless.
10. I have resided at the Branchton Encampment for eight (8) months.
11. Previously, I was living at an encampment at 150 Main Street, Cambridge for one (1) month. I was evicted from there in August of 2023, along with many other residents. During the eviction process while I was packing my belongings I was approached by an outreach worker from the Region of Waterloo named Nicole Hollingworth. Nicole persuaded me to go to the hospital because I had a severe infection in my leg. I was worried about losing all my belongings in the eviction, but Nicole promised me that nothing would be lost and I would be housed by September. An ambulance was called and I was taken to the hospital and admitted. I was discharged from the hospital six (6) days later and did not know where to go.

12. I returned to the 150 Main Street, Cambridge encampment and found that all my stuff was gone. I learned that my friend, Michael Nanos, had packed up my belongings and moved them to the Branchton encampment, so I moved there and reconnected with Michael. I have not hear from Nicole since and I have not been offered any housing options.
13. By-law officers at the 150 Main Street encampment were verbally abusive and manipulative. They pressured people to leave and then threw out their belongings. Some of the residents at that encampment were offered a space in a motel or housing, but I was not offered anything other than empty promises.
14. Before moving to the 150 Main Street encampment I was couch surfing for a while until I was no longer welcome to stay where I was living. I lived for several months at an encampment at Franklin Boulevard and Champlain Boulevard in Cambridge. Eventually it became too cold and challenging for me to stay in a tent. I was able to rent a room on Kerr Street in Cambridge for a period of time. While I was living at Kerr Street I noticed that many of my belongings would go missing while I was gone for the day and I realized that my landlord was stealing from me. I left this location to go to the 150 Main Street encampment.
15. Over the years I lost many of my belongings repeatedly, particularly during each move. I have never been attacked or assaulted while experiencing homelessness but I have had many of my belongings stolen while away from my tent. I keep all my remaining belongings in my backpack and I carry it with me everywhere I go so it does not get stolen.
16. I have never been offered a space at a shelter but I am very fearful about accessing the Bridges shelter or any shelter. I have heard many stories from others of thefts and

assaults that take place in Bridges and believe Bridges to be dangerous. At my age this is not a risk I am willing to take.

17. The Branchton encampment feels safe and I get along well with the other residents. This location is relatively small and is hidden from the public, which lessens any potential problems and risk of theft. I try to keep this location clean and pick up after myself. I appreciate that this location is close to the Petro-Canada where I can use the washroom and get a cold drink. I have never had any problems with the staff at Petro-Canada. Sometimes the police come by to search for missing people, but I have never had any issues with them. I maintain a friendly and respectful relationship with the other tenants here.
18. From the Branchton encampment location I sometimes access services at Cambridge Vineyard Church (37 minute walk), Trinity Community Church (45 minute walk) and the Cambridge Food Bank (49 minute walk). Sometimes I am unable to reach those places because of fatigue, pain in my leg or weather and I often miss many meals.
19. When I am able to walk to the Cambridge Vineyard Church I can access meals, showers, laundry, essential needs and community support. I am able to take six (6) items from their essential needs cupboard every visit and will often take things like shampoo and toothbrushes.
20. I also receive support from some outreach workers and community volunteers. I receive support from The AIDS Committee of Cambridge, Kitchener, Waterloo and Area ("ACCKWA") when they come by and can seek support from their team at 150 Main St when I am able to get there (45 minute walk).

21. I also receive support from the 519 Collective when they come to the encampment on Thursdays and Sundays. The people from the 519 Collective bring meals to us when they come as well as supplies like clothing.
22. I am exhausted from everything I have been through, from being constantly displaced and from recovering from my leg infection and hospital stay. There are many days where I am not able to go anywhere and I just stay and rest in my tent. I need a place during the day to sleep, rest, and shelter from the weather. My tent at the Branchton Encampment provides me with a place to rest during the day and also provides a sense of privacy and safety during the day and night. I have heard coyotes in the night but there have never been any issues.
23. There are very few places to go where I can be inside in bad weather during the day. I tend to feel sleepy when I get indoors to a warm place but you get kicked out if you fall asleep in places like the library.
24. There are a couple of places in Cambridge that offer meals during the day. Sometimes I am too tired and exhausted to walk to those locations. None of those locations allow for me to lay down or rest, they just offer food and other services and they are often quite busy, crowded and noisy.
25. I feel numb, disappointed and sometimes I feel like I just do not care anymore. I sincerely distrust the Region and the City of Cambridge and I am upset by the constant broken promises and let downs. I would not do this but I have had thoughts of doing something drastic to try to make a point, like hanging myself in front of 150 Main Street just so that people will listen and care.
26. If I am evicted from the encampment, I believe I will lose most of my belongings as I have no way to move all of my stuff to a new site. I don't even know where that site

would be. As soon as people leave the encampment, By-law throws out any of the stuff that they leave behind before people have a chance to come back and get their belongings.

27. I do not know what I will do if I get evicted again. There is no where for me to go. My health has already deteriorated and it will only get worse. I feel as if those in power do not care about people that are homeless and are trying to sweep us under the rug.

28. I make this affidavit in support of a motion for an injunction and for no other purposes.

AFFIRMED BEFORE ME in the)
City of Cambridge, this 24th day of)
March, 2024)
In the Regional Municipality of Waterloo)

SHANNON KATHLEEN DOWN,
a Commissioner, etc.,
Province of Ontario,
while a Barrister and Solicitor.
LSO #43894D

JOSEPH MICALLEF

**MICHAEL NANOS AND JOSEPH
MICALLEF**
Plaintiffs

and

**THE CORPORATION OF THE CITY OF
CAMBRIDGE**
Defendant

38

Court File No.: CV-24-00000526-0000

**ONTARIO
SUPERIOR COURT OF JUSTICE**

Proceeding commenced at KITCHENER

AFFIDAVIT OF JOSEPH MICALLEF

WATERLOO REGION COMMUNITY LEGAL SERVICES
450 Frederick Street, Unit 101
Kitchener, Ontario N2H 2P5

Shannon K. Down LSO #43894D,
Tel: 519.743.0254 x 20
Fax: 519.743.1588
Email: shannon.down@wrcls.clcj.ca

Ashley Schuitema LSO #68257G
Tel: 519.743.0254 x 17
Email: ashley.schuitema@wrcls.clcj.ca

Lawyers for the Plaintiffs, Michael Nanos and
Joseph Micallef

TAB 5

Court File No. CV-24-00000526-0000

**ONTARIO
SUPERIOR COURT OF JUSTICE**

B E T W E E N:

MICHAEL NANOS and JOSEPH MICALLEF

Plaintiffs

and

THE CORPORATION OF THE CITY OF CAMBRIDGE

Defendant

AFFIDAVIT OF DR. STEPHEN HWANG

I, **DR. STEPHEN HWANG**, of the City of Toronto, in the Province of Ontario, SOLEMNLY AFFIRM as follows:

1. The facts and opinions contained in this affidavit are based on my own research and experiences as well as other reliable research in this area, where noted.

Background and nature of work

2. I have been a practicing medical doctor for 33 years. I received my medical degree from John Hopkins University School of Medicine in Baltimore, Maryland in 1988 and a master of public health degree from the Harvard School of Public Health in 1996.

3. My expertise is on the health impacts of being homeless and interventions to improve the health of people experiencing homelessness. I refer to homeless persons as those who live in

emergency shelters, transitional shelters, or places not intended for human habitation, such as parks, abandoned buildings, and bus or train stations.

4. I practice as a doctor in Toronto. I am a staff physician at St. Michael's Hospital in Toronto, specializing in internal medicine. About 15% of my patients are homeless. I also work at a weekly clinic at Seaton House, which provides healthcare exclusively to homeless men in Toronto.

5. I have been on the faculty of the University of Toronto since 1996. I am a professor at the University of Toronto in the Department of Medicine, the Dalla Lana School of Public Health, and the Institute of Health Policy, Management, and Evaluation. I conduct research on health and homelessness at St. Michael's Hospital, Unity Health Toronto.

6. I have authored or co-authored almost 300 peer-reviewed articles based on my research into the relationship between homelessness, housing, and health. I lecture extensively on a broad range of topics relating to homelessness and health and have received numerous Canadian and international awards for my work. I am frequently invited to speak about homelessness and health by various groups, including government agencies and ministries at the municipal, provincial, and federal levels. A copy of my current curriculum vitae is attached as **Exhibit "A"** to this affidavit.

The impacts of homelessness on health

7. Most homeless persons have chronic health conditions. They often have unmet healthcare needs because they need to prioritize day-to-day survival. Studies I have conducted demonstrate that homelessness and inadequate housing have negative effects on health, including increased risk of death. These negative effects include:

- a) Exposure to the elements. Prolonged exposure to sun and heat increases the risk of heatstroke and severe sunburns. Prolonged exposure to wet and/or cold conditions increases the risk of skin and foot diseases as well as hypothermia. Homeless persons disproportionately die from hypothermia because they cannot dry wet clothing or escape the cold. In a recent study, my colleagues and I found that emergency department visits for cold-related injuries from 2018-2022 were 14-18 times higher for homeless individuals than the general population. This study is attached as **Exhibit “B”** to my affidavit. Having a tent or other temporary structure provides some relief from the elements.
- b) Cardiovascular disease. Homeless people are at increased risk of death from cardiovascular disease (CVD) as compared to housed individuals. Homeless persons often have high prevalence of cigarette smoking and other CVD risk factors, such as high blood pressure, diabetes, stress, depression, heavy alcohol use, and drug use. Poor access to health care and logistical challenges to cardiac testing may lead to delays in recognizing CVD and diagnosing it. A 2018 article I wrote about this problem is attached as **Exhibit “C”**.
- c) Violence and brain injury. Violence in shelters and on the street is commonplace. For example, homeless persons disproportionately suffer from traumatic brain injuries. In a 2008 study, my colleagues and I found that over 50% of homeless individuals reported having a traumatic brain injury. In a 2015 study, we found that 28.8% of homeless individuals reported being physically assaulted in the past year. The paper with these statistics is attached as **Exhibit “D”** to my affidavit. TBIs are consistently related to poorer self-reported physical and mental health,

higher suicide risk, memory concerns, increased health service use, and criminal justice system involvement. An article on the effects of TBIs on homeless people is attached as **Exhibit “E”** to my affidavit.

- d) Bed bug infestations. Bed bug infestations are common at shelters. In a 2005 study, my fellow researchers and I contacted all 65 homeless shelters in Toronto and found that 31% of shelters reported previous or current bed bug infestations. This article is attached as **Exhibit “F”** to my affidavit. Our data suggest that bed bugs can spread from shelter to shelter, presumably transported in the personal belongings of residents. Given the constant turnover of shelter residents, bed bugs could potentially affect a large number of homeless people over the course of a year. Homeless persons with bed bug bites suffer a substantial degree of discomfort and emotional distress. Although this study was conducted in 2005, I still commonly see patients with bed bug bites in my practice.
- e) Transmission of tuberculosis. Shelters increase the risk of contracting tuberculosis (TB). The likelihood of exposure to TB is high in shelters because of shared living spaces, crowding, high population turnover, and inadequate ventilation. Treatment of active TB is difficult with the homeless because of prolonged infectivity, drug resistance, and inability to follow up with treatment. Homeless people die of tuberculosis at double the rate of non-homeless people with the disease. A 10-year study of the incidence and health effects of tuberculosis in Toronto homeless persons is attached as **Exhibit “G”** to my affidavit.
- f) Transmission of COVID-19. Shelters are the ideal environment for transmission. The homeless are at a higher risk of developing severe COVID because of the

high prevalence of risk factors in this population, such as respiratory conditions and heart disease. COVID is harder to prevent with homeless persons because of inadequate access to personal protective equipment, healthcare, and the inability to self-isolate. The study explaining these impacts is attached as **Exhibit “H”** to my affidavit.

- g) Skin and foot problems. Skin and foot problems are frequently seen among the homeless. Homeless persons are particularly prone to develop skin diseases such as impetigo, venous stasis dermatitis, scabies, and body lice. Prolonged exposure to cold and dampness increases the risk of skin breakdown and skin infections, particularly in the feet. Foot disorders such as fungal infections, athlete’s foot, and trench foot usually result from inadequate footwear, prolonged exposure to moisture and cold, long periods of walking and standing, and repetitive minor trauma — all of which are common features of homelessness. These disorders cause pain, aching, and itching that can be debilitating.

- h) Sleep deprivation. Homeless people often suffer from sleep deprivation due to inadequate and disturbed or fragmented sleep. Sleep fragmentation is often related to external stimuli, such as bright lights, loud noises, and intentional efforts by other people to awaken or disturb them. In my experience, sleep deprivation has numerous adverse health effects, including increased risks of diabetes, cardiovascular disease, obesity, depression, and injuries, in addition to the more commonly recognized problems of impaired alertness, attention, and concentration.

- i) Chronic health conditions and mental illness. Homeless people disproportionately suffer from chronic health conditions and mental illness, which often go untreated. In a comprehensive 2010 study, my colleagues and I found that over 50% of homeless or vulnerably housed participants from Vancouver, Toronto, and Ottawa reported being diagnosed with a mental health problem. Over 85% reported having at least one health condition. The study is attached as **Exhibit “I”** to my affidavit.

8. Physical and mental health problems worsen over the period that a person is homeless. The deterioration in health is related to several factors, including a lack of stable housing, a volatile social environment, and barriers to accessing appropriate healthcare. Many homeless persons do not have a health card, do not know where to access services, cannot attend regular appointments, and/or lack continuity of care because they do not have a permanent address or phone access. Prescription medications are difficult to obtain without proper access to a doctor or insurance. Many homeless persons also report experiencing discrimination when accessing healthcare.

The dangers of prohibiting shelter for people living outdoors

9. Homeless people who are prohibited from erecting even rudimentary shelter from the elements — such as tents, tarps, or cardboard barriers — will suffer clear and direct adverse impacts on their health:

- A lack of protection from wind and rain increases the wind chill effect, greatly increasing the risk of hypothermia. Homeless persons are at a particularly high risk of death from hypothermia because their clothing gets wet and they cannot dry it. The temperature does

not have to be freezing for hypothermia to occur. Many deaths occur when the air temperature is above freezing.

- Prolonged exposure to wet and cold conditions can lead to serious skin and foot diseases as well as respiratory diseases. A lack of protection from wet and cold conditions heightens the likelihood of these diseases and magnifies their severity. These diseases are debilitating.
- The lack of protection from the sun greatly increases homeless people's risk of severe sunburn and heatstroke during the summer months. There is little relief from the heat and sun without adequate shelter.
- Lack of shelter also increases the severity of the disturbed and fragmented sleep experienced by the homeless. The weather, light, and noise is more disruptive without any barrier — leading to many serious health conditions.

10. There is no question that the lack of shelter for people living outside causes severe adverse effects on their health.

The adverse effects of forced encampment evictions

11. Homeless people forced to leave their encampments suffer adverse impacts on their health. In a study published in 2022, encampment sweeps or evictions were found to be a harmful factor contributing to the declining health of homeless people. This study is attached as **Exhibit "J"** to my affidavit. Forced evictions tend to disperse people to more remote public spaces which are less publicly visible and/or accessible. Being constantly forced into increasingly remote locations makes it difficult to get to pharmacies, attend medical appointments and outpatient clinics, access

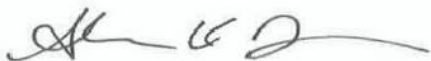
food programs, counseling services, methadone clinics and addictions treatment. Frequent displacement leads to significantly enhanced vulnerabilities and health risks for those displaced, particularly for women, people with disabilities and mental health conditions and people using substances.

12. Forced eviction and the subsequent displacement deprive homeless people of survival supplies required to survive unhoused. Homeless people may lose medical supplies like wound care supplies or safe drug consumption supplies as a result of displacement. The displacement may also mean that they lose food, clothing and blankets which are essential items needed to survive outdoors. This deprivation of survival supplies results in adverse effects on their ability to look after their own health.

13. Forced evictions increases the likelihood for negative encounters between unhoused people and authorities such as law enforcement. These negative interactions cause emotional stress and distrust which exacerbates homeless people's social exclusion and increases their reluctance to seek health and social supports.

14. I affirm this affidavit to provide evidence on this action and for no other purpose.

SWORN remotely by Stephen Hwang at the City of Toronto, in the Province of Ontario, before me at the City of Waterloo in the Province of Ontario on March 23, 2024 in accordance with O. Reg. 431/20.

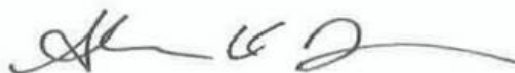


Shannon Kathleen Down, a commissioner of oaths (LSO#: 83494D)



Dr. Stephen Hwang

This is Exhibit "A" referred to in
the Affidavit of Dr. Stephen Hwang of
the City of Toronto in the Province
of Ontario, sworn remotely
before me at the City of Waterloo
in the Province of Ontario on March 23, 2024.

A handwritten signature in black ink, appearing to read 'Shannon Down', written over a horizontal line.

Shannon Down
LSO#43894D

1. EDUCATION

Degrees

1994 - 1996	Master of Public Health, Clinical Effectiveness, Harvard School of Public Health, Boston, Massachusetts, United States
1984 - 1988	MD, Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland, United States
1980 - 1984	BA, Biochemistry (magna cum laude), Harvard University, Cambridge, Massachusetts, United States

Postgraduate, Research and Specialty Training

1991 - 1992	Chief Medical Resident, Toronto Western Hospital/Toronto General Hospital, Department of Medicine, University of Toronto, Toronto, Ontario, Canada
1988 - 1991	Internal Medicine Residency, Department of Medicine, University of Toronto, Toronto, Ontario, Canada

Qualifications, Certifications and Licenses

2003 - present	Fellow, American College of Physicians, Philadelphia, Pennsylvania, License / Membership #: 46674
1992 - present	General Licence, College of Physicians and Surgeons of Ontario, Toronto, Ontario, License / Membership #: 60001
1992 - present	Fellow, Royal College of Physicians of Canada, Ottawa, Ontario, License / Membership #: 432499

2. EMPLOYMENT

Current Appointments

2017 Jan - present	Full Member, School of Graduate Studies, University of Toronto, Toronto, Ontario, Canada
2015 Jul - present	Director, MAP Centre for Urban Health Solutions, St. Michael's Hospital, Toronto, Ontario, Canada
2014 Jul - present	Professor, Department of Medicine, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada
2014 Jul - present	Professor (cross appointment), Health Policy, Management and Evaluation, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada
2014 Jul - present	Professor (cross appointment), Dalla Lana School of Public Health, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada
2008 Sep - present	Research Scientist, Li Ka Shing Knowledge Institute, St. Michael's Hospital, Toronto, Ontario, Canada
2008 Mar - present	Adjunct Senior Scientist, Primary Care and Population Health Program, Institute for Clinical Evaluative Sciences, Toronto, Ontario, Canada
1996 Sep - present	Staff Physician, Division of General Internal Medicine, Department of Medicine, St. Michael's Hospital, Toronto, Ontario, Canada

Previous Appointments

HOSPITAL

2001 - 2005	Acting Director, Clinical Epidemiology Unit, St. Michael's Hospital, Toronto, Ontario, Canada
1996 Sep - 2008 Sep	Population Health Epidemiologist, Inner City Health Program, St. Michael's Hospital, Toronto, Ontario, Canada
1992 - 1996	Staff Physician, Division of General Internal Medicine, Boston City Hospital, Boston, Massachusetts, United States

2020	2020 President of Medical Association Awarding Postgraduate Teacher Award , Dept of Medicine, Faculty of Medicine, St. Michael's Hospital, University of Toronto. (Postgraduate MD)
2018	2018 Robert Sheppard Award for Health Equity and Social Justice , Faculty of Medicine, St. Michael's Hospital, Toronto, Ontario, Canada. (Distinction)
2020	2020 Complete Physician Award , St. Michael's Hospital, Toronto, Ontario, Canada. (Distinction) recognizes outstanding contributions of faculty members involved in the development and recognition of a variety of activities, sports, and other related to social justice and health equity to faculty level during the year.
2016	FitzGerald Leadership Award Teacher Award , Dept of Medicine, Faculty of Medicine, University of Toronto. This award is presented annually by the FitzGerald Academy, Faculty of Medicine, in recognition of a physician's enthusiasm and sustained excellence in the teaching and support of staff and medical students.
2013	Dr. Vincent J. Hughes Physician Humanitarian Award , St. Michael's Hospital Medical Staff Association. (Distinction)
2001	Outstanding Teacher Award in Postgraduate Medical Education , Dept of Medicine, Faculty of Medicine, St. Michael's Hospital, Toronto, Ontario. (Postgraduate MD)
1998	Outstanding Teacher Award in Postgraduate Medical Education , Dept of Medicine, Faculty of Medicine, St. Michael's Hospital, Toronto, Ontario. (Postgraduate MD)
2008	Community Based Research Award of Merit , Centre for Urban Health and the Wellesley Institute, Toronto, Ontario, Canada. (Research Award)
1997	Outstanding Teacher Award in Postgraduate Medical Education , Dept of Medicine, Faculty of Medicine, St. Michael's Hospital, Toronto, Ontario. (Postgraduate MD)

4. PROFESSIONAL AFFILIATIONS AND ACTIVITIES

Teaching and Education Awards

Professional Associations

LOCAL

2010 Oct - present	Member of Council and Executive Committee , Canadian Society of Internal Medicine
2003 - present	Member , International Society for Urban Health
2002 - present	Member , Canadian Society of Internal Medicine
2001 - present	Member , Christian Medical and Dental Society of Canada
1998 - present	Member , National Health Care for the Homeless Council
1992 - present	Member , Society of General Internal Medicine
2015 Oct - 2017 Oct	President , Canadian Society of Internal Medicine
2014 Oct - 2015 Oct	President-Elect , Canadian Society of Internal Medicine
2010 Oct - 2014 Oct	Secretary-Treasurer , Canadian Society of Internal Medicine
2006 - 2016	Member , Association of Chiefs and Leaders of General Internal Medicine (ACLGIM)
2004 - 2006	Member, Executive Committee , International Society for Urban Health
2003 - 2009	Chair, Communications Committee , International Society for Urban Health

Administrative Activities

INTERNATIONAL

International Society for Urban Health

2006 Jan - 2006 Oct	Member , Scientific Committee, 5th International Conference on Urban Health, Amsterdam, Netherlands.
2005 Jan - 2005 Oct	Member , Community Engagement Subcommittee, 4th International Conference on Urban Health, Toronto, Ontario, Canada.
2005 Jan - 2005 Oct	Member , Conference Steering Committee, 4th International Conference on Urban Health, Toronto, Ontario, Canada.
2004 Jan - 2004 Oct	Member , Scientific Committee, 3rd International Conference on Urban Health, Boston, Massachusetts, United States.
2003 Jan - 2003 Oct	Member , Scientific Committee, 2nd International Conference on Urban Health, New York City, New York, United States.
2001 Dec - 2002 Oct	Co-Chair , Scientific Committee, 1st International Conference on Inner City Health, Toronto, Ontario, Canada.

National Academies of Sciences, Engineering, and Medicine

2016 Aug - 2018 Jul **Member**, Housing, Health, and Homelessness Committee, Washington, District of Columbia, United States.

National Health Care for the Homeless Council (NHCHC)

2009 Sep - present **Member**, Research Committee, United States.

North American Housing and HIV/AIDS Research Summit.

2010 Mar - 2010 Jun **Member**, Planning Committee for Pre-Summit Learning Institute on "Examining Structural HIV Interventions: Methodological Challenges", Toronto, Ontario, Canada.

Society of General Internal Medicine

2014 Sep - 2015 Feb **Member**, 2015 Eisenberg Award Selection Committee, United States.

2013 Jun - 2018 May **Member**, SGIM Research Committee, United States.

2006 Jul - 2007 Mar **Chair**, 2007 Annual Meeting Workshop Review Committee, Health Disparities/Unique Populations, Toronto, Ontario, Canada.

2006 Jan - 2006 Mar **Member**, 2006 Annual Meeting Workshop Review Committee, Health Disparities/Unique Populations, United States.

2005 Jan - 2005 Mar **Member**, 2005 Annual Meeting Workshop Review Committee, Health Disparities/Unique Populations, United States.

2004 Jan - 2004 Mar **Member**, 2004 Annual Meeting Workshop Review Committee, Health Disparities/Unique Populations, United States.

2003 Jan - 2003 Mar **Member**, 2003 Annual Meeting Workshop Review Committee, Health Disparities/Unique Populations, United States.

University of Pennsylvania

2012 Jul - 2013 Jun **Member**, Conference Organizing Committee, International Homelessness Research Conference, June 2013, Philadelphia, Pennsylvania, United States.

NATIONAL

Canadian Conference on Homelessness

2004 Jul - 2005 May **Member**, Steering Committee, Toronto, Ontario, Canada.

Canadian Housing and Renewal Association

2003 Jan - 2003 Oct **Member**, Organizing Committee, National Symposium on Health and Housing, Calgary, Alberta, Canada.

Canadian Observatory on Homelessness (successor to the Canadian Homelessness Research Network)

2009 Jul - 2019 **Member**, National Advisory Board, Toronto, Ontario, Canada.

Canadian Society of Hospital Medicine

2008 Jan - 2009 Sep **Member**, Organizing Committee, 7th Annual Canadian Society of Hospital Medicine Conference, Toronto, Ontario, Canada.

Canadian Society of Internal Medicine

2013 Oct - 2014 Oct **Member**, 2014 Annual Meeting Committee, Calgary, Alberta, Canada.

2012 Oct - 2013 Oct **Chair**, 2013 Annual Meeting Committee, Toronto, Ontario, Canada.

2011 Oct - 2012 Oct **Member**, 2012 Annual Meeting Committee, Quebec City, Quebec, Canada.

Government of Canada

2005 Sep - 2006 Jun **Member**, Minister's Advisory Board, Canadian Housing Framework, Ottawa, Ontario, Canada.

The Salvation Army

2013 Jul - 2014 Dec **Member**, National Advisory Board, Task Team on Homelessness, Canada.

PROVINCIAL / REGIONAL

Ministry of Municipal Affairs and Housing

2015 Jan - 2015 Oct **Member**, Expert Panel on Homelessness, Ontario, Canada.

University of Calgary

2017 Oct **External Reviewer**, External Review of the Division of General Internal Medicine, University of Calgary, Ottawa, Ontario, Canada.

University of Ottawa

2010 Nov - 2010 Dec **External Reviewer**, External Review of the Division of General Internal Medicine, University of Ottawa, Ottawa, Ontario, Canada.

LOCAL

Department of Health Policy, Management and Evaluation, University of Toronto

2001 Jul - 2006 Jun **Member**, Executive Committee, Clinical Epidemiology and Health Care Research Program

Department of Medicine, University of Toronto

2006 Apr - 2016 Jun **Co-Chair**, On-Site Review Committee for the Core Internal Medicine Training Program, Faculty of Medicine, Dept of Medicine

2005 Nov - 2016 Jun **Member**, Core Internal Medicine Program Committee, Faculty of Medicine, Dept of Medicine

2005 Nov - 2016 Jun **Member**, Executive Committee, Department Division Directors

2004 Sep - 2005 Oct **Member**, Selection Committee, Director of the Division of General Internal Medicine

1998 Jul - 2005 Jun **Member**, Internal Medicine PGY1 Selection Committee, Faculty of Medicine, Dept of Medicine

Division of General Internal Medicine, University of Toronto

2006 Jul - 2016 Jun **Member**, General Internal Medicine PGY4-5 Selection Committee, Faculty of Medicine, Dept of Medicine, General Internal Medicine

2006 Jan - 2016 Jun **Chair**, University of Toronto Division of General Internal Medicine Executive Committee, Toronto, Ontario, Canada.

Good Shepherd Ministries

2020 Oct - present **Vice Chair**, Board of Directors, Toronto, Ontario, Canada.

2019 Oct - present **Member**, Board of Directors, Toronto, Ontario, Canada.

Member, Board of Directors, Toronto, Ontario, Canada.

Inner City Family Health Team (ICFHT)

2015 Jan - 2019 Oct **President**, Board of Directors, Toronto, Ontario, Canada.

2013 Oct - 2015 Jan **Member**, Board of Directors, Toronto, Ontario, Canada.

2011 Jul - 2013 Oct **Chair**, Board of Directors, Toronto, Ontario, Canada.

Inner City Health Associates (ICHA)

2011 Jul - 2014 Sep **Chair**, Board of Directors, Toronto, Ontario, Canada.

St. Michael's Hospital

2011 Jan - 2013	Member , St. Michael's Hospital Research Advisory Committee, Toronto, Ontario, Canada.
2011 Jan - 2011 Dec	Chair , Li Ka Shing Knowledge Institute, Internal Scan Working Group on Knowledge Translation/Policy Research/Disadvantaged Populations, Toronto, Ontario, Canada.
2010 Nov - 2017 Dec	Member , Li Ka Shing Knowledge Institute Reappointments Committee
2009 Apr - 2009 Jun	Member , Search Committee for Physician-in-Chief, St. Michael's Hospital
2009 Feb - 2009 Apr	Member , Five-Year Review Committee for Dr. Patricia O'Campo, Ricard Chair of Inner City Health and Director, Centre for Research on Inner City Health, St. Michael's Hospital
2000 Jul - 2003 Jun	Member , Postgraduate Medical Education Committee, St. Michael's Hospital, Faculty of Medicine, Dept of Medicine
2000 Jul - 2003 Jun	Coordinator , Postgraduate Education, Division of General Internal Medicine, St. Michael's Hospital
1997 - 2001	Member , Research Operations Committee, St. Michael's Hospital
1996 Jan - 2009 Jun	Member , Homeless and Underhoused Community Advisory Panel, St. Michael's Hospital

Street Health Community Nursing Foundation

2006 Jan - 2009 Jun	Member , Street Health Survey - Community Advisory Committee, Toronto, Ontario, Canada.
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The Hospital for Sick Children

2009 May - 2009 Jun	Member , External Review Committee, Division of Paediatric Medicine
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Unity Health Toronto

2019 Jan - present	Research Ethics Board, Toronto, Ontario, Canada.
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University of Toronto

2013 Dec - 2014 Jun	Member , Review and Search Committee, Chair, Division of General Surgery, Toronto, Ontario, Canada.
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Peer Review Activities

EDITORIAL BOARDS

Editorial Board Member

2018 Oct - present	Canadian Society of Internal Medicine, Canadian Journal of General Internal Medicine (CJGIM)
2009 May - 2012 Apr	Society of General Internal Medicine, Journal of General Internal Medicine

GRANT REVIEWS

External Grant Reviewer

2009	Ontario HIV Treatment Network (OHTN), Community Based Research Capacity Building Fund, Number of Reviews: 1
2009	Winnipeg Health Sciences Centre Foundation, Number of Reviews: 1
2008	Michael Smith Health Research Foundation, British Columbia, Number of Reviews: 1
2005	Ontario HIV Treatment Network (OHTN), Number of Reviews: 1
2004	Canadian Foundation for AIDS Research (CANFAR), Number of Reviews: 1
2004	Ontario Ministry of Health and Long Term Care, Health Research Personnel Development Program, Number of Reviews: 1
2002 - 2004	The Physicians' Services Incorporated Foundation, Ontario, Number of Reviews: 2
2001 - 2007	Michael Smith Health Research Foundation, British Columbia, Number of Reviews: 4

Reviewer

2014	Guy's and St. Thomas' Charity, United Kingdom, Number of Reviews: 1
2013	United States Department of Veterans Affairs, Cooperative Studies Program (CSP) Letter of Intent (LOI), Number of Reviews: 1
2010	United States Department of Veterans Affairs, Health Services Research and Development Service, Special Research Proposal Review Panel on Ending Homelessness Among Veterans. Number of Reviews: 1
2004 - 2007	Canadian Institutes of Health Research, Health Research Salary A Peer Review Committee (New Investigator Awards), Number of Reviews: 120
2003 - 2004	Canadian Institutes of Health Research, Health Disparities Initiative Peer Review Committee, Number of Reviews: 40

MANUSCRIPT REVIEWS

Reviewer

2022	Canadian Journal of Public Health, Number of Reviews: 1
2022	JAMA, Number of Reviews: 1
2022	JAMA Pediatrics, Number of Reviews: 1
2022	Journal of Substance Abuse Treatment, Number of Reviews: 1
2022	Journal of Urban Health, Number of Reviews: 1
2022	New England Journal of Medicine, Number of Reviews: 1
2022	The Lancet Public Health, Number of Reviews: 1
2021	American Journal of Public Health, Number of Reviews: 1
2021	Annals of Internal Medicine, Number of Reviews: 1
2021	Canadian Journal of General Internal Medicine, Number of Reviews: 1
2021	Canadian Medical Association Journal (CMAJ), Number of Reviews: 1
2021	Journal of General Internal Medicine, Number of Reviews: 1
2021	The Lancet Public Health, Number of Reviews: 1
2020	American Heart Association (AHA) Statements, Number of Reviews: 1
2020	Annals of Internal Medicine, Number of Reviews: 1
2020	British Journal of Psychiatry, Number of Reviews: 1
2020	Health Services Research, Number of Reviews: 1
2020	New England Journal of Medicine, Number of Reviews: 1
2019	AIDS Care, Number of Reviews: 1
2019	Annals of Internal Medicine, Number of Reviews: 1
2019	Canadian Journal of Public Health, Number of Reviews: 1
2019	Health & Social Care in the Community, Number of Reviews: 1
2019	Health Services Research, Number of Reviews: 1
2019	Social Psychiatry and Psychiatric Epidemiology, Number of Reviews: 1
2018	Health & Social Care in the Community, Number of Reviews: 1
2016	Health Services Research, Number of Reviews: 1
2015	Journal of General Internal Medicine, Number of Reviews: 1
2015	Journal of Urban Health, Number of Reviews: 1
2014	American Journal of Public Health, Number of Reviews: 1
2014	BMC Health Services Research, Number of Reviews: 1
2014	Journal of Neurotrauma, Number of Reviews: 1
2013	Canadian Medical Association Journal, Number of Reviews: 2
2013	Trials, Number of Reviews: 1
2012	Journal of Urban Health, Number of Reviews: 2
2011	Annals of Internal Medicine, Number of Reviews: 1
2011	BMC Research Notes, Number of Reviews: 1
2011	Journal of General Internal Medicine, Number of Reviews: 1

2010	Canadian Journal of Urban Research, Number of Reviews: 1
2010	Journal of General Internal Medicine, Number of Reviews: 1
2009	JAMA, Number of Reviews: 1
2008	International Journal of Epidemiology, Number of Reviews: 1
2008	JAMA, Number of Reviews: 1
2008	Journal of Urban Health, Number of Reviews: 1
2008	Medical & Veterinary Entomology, Number of Reviews: 1
2008	Milbank Quarterly, Number of Reviews: 1
2007	JAMA, Number of Reviews: 2
2007	Journal of Hospital Medicine, Number of Reviews: 1
2007	Open Medicine, Number of Reviews: 1
2007	Seminars in Medical Practice, Number of Reviews: 1
2006	BMC Health Services Research, Number of Reviews: 1
2006	Emerging Infectious Diseases, Number of Reviews: 1
2005 - 2007	American Journal of Public Health, Number of Reviews: 2
2005 - 2007	Canadian Journal of Public Health, Number of Reviews: 2
2003 - 2006	JAMA, Number of Reviews: 4
2003 - 2006	Journal of General Internal Medicine, Number of Reviews: 3
2003	The Lancet, Number of Reviews: 1
2002 - 2006	Canadian Medical Association Journal, Number of Reviews: 6
2002	International Journal for Quality in Health Care, Number of Reviews: 1
2001 - 2007	Journal of Urban Health, Number of Reviews: 4
2001	Lancet Infectious Disease, Number of Reviews: 1
2000 - 2001	Acta Psychiatrica Scandinavica, Number of Reviews: 4
1999 - 2006	Annals of Internal Medicine, Number of Reviews: 8
1999	Journal of Health Care for the Poor and Underserved, Number of Reviews: 1
<u>External Scientific Report Reviewer</u>	
2007	Canadian Institute for Health Information, Canadian Population Health Initiative, Number of Reviews: 1

SCIENTIFIC ABSTRACT REVIEWS

Member

2012 Oct - 2013 Jan	Society of General Internal Medicine 2013 Annual Meeting, Health Disparities & Vulnerable Populations Abstract Review Committee
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Chair

2013 Oct - 2014 Jan	Society of General Internal Medicine 2014 Annual Meeting, Health Disparities & Vulnerable Populations Abstract Review Committee
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Conference Abstract Reviewer

2008	7th International Conference on Urban Health, Vancouver 2008, Number of Reviews: 38
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C. Academic Profile

1. RESEARCH STATEMENTS

Description of Research Program.

My research program focuses on the connections between homelessness, housing, and health. Our objectives are to develop, evaluate, and scale up interventions to improve the health and well-being of people who are homeless or unstably housed, and interventions to end homelessness itself.

D. Research Funding

1. Grants, Contracts and Clinical Trials

PEER-REVIEWED GRANTS

FUNDED

2023 Jul - 2024 Jun	Co-Investigator. Predicting outbreaks in shelters: development and data-driven testing of a computational model of airborne SARS-CoV-2 spread. Emerging & Pandemic Infections Consortium (EPIC) Institute for Pandemics (IfP). PI: Chaudhuri, Swetaprovo. Collaborator(s): S. Mishra, K. Murty, S. Hwang . 25,000 CAD. [Grants]
2023 Apr - 2024 Mar	Co-Investigator. Effect of healthy food vouchers on blood glucose control in people with type 2 diabetes or prediabetes: a randomized controlled trial. Canadian Institutes of Health Research (CIHR). Project Grant. PI: Persaud, Nav. Collaborator(s): E. Gucciardi, S. Hwang , A. Pinto, K. Thorpe. 100,000 CAD. [Grants]
2023 Jan - 2026 Dec	Co-Investigator. The Effect of Canadian Income Transfer Programs on Health. Canadian Institutes of Health Research (CIHR). Project Grant. PI: Dunn, James. Collaborator(s): M. Brownell, E. Forget, S. Hwang , J. Lavis, N. Nickel, N. Persaud, A. Siddiqi. 348,000 CAD. [Grants]
2023 Jan - 2025 Dec	Co-Investigator. Effect of a healthy food voucher on blood glucose control in people with type 2 diabetes or prediabetes: a randomized controlled trial. Physicians Services Incorporated (PSI) Foundation. Clinical Research Grant. 22-38. PI: Persaud, Nav. Collaborator(s): Gucciardi E, Hwang SW , Thorpe KE, Pinto A. 226,500 CAD. [Grants]
2022 Jul - 2024 Jun	Co-Investigator. Transitioning Youth Out of Homelessness 2.0: A Pilot Randomized Rent Subsidy and Identity Capital Intervention for Youth Exiting Homelessness. Making the Shift Youth Homelessness Social Innovation Lab. Insight Grant. PI: Thulien, Naomi. Collaborator(s): Abramovich A, Cote J, Craig K, Daley M, Downey B, Frederick T, O'Keefe H, Hwang S , Kozloff N, Lethby M, Nisenbaum R, Noble A, Rampersaud M. 119,688 CAD. [Grants]
2022 Jun - 2029 May	Co-Investigator. The Canadian Observatory on Homelessness - Mobilizing Partnerships to Prevent and End Homelessness. Social Sciences and Humanities Research Council of Canada (SSHRC). Partnership Grant. PI: Gaetz, Stephen. Collaborator(s): Abram Oudshoorn, Alex Abramovich, Alexandria Wilson, Amanda Noble, Amber Gazso, Bernadette Pauly, Carol Kauppi, Carolyne Grimard, Céline Bellot, Cheryl Forchuk, Eric Latimer, Erin Dej, Jacqueline Kennelly, Jeannette Waegemakers Schiff, Jeff Karabanow, Jeffrey Ansloos, Jennifer Connolly, Jino Distasio, John Graham, Joseph Hermer, Katharina Kovacs Burns, Katrina Milaney, Kristy Buccieri, Maritt Kirst, Naomi Nichols, Nicole Kozloff, Peter Mackie, Stephen Hwang et.al. 2,499,457. [Grants]
2022 Apr - 2024 Mar	Co-Principal Investigator. Access to Advanced Gynecological Care for Patients Experiencing Disadvantage: A Population Based Study. St. Michael's Hospital. AFP Innovation Fund. SMH-22-007. PI: Simpson, Andrea. Collaborator(s): Skolnik, Emma. 41,596 CAD. [Grants]
2022 Feb - 2024 Jan	Co-Investigator. Health equity during the pandemic recovery period: Updated knowledge syntheses, policy tracking and health outcome monitoring. Canadian Institutes of Health Research (CIHR). Operating Grant: Addressing the Wider Health Impacts of COVID. PI: Persaud, Navindra. Collaborator(s): Co-Principal Applicants: Adams O, Lofters A. Co-Applicants: Hwang S , Pinto A, Sayani A. 184,134 CAD. [Grants]
2021 Dec - 2022 Nov	Co-Investigator. MARCO:POLO Marginalization & COVID-19: Promoting Opportunities for

Learning & Outreach. Canadian Institutes of Health Research (CIHR). Operating Grant: Emerging COVID-19 Research Gaps & Priorities. PI: Bayoumi, Ahmed. Collaborator(s): Co-Principal Applicants: Firestone M, Boucher L, Dodd Z, Durbin A, Hayman K, Isaacs BJ, Kolla G, Matheson FI, Steer LA, Yakubovich AR, Young SV. Co-Applicants: Beder M, Brothers T, Dobrow M, Du Mont J, Holness L, Huijbregts M, **Hwang S**, Hynie M, Kendall C, Kenny K, Long C, Maguire J, Nisenbaum R, Shankardass K, Strike C, Walker D. Collaborators: Arcenal M, Delgado R, Heineck K, Lunsky Y, Marcolin A, Pepper V. 313,804 CAD. [Grants]

- 2021 Dec - 2022 Nov **Co-Investigator.** The Surgical EQUITY initiative: Establishing equitable access to surgery following the pandemic. Canadian Institutes of Health Research (CIHR). Operating Grant: Emerging COVID-19 Research Gaps & Priorities. PI: Gomez Jaramillo, David. Collaborator(s): Co-PIs: Chan T, Sankar A. Co-Investigators: Baxter N, **Hwang S**, Irish J, Sarhangian V, Simpson A, Stukel T, Urbach D, Wijeyesundera D, de Mestral C. 220,596 CAD. [Grants]
- 2021 Jul - 2023 Jun **Co-Investigator.** Service Bans among People Experiencing Homelessness: A Timeline Mapping Study of Antecedents and Consequences. Social Sciences and Humanities Research Council of Canada (SSHRC). Insight Development Grant. PI: Kidd, Sean. Collaborator(s): **Hwang S**, Kozloff N, Marshall CA, Noble A, Stergiopoulos V, Kerman N, Polillo A. 74,885 CAD. [Grants]
- 2021 Jun - 2022 May **Principal Applicant.** A Qualitative Exploration of Vaccine Uptake and Hesitancy Among People Experiencing Homelessness in Toronto. Canadian Institutes of Health Research (CIHR). Operating Grant: Emerging COVID-19 Research Gaps & Priorities. PI: **Hwang, Stephen**. Collaborator(s): Jenkinson J, Kiran T, Orkin A, Thulien N. 100,258 CAD. [Grants]
- 2021 Feb - 2022 Mar **Co-Investigator.** Co-building Equity-Mobilizing Partnerships in Community (EMPaCT) to increase impact through equitable patient-oriented partnerships in research, policy and practice. Ontario Strategy for Patient Oriented Research (SPOR) SUPPORT Unit. EMPOWER Award. PI: Sayani, Ambreen and Maybee, Alies. Collaborator(s): Lofters A, Shaw J, **Hwang S**, Bloch G, Parsons J, Gordon D, Chandra S, Corrado AM, Manthorne J, Nicholson E. 25,000 CAD. [Grants]
- 2020 Sep - 2021 Aug **Principal Applicant.** The COVENANT Study: COVID-19 Cohort Study of People Experiencing Homelessness in Toronto. Canadian Institutes of Health Research (CIHR). Operating Grant: COVID-19 Rapid Research Funding Opportunity. VR5-173211. PI: **Hwang, Stephen**. Collaborator(s): Nisenbaum N, McGeer A, Mishra S, Ostrowski M, deVilla E, Dhalla I, Gingras A, Gommerman J, Jamal A, Kiran T, Lachaud J, Lee R, Mejia Lancheros C, Mubareka S, Baral S, Chris A, Agarwal A. 1,901,698 CAD. [Grants]
- 2020 Jul - 2024 Jun **Co-Investigator.** Canadian Housing Evidence Collaborative (CHEC). Canada Mortgage and Housing Corporation (CMHC) / Social Sciences and Humanities Research Council (SSHRC). CMHC-SSHRC Housing Partnership Development Grant. PI: Dunn, James R. Collaborator(s): 41 Co-investigators. 1,135,000. [Grants]
- 2020 Jul - 2022 Jun **Co-Investigator.** Differential Cognitive Contributions to Functional Ability and Quality of Life in Homeless Adults. Social Sciences and Humanities Research Council of Canada (SSHRC). Insight Development Grant. PI: Gicas, Kristina. Collaborator(s): Stergiopoulos V, **Hwang S**. 65,188 CAD. [Grants]
- 2020 Jun - 2021 May **Co-Investigator.** The COVID-19 Hospital Analytics Laboratory: Improving the Clinical, Organizational, and System Response to COVID-19. Canadian Institutes of Health Research (CIHR). Operating Grant: COVID-19 Rapid Research Funding Opportunity. PI: Verma A (Nominated PI). Collaborator(s): Greenberg A, Chan T, Cheung A, Ghassemi M, Herridge M, Mamdani M, Razak F, Rosella L (Co-PI); Ahmed A. Appleton A, Azzam K, Bell C, Chignell M, Clifford P, Cram P, Daneman N, Desveaux L, Dhalla I, Diamant A, Edelstein B, Fralick M, Gill S, Grimshaw J, Hadfield G, Hawker G, Hussein H, **Hwang SW**, Ivers N, Jensen L, Kandel C, Kapral M, Kwan J, Lapointe-Shaw L, Leis J, Liu J, Lubbers S, MacFadden D,

MacMillan T, Manuel D, Marville-Williams C, Mishra S, Muller M, Ng V, et.al. (Co-I).
2,010,000 CAD. [Grants]

- 2020 May - 2023 May **Co-Investigator.** Improving access to lung cancer screening in the underserved, and building capacity for future cancer patient oriented research in Canada. Canadian Institutes of Health Research (CIHR). Patient-Oriented Research Grant. PI: Sayani, Ambreen. Collaborator(s): Lofters A, **Hwang S**, Bloch G, Parsons J, Manthorne J, Nicholson E. 22,500 CAD. [Grants]
- 2020 May - 2021 Apr **Co-Investigator.** The Effects of the COVID-19 Pandemic Response for People who are Marginalized. University of Toronto, Toronto COVID-19 Action Initiative. PI: Bayoumi, Ahmed M. Collaborator(s): Caudarella A, Du Mont J, Durbin A, Firestone M, Holness L, **Hwang S**, Maguire J, Mason R, Matheson F, Nisenbaum R, O'Campo P, Persaud N, Strike C, Werb D, Kolla G, Long C, Young S, Beder M, Dell E, Vozzolo B, Brillinger C, Davis S, Klaiman M, Schlosser L, Younie K, Raybourne R, Sheth P, Steer L, Hewitt T, Heineck K, Lunsy Y, Ibrahim S, John J, Thompson C, Kenny K, Brothers T, Dodd Z, Kendall C, Mawani F, Yakubovich A. 250,000 CAD. [Grants]
- 2020 May - 2020 Nov **Co-Investigator.** Pandemic-Proof: Synthesizing Real-World Knowledge of Promising Mental Health and Substance Use Practices for Young People Who Are Experiencing or Have Experienced Homelessness. Canadian Institutes of Health Research (CIHR). Operating Grant: Knowledge Synthesis: COVID-19-Mental Health. PI: Thulien N, Noble A. Collaborator(s): **Hwang S**, Kidd S. 49,548 CAD. [Grants]
- 2019 Sep - 2021 Sep **Co-Investigator.** Phenobarbital for the management of severe acute alcohol withdrawal syndrome: The PHENOMANAL Trial. St. Michael's Hospital. Department of Medicine Priorities Fund. PI: Burns, Karen E.A. Collaborator(s): Filewod N, **Hwang S**, Ailon J, Caudarella A, Lamba W, Gray S, Klaiman M. 50,000. [Grants]
- 2019 Apr - 2027 Mar **Principal Investigator.** Interventions Research in Homelessness, Housing, and Health. Canadian Institutes of Health Research (CIHR). Foundation Grant. Collaborator(s): Aubry T, Dunn J, Fabreau G, Gaetz S, Heineck K, Isaranuwatthai W, Nisenbaum R, Palepu A, Raine L, Richter T, Stergiopoulos V, Thulien N, Watson K. 3,972,033 CAD. [Grants]
- 2019 Apr - 2020 Mar **Co-Investigator.** Housing for All Canadians. Social Sciences and Humanities Research Council of Canada (SSHRC). Partnership Development Grant. PI: Dunn, James. Collaborator(s): Harris R, Gabel C, Dion M, Baker-Collins S, Fudge Schormans A, Van Der Linden C, Woodhall J, **Hwang S**, Riva M, Evans J, Collins D, Moos M, Amborski D, Baker E, Leishman C, Suttor G, Gurstein P, Smith M, Pomeroy S, Smetanin P, Barata P, Dewling G, Johnson P, Nord P, Rolfe S. 80,000 CAD. [Grants]
- 2018 Oct - 2019 Sep **Co-Investigator.** Women, Victimization, and Homelessness: Towards a conceptual model to advance trauma- and violence-informed research, policy and practice. Canadian Institutes for Health Research (CIHR). Project Grant. PI: Frankish, James and Abbott, Janet. Collaborator(s): Eiboff F, **Hwang S**, Krausz R, Martin R, Nicholls T, O'Campo P, Strehlau V, Torchalla I. 68,850. [Grants]
- 2017 Oct - 2020 Sep **Principal Investigator.** Improving Support Systems and Health Outcomes for People Experiencing Homelessness. Ontario Ministry of Health and Long-Term Care. Health System Research Fund. Collaborator(s): Vicky Stergiopoulos. 2,087,998 CAD. [Grants]
- 2017 Jul - 2018 Nov **Principal Investigator.** Evaluation Services for the Ontario Basic Income Pilot. Ministry of Community and Social Services. Collaborator(s): **Hwang S**, Dunn J (Co-Lead) O'Campo P, Gabel C, Downey B, Pinto A, Tarride J, Lewchuk W (Co-Principal Investigators) Jüni P, Glazier R, Persaud N, Tarasuk V, Kurdyak P, Coulombe S, Oreopoulos P, Kroft K, Forget E, Sweetman A, Myers K, Aratany T, Shankardass K, Upshur R, Smith B, Rosella L, Bayoumi AM, Isaranuwatthi W, Zuberi D, Fudge-Schormans A, Boyle M, Siddiqi A, King M (Co-Investigators). 2,460,000 CAD. [Grants]

- 2017 Mar - 2021 Mar **Co-Investigator.** CLEAN Meds RCT: Carefully seLected and Easily Accessible at No charge Medications. Canadian Institutes of Health Research (CIHR). SPOR Innovative Clinical Trial Multi-Year Grant. PI: Persaud, Nav. Collaborator(s): Mitchell C, Laupacis A, Nicholas A, Boozary A, Glazier R, Gomes T, **Hwang S**, Jüni P, Law M, Mamdani M, Manns B, Martin D, Morgan S, Oh P, Pinto A, Shah B, Sullivan F, Thorpe K, Tu K. 1,065,001 CAD. [Grants]
- 2017 Mar - 2021 Mar **Co-Investigator.** Betting on housing: Women, problem gambling and homelessness. Social Sciences and Humanities Research Council of Canada (SSHRC). Insight Grants. 435-2017-0716. PI: Matheson, Flora. Collaborator(s): Woodhall-Melnik J, Guilcher SJT, **Hwang SW**, Hahmann TE. 252,387 CAD. [Grants]
- 2016 Apr - 2019 Mar **Co-Investigator.** Optimizing Support and Service Delivery for Problem Gambling Among People Living with Complex Needs. Ontario Ministry of Health and Long-Term Care. Health System Research Fund. PI: Matheson, Flora & Guilcher, Sara. Collaborator(s): **Stephen Hwang**, Nigel Turner, Chris McKillop, Stuart Watt, Wayne Skinner. 749,185. [Grants]
- 2016 Jan - 2019 Dec **Co-Investigator.** CLEAN Meds RCT: The impact of providing carefully selected essential medications at no charge to primary care patients. Ontario Strategy for Patient-Oriented Research (SPOR) Support Unit. Targeted IMPACT Award. PI: Persaud, Nav & Shah, B. Collaborator(s): J Abelson, M Bedard, S Booker, A Boozary, M Evans, R Glazier, T Gomes, **S Hwang**, S Ikura, A Laupacis, M Law, M Mamdani, B Manns, D Martin, S Morgan, D Morissette, P Oh, A Pinto, F Sullivan, K Thorpe, K Tu. 1,000,000. [Grants]
- 2015 Oct - 2017 Sep **Co-Investigator.** Elucidating the health care utilization of people who experience detention or incarceration in provincial facilities in Ontario: a population-based study. Physicians Services Inc. Health Research Grant. PI: Kouyoumdjian, Fiona. 77,000. [Grants]
- 2015 Jul - 2022 Jun **Co-Investigator.** Improving Mental Health Care for High Risk and Disadvantaged Populations: Evidence to Inform Policy and Practice. Canadian Institutes for Health Research (CIHR). Foundation Scheme. PI: Stergiopoulos V. Collaborator(s): **Hwang S**, Goering P, Bowlby A, Chodos H. 1,427,647. [Grants]
- 2015 May - 2016 Apr **Co-Principal Investigator.** Understanding the health impact of extreme temperatures on homeless populations with a view to enhancing Toronto's extreme weather plans and responses: Developing a research proposal. University of Toronto Dalla Lana School of Public Health, The Wellesley Institute, and Toronto Public Health. Healthier Cities and Communities Hub Seed Grant. PI: Bassil, Kate. Collaborator(s): **SW Hwang**, S Gower, A Wainberg, M Kim. 9,861. [Grants]
- 2015 Apr - 2017 Mar **Co-Investigator.** Effects of the Regent Park Housing Redevelopment on Mental Health: Medium-Term Effects of a Population Health Intervention. Canadian Institutes of Health Research (CIHR). Population Health Intervention Research. PI: Dunn, James. Collaborator(s): Co-Investigators: **S. Hwang**, M. Janus, F. Matheson, R Moineddin, C. Muntaner, P. O'Campo. 198,878. [Grants]
- 2015 Jan - 2015 Dec **Co-Investigator.** Understanding the Landscape of Youth Mental Health: Engaging Youth in an Interactive World Café. Canadian Institutes of Health Research (CIHR). Planning and Dissemination Grant. PI: Woodhall-Melnik, Julia. Collaborator(s): Co-Principal Investigator: F.I. Matheson. Co-Investigators: S. Guilcer, P. Ferentzey, W. Skinner, **S. Hwang**, N. Turner. 12,500. [Grants]
- 2015 Jan - 2015 Dec **Co-Investigator.** Defining Gender-Specific Health Research Priorities for Youth Facing Homelessness. Canadian Institutes of Health Research (CIHR). Planning and Dissemination Grant. PI: Matheson, Flora. Collaborator(s): Co-Principal Investigator: J. Woodhall-Melnik. Co-Investigators: S. Guilcer, P. Ferentzey, W. Skinner, **S.W. Hwang**, N. Turner. 10,000. [Grants]
- 2014 Oct - 2019 Sep **Co-Investigator.** Examining the interplay between victimization, justice involvement and housing among homeless mentally ill men and women: A longitudinal study. Canadian

Institutes of Health Research (CIHR). Open Operating Grant. PI: Nicholls, Tonia. Collaborator(s): A.G. Crocker, **S.W. Hwang**, R.M. Krausz, E.A. Latimer, L. Roy, J. Somers. 774,958. [Grants]

- 2014 Jul - 2018 Jun **Co-Investigator.** Does subsidized housing improve mental health? GTA West Housing and Health Study Renewal. Canadian Institutes of Health Research (CIHR). Open Operating Grant. PI: Dunn, James. Collaborator(s): P. O'Campo, C. Muntaner, R. Moineddin, **S. Hwang**, F. Matheson, M. Janus. 995,877. [Grants]
- 2014 Jul - 2015 Jun **Co-Investigator.** Defining priorities and creating a network for prisoner health research in Canada. Canadian Institutes of Health Research (CIHR). Planning Grant. PI: Kouyoumdjian, Fiona. Collaborator(s): G. Brown, **S. Hwang**, L. Kiefer, F. Matheson, D. Silva. 24,890. [Grants]
- 2013 Oct - 2018 Sep **Co-Principal Investigator.** A Randomized Controlled Trial of Housing First for Homeless People with Mental Illness: Long-term Outcomes. Canadian Institutes of Health Research (CIHR). Operating Grant. MOP-130405. PI: **Hwang, Stephen**, O'Campo P, Stergiopoulos V. Collaborator(s): A. Bayoumi, P. Goering, R. Nisenbaum, S. Tsemberis. 1,984,383. [Grants]
- 2013 Oct - 2017 Sep **Co-Investigator.** Our Health Counts Toronto: Developing a Population Based Urban Aboriginal Cohort to Assess and Enhance Individual, Family, and Community Health and Wellbeing. Canadian Institutes for Health Research (CIHR). Operating Grant. PI: Smylie, Janet. Collaborator(s): SE Booth, C Bourgeois, SH Wolfe, B Allan, M Firestone, P Fleischer, D Gesink, RH Glazier, HA Howard, **SW Hwang**, R Nisenbaum, PJ O'Campo, M Snyder. 992,183. [Grants]
- 2013 May - 2014 Jul **Co-Investigator.** Problem Gambling and Housing Instability. Ontario Problem Gambling Research Centre. Standard Research Awards. PI: Matheson, Flora. Collaborator(s): **S.W. Hwang**, P. Ferentzy, W.J. Skinner. 101,346. [Grants]
- 2013 Mar - 2014 Feb **Co-Investigator.** Does subsidized housing improve mental health and healthy child development? GTA West Housing and Health Study Renewal. Canadian Institutes of Health Research (CIHR). Operating Grant - Population Health Interventions. PI: Dunn, James. Collaborator(s): **S. Hwang**, M. Janus, F. Matheson, R. Moineddin, C. Muntaner, P. O'Campo. 100,000. [Grants]
- 2012 Jul - 2019 Jun **Co-Investigator.** Canadian Observatory on Homelessness: Creating Policy Impact. Social Sciences and Humanities Research Council of Canada (SSHRC). Partnership Grant. PI: Gaetz, Stephen. Collaborator(s): T Aubry, S Baker Collins, Y Belanger, C Bellot, CJ Charette, J Distasio, MP Eberle, C Forchuk, P Goering, JR Graham, R Hurtubise, **SW Hwang**, JM Karabanow, KA Kovacs Burns, DS McCormack, PM Menzies, J Mosher, WL O'Grady, B Pauly, VA Preston, S Shapson, AI Tanasescu Turner, WE Thurston, JL Waegemakers Schiff. 2,500,000. [Grants]
- 2012 Apr - 2015 Mar **Co-Investigator.** The effectiveness of a brief intervention on improving health outcomes for homeless people with unmet health needs. Canadian Institutes of Health Research (CIHR). Partnerships for Health System Improvement. PI: Stergiopoulos, Vicky. Collaborator(s): D. Wasylenki, J. Durbin, **S. Hwang**, R. Nisenbaum, P. O'Campo, J. Tepper. 343,000. [Grants]
- 2012 Apr - 2015 Mar **Co-Investigator.** Increasing Access to Mental Health Services for Street-Involved Youth: The Effectiveness of a Theory-based Multicomponent Resilience and Motivational Intervention. Canadian Institutes of Health Research (CIHR). Partnerships for Health System Improvement. PI: McCay, Elizabeth. Collaborator(s): C. Howes, B. Ferguson, J. Henderson, W. Horton, J. Hughes, **S. Hwang**, J. Karabanow, S. Kidd, J. Langley, B. MacLaurin, I. Manion, S. Quesnel, E. Saewyc, E. Santa Mina, J. Schwind, A. Aiello, K. Ginsburg, D. Soenen. 217,140. [Grants]
- 2012 Apr - 2014 Mar **Co-Investigator.** Picturing foster care: A photo voice evaluation of three different fostering models and their implications for perinatal care provision. Canadian Institutes of Health

Research (CIHR). Operating Grant. PI: Parsons, Janet. Collaborator(s): K. Boydell, **S. Hwang**, P. O'Campo, A. Scott, S. Sridharan. 257,496. [Grants]

- 2012 Apr - 2014 Mar **Principal Investigator.** Advancing the Health and Housing in Transition (HHIT) Study: An extended four-year follow-up of the health of homeless and vulnerably housed adults in three Canadian cities. Canadian Institutes of Health Research (CIHR). Operating Grant. MOP-86765. Collaborator(s): T. Aubry, S. Farrell, A. Palepu, J. Dunn, J. Hoch, A. Hubley, J. Hulchanski, F. Klodawsky, R. Nisenbaum. 1,111,930. [Grants]
- 2012 Mar - 2014 Feb **Principal Investigator.** Population Health Interventions to End Homelessness. Canadian Institutes of Health Research (CIHR). Operating Grant: Population Health Intervention Research. GIR-120511. Collaborator(s): T. Aubry, C. Benoit, J. Dunn, S. Farrell, J. Hoch, A. Hubley, J. Hulchanski, F. Klodawsky, B. MacLaurin, A. Palepu, M. Shapcott, V. Stergiopoulos, C. Worthington. 200,000. [Grants]
- 2011 Oct - 2012 Sep **Co-Investigator.** Clarifying the link between traumatic brain injury and homelessness: a planning workshop. Canadian Institutes of Health Research (CIHR). Meetings, Planning and Dissemination Grant: Planning Grant. PI: Topolovec-Vranic, Jane. Collaborator(s): Angela Colantonio, Michael Cusimano, **Stephen Hwang**, Pia Kontos, M. Donna Ouchterlony, Vicky Stergiopoulos. 24,837. [Grants]
- 2011 Jul - 2012 Jun **Co-Investigator.** Meeting, Planning, and Dissemination Grant: A Resilience and Strengths-based Intervention to Promote Engagement, Positive Development and Reduce Risk in Street-involved Youth. Canadian Institutes of Health Research (CIHR). PI: McCay, Elizabeth. Collaborator(s): C. Howes, M. McDonald, S. Quesnel, K. Ginsburg, T. Guimond, S. Kidd, J. Hughes, **S. Hwang**, J. Karabanow, J. Langley, B. MacLaurin, E. Saewyc, E. Santa Mina, J. Scwind, A. Aiello. 24,800. [Grants]
- 2010 Nov - 2011 Mar **Principal Investigator.** Development Grant for the preparation of a CIHR Programmatic Grant Proposal "Population Health Interventions to Reduce Homelessness and Improve Health". Canadian Institutes for Health Research (CIHR). Collaborator(s): Tim Aubry, Susan Farrell, Anita Hubley, Fran Klodawsky, Anita Palepu, Catherine Worthington (Co-Investigators). 15,000. [Grants]
- 2010 Apr - 2011 Mar **Co-Investigator.** Responding to H1N1 in the Context of Homelessness in Canada. Canadian Institutes of Health Research (CIHR). Operating Grant: Health Systems Research on H1N1. PI: Gaetz, Stephen. Collaborator(s): Syed Ali, John Graham, Roch Hurtubise, **Stephen Hwang**, Roger Keil, Janet Mosher, Bernadette Pauly, Jeannette Waegemakers-Schiff, Jianhong Wu. 99,975. [Grants]
- 2010 Jan - 2014 Dec **Co-Investigator.** CIHR Team in Traumatic Brain Injury and Violence. Canadian Institutes of Health Research (CIHR). Team Grant: Strategic Teams in Applied Injury Research. TIR-103946. PI: Cusimano, Michael. Collaborator(s): Jane Topolovec-Vranic, Carolyn Snider, Charles Tator, **Stephen Hwang**, et al. 2,000,000. [Grants]
- 2010 Jan - 2012 Dec **Co-Investigator.** Enhancement of Transitional Housing Programmes for Street-involved Youth through the Application of Dialectical Behaviour Therapy to Strengthen Resilience. Canadian Institutes of Health Research (CIHR) & the Mental Health Commission of Canada (MHCC). Partnerships for Health System Improvement (PHSI). PI: McCay, Elizabeth. Collaborator(s): Carol Howes, Madelyn McDonald, Heather Beanlands, Linda Cooper, Jean Hughes, **Stephen Hwang**, Jeff Karabanow, John Langley, Bruce MacLaurin, Shelley McMMain, Susan Quesnel, Souraya Sidani, Catherine Worthington (co-investigators & decision maker partners). 329,792. [Grants]
- 2009 Aug - 2010 Jun **Co-Investigator.** Understanding Pandemic Preparedness in the Context of the Canadian Homelessness Crisis. Canadian Institutes of Health Research (CIHR). CIHR Catalyst Grant: Pandemic Preparedness. PI: Gaetz, Stephen. Collaborator(s): Syed Ali, John Graham, Roch Hurtubise, **Stephen Hwang**, Roger Keil, Janet Mosher, Bernadette Pauly, Jeannette Waegemakers-Schiff, Jianhong Wu. 100,000. [Grants]

- 2009 Jul - 2012 Jun **Co-Investigator.** Positive Spaces, Healthy Places - Phase IV: Monitoring and Evaluation to Understand the Health Effects of Housing Status in HIV/AIDS. Canadian Institutes of Health Research (CIHR). PI: Rourke, Sean. Collaborator(s): Saara Greene, Ruthanne Tucker, Jean Bacon, Steve Byers, **Stephen Hwang**, Jay Koornstra, Frank McGee, LaVerne Monette, Michael Sobota. 300,000. [Grants]
- 2009 Apr - 2015 Mar **Co-Investigator.** The CIHR ACHIEVE Research Partnership: Action for Health Equity Interventions Training Grant. Canadian Institutes of Health Research (CIHR). Strategic Training Initiative in Health Research. TGF-96566. PI: O'Campo, Patricia. Collaborator(s): Kelly Murphy (co-PI), Ahmed M Bayoumi, James Dunn, Patrick Fafard, Sarah Flicker, Richard Glazier, Jeffrey Hoch, **Stephen Hwang**, Kamran Kahn, James Lvery, Rosane Nisenbaum, Sean B Rourke, Janet K Smylie, Sanjeev Sridharan, Robb Travers, Alan Walks, Blair Whaeaton. 1,790,000. [Grants]
- 2009 Apr - 2013 Mar **Co-Principal Investigator.** The "At Home" Research Demonstration Project in Mental Health and Homelessness --Toronto Site. Mental Health Commission of Canada / Health Canada. PI: **Stephen Hwang**, Vicky Stergiopoulos, Pat O'Campo. Collaborator(s): Sanjeev Sridharan, James Dunn, Ahmed Bayoumi, Kelly Murphy. 22,246,216. [Grants]
This project is a multi-site randomized controlled trial of Housing First and mental health support services for persons experiencing homelessness and mental illness. I am co-PI for the Toronto site, which has recruited a total of 550 study participants (300 to receive intervention and 250 to receive "treatment as usual"). Total funding for the Toronto site is \$22.2 million over 4 years (\$18.6 million for service delivery and \$3.6 million for research and evaluation). This project has already had a major policy impact at the national level: (<http://www.vancouversun.com/news/Ottawa+commits+five+more+years+funding+affordable+housing/8133648/story.html>).
- 2009 Jan - 2009 Dec **Co-Investigator.** A retrospective longitudinal cohort study comparing health services utilization and health outcomes between patients admitted to an urban tertiary care centre's family practice inpatient ward, either under their own family doctor or a previously unknown family doctor. British Columbia College of Family Physicians. PI: Chuck Wen. Collaborator(s): Garey Mazowita and **Stephen W. Hwang** (co-investigators). 7,600. [Grants]
- 2009 Jan - 2009 Dec **Co-Investigator.** Alleviating disparities in oral health: Responding to the information needs of key decision makers. Canadian Institutes of Health Research (CIHR). DOH-87105. PI: David Locker, Carlos Quinonez. Collaborator(s): Peter Cooney, Raisa Deber, Paul Grootendorst, **Stephen Hwang**, Jeffrey Racine, S. Suri (Co-Investigators). 109,900. [Grants]
- 2008 Dec - 2012 Jun **Co-Investigator.** Effects of the Regent Park Housing Redevelopment on Mental Health and Healthy Child Development. Canadian Institutes of Health Research (CIHR). PI: James Dunn. Collaborator(s): **Stephen Hwang**, Patricia O'Campo (co-investigators). 251,000. [Grants]
- 2008 Jul - 2015 Jun **Co-Investigator.** Strategic Knowledge Clusters Grant: Canadian Homelessness Research Network. Social Sciences and Humanities Research Council (SSHRC). PI: Stephen Gaetz. Collaborator(s): Céline Bellot, C. James Frankish, Janet Mosher, J. David Hulchanski, Jeff Karabanow, Roch Hurtubise, **Stephen Hwang**, Tim Aubry, Uzoamaka Anucha, William O'Grady (Co-applicants); Anita Palepu, Isolde Daiski, Roger Keil, Shirley Roy, Valerie Preston (Collaborators). 2,100,000. [Grants]
- 2008 Apr - 2013 Mar **Co-Investigator.** Effects of Social Housing on Adult and Child Mental Health: A Prospective Study in the GTA West. Canadian Institutes of Health Research (CIHR). PI: James Dunn. Collaborator(s): **Stephen Hwang**, Magdalena Janus, Flora Matheson, Rahim Moineddin, Carles Muntaner, Patricia O'Campo (Co-Investigators). 1,119,795. [Grants]
- 2008 Apr - 2012 Mar **Principal Investigator.** The Health and Housing in Transition (HHiT) Study: A Longitudinal Study of the Health of Homeless and Vulnerably Housed Adults in Vancouver, Toronto, and Ottawa. Canadian Institutes of Health Research (CIHR). CIHR MOP-86765. Collaborator(s):

Tim Aubry, Susan Farrell, Anita Palepu (Co-Principal Investigators); James Dunn, Jeff Hoch, Anita Hubley, J. David Hulchanski, Fran Klodawsky, Rosane Nisenbaum (Co-Investigators). 1,602,472. [Grants]

- 2008 Jan - 2009 Mar **Co-Principal Investigator.** A Developmental Community-Based Research Study to Investigate Factors Leading to Pregnancy and HIV Risk among Female Street Youth in Toronto. Ontario HIV Treatment Network (The) (OHTN). PI: Allison Scott & **Stephen Hwang**. Collaborator(s): Beth Hayhoe, Janet Parsons, Catherine Worthington (Co-investigators). 23,880. [Grants]
- 2007 Oct - 2009 Sep **Co-Investigator.** Collaborative mental health care for the homeless: Effectiveness and cost-effectiveness of two shelter-based models. Canadian Institutes of Health Research (CIHR). CIHR PHE-85210. PI: Vicky Stergiopoulos. Collaborator(s): Carolyn Dewa, Katherine Rouleau, Donald Wasylenki (Co-Principal Investigators); Jeffrey Hoch, **Stephen Hwang**, Rosane Nisenbaum (Co-Investigators). 98,224. [Grants]
- 2007 Jul - 2008 May **Principal Investigator.** A Survey of Domiciliary Hostel Program Residents in Ontario. Ontario Mental Health Foundation. 149,250. [Grants]
- 2006 Dec - 2007 Dec **Co-Investigator.** Homelessness and Diversity Issues in Canada: Dissemination Grant in support of the preparation of an edited volume entitled "Finding Home: Policy Options for Addressing Homelessness in Canada". Social Sciences and Humanities Research Council (SSHRC). PI: J. David Hulchanski. Collaborator(s): **Stephen Hwang**, Sylvia Novac (Co-Investigators). 50,000. [Grants]
- 2006 Jun - 2006 Nov **Principal Investigator.** Development Grant to assist in the preparation of a full proposal entitled "CIHR Team Grant in Homelessness, Housing, and Health". Canadian Institutes for Health Research (CIHR). CIHR CTL-80871. Collaborator(s): Tim Aubry, James Dunn, Jeff Hoch, Anita Hubley, David Hulchanski, Bruce MacLaurin, Anita Palepu, Marie Robert, Élise Roy, Jeffrey Turnbull, Catherine Worthington (Co-Investigators). 10,000. [Grants]
- 2006 Apr - 2011 Mar **Principal Investigator.** Interdisciplinary Capacity Enhancement Grant in Homelessness, Housing, and Health. Canadian Institutes of Health Research (CIHR). CIHR HOA-80066. Collaborator(s): Tim Aubry, James Dunn, Jeff Hoch, Anita Hubley, David Hulchanski, Bruce MacLaurin, Anita Palepu, Marie Robert, Élise Roy, Jeffrey Turnbull, Catherine Worthington (Co-Investigators). 820,000. [Grants]
- 2006 Apr - 2009 Mar **Collaborator.** Hospice and Homelessness in Canada. Social Sciences and Humanities Research Council (SSHRC). PI: Manal Guirguis-Younger. Collaborator(s): Frances Legault, Tim Aubry (Co-Investigators); **Stephen Hwang**, Jeff Turnbull, Vivien Runnels (Collaborators). 85,845. [Grants]
- 2006 Apr - 2007 Feb **Principal Investigator.** The Effects of Supportive Housing on the Health Status and Service Utilization of Homeless and Hard-to-House Adults. The Wellesley Institute. Collaborator(s): Tim Aubry, Jim Dunn, Jeff Hoch (Co-Investigators); Joseph Taylor, Marcella Fresolone (Collaborators). 40,000. [Grants]
- 2005 Jul - 2006 Jun **Co-Investigator.** Access to Primary Care for the Homeless: A Synthesis of Research Evidence on Effective Practices. Canadian Institutes for Health Research (CIHR). PI: Samuel Shortt. Collaborator(s): **Stephen Hwang**, Heather Stuart (Co-Investigators). 64,900. [Grants]
- 2005 Jul - 2005 Nov **Principal Investigator.** Development Grant to assist in the preparation of a full proposal entitled "CIHR Interdisciplinary Capacity Enhancement Grant in Homelessness, Housing, and Health". Canadian Institutes for Health Research (CIHR). CIHR HDD-77939. Collaborator(s): Tim Aubry, James Dunn, Jeff Hoch, Anita Hubley, David Hulchanski, Bruce MacLaurin, Anita Palepu, Marie Robert, Élise Roy, Jeffrey Turnbull, Catherine Worthington (Co-Investigators). 5,000. [Grants]
- 2005 Jun - 2007 May **Co-Principal Investigator.** Attitudes of Medical Trainees Towards Homeless Persons

Presenting for Care in the Emergency Department. The Physicians' Services Incorporated (PSI) Foundation. PI: Julie Spence and **Stephen Hwang**. Collaborator(s): Glen Bandiera (Co-Investigator). 94,000. [Grants]

- 2005 Jun - 2006 Mar **Principal Investigator**. Development Grant to assist in the preparation of a full proposal entitled "CIHR Team Grant in Homelessness, Housing, and Health". Canadian Institutes for Health Research (CIHR). CIHR CTL-77144. Collaborator(s): Tim Aubry, James Dunn, Jeff Hoch, Anita Hubley, David Hulchanski, Bruce MacLaurin, Anita Palepu, Marie Robert, Élise Roy, Jeffrey Turnbull, Catherine Worthington (Co-Investigators). 10,000. [Grants]
- 2005 Apr - 2008 Mar **Co-Investigator**. A prospective study to explore the impact of housing support and homelessness on the health outcomes of people living with HIV/AIDS in Ontario. Canadian Institutes for Health Research (CIHR). CIHR CBR-75568. PI: Ruthann Tucker and Saara Greene. Collaborator(s): Steve Byers, James Dunn, Dale Guenter, **Stephen Hwang**, Jay Koonstra, LaVerne Monette, Lea Narciso, Sean Rourke, Michael Sobota (Co-Investigators). 300,000. [Grants]
- 2004 Jul - 2005 Jun **Co-Investigator**. Nature and Extent of Inappropriate Living Environments for Adults with Moderate to Severe Acquired Brain Injury. Ontario Neurotrauma Foundation. PI: Angela Colantonio. Collaborator(s): Peter Coyte, **Stephen Hwang**, Audrey LaPorte, Bruce Christensen, Bonnie Kirsh, Charissa Levy, Teresa Chiu, Diana Clarke, Carolyn Abramowitz (Co-Investigators). 150,000. [Grants]
- 2004 Jul - 2005 Jun **Co-Investigator**. Development of a quality of life instrument for homeless persons and street youth. Canadian Institutes for Health Research (CIHR). PI: Anita Palepu and Anita Hubley. Collaborator(s): Tim Aubry, Ahmed Bayoumi, **Stephen Hwang**, Elise Roy (Co-Investigators). 60,160. [Grants]
- 2004 Mar - 2005 Aug **Co-Principal Investigator**. The Effect of the Ontario Severe Acute Respiratory Syndrome (SARS) Outbreak on Population Mortality. Canadian Institutes for Health Research (CIHR). CIHR SAR-67802. PI: **Stephen Hwang** and Chaim Bell. Collaborator(s): Angela Cheung, Rahim Moineddin (Co-Investigators). 51,593. [Grants]
- 2003 Sep - 2006 Sep **Principal Investigator**. Health Care Utilization among Homeless People. Agency for Healthcare Research and Quality (AHRQ). 1 RO1 HS014129-01. Collaborator(s): Wendy Levinson, Don Redelmeier, John Paul Szalai, George Tolomiczenko (Co-Investigators). 667,788 USD. [Grants]
- 2003 Jul - 2009 Jun **Co-Investigator**. An Integrated Training Program in Health and Social Science Research to Improve the Health of Marginalized Populations. Canadian Institutes of Health Research (CIHR). CIHR STO-64598. PI: Wendy Levinson, Andreas Laupacis, Joan Eakin. Collaborator(s): Richard Glazier, **Stephen Hwang**, Alex Jadad, Prabhat Jha, Donald Redelmeier, Harvey Skinner, Donald Wasylenki (Co-Investigators). 1,350,000. [Grants]
- 2003 Jul - 2007 Jun **Co-Investigator**. Health services utilization in a concentrated urban setting: A population-based analysis of trends over time. Canadian Institutes for Health Research (CIHR). CIHR MOP-15693. PI: Richard Glazier. Collaborator(s): Mohammad Agha, Elizabeth Badley, **Stephen Hwang**, Flora Matheson, Rahim Moineddin, Leah Steele (Co-Investigators). 630,092. [Grants]
- 2003 Jul - 2004 Jun **Principal Investigator**. REACH3: Research Alliance for Canadian Homelessness, Housing, and Health. Canadian Institutes for Health Research (CIHR). CIHR HDP-63062. Collaborator(s): Tim Aubry, James Dunn, Anita Palepu, Élise Roy, Alan Shiell, Jeffrey Turnbull (Co-Investigators). 100,000. [Grants]
- 2003 Mar - 2006 Mar **Principal Investigator**. Health Care Utilization among Homeless People. Canadian Institutes for Health Research (CIHR). CIHR MOP-62736. Collaborator(s): Wendy Levinson, Don Redelmeier, John Paul Szalai, George Tolomiczenko (Co-investigators). 261,328. [Grants]

- 2002 Jul - 2003 Jun **Co-Investigator.** Housing as a Socio-economic Determinant of Health: A needs, gaps, and opportunities assessment for research. Canadian Institutes for Health Research (CIHR), Institute of Population and Public Health. CIHR NGO-54119. PI: James Dunn. Collaborator(s): Michael Hayes, David Hulchanski, **Stephen Hwang**, Louise Potvin (Co-Investigators). 97,900. [Grants]
- 2001 Feb - 2003 Mar **Principal Investigator.** A Community-Based Program to Promote Cervical Cancer and Breast Cancer Screening in Homeless Women. Ontario Women's Health Council. Collaborator(s): Angela Cheung, Eva Mocarski (Co-Investigators). 622,650. [Grants]
- 1999 Jul - 2003 Jun **Co-Investigator.** Trends in Health Services Utilization in a Concentrated Urban Setting, 1991-2003. Medical Research Council of Canada. MRC MT-15693. PI: Richard Glazier. Collaborator(s): Robin Badgley, Elizabeth Badley, Marsha Cohen, **Stephen Hwang**, Dianne Patychuk (Co-Investigators). 158,140. [Grants]
- 1999 Jul - 2000 Jun **Co-Investigator.** Changes in the Demographic Composition and Health Status of Immigrant Populations in Toronto's Inner City: Time Trend Analysis and Innovative Mapping. Joint Centre of Excellence for Research on Immigration and Settlement – Toronto (CERIS). PI: Richard Glazier. Collaborator(s): Carl Amrhein, Marsha Cohen, Elizabeth Badley, Robin Badgley, **Stephen Hwang**, Byron Moldofsky, Rob Wright, David Buckeridge, Nita Chaudhry (Co-Investigators). 40,000. [Grants]
- 1998 Jul - 2001 Jun **Co-Investigator.** Effects of Restructuring the Health System on Equity and Access for a Vulnerable Inner City Population: A Time Trend Analysis 1991-2001. National Health Research and Development Program. PI: Richard Glazier. Collaborator(s): Robin Badgley, Elizabeth Badley, Marsha Cohen, Vivek Goel, **Stephen Hwang**, Michael Mendelson (Co-Investigators). 149,892. [Grants]
- 1998 Jul - 2001 Jun **Co-Investigator.** The Health Effects of Reductions in Welfare Payments and Hospital Closures on Immigrant Populations in Southeast Toronto: A Ten Year Time Trend Analysis. Joint Centre of Excellence for Research on Immigration and Settlement - Toronto. PI: Richard Glazier. Collaborator(s): Marsha Cohen, Elizabeth Badley, Robin Badgley, Vivek Goel, **Stephen Hwang**, Michael Mendelson (Co-Investigators). 45,000. [Grants]
- 1998 Jul - 2000 Jun **Principal Investigator.** Determinants of Health Status in Inner City Rooming House Residents. The Connaught Foundation and the University of Toronto. Collaborator(s): George Tolomiczenko, J. David Hulchanski (Co-Investigators). 45,000. [Grants]
- 1997 Jul - 1999 Jun **Principal Investigator.** Health Status and Health Care Utilization in Patients Leaving the Hospital Against Medical Advice. The Physicians' Services Incorporated Foundation. Collaborator(s): Jianli Li (Co-Investigator). 16,000. [Grants]

AWARDED BUT DECLINED

- 2022 Apr - 2025 Mar **Co-Investigator.** Social isolation, loneliness and causes of early death among adults with histories of homelessness who transitioned into urban supportive housing in Toronto. Social Sciences and Humanities Research Council of Canada (SSHRC). Insight Grant. 435-2022-0602. PI: Lachaud, James. Collaborator(s): **Hwang SW**, Jenkinson J, Mejia-Lancheros C, O'Campo P, Woodhall-Melnik J, Perri M, Stergiopoulos V; Sirotich F, Merchant P, Peters V. 89,908 CAD. [Grants]

NON-PEER-REVIEWED GRANTS

FUNDED

- 2017 - 2026 **Principal Investigator.** Beyond Housing Initiative & The Navigator Program. St. Michael's Foundation. 4,038,353 CAD. [Donations]
The Beyond Housing Initiative is improving service coordination to achieve better wellness and housing outcomes for individuals experiencing chronic homelessness in Toronto. The

Navigator Program is a critical-time intervention to improve health and health care outcomes for people experiencing homelessness who have been admitted to the hospital.

2012 Jan - 2013 Dec	Principal Investigator. Probiotics for the Prevention of Clostridium difficile Infection in Hospitalized Patients. University of Toronto, Department of Medicine. Strategic Planning Innovation Fund. Collaborator(s): Valerie Palda, Susy Hota, Irfan Dhalla, David Klein, Dante Morra, Muhammad Mamdani, Kevin Thorpe, Catharine Chambers. 74,784. [Grants]
2003 Jul - 2003 Dec	Co-Investigator. Health, mental health, and addiction treatment needs of people who are homeless in Toronto. City of Toronto, Supporting Community Partnership Initiative (SCPI). PI: Paula Goering. Collaborator(s): Jennifer Pyke, Stephen Hwang , Sheryl Lindsay, George Tolomiczenko, Donald Wasylenki (Co-Investigators). 90,000. [Grants]
2002 Jul - 2003 Jun	Co-Principal Investigator. Models and Practices in Service Integration and Coordination for Women who are Homeless or at Risk of Homelessness. Ontario Women's Health Council. PI: Stephen Hwang . Collaborator(s): Deborah Hierlihy (Co-Principal Investigator). 94,969. [Grants]
2002 Jul - 2003 Jun	Co-Investigator. The Multidimensional Impacts of Adequate Housing: Factors that Affect Housing Stability, Service Use, and Community Integration. City of Toronto, Supporting Communities Partnership Initiative (SCPI). PI: J. David Hulchanski. Collaborator(s): Stephen Hwang , Lynn McDonald, Sylvia Novac, George Tolomiczenko, Valerie Tarasuk (Co-Investigators). 64,953. [Grants]
2002 Jul - 2002 Dec	Co-Principal Investigator. First International Conference on Inner City Health. Canadian Institutes for Health Research (CIHR). PI: Stephen Hwang . Collaborator(s): Ahmed Bayoumi (Co-Principal Investigator). 50,000. [Grants]
1998 Jul - 1999 Jun	Co-Principal Investigator. Housing and Population Health. Canada Mortgage and Housing Corporation. PI: Stephen Hwang . Collaborator(s): Esme Fuller-Thompson, J. David Hulchanski (Co-Principal Investigators). 45,800. [Grants]
1997 Jul - 1999 Jun	Principal Investigator. Mortality in a Cohort of Homeless Adults in Toronto. University of Toronto Faculty of Medicine, Dean's Fund. 10,000. [Grants]
1995 Jul - 1996 Jun	Principal Investigator. Risk Factors for Death in Homeless Adults in Boston. Boston University School of Medicine, Health Services Research Program. 6,500 USD. [Grants]

2. Salary Support and Other Funding

Personal Salary Support

2013 Jan - present	Chair in Homelessness, Housing and Health. St. Michael's Hospital and the University of Toronto. Toronto, Ontario, Canada.
2003 Mar - 2008 Feb	New Investigator Award. Canadian Institutes of Health Research. 275,000. Ottawa, Ontario, Canada.
1998 Jul - 2003 Jun	Career Scientist Award, Health Research Personnel Development Program. Ontario Ministry of Health and Long Term Care. 298,750. Toronto, Ontario, Canada.
1996 Sep - 2013 Jan	Population Health Epidemiologist. St. Michael's Hospital. Toronto, Ontario, Canada.
1994 Jul - 1996 Jun	Health Services Research Fellowship. Agency for Health Care Policy Research (AHCPH) and the Harvard School of Public Health. 90,000. Boston, Massachusetts, United States.

Trainee Salary Support

2021 Jun - 2023 Jun	CIHR Fellowship - Research & Knowledge Translation on Urban Housing and Health. Trainee Name: Jesse Jenkinson. Canadian Institutes of Health Research. 90,000. Toronto, Ontario, Canada.
2020 Apr - 2022 Mar	CIHR Fellowship - Research & Knowledge Translation on Urban Housing and Health. Trainee Name: James Lachaud. Canadian Institutes of Health Research. 90,000. Toronto, Ontario, Canada.
2013 Jul - 2016 Jun	CIHR Fellowship. Trainee Name: Fiona Kouyoumdjian, MD, PhD. Canadian Institutes of Health Research. 165,000. Ottawa, Ontario, Canada.
2012 Aug - 2017 Jul	National Institute on Drug Abuse (NIDA) Mentored Patient-Oriented Research Career Development Award (K23). Trainee Name: Travis Baggett, MD, MPH. National Institutes of Health. 840,000 USD. Bethesda, Maryland, United States.
2008 Sep - 2010 Aug	Graduate Studentship Award. Trainee Name: Allison Scott, MSc. Ontario HIV Treatment Network (OHTN). 44,000. Toronto, Ontario, Canada.
2006 Jul - 2008 Jun	CIHR Strategic Training Initiative in Health Research (STIHR) Fellowship. Trainee Name: Allison Scott, MSc. Canadian Institutes of Health Research. 50,000. Toronto, Ontario, Canada.

E. Publications

1. MOST SIGNIFICANT PUBLICATIONS

Stergiopoulos V, Mejia-Lancheros C, Nisenbaum R, Wang R, Lachaud J, O'Campo P, **Hwang SW**. The long-term effects of rent supplements and mental health support services on housing and health outcomes of homeless adults with mental illness: outcomes of the extended At Home/Chez Soi randomized controlled trial. *The Lancet Psychiatry*. 2019 Nov;6(11):915-925. Impact Factor 18.3. **Coauthor or Collaborator**.

This paper reports the long-term effects of housing first for people experiencing homelessness. This landmark RCT provides 7-year outcome data, the longest follow-up of any such study in the world.

Stergiopoulos V, **Hwang SW**, Gozdzik A, Nisenbaum R, Latimer E, Rabouin D, Adair CE, Bourque J, Connelly J, Frankish J, Katz LY, Mason K, Misir V, O'Brien K, Sareen J, Schütz CG, Singer A, Streiner DL, Vasiliadis H-M, Goering PN, for the At Home/Chez Soi Investigators. Effect of Scattered-Site Housing Using Rent Supplements and Intensive Case Management on Housing Stability among Homeless Adults with Mental Illness: A Randomized Trial. *JAMA*. 2015 Mar;313(9):905-915. Impact Factor 30. **Co-Principal Author**.

This paper reports the main outcomes of the At Home/Chez Soi Study, a randomized trial of the Housing First model for people with mental illness who are experiencing homelessness. This study is helping to change how society addresses the problem of homelessness. The study has had a substantial impact on federal and provincial programs and policies to end chronic homelessness (http://www.esdc.gc.ca/eng/communities/homelessness/housing_first/index.shtml), and it is the impetus for a MaRS proposal for a Housing First Social Impact Bond (<http://www.marsdd.com/mars-library/housing-first-social-impact-bond-feasibility-study/>).

Hwang SW, Burns T. Health Interventions for People who are Homeless. *The Lancet*. 2014 Oct;384(9953):1541-1547. Impact Factor 39.1. **Principal Author**.

This review article was published by The Lancet as one of two featured papers on the theme of homelessness.

Hwang SW, Wilkins R, Tjepkema M, O'Campo PJ, Dunn JR. Mortality among residents of shelters, rooming houses, and hotels in Canada: An 11-year follow-up study. *BMJ*. 2009 Oct;339:b4036. Impact Factor 12.8. **Co-Principal Author**.

This large national cohort study, the first of its kind, demonstrated that homeless and marginally- housed persons living in shelters, rooming houses, and hotels have much higher mortality and shorter life expectancy than expected on the basis of low income alone. This study highlighted the fact that people who are vulnerably housed suffer from many of the same threats to health as people who are homeless. This research provided important support for the concept of housing as a determinant of health.

Hwang SW, Colantonio A, Chiu S, Tolomiczenko G, Kiss A, Cowan L, Redelmeier DA, Levinson W. The Effect of Traumatic Brain Injury on the Health of Homeless People. Canadian Medical Association Journal. 2008 Oct;179(8):779-784. Impact Factor 7.1. **Principal Author**.

This study was the first to demonstrate the high prevalence of traumatic brain injury among homeless individuals and the strong association between history of traumatic brain injury and poor health in this population. This paper has sparked research efforts on this topic in Canada, the United States, and Europe.

2. PEER-REVIEWED PUBLICATIONS

Journal Articles

Richard L, Golding H, Saskin R, Jenkinson JIR, Francombe Pridham K, Gogosis E, Snider C, **Hwang SW**. Cold-related injuries among patients experiencing homelessness in Toronto: a descriptive analysis of emergency department visits. Canadian Journal of Emergency Medicine. 2023 Jul. [Epub ahead of print]. Impact Factor 2.9. **Senior Responsible Author**.

Thulien N, **Hwang SW**, Kozloff N, Nisenbaum R, Akdikmen A, Fambegbe O, Feraday R, Mathewson C, Mutamiri M, Roglich J, Wang A, Zagala M, Amiri A. "When I think about my future, I just see darkness": How youth exiting homelessness navigate the hazy, liminal space between socioeconomic exclusion and inclusion. Canadian Journal of Public Health. 2023 Jul. [Epub ahead of print]. Impact Factor 4.3. **Coauthor or Collaborator**.

Agha A, **Hwang SW**, Wang R, Nisenbaum R, Palepu A, Aubry T. A Longitudinal Study of the Prevalence of Chronic Homelessness Among Single Adults According to Different Definitions in Canada. Canadian Journal of Urban Research. 2023 Jun. In Press. **Coauthor or Collaborator**.

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Hwang SW, Martin RE, Tolomiczenko GS, Hulchanski JD. The Relationship Between Housing Conditions and Health Status of Rooming House Residents in Toronto. Centre for Urban and Community Studies, Research Bulletin #26. Toronto: Centre for Urban and Community Studies, 2004. **Principal Author.**

Goering P, Pyke J, Bullock H, Hoch J, **Hwang S**, Lindsay S, Tolomiczenko G, Wasylenki D. Health, Mental Health and Addiction Treatment Needs of People Using Emergency Shelters in Toronto. Prepared for: City of Toronto, Community and Neighbourhood Services, Shelter, Housing and Support Division, 2004. **Coauthor or Collaborator.**

Hierlihy D, **Hwang SW**, Whitzman C, Hamilton A. Models and Practices in Service Integration and Coordination for Women who are Homeless or At-Risk of Homelessness: An Inventory of Initiatives. Toronto: Ontario Women's Health Council, 2004. **Coauthor or Collaborator.**

Frankish CJ, **Hwang SW**, Quantz D. The Relations Between Homelessness & Health in Canada: Research Lessons and Priorities. Ottawa: Canadian Institutes of Health Research, 2003. **Coauthor or Collaborator.**

Hwang SW, Martin R, Tolomiczenko G, Hulchanski D. Rooming house residents: Challenging the stereotypes. Centre for Urban and Community Studies, Research Bulletin #16. Toronto: Centre for Urban and Community Studies, 2003. **Principal Author.**

Hwang SW, Fuller-Thomson E, Hulchanski JD, Bryant T, Habib Y, Regoeczi W. Housing and Population Health: A Review of the Literature. Ottawa: Canada Mortgage and Housing Corporation, 1999. **Principal Author.**

Hwang SW, Fuller-Thomson E, Hulchanski JD, Bryant T, Habib Y, Regoeczi W. The Housing/Health Relationship: Research, Policy and Program Implications. Ottawa: Canada Mortgage and Housing Corporation, 1999. **Principal Author.**

4. SUBMITTED PUBLICATIONS**Journal Articles**

Richard L, Nisenbaum R, Colwill K, Mishra S, Dayam RM, Liu M, Pedersen C, Gingras A-C, **Hwang SW**. Enhancing detection of SARS-CoV-2 re-infections using longitudinal sero-monitoring: demonstration of a methodology in a cohort of people experiencing homelessness in Toronto, Canada. *Annals of Epidemiology*. 2023 Jul. **Senior Responsible Author.**

Jamal O, Dimaras H, Mallipatna A, **Hwang S**. Social Determinants of Health in Pediatric Ophthalmology Patients: Availability in the Electronic Health Record and Association with Clinic Visits. *Translational Vision Science & Technology (TVST)*. 2023 Jul. **Coauthor or Collaborator.**

Dunn JR, Smith KLW, Smith P, Moineddin R, Muntaner C, Matheson FI, **Hwang, SW**, Janus M, O'Campo P. Baseline participant profile and study design from a quasi-experimental study assessing the health impacts of receiving subsidized housing. *Social Science & Medicine - Population Health*. 2023 Jul. **Coauthor or Collaborator.**

Stephenson R, Sarhangian V, Park J, Sankar A, Baxter NN, Stukel TA, Simpson AN, Wijeyesundera DN, Wilton AS, de Mestral C, **Hwang SW**, Pincus D, Campbell R, Urbach DR, Irish J, Gomez D, Chan TCY. Evolution of the surgical procedure gap during and after the COVID-19 pandemic in Ontario, Canada: a cross-sectional and modeling study. *British Journal of Surgery*. 2023 Jun. **Coauthor or Collaborator.**

Durbin A, Woodhall-Melnik J, Wang R, Stergiopoulos V, **Hwang SW**, Lachaud J, Mejia-Lancheros C. The relationship between resilience and suicidal ideation and suicide attempts among homeless adults with mental illness: Longitudinal findings from the At Home/Chez Soi Study, Toronto site. *Suicide and Life-Threatening Behavior*. 2023 May. **Coauthor or Collaborator.**

Booth RG, Shariff SZ, Carter B, **Hwang SW**, Orkin A, Forchuk C, Gomes T. Mortality from opioid toxicity among people experiencing homelessness, 2017 to 2021: a population-based analysis using coroner and health administrative data from Ontario, Canada. *Addiction*. 2023 Apr. Impact Factor 6. **Coauthor or Collaborator**.

F. Presentations and Special Lectures

1. International

Invited Lectures and Presentations

- 2023 Mar 30 **Invited Speaker**. Housing First: Efficacy, Limitations and Future Directions. Drug Policy Alliance. United States. Presenter(s): **Hwang SW**, Boden P.
- 2022 Sep 22 **Invited Speaker**. Beyond Housing. 18th Annual International Street Medicine Symposium. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**, Ecker J.
- 2022 Apr 5 **Invited Speaker**. A Pilot Intervention Program: From Shelter Hotels to Stable Housing. Harvard T.H. Chan School of Public Health, Initiative on Health and Homelessness, Research & Practice Seminar Series. Boston, Massachusetts, United States. Presenter(s): **Hwang SW**.
- 2020 Feb 19 **Distinguished Speaker**. Creating Urban Health Solutions: Promises and Perils. University of Colorado, Department of Family Medicine, Levitt Distinguished Speaker Series. Denver, Colorado, United States. Presenter(s): **Hwang SW**.
- 2015 Apr 23 **Invited Speaker**. Pragmatic and Patient-Centered: Clinical Trials Done Differently. Society of General Internal Medicine (SGIM) 38th Annual Meeting / Patient-Centered Outcomes Research Institute (PCORI). Toronto, Ontario, Canada. Presenter(s): Chuang CH, **Hwang SW**, Jacobs E, Gapka S, Bild D, Kraschnewski JL.
- 2015 Apr 22 **Invited Speaker**. Defining the Role and Value of GIM -- The Canadian Experience. Association of Chiefs and Leaders of General Internal Medicine (ACLGIM) Management and Leadership Institute. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Dec 5 **Invited Speaker**. High-Cost Medicaid Users Supportive Housing Think Tank. Supportive Housing Network of New York (SHNNY). New York City, New York, United States. Presenter(s): **Hwang SW**.
- 2014 Mar 5 **Keynote Speaker**. 2nd International Symposium on Homelessness, Social Exclusion, and Health Inequalities. Faculty for Homeless and Inclusion Health. London, United Kingdom. Presenter(s): **Hwang SW**. Epidemiology of Homelessness and Exclusion.
- 2012 Oct 24 **Invited Speaker**. Caring for Homeless Patients: Why Research Does (and Doesn't) Help. Boston University School of Medicine/Boston Medical Center - Section of General Internal Medicine Grand Rounds. Boston, Massachusetts, United States. Presenter(s): **Hwang SW**.
- 2012 Oct 24 **Invited Speaker**. The At Home Study: An RCT of Housing First for Homeless People with Mental Illness. Massachusetts General Hospital - General Internal Medicine Rounds. Boston, Massachusetts, United States. Presenter(s): **Hwang SW**.
- 2012 Oct 23 **Invited Speaker**. Research on Homelessness, Housing, and Health in Toronto, Canada. Boston Health Care for the Homeless Program (BHCHP) Grand Rounds. Boston, Massachusetts, United States. Presenter(s): **Hwang SW**.
- 2010 Jun 2 **Invited Speaker**. Examining Structural HIV Interventions: Methodological Challenges. North American Housing and HIV/AIDS Research Summit V. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2008 Feb 4 **Invited Speaker**. Traumatic Brain Injury and Homelessness. The 2nd Annual Camillus House Institute of Homeless Studies Symposium: Applying Research to End Homelessness. Miami, Florida, United States. Presenter(s): **Hwang SW**.
- 2007 Oct 18 **Invited Speaker**. Traumatic Brain Injury and Homelessness. Columbia University Mailman School of

- Public Health, Center for Homelessness Prevention Studies, Grand Rounds. New York City, New York, United States. Presenter(s): **Hwang SW**.
- 2007 Oct 11 **Invited Speaker**. Quality of Life in Non-mainstream Populations. 2007 Annual Meeting of the International Society for Quality of Life Research (ISOQOL). Toronto, Ontario, Canada. Presenter(s): **Hwang SW**, Hubley A, Smylie J.
- 2007 Jun 14 **Invited Speaker**. Pandemic readiness planning and homelessness. 2007 National Health Care for the Homeless Conference. Washington, District of Columbia, United States. Presenter(s): **Hwang SW**.
- 2006 Oct 21 **Co-author**. Impact of Housing Status and Perceived Quality of Housing Environment on Health Related Quality of Life in HIV/AIDS. National Housing and HIV/AIDS Research Summit II. Baltimore, Maryland, United States. Presenter(s): Tucker R, Greene S, Rourke SB, Guenter D, Monette L, Narciso L, Koornstra J, Byers S, Sobota M, Dunn J, **Hwang SW**. Oral presentation by M. Sobota and J. Koornsta.
- 2006 Mar 9 **Invited Speaker**. National and International Perspectives on Homelessness and Health. Canadian Institutes of Health Research (CIHR), Reducing Health Disparities Research and Policy Symposium. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2005 Oct 26 **Invited Speaker**. How to Understand and Conduct Research on Homelessness: A Practical Guide. 4th International Conference on Urban Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**, Svoboda T. Pre-Conference Workshop.
- 2005 Jun 29 **Invited Speaker**. Homeless and Mentally Ill: Quality of Life. Seminar on "Psychiatric Epidemiology: Searching for Causes". 2005 Joint Meeting of the Society for Epidemiologic Research and the Canadian Society for Epidemiology and Biostatistics (SER/CSEB). Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. Seminar Presentation.
- 2003 Sep 21 **Invited Speaker**. Homelessness and Health. Canadian Institutes of Health Research (CIHR), International Think Tank on Reducing Health Disparities and Promoting Equity for Vulnerable Populations. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2002 Oct 6 **Chair**. Closing Remarks. 1st International Conference on Inner City Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**, Bayoumi A.
- 1996 Apr **Speaker**. Mortality Rates Among Homeless Adults in Boston. Harvard School of Public Health, Clinical Epidemiology Research Rounds. Boston, Massachusetts, United States. Presenter(s): **Hwang SW**.

Presented Abstracts

- 2023 May 16 **Presenter**. A Navigator Program to Improve the Care of Homeless Patients Admitted to Hospital. 2023 National Health Care for the Homeless Conference & Policy Symposium. Baltimore, Maryland, United States. Presenter(s): **Hwang SW**, Ellerington F, Ranieri A, Jenkinson J.
- 2021 Dec **Co-author**. What can be done to improve diabetes care for the homeless? A comprehensive international scoping review of interventions. International Diabetes Federation Congress [Virtual Meeting]. Presenter(s): Campbell D, Grewal E, Tibebe T, Gonzalez P, Campbell R, **Hwang S**, McBrien K, Booth G.
- 2021 Nov **Co-author**. Placeless and Powerless: Experiences of patients who are homelessness and healthcare workers caring for them during COVID-19. 2021 North American Primary Care Research Group (NAPCRG) Annual Meeting. United States. Presenter(s): Hodwitz K, Juando-Prats C, Parsons J, Rosenthal E, Das P, Lockwood J, Snider C, **Hwang S**, Kiran T.
- 2021 Oct **Presenter**. Beyond Housing: Enhancing coordination and supports to complement case management in Housing First. Fourth International Housing First Conference. Canada. Presenter(s): **Hwang S**, Francombe Pridham K, Ecker J.
- 2021 Feb **Co-author**. Cognitive and functional trajectories in homeless adults: 6-year outcomes from the At Home/ Chez Soi study. 49th Annual Meeting of the International Neuropsychological Society. United States. Presenter(s): Gicas KM., Mejia-Lancheros C, Wang R., **Hwang S**, Stergiopoulos V. Poster presentation [virtual conference].
- 2019 Nov **Co-author**. How does context shape the process of discharging people experiencing homelessness from acute care hospitals? American Public Health Association (APHA) 2019 Annual Meeting and Expo.

Philadelphia, Pennsylvania, United States. Presenter(s): Jenkinson J, **Hwang SW**, Strike C, Di Ruggiero E. Oral presentation. (Trainee Presentation).

- 2019 Sep **Co-author.** Beyond a Home: Facilitating Socioeconomic Inclusion for Young People Transitioning Out of Homelessness. 14th European Research Conference on Homelessness. Helsingborg, Skåne län [SE-12], Sweden. Presenter(s): Naomi Thulien, **Stephen Hwang**, Andrea Wang. (Trainee Presentation).
- 2019 Jun **Co-author.** Mental illness, homelessness, and victimization: Results from the National At Home/Chez Soi Study and perspectives of people with lived experience (Symposium). International Association of Forensic Mental Health Services. Montreal, Quebec, Canada. Presenter(s): Nicholls TL, Eiboff F, Wang R, O'Campo P, **Hwang SW**, Frankish CJ. (Trainee Presentation).
- 2019 Jun **Co-author.** The effect of housing status on health care utilization and costs among homeless and vulnerably housed persons in Ontario. Symposium on Findings from a Longitudinal Study of the Health of Adults Who Are Homeless or Vulnerably Housed in Three Canadian Cities. Society for Community Research and Action - 2019 Biennial Conference. Chicago, Illinois, United States. Presenter(s): **Stephen Hwang**, Kathryn Wiens, Rosane Nisenbaum, Ewa Sucha, Tim Aubry, Arnaud Duhoux, Susan Farrell, Anne Gadermann, Anita Palepu. (Trainee Presentation).
- 2018 Aug **Co-author.** Perceptions of Housing Transitions Among People with Histories of Unstable Housing in Ottawa, Canada. American Psychological Association (APA) 2018 Convention. San Francisco, California, United States. Presenter(s): Konrad Czechowski, John Sylvestre, Fran Klodawsky, **Stephen Hwang**.
- 2018 Jun **Co-author.** Criminal justice-involvement, recovery and victimization among homeless mentally ill individuals: Findings from the Canadian At Home/Chez Soi study. International Association of Forensic Mental Health Services. Antwerp, Antwerpen, Belgium. Presenter(s): Eiboff F, Nicholls TL, Wang R, Frankish CJ, **Hwang SW**. (Trainee Presentation).
- 2018 Mar **Co-author.** High prevalence and severity of intimate partner violence among women who are homeless with mental illness. American Psychology-Law Society (AP-LS) 2018 Annual Conference. Memphis, Tennessee, United States. Presenter(s): Eiboff F, Nicholls TL, Wang R, Krausz M, Frankish CJ, **Hwang SW**. (Trainee Presentation).
- 2017 Nov 6 **Co-author.** Understanding the health impacts of weather on people experiencing homelessness: Using research to inform healthy public policy. American Public Health Association (APHA) 2017 Annual Meeting and Expo. Atlanta, Georgia, United States. Presenter(s): Bassil K, Wainberg A, Coleman PC, Gower S, Keirstead H, Kim M, **Hwang S**, Gogosis E. Oral presentation.
- 2017 Sep 1 **Co-author.** A comparison of intimate partner victimization among homeless women and men with mental illness. Symposium: Criminal justice involvement and victimization among homeless individuals with mental illnesses. The Royal Australian & New Zealand College of Psychiatrists (RANZCP) Faculty of Forensic Psychiatry 2017 Conference. Vancouver, British Columbia, Canada. Presenter(s): Eiboff F, Nicholls TL, Wang R, Moniruzzaman A, **Hwang SW**, Frankish CJ, Krausz M.
- 2015 Nov 2 **Senior author.** Emergency Department Visits for Cold-related Injuries among Homeless Adults: A 5-Year Cohort Study in Toronto, Canada. 143rd Annual Meeting of the American Public Health Association (APHA). Chicago, Illinois, United States. Presenter(s): Zhang P, Gower S, Bassil K, Kiss A, Katic M, **Hwang S**. Poster presentation.
- 2015 Nov 1 **Co-author.** High prevalence of overweight and obesity among homeless individuals with mental illness in Toronto, Canada. 143rd Annual Meeting of the American Public Health Association (APHA). Chicago, Illinois, United States. Presenter(s): Kaufman-Shriqui V, Gozdzik A, Misir V, Molnar A, **Hwang SW**. Oral presentation.
- 2015 Sep 25 **Co-author.** Homeless youth transitions to independent housing in Canada: Preliminary findings. European Research Conference on Families, Housing and Homelessness. Dublin, Ireland. Presenter(s): Thulien N, Gastaldo D, **Hwang S**, McCay E. (Trainee Presentation).
- 2015 Jun 25 **Co-author.** Health and housing in transition: A qualitative study. 2015 Biennial Conference of the Society for Community Research and Action. Lowell, Massachusetts, United States. Presenter(s): Polillo A, Sylvestre J, Aubry T, Klodawsky F, **Hwang SW**. Poster presentation. (Trainee Presentation).
- 2015 Apr 25 **Presenter.** Canadian Healthcare 101: Answers to all of the questions you are embarrassed to ask. 38th Annual Meeting of the Society of General Internal Medicine (SGIM). Toronto, Ontario, Canada.

- Presenter(s): Cram P, Bell C, Cavalcanti R, Dhalla I, **Hwang S**. Workshop. (Trainee Presentation).
- 2013 Nov 4 **Presenter**. Housing First with Intensive Case Management: 12 Month Outcomes of the At Home/Chez Soi Randomized Trial. 141st Annual Meeting of the American Public Health Association (APHA). Boston, Massachusetts, United States. Presenter(s): **Hwang SW**. Oral presentation.
- 2013 Oct 9 **Co-author**. Critical Illness in Homeless Persons: A Systematic Review of the Literature. 26th Annual Congress of the European Society of Intensive Care Medicine (ESICM). Paris, Paris, France. Presenter(s): Chant C, Smith O, Wang A, **Hwang S**, Friedrich JO, Burns KEA, Dos Santos CC. Poster presentation.
- 2013 Jun 3 **Co-author**. Development and Initial Validation of the Observer-rated Housing Quality Scale (OHQS) in a multi-site trial of Housing First. 2013 International Homelessness Research Conference, University of Pennsylvania & VA National Center on Homelessness Among Veterans. Philadelphia, Pennsylvania, United States. Presenter(s): Adair CE, Kopp B, Lavoie J, Distasio J, **Hwang S**, Watson A, Veldhuizen S, Chislett K, Voronka J, Ahmad M, Ahmed N, Goering P. Poster presentation.
- 2013 Jun 3 **Presenter**. At Home: A Randomized Controlled Trial of Housing First and Intensive Case Management for Homeless People with Mental Illness. 2013 International Homelessness Research Conference, University of Pennsylvania & VA National Center on Homelessness Among Veterans. Philadelphia, Pennsylvania, United States. Presenter(s): **Hwang SW**. Oral presentation.
- 2013 May 21 **Co-author**. Homelessness and Critical Care: A Systematic Review of the Literature. 2013 American Thoracic Society International Conference. Philadelphia, Pennsylvania, United States. Presenter(s): Chant C, Smith O, Wang A, **Hwang S**, Friedrich JO, Burns KEA, Dos Santos CC. Poster presentation.
- 2013 Mar 14 **Presenter**. At Home: A Randomized Controlled Trial of Housing First for Homeless People with Mental Illness. 2013 National Health Care for the Homeless Conference. Washington, District of Columbia, United States. Presenter(s): **Hwang SW**, Stergiopoulos V. Oral presentation (Workshop).
- 2012 Oct **Co-author**. Examining response shift and true change in self-reported physical and mental health status in homeless and vulnerably housed individuals. International Society for Quality of Life Research Conference. Budapest, Budapest, Hungary. Presenter(s): Gadermann AM, Sawatzky R, Palepu A, Hubley AM, Zumbo BD, Aubry T, **Hwang SW**. Oral presentation.
- 2011 Nov 3 **Co-author**. Implementing and Evaluating Dialectical Behaviour Therapy in Urban Street Youth: Addressing the Need for Mental Health Intervention. 10th International Conference on Urban Health. Belo Horizonte, Brazil. Presenter(s): McCay B, **Hwang SW**, et al. Poster presentation.
- 2011 May 10 **Senior Author**. Drowning risk of immigrants versus non-immigrants in the province of Ontario: A cross-sectional retrospective study. World Conference on Drowning Prevention 2011. Danang, Viet Nam. Presenter(s): Gallinger Z, Fralick M, Nisenbaum R, **Hwang SW**. Oral Presentation. (Trainee Presentation).
- 2010 Oct 28 **Co-author**. Housing Satisfaction is Associated with Better Physical and Mental Health-related Quality of Life among Persons Living with HIV. 9th International Conference on Urban Health. New York City, New York, United States. Presenter(s): Rourke SB, Bekele T, Tucker R, Sobota M, Monette L, Koornstra J, Byers S, **Hwang SW**, Dunn J, Guenter D, Watson J, Ahluwalia A, Bacon J, the Positive Spaces, Healthy Places Team. Oral presentation.
- 2010 Oct 28 **Presenter**. Health Care Utilization among Homeless Adults in Toronto, Canada. 9th International Conference on Urban Health. New York City, New York, United States. Presenter(s): **Hwang SW**, Chiu S, Chambers C, Tolomiczenko G, Kiss A, Cowan L, Redelmeier D, Levinson W. Oral presentation.
- 2010 Oct 28 **Principal Author**. Homeless People in the Hospital: Why Do They Cost More? 9th International Conference on Urban Health. New York City, New York, United States. Presenter(s): **Hwang SW**, Weaver J, Aubry T, Hoch J. Oral presentation. (Trainee Presentation).
- 2010 Oct 27 **Co-author**. Defining a Typology of Homelessness for Single Adults Based on Shelter Utilization Patterns in Three Canadian Cities. 9th International Conference on Urban Health. New York City, New York, United States. Presenter(s): Aubry TD, **Hwang SW**, Farrell S, Calhoun M. Oral presentation. (Trainee Presentation).
- 2010 Jul 19 **Co-author**. Upstream determinants of health and housing are major contributors to health-related quality

- of life in HIV infection. XVIII International AIDS Conference. Vienna, Austria. Presenter(s): Rourke S, Bekele T, Tucker R, Greene S, Monette L, Koornstra J, Sobota M, Byers S, Watson J, Bacon J, Ahluwalia A, Hambly K, **Hwang S**, Guenter D, Dunn J, Hamilton M, Truax J, Hintzen DB, White P, Kayitesi M, Desbiens M, De Blois S, Cubillos M, The Positive Spaces, Healthy Places Team. Poster presentation.
- 2009 Feb 26 **Co-author.** Epidemiology of tuberculosis among the homeless: Toronto 1998-2007. 13th International Union Against Tuberculosis and Lung Disease (IUATLD) North America Region Conference. Vancouver, British Columbia, Canada. Presenter(s): Khan K, Rea E, McDermaid C, Stuart R, Gardam M, Yang J, **Hwang S**. Poster presentation.
- 2008 Oct 31 **Presenter.** Changes in health status, quality of life, and alcohol and drug use among homeless and vulnerably housed adults applying to a supportive housing program. 7th International Conference on Urban Health. Vancouver, British Columbia, Canada. Presenter(s): **Hwang SW**. Oral presentation.
- 2008 Oct 30 **Presenter.** Access to primary care among homeless people within a system of universal health insurance. 7th International Conference on Urban Health. Vancouver, British Columbia, Canada. Presenter(s): **Hwang SW**. Poster presentation.
- 2008 Oct 29 **Presenter.** Homelessness and immigration in Toronto: A comparison of the health of homeless recent immigrants, non-recent immigrants, and Canadian-born individuals. 7th International Conference on Urban Health. Vancouver, British Columbia, Canada. Presenter(s): **Hwang SW**. Oral presentation.
- 2008 Oct 29 **Presenter.** The research alliance for Canadian homelessness, housing, and health (REACH3). 7th International Conference on Urban Health. Vancouver, British Columbia, Canada. Presenter(s): **Hwang SW**, Cowan L. Oral presentation.
- 2008 Oct 28 **Presenter.** Homelessness and immigration in Toronto: A comparison of the health of homeless recent immigrants, non-recent immigrants, and Canadian-born individuals. 136th Annual Meeting of the American Public Health Association (APHA). San Diego, California, United States. Presenter(s): Chiu S, **Hwang SW**. Oral presentation.
- 2008 Aug 6 **Co-author.** Housing status/stability and key determinants of health affect health outcomes in people living with HIV/AIDS: Moving Research into Action. XVII International AIDS Conference. Mexico City, Mexico. Presenter(s): Tucker R, Greene S, Sobota M, Koornstra J, Monette L, Guenter D, Byers S, Dunn J, **Hwang S**, Bernstine N, Shubert G, Bacon J, Rourke SB. Poster presentation.
- 2007 Nov 7 **Presenter.** Traumatic brain injury among homeless persons. 135th Annual Meeting of the American Public Health Association. Washington, District of Columbia, United States. Presenter(s): **Hwang SW**, Colantonio A, Chiu S, Tolomiczenko G, Kiss A, Cowan L, Redelmeier D, Levinson W. Poster presentation.
- 2007 Nov 2 **Presenter.** Traumatic brain injury among homeless persons. 6th International Conference on Urban Health. Baltimore, Maryland, United States. Presenter(s): **Hwang SW**, Colantonio A, Chiu S, Tolomiczenko G, Kiss A, Cowan L, Redelmeier D, Levinson W. Poster presentation.
- 2007 Jul 25 **Co-author.** Significant Housing, Economic and Social Challenges for People with HIV Who are Living with and Caring for Their Children: Results from the Canadian Positive Spaces, Healthy Places Study. NIMH Annual International Research Conference on the Role of Families in Preventing and Adapting to HIV/AIDS. San Francisco, California, United States. Presenter(s): Greene S, Tucker R, Rourke SB, Guenter D, Monette L, Narciso L, Koornstra J, Byers S, Sobota M, Dunn J, **Hwang SW**.
- 2006 Aug 13 **Co-author.** Building Community-Based Research Capacity through Exploring the Impact of Housing Status on People Living with HIV/AIDS in Ontario. XVI International AIDS Conference. Toronto, Ontario, Canada. Presenter(s): Tucker R, Greene S, Rourke SB, Guenter D, Monette L, Narciso L, Koornstra J, Byers S, Sobota M, Dunn J, **Hwang SW**. Oral presentation.
- 2006 Jun 8 **Presenter.** Access to Health Care for Homeless People with Serious Health Conditions in Toronto, Canada. 2006 National Health Care for the Homeless Conference. Portland, Oregon, United States. Presenter(s): **Hwang SW**, Chiu S, Khandor E, Mason K, Cowan L, Tolomiczenko G, Kiss A, Katic M, Redelmeier D, Levinson W. Poster presentation.
- 2005 Oct 26 **Presenter.** Access to Health Care for Homeless People with Serious Health Conditions in Toronto, Canada. 4th International Conference on Urban Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**, Chiu S, Khandor E, Mason K, Cowan L, Tolomiczenko G, Kiss A, Katic M, Redelmeier D, Levinson

W. Oral presentation.

- 2004 Oct **Presenter.** Bedbugs redux: Cimex lectularius infestations in homeless shelters and other locations in Toronto. 3rd International Conference on Urban Health. Boston, Massachusetts, United States. Presenter(s): **Hwang SW**, Svoboda TJ, De Jong IJ, Kabasele KJ, Moukas E. Poster presentation.
- 2004 Oct **Presenter.** Use of meal programs and shelters by homeless people in Toronto. 3rd International Conference on Urban Health. Boston, Massachusetts, United States. Presenter(s): **Hwang SW**, Chiu S, Kiss A, Katic M, Tolomiczenko G, Levinson W, Redelmeier D, Szalai JP, Cowan L. Poster presentation.
- 2004 Oct **Co-author.** Predictors of satisfaction with primary care and improving homeless men's access to primary care: A randomized controlled trial (preliminary results). 3rd International Conference on Urban Health. Boston, Massachusetts, United States. Presenter(s): Svoboda T, Bloch G, Knowles H, **Hwang S**, Glazier R, Kelly M, Chow K, Jones K, Tynan AM. Poster presentation.
- 2004 May 13 **Presenter.** General Internists: Shaping the Future of Homeless Health Care. 27th Annual Meeting of the Society of General Internal Medicine. Chicago, Illinois, United States. Presenter(s): Kertesz SG, Gordon A, Bharel M, Buchanan D, **Hwang S**, Jain S, Kehoe L, Kushel M, McCary J, O'Connell JJ, O'Toole TP. Pre-Course Presentation.
- 2003 Oct 15 **Presenter.** Risk factors for cardiovascular disease among homeless people in Toronto. 2nd International Conference on Urban Health. New York City, New York, United States. Presenter(s): Lee TC, Hanlon J, Ben-David J, Booth G, Cantor W, **Hwang SW**. Poster presentation.
- 2003 Sep 20 **Co-author.** Do graphic illustrations improve patients' comprehension of medication labels? Society of Teachers of Family Medicine Conference, Research Forum. Atlanta, Georgia, United States. Presenter(s): Tram C, Knarr N, **Hwang SW**. Oral presentation.
- 2002 Oct 3 **Co-author.** The Annex Harm Reduction Program: Rates of adherence and hepatotoxicity among homeless alcohol dependent men receiving directly observed prophylactic therapy (DOPT) during a tuberculosis outbreak. 1st International Conference on Inner City Health. Toronto, Ontario, Canada. Presenter(s): Svoboda T, **Hwang SW**, Chien K, Ross J. Poster presentation.
- 2002 Oct 3 **Co-author.** Do shelters for the homeless in Toronto provide appropriate menus for those with diabetes? 1st International Conference on Inner City Health. Toronto, Ontario, Canada. Presenter(s): Ross N, Chislett D, **Hwang S**, Whitham D, Hanning R, Miller K, Darling P. Poster presentation.
- 2002 Sep **Co-author.** Dietary folate deficiency suppresses mammary tumorigenesis in a chemical carcinogen rat model of breast cancer. Era of Hope 2002 Department of Defense Breast Cancer Research Program Meeting. Orlando, Florida, United States. Presenter(s): Kotsopoulos J, Sohn K-J, Martin R, Renlund R, **Hwang S**, Medline A, Kim YI. Oral presentation.
- 2002 Jun **Co-author.** Perceptions of emergency services among homeless people. 2nd International Conference of the International Society for Equity in Health. Toronto, Ontario, Canada. Presenter(s): Zakrisson TL, Hamel PA, **Hwang SW**. Poster presentation.
- 2002 Apr **Co-author.** Effects of dietary folate on the initiation and promotion phases of MNU-induced mammary tumorigenesis in rats. 2002 Annual Meeting of the American Association for Cancer Research. San Francisco, California, United States. Presenter(s): Kotsopoulos J, Sohn K-J, Martin R, Renlund R, **Hwang S**, Medline A, Kim YI. Oral presentation.
- 2001 May **Co-author.** Effects of dietary folate on colorectal carcinogenesis in a genetically-predisposed murine model of ulcerative colitis-associated colon cancer. 2001 Digestive Disease Week. Atlanta, Georgia, United States. Presenter(s): Carrier J, Medline A, Sohn KJ, **Hwang SW**, Kim YI. Poster presentation. Award for poster of distinction.
- 1999 Apr **Presenter.** Mortality Among Homeless Men in Toronto. 22nd Annual Meeting of the Society of General Internal Medicine. San Francisco, California, United States. Presenter(s): **Hwang SW**. Poster presentation.
- 1997 May **Presenter.** Risk Factors for Death in Homeless Adults in Boston. 20th Annual Meeting of the Society of General Internal Medicine. Washington, District of Columbia, United States. Presenter(s): **Hwang SW**, Lebow JM, Bierer MF, O'Connell JJ, Orav EJ, Brennan TA. Poster presentation.

Presented and Published Abstracts

- 2015 Oct 22 **Co-author.** Minimal impact of response shift for SF-12 mental and physical health status in the homeless and vulnerably housed: An item-level multi-group analysis. International Society for Quality of Life Research (ISOQOL) 22nd Annual Conference. Vancouver, British Columbia, Canada. Presenter(s): Gadermann AM, Sawatzky R, Palepu A, Hubley AM, Zumbo BD, Aubry T, **Hwang SW**. Oral presentation.
- Publication Details:*
Minimal impact of response shift for SF-12 mental and physical health status in the homeless and vulnerably housed: An item-level multi-group analysis. **Coauthor or Collaborator.**
- 2015 Apr 22 **Senior author.** The effect of advance directive completion on hospital care among homeless persons: A prospective cohort study. 38th Annual Meeting of the Society of General Internal Medicine (SGIM). Toronto, Ontario, Canada. Presenter(s): Leung AK, To M, Luong L, Syavash-Vahabi Z, Song J, **Hwang SW**. Poster presentation. (Trainee Presentation)
- Publication Details:*
The effect of advance directive completion on hospital care among homeless persons: A prospective cohort study. Journal of General Internal Medicine. April 2015;30,(2) S268.
- 2014 Jun 8 **Co-author.** Concurrent validity of the EQ-5D-3L in homeless adults with mental illness. 15th Biennial European Meeting of the Society for Medical Decision Making (SMDM). Antwerp, Antwerpen, Belgium. Presenter(s): Bayoumi AM, Pinto AD, O'Campo P, Stergiopoulos V, **Hwang S**. Oral presentation.
- Publication Details:*
Concurrent validity of the EQ-5D-3L in homeless adults with mental illness. Medical Decision Making. October 2014, 34(7) p.E7.
- 2014 Apr 24 An Advance Directive Intervention for Chronically Homeless People: Acceptability, Factors Associated with Completion, and Treatment Preferences. 37th Annual Meeting of the Society of General Internal Medicine (SGIM). San Diego, California, United States. Presenter(s): Leung AK, Nayyar D, Sachdeva M, Song J, **Hwang SW**. Poster presentation. (Trainee Presentation)
- Publication Details:*
An Advance Directive Intervention for Chronically Homeless People: Acceptability, Factors Associated with Completion, and Treatment Preferences. Journal of General Internal Medicine. April 2014;29,(1)S17.
- 2014 Apr **Senior author.** Advance directive intervention for chronically homeless people: Acceptability, factors associated with completion, and treatment preferences.
- Publication Details:*
Leung A, Nayyar D, Sachdeva M, Song J, **Hwang S**. Advance directive intervention for chronically homeless people: Acceptability, factors associated with completion, and treatment preferences. Journal of General Internal Medicine. 2014 Apr. April 2014;29(S1):S17-18. **Senior Responsible Author.**
- 2013 Jun Health status, health care utilization, and legal incidents following traumatic brain injury in homeless and vulnerably housed adults in three Canadian cities.
- Publication Details:*
To M, O'Brien K, Palepu A, Hubley AM, Farrell S, Aubry T, Gogosis E, Muckle W, **Hwang S**. Health status, health care utilization, and legal incidents following traumatic brain injury in homeless and vulnerably housed adults in three Canadian cities. Journal of General Internal Medicine. 2013 Jun. June 2013;28(S1):S85. **Senior Responsible Author.**
- 2013 Jun Unmet health needs among homeless and vulnerably housed adults in three Canadian cities.
- Publication Details:*
Argintaru N, Chambers C, Gogosis E, Farrell S, Palepu A, Klodawsky F, **Hwang S**. Unmet health needs among homeless and vulnerably housed adults in three Canadian cities. Journal of General Internal Medicine. 2013 Jun. June 2013;28(S1):S231-232. **Senior Responsible Author.**
- 2013 May Homelessness And Critical Care: A Systematic Review Of The Literature.

Publication Details:

Chant C, Smith O, Wang A, **Hwang S**, Friedrich JO, Burns KEA, Dos Santos CC. Homelessness And Critical Care: A Systematic Review Of The Literature. American Journal of Respiratory and Critical Care Medicine. 2013 May. 187;2013:A4419. **Coauthor or Collaborator**.

2011 May Mortality and Causes of Death Among Homeless Adults in Boston.

Publication Details:

Baggett TP, Rigotti NA, Stringfellow E, **Hwang S**, Orav EJ, O'Connell JJ. Mortality and Causes of Death Among Homeless Adults in Boston. Journal of General Internal Medicine. May 2011;26(S1):S234. **Coauthor or Collaborator**.

2011 May Is "appearing chronically ill" a sign of poor health?

Publication Details:

Hwang SW, Rawal S, Atia M, Nisenbaum R, Pare DE, Joordens S. Is "appearing chronically ill" a sign of poor health? Journal of General Internal Medicine. May 2011;26(S1):S94. **Principal Author**.

2009 May Differences in social and health determinants between First Nations and Non-First Nations Aboriginal people living with HIV/AIDS in Ontario: The Positive Spaces, Healthy Places Study.

Publication Details:

Monette L, Rourke SB, Tucker R, Greene S, Sobota M, Koornstra J, Byers S, Guenter D, **Hwang SW**, Dunn J, Ahluwalia A, Bekele T, Johnston C, Bacon J. Differences in social and health determinants between First Nations and Non-First Nations Aboriginal people living with HIV/AIDS in Ontario: The Positive Spaces, Healthy Places Study. Journal of Urban Health. May 2009;86(3):324. **Coauthor or Collaborator**.

2009 May Direct and indirect effect of social support on health-related quality of life among people living with HIV/AIDS in Ontario: The Positive Spaces, Healthy Places Study.

Publication Details:

Bekele T, Rourke SB, Tucker R, Greene S, Sobota M, Koornstra J, Monette L, Byers S, Ahluwalia A, **Hwang SW**, Dunn J, J Bacon. Direct and indirect effect of social support on health-related quality of life among people living with HIV/AIDS in Ontario: The Positive Spaces, Healthy Places Study. Journal of Urban Health. May 2009;86(3):326. **Coauthor or Collaborator**.

2009 May Disparities in health outcomes and social determinants of health between Aboriginal and Caucasian people living with HIV/AIDS in Ontario.

Publication Details:

Monette L, Rourke SB, Tucker R, Greene S, Sobota M, Koornstra J, Byers S, Guenter D, **Hwang SW**, Dunn J, Ahluwalia A, Bekele T, Johnston C, J Bacon. Disparities in health outcomes and social determinants of health between Aboriginal and Caucasian people living with HIV/AIDS in Ontario. Journal of Urban Health. May 2009;86(3):327. **Coauthor or Collaborator**.

2009 May Mental health and addiction issues and health service needs of people living with HIV/AIDS in Ontario: The Positive Spaces, Healthy Places Study.

Publication Details:

Rourke SB, Tucker R, Greene S, Sobota M, Koornstra J, Monette L, Byers S, Guenter D, **Hwang SW**, Dunn J, Ahluwalia A, Bacon J. Mental health and addiction issues and health service needs of people living with HIV/AIDS in Ontario: The Positive Spaces, Healthy Places Study. Journal of Urban Health. May 2009;86(3):446. **Coauthor or Collaborator**.

2009 May Homelessness and immigration in Toronto: A comparison of the health of homeless recent immigrants, non-recent immigrants, and Canadian born individuals.

Publication Details:

Hwang SW, Chiu A, Tolomiczenko C, Kiss A, Cowan L, Redelmeier D, Levinson W. Homelessness and immigration in Toronto: A comparison of the health of homeless recent immigrants, non-recent immigrants, and Canadian born individuals. Journal of Urban Health. May 2009;86(3):350. **Principal Author**.

- 2009 May Changes in health status, quality of life, and alcohol and drug use among homeless and vulnerably housed adults applying to a supportive housing program.
- Publication Details:*
Hwang SW, Gogosis E, Aubry T, Dunn J, Hoch J, Taylor J, Fresolone M, Kiss A. Changes in health status, quality of life, and alcohol and drug use among homeless and vulnerably housed adults applying to a supportive housing program. *Journal of Urban Health*. May 2009;86(3):365. **Principal Author**.
- 2009 May Access to primary care among homeless people within a system of universal health insurance.
- Publication Details:*
Hwang SW, Chiu S, Ueng J, Tolomiczenko C, Kiss A, Cowan L, Levinson W, Redelmeier D. Access to primary care among homeless people within a system of universal health insurance. *Journal of Urban Health*. May 2009;86(3):435. **Principal Author**.
- 2008 Apr 9 **Co-author**. Value of a longitudinal clinic experience: A survey of resident perceptions at a large Canadian internal medicine program. 31st Annual Meeting of the Society of General Internal Medicine. Pittsburgh, Pennsylvania, United States. Presenter(s): Locke KA, Tzanetos K, Imrie K, **Hwang SW**.
- Publication Details:*
 Value of a longitudinal clinic experience: A survey of resident perceptions at a large Canadian internal medicine program. *Journal of General Internal Medicine*. March 2008; 23, (S2) p. 437.
- 2008 Apr 9 **Co-author**. Priced out of the safety net? Declining access to health care among Birmingham's homeless, 1995-2005. 31st Annual Meeting of the Society of General Internal Medicine. Pittsburgh, Pennsylvania, United States. Presenter(s): Kertesz SG, **Hwang SW**, Ritchey FJ, LaGory M.
- Publication Details:*
 Priced out of the safety net? Declining access to health care among Birmingham's homeless, 1995-2005. *Journal of General Internal Medicine*. March 2008; 23, (S2) p. 379.
- 2008 Mar Value of a longitudinal clinic experience: A survey of resident perceptions at a large Canadian internal medicine program.
- Publication Details:*
 Locke KA, Tzanetos K, Imrie K, **Hwang SW**. Value of a longitudinal clinic experience: A survey of resident perceptions at a large Canadian internal medicine program. *Journal of General Internal Medicine*. March 2008;23(S2):437. **Coauthor or Collaborator**.
- 2008 Mar Priced out of the safety net? Declining access to health care among Birmingham's homeless, 1995-2005.
- Publication Details:*
 Kertesz SG, **Hwang SW**, Ritchey FJ, LaGory M. Priced out of the safety net? Declining access to health care among Birmingham's homeless, 1995-2005. *Journal of General Internal Medicine*. March 2008;23(S2):379-380. **Coauthor or Collaborator**.
- 2006 Apr 27 **Presenter**. Population Mortality during the SARS Outbreak in Toronto. 29th Annual Meeting of the Society of General Internal Medicine. Los Angeles, California, United States. Presenter(s): **Hwang SW**, Cheung AM, Bell CM, Moineddin R. Poster presentation.
- Publication Details:*
 Population Mortality during the SARS Outbreak in Toronto. *Journal of General Internal Medicine*. April 2006; 21, (S4) p. 104.
- 2006 Apr Population Mortality during the SARS Outbreak in Toronto.
- Publication Details:*
Hwang SW, Cheung AM, Moineddin R, Bell CM. Population Mortality during the SARS Outbreak in Toronto. *Journal of General Internal Medicine*. April 2006;21(Supplement 4):104. **Principal Author**.
- 2005 Dec Access to Health Care for Homeless People with Serious Health Conditions in Toronto, Canada.
- Publication Details:*

Hwang SW, Chiu S, Khandor E, Mason K, Cowan L, Tolomiczenko G, Kiss A, Katic M, Redelmeier D, Levinson W. Access to Health Care for Homeless People with Serious Health Conditions in Toronto, Canada. *Journal of Urban Health*. December 2005;82(Supplement 5):v28. **Principal Author**.

2005 Jun Use of meal programs and shelters by homeless people in Toronto.

Publication Details:

Hwang SW, Chiu S, Kiss A, Katic M, Tolomiczenko G, Levinson W, Redelmeier D, Szalai JP, Cowan L. Use of meal programs and shelters by homeless people in Toronto. *Journal of Urban Health*. June 2005;82(Supplement 2):ii46. **Principal Author**.

2005 Jun Bedbugs redux: Cimex lectularius infestations in homeless shelters and other locations in Toronto.

Publication Details:

Hwang SW, Svoboda TJ, De Jong IJ, Kabasele KJ, Moukas E. Bedbugs redux: Cimex lectularius infestations in homeless shelters and other locations in Toronto. *Journal of Urban Health*. June 2005;82(Supplement 2):ii46. **Principal Author**.

2005 Jun Predictors of satisfaction with primary care and improving homeless men's access to primary care: A randomized controlled trial (preliminary results).

Publication Details:

Svoboda T, Bloch G, Knowles H, **Hwang S**, Glazier R, Kelly M, Chow K, Jones K, Tynan AM. Predictors of satisfaction with primary care and improving homeless men's access to primary care: A randomized controlled trial (preliminary results). *Journal of Urban Health*. June 2005;82(Supplement 2):ii47-ii48. **Coauthor or Collaborator**.

2003 Oct Risk factors for cardiovascular disease among homeless people in Toronto.

Publication Details:

Lee TC, Hanlon J, Ben-David J, Booth G, Cantor W, **Hwang SW**. Risk factors for cardiovascular disease among homeless people in Toronto. *Journal of Urban Health*. October 2003;80(Supplement 2):ii69. **Senior Responsible Author**.

2003 Apr Mortality among homeless women.

Publication Details:

Cheung AM, **Hwang SW**. Mortality among homeless women. *Journal of General Internal Medicine*. April 2003;18(Supplement 1):170. **Senior Responsible Author**.

2003 Apr Homeless people's interactions with and trust in paramedics and police in Toronto.

Publication Details:

Hwang SW, Zakrisson TL, Hamel PA. Homeless people's interactions with and trust in paramedics and police in Toronto. *Journal of General Internal Medicine*. April 2003;18(Supplement 1):176. **Principal Author**.

2002 Dec The Annex Harm Reduction Program: Rates of adherence and hepatotoxicity among homeless alcohol dependent men receiving directly observed prophylactic therapy (DOPT) during a tuberculosis outbreak.

Publication Details:

Svoboda T, **Hwang S**, Chien K, Ross J. The Annex Harm Reduction Program: Rates of adherence and hepatotoxicity among homeless alcohol dependent men receiving directly observed prophylactic therapy (DOPT) during a tuberculosis outbreak. *Journal of Urban Health*. December 2002 (Supplement 1);79:S150-S151. **Coauthor or Collaborator**.

2002 Dec Do shelters for the homeless in Toronto provide appropriate menus for those with diabetes?

Publication Details:

Ross N, Chislett D, **Hwang S**, Whitham D, Hanning R, Miller K, Darling P. Do shelters for the homeless in Toronto provide appropriate menus for those with diabetes? *Journal of Urban Health*. December 2002 (Supplement 1);79:S147-S148. **Coauthor or Collaborator**.

- 2002 Effects of dietary folate on the initiation and promotion phases of MNU-induced mammary tumorigenesis in rats.
- Publication Details:*
Kotsopoulos J, Sohn K-J, Martin R, Renlund R, **Hwang S**, Medline A, Kim Y-I. Effects of dietary folate on the initiation and promotion phases of MNU-induced mammary tumorigenesis in rats. Proceedings of the American Association for Cancer Research 2002;. 43: Abstract #2539. **Coauthor or Collaborator**.
- 2001 Jun 1 The Impact of Leaving Hospital Against Medical Advice.
- Publication Details:*
Hwang SW, Li J. The Impact of Leaving Hospital Against Medical Advice. American Journal of Epidemiology. June 1, 2001;153(11):S221. **Principal Author**.
- 2001 Jun 1 The Relationship Between Income Level and Alcohol-Related Hospitalization Rates in an Urban Area.
- Publication Details:*
Hwang SW, Glazier RH. The Relationship Between Income Level and Alcohol-Related Hospitalization Rates in an Urban Area. American Journal of Epidemiology. June 1, 2001;153(11):S242. **Principal Author**.
- 2001 Jun **Presenter**. The Relationship Between Income Level and Alcohol-Related Hospitalization Rates in an Urban Area. 2001 Congress of Epidemiology. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**, Glazier RH. Joint Meeting of the American College of Epidemiology, the American Public Health Association Epidemiology Section, the Canadian Society for Epidemiology and Biostatistics, and the Society for Epidemiologic Research. Poster presentation.
- Publication Details:*
The Relationship Between Income Level and Alcohol-Related Hospitalization Rates in an Urban Area. American Journal of Epidemiology. 153,(11), p. S242.
- 2001 May Effects of dietary folate on colorectal carcinogenesis in a genetically-predisposed murine model of ulcerative colitis-associated colon cancer.
- Publication Details:*
Carrier J, Medline A, Sohn KJ, **Hwang SW**, Kim YI. Effects of dietary folate on colorectal carcinogenesis in a genetically-predisposed murine model of ulcerative colitis-associated colon cancer. Gastroenterology. May 2001;120(supp 1):A2279. **Coauthor or Collaborator**.
- 2001 Apr What happens to patients who leave against medical advice?
- Publication Details:*
Hwang SW, Li J. What happens to patients who leave against medical advice? Journal of General Internal Medicine. April 2001;16(S1):140. **Principal Author**.
- 2001 Reductions in welfare payments and avoidable hospital admissions in a Canadian inner city.
- Publication Details:*
Glazier RH, Badley EM, Agha MM, Creatore MI; Inner City Toronto Time Trends Working Group. Reductions in welfare payments and avoidable hospital admissions in a Canadian inner city. American Journal of Epidemiology. 2001; 153(11):S1017. **Member of Research Group**.
- 2000 Apr Income levels and alcohol-related hospital admission rates.
- Publication Details:*
Hwang SW, Glazier RH. Income levels and alcohol-related hospital admission rates. Journal of General Internal Medicine. April 2000;15(S1):73. **Principal Author**.
- 2000 Apr Risk of death during periods of homeless shelter use.
- Publication Details:*
Hwang SW. Risk of death during periods of homeless shelter use. Journal of General Internal Medicine.

April 2000;15(S1):73. **Principal Author.**

1999 Aug Barriers to appropriate diabetes management among homeless persons in Toronto.

Publication Details:

Bugeja AL, **Hwang SW.** Barriers to appropriate diabetes management among homeless persons in Toronto. *Clinical and Investigative Medicine.* August 1999; 22(S4):S10. **Senior Responsible Author.**

1999 Apr Mortality among homeless men in Toronto.

Publication Details:

Hwang SW. Mortality among homeless men in Toronto. *Journal of General Internal Medicine.* April 1999;14(S2):42. **Principal Author.**

1998 Aug Patients with serious injury from stairway falls.

Publication Details:

Ragg M, Steinhart B, **Hwang SW.** Patients with serious injury from stairway falls. *Clinical and Investigative Medicine.* August 1998;21(S4):S32. **Senior Responsible Author.**

1997 Apr Risk factors for death in homeless adults in Boston.

Publication Details:

Hwang SW, Lebow JM, Bierer MF, O'Connell JJ, Orav EJ, Brennan TA. Risk factors for death in homeless adults in Boston. *Journal of General Internal Medicine.* April 1997;12(S1):121. **Principal Author.**

1996 Apr Causes of mortality in a cohort of homeless adults in Boston.

Publication Details:

Hwang SW, Lebow JM, O'Connell JJ, Orav EJ, Brennan TA. Causes of mortality in a cohort of homeless adults in Boston. *Journal of General Internal Medicine.* April 1996;11(S1):144. **Principal Author.**

1996 Apr Medicaid expenditures in a homeless population admitted to a recuperative care facility.

Publication Details:

Lebow J, **Hwang S,** O'Connell JJ, Krause D, DeCoursey M. Medicaid expenditures in a homeless population admitted to a recuperative care facility. *Journal of General Internal Medicine.* April 1996;11(S1):145. **Coauthor or Collaborator.**

Media Appearances

- 2020 Feb 6 **Quoted Source.** Traumatic Brain Injury in Homeless People Is Underrecognized. Interviewer: Susan Fitzgerald. *Neurology Today, American Academy of Neurology.* United States. https://journals.lww.com/neurotodayonline/Fulltext/2020/02060/Traumatic_Brain_Injury_in_Homeless_People_Is.4.aspx.
- 2015 May 15 **Quoted Source.** Panhandling. Interviewer: Trey Kay. *Us & Them Podcast, West Virginia Public Broadcasting.* West Virginia, United States. <http://usandthempodcast.com/podcast/to-give-or-not-to-give/>.
- 2013 Sep 25 **Quoted Source.** The Portland Mercury. Portland, Oregon, United States. Presenter(s): Joe Streckert. *The Millionaire Panhandler.* <http://www.portlandmercury.com/portland/the-millionaire-panhandler/Content?oid=10627133>.
- 2010 Dec 20 **Quoted Source.** A Plan to Make Homelessness History. *The New York Times.* New York City, New York, United States. Presenter(s): David Bornstein. *The New York Times.* <http://opinionator.blogs.nytimes.com/2010/12/20/a-plan-to-make-homelessness-history/>.
- 2009 May **Personal Profile.** At Home with the Homeless. Stephen Hwang '88 has dedicated his career to serving society's most desperate and difficult. *Johns Hopkins University School of Medicine.* Baltimore, Maryland, United States. Presenter(s): Kurt Kleiner. *Hopkins Medicine.* Spring/Summer 2009.
- 2005 Nov 16 **Personal Profile.** Interventions to Improve the Health of the Homeless. *A Backwards Glance: Interviews with public health and healthcare leaders coping with infectious disease challenges to the marginalized.*

Medical Advocates (medadvocates.org). United States.

2. National

Invited Lectures and Presentations

- 2023 Jun 8 **Invited Speaker.** Housing First: The Solution to Homelessness? A Journey from Concept to Research to Policy. Homelessness Policy Directorate, Infrastructure Canada, Government of Canada. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2022 Oct 14 **Invited Speaker.** Debate -- Be It Resolved: When Compared to Observational Research Studies, Randomized Controlled Trial Evidence is the Only Evidence That Matters. Canadian Society of Internal Medicine - Annual Meeting 2022. Victoria, British Columbia, Canada. Presenter(s): Steve Shadowitz and **Stephen Hwang.**
- 2022 Jan 25 **Presenter.** The COVENANT Study: COVID-19 Cohort Study of People Experiencing Homelessness in Toronto. CanCOVID Speaker Series. Canada. Presenter(s): **Stephen Hwang.**
- 2019 May 28 **Keynote Speaker.** Challenges in homelessness research: What data will make a difference? Data That Makes a Difference: 4th Annual Canadian Homelessness Data Sharing Initiative Conference, Calgary Homeless Foundation and University of Calgary School of Public Policy. Calgary, Alberta, Canada. Presenter(s): **Stephen Hwang.**
- 2017 May 6 **Invited Speaker.** Healthcare among the Marginalized. Christian Medical and Dental Society 2017 National Conference. Toronto, Ontario, Canada. Presenter(s): **Hwang SW,** Etkorn W, Rajah J, Zung P.
- 2016 Sep 24 **Invited Speaker.** "Homeless but not Hopeless:" A Panel Discussion on Homelessness. Young Presidents' Organization (YPO) 2016 Canadian Conference. Toronto, Ontario, Canada. Presenter(s): Barata P, **Hwang SW,** Stergiopoulos V, Gadon S.
- 2015 Oct 15 **Keynote Speaker.** The Beauty and Boundaries of Research. Canadian Society of Internal Medicine 2015 Annual Conference, Dr. David Sackett Senior Investigator Award Presentation. Charlottetown, Prince Edward Island, Canada. Presenter(s): **Hwang SW.**
- 2015 Oct 15 **Invited Speaker.** Five Top Papers in General Internal Medicine. Canadian Society of Internal Medicine 2015 Annual Conference. Charlottetown, Prince Edward Island, Canada. Presenter(s): **Hwang SW.**
- 2014 Oct 3 **Invited Speaker.** Seeing the Big Picture: Acting on the Social Determinants of Health. Canadian Society of Internal Medicine 2014 Annual Conference, ACP/AM Edwards Lecture. Calgary, Alberta, Canada. Presenter(s): **Hwang SW.**
- 2014 Jun 6 **Invited Speaker.** Science Panel: Livable Cities. Canadian Science Writers Association 2014 Annual Conference. Toronto, Ontario, Canada. Presenter(s): Murphy J, **Hwang SW,** Roorda M, Cowen D.
- 2014 May 15 **Invited Speaker.** Caring for Vulnerable and Marginalized Populations in Toronto. The Commonwealth Fund and the Canadian Foundation for Healthcare Improvement (CFHI). Harkness Fellowships in Health Care Policy and Practice. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2014 May 15 **Invited Speaker.** The Bridging of Research and Policy by At Home/Chez Soi (AH/CS): A multi-site trial of Housing First for persons with a mental illness who are homeless. Canadian Association of Health Services and Policy Research (CAHSPR) 2014 Conference. Toronto, Ontario, Canada. Presenter(s): **Hwang S,** Goering P, More F.
- 2013 Oct 17 **Invited Speaker.** Poverty, Homelessness, and Health: Why Housing Matters. Canadian Mental Health Association (CMHA) National Conference 2013. Addressing the Social Determinants of Mental Health and Addictions. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2011 Oct 6 **Invited Speaker.** Health care utilization among people who are homeless. Canadian Homelessness Research Network. Without a Home: Research symposium on contemporary issues in Canadian homelessness. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2010 Nov 15 **Invited Speaker.** The Health and Housing in Transition Study: Understanding the trajectories of homeless

and vulnerably housed adults. National Housing Research Committee (NHRC) Homelessness Working Group. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.

- 2010 Jun 14 **Invited Speaker**. Beyond Barriers: Photographs from the Frontlines of Health (Exhibit at the Centenary Conference of the Canadian Public Health Association). AstraZeneca Canada/Frontline Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2009 Dec 1 **Invited Speaker**. Life expectancy of the homeless. Canadian Housing and Renewal Association. Ontario, Canada. Presenter(s): **SW Hwang**.
- 2009 Nov 29 **Invited Speaker**. What Causes Homelessness? Myths and Realities. Mental Health Commission of Canada. Into the Light: Transforming Mental Health in Canada. Vancouver, British Columbia, Canada. Presenter(s): **SW Hwang**.
- 2009 May 27 **Invited Speaker**. One Size Doesn't Fit All: Primary Care Access for Vulnerable Populations. Canadian Institutes of Health Research - Institute of Gender and Health and Institute of Health Services and Policy Research. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**, Grace SL, Travers A.
- 2009 Apr 24 **Invited Speaker**. Aging among People Experiencing Homelessness. 2009 Annual Meeting of the Canadian Geriatric Society. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. (Continuing Education).
- 2009 Feb 18 **Invited Speaker**. Unmet needs for health care among homeless people within a universal health insurance system. Finding Home: The 2nd National Conference on Housing and Homelessness. Calgary, Alberta, Canada. Presenter(s): **Hwang SW**.
- 2009 Feb 18 **Invited Speaker**. REACH3: The Research Alliance for Canadian Homelessness, Housing, and Health. Finding Home: The 2nd National Conference on Housing and Homelessness. Calgary, Alberta, Canada. Presenter(s): **Hwang SW**. Khandor E. Klodawky F. Worthington C. MacLaurin B. Aubry T.
- 2008 Jun 2 **Invited Speaker**. Drug Use among Homeless People: Data from a Representative Sample in Toronto. Health Canada, Drug Strategy and Controlled Substances Programme, Office of Research and Surveillance. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2008 May 27 **Invited Speaker**. Mental Health and Homelessness Workshop. Canadian Population Health Initiative, Canadian Institute for Health Information (CIHI). Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2008 May 13 **Invited Speaker**. Research on Homelessness, Housing, and Health. Health Council of Canada. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2006 Nov 2 **Invited Speaker**. Health Care Delivery in the Shelter Setting. Human Resources and Social Development Canada (HRSDC), Housing and Homelessness Branch, Meeting of Large Multi-Service Shelters. Montreal, Quebec, Canada. Presenter(s): **Hwang SW**.
- 2006 Mar 30 **Invited Speaker**. Homelessness and Health. Street Level Conference 2006: Truth-tellers and Peacemakers. Sponsored by the Evangelical Fellowship of Canada. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2005 May 20 **Invited Speaker**. Risk Factors and Behaviors Among Homeless Persons: Mortality Among Homeless Women. Canadian Conference on Homelessness. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. Plenary address.
- 2005 May 19 **Invited Speaker**. Translating Research on Homelessness into Policy and Action. Canadian Conference on Homelessness. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. Plenary address.
- 2005 May 19 **Presenter**. Bedbugs infestations in homeless shelters and other locations in Toronto. Canadian Conference on Homelessness. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**, Svoboda TJ, De Jong IJ, Kabasele KJ, Gogosis E. Poster presentation.
- 2005 May 19 **Presenter**. Use of meal programs and shelters by homeless people in Toronto. Canadian Conference on Homelessness. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**, Chiu S, Kiss A, Katic M, Tolomiczenko G, Levinson W, Redelmeier D, Szalai JP, Cowan L. Poster presentation.
- 2004 May 5 **Invited Speaker**. Canadian Policy Briefing. Commonwealth Fund International Program in Health Care Policy (Harkness Fellowships) and the Canadian Health Services Research Foundation. Toronto, Ontario,

Canada. Presenter(s): **Hwang SW**.

- 2004 Mar 22 **Invited Speaker**. Policy Forum on Health Disparities. Health Canada, Canadian Institutes for Health Research (CIHR), and the Health Disparities Task Group of the Federal/Provincial/Territorial Advisory Committee on Population Health and Health Security. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2003 Nov 18 **Invited Speaker**. Homelessness and Health: What is the Role of Housing? Canada Mortgage and Housing Corporation (CMHC), National Housing Research Committee (NHRC) Working Group on Homelessness. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2003 Oct 3 **Invited Speaker**. Homelessness: Implications for Housing and Health. Canadian Housing and Renewal Association (CHRA), National Symposium on Health and Housing. Calgary, Alberta, Canada. Presenter(s): **Hwang SW**.
- 2003 Jun 18 **Invited Speaker**. Consultation Workshop on the National Research Agenda of the National Homelessness Initiative. National Secretariat on Homelessness (Human Resources Development Canada). Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2002 Nov 4 **Invited Speaker**. Overview of Research on Homelessness and Health. Canadian Institutes of Health Research (CIHR) and the National Secretariat on Homelessness (NSH), Community-Research Think Tank on Health and Homelessness. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2002 Oct 18 **Invited Speaker**. Inner City Health and the Heart of General Internal Medicine. 2002 National Conference of the Canadian Society of Internal Medicine. Halifax, Nova Scotia, Canada. Presenter(s): **Hwang SW**. Keynote Address.
- 2002 Mar **Invited Speaker**. National Roundtable on Homelessness. National Secretariat on Homelessness (Human Resources Development Canada). Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2000 Aug **Invited Speaker**. Expert Panel on Gaps in Research on Homelessness. National Secretariat on Homelessness (Human Resources Development Canada). Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.
- 1997 Mar **Invited Speaker**. The Role of the Chief Medical Resident: Leadership. 6th Annual Canadian Chief Medical Resident's Conference. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. (Continuing Education).

Presented Abstracts

- 2023 May 30 **Senior Author**. The Navigator Program: Reflections from a multidisciplinary inpatient healthcare team providing care for patients experiencing homelessness. Canadian Association for Health Services and Policy Research (CAHSPR) Annual Conference 2023. Montreal, Quebec, Canada. Presenter(s): Cygler J, Jenkinson J, Ffrancombe Pridham K, Dada O, **Hwang S**. (Trainee Presentation).
- 2021 Jun 24 **Co-author**. : The Attitudes of Canadian Ophthalmology Residents and Pre-Clerkship Medical Students at an Ontario Medical School Towards Homeless Individuals. Canadian Ophthalmological Society (COS) 2021 Annual Conference. Canada. Presenter(s): Sayal AP, Popovic MM, Mustafa M, **Hwang SW**, Lichter M.
- 2021 May 19 **Co-author**. Diabetes self-management and homelessness: Using concept mapping to understand and prioritize challenges. Canadian Association for Health Services and Policy Research (CAHSPR) Annual Conference 2021. Canada. Presenter(s): Grewal E, Campbell R, Booth G, McBrien K, **Hwang S**, O'Campo, P, Campbell D.
- 2020 Oct 28 **Co-author**. Identifying Challenges and Solutions to Providing Diabetes Care for the Homeless. Diabetes Canada/CSEM Professional Conference. Canada. Presenter(s): Mancini N, Campbell R, Yaphe H, Tibebu T, Grewal E, Saunders-Smith T, **Hwang S**, McBrien K, Booth G, Campbell D.
- 2020 Oct 28 **Co-author**. Approaches to Enabling Care for People with Diabetes Experiencing Homelessness. Diabetes Canada/CSEM Professional Conference, Virtual Conference. Oct 28-30, 2020. Canada. Presenter(s): Yaphe H, Campbell R, Mancini N, Grewal E, Tibebu T, Saunders-Smith T, Booth G, McBrien K, **Hwang S**, Campbell D.

- 2020 Oct 28 **Co-author.** Patient-level Barriers to Diabetes Management Among those with Housing Instability. Diabetes Canada/CSEM Professional Conference, Virtual Conference. Oct 28-30, 2020. Canada. Presenter(s): Campbell R, Saunders-Smith T, Tibebu T, Grewal E, Yaphe H, Mancini N, **Hwang S**, McBrien K, Booth G, Campbell D.
- 2020 Oct 28 **Co-author.** Diabetes Management and Homelessness: Understanding Barriers Using Concept Mapping. Diabetes Canada/CSEM Professional Conference, Virtual Conference. Oct 28-30, 2020. Canada. Presenter(s): Campbell R, Saunders-Smith T, Tibebu T, Grewal E, Yaphe H, Mancini N, **Hwang S**, McBrien K, Booth G, Campbell D.
- 2020 Oct 21 **Co-author.** Baseline characteristics and clinical outcomes of homeless adults presenting to an inner city STEMI network hospital. Canadian Cardiovascular Congress (CCC). Canada. Presenter(s): Liauw S et al. (Trainee Presentation).
- 2020 May **Co-author.** Giving a voice to the voiceless: Use of an arts-based approach to understand the challenges of managing diabetes while homeless . 2020 Canadian Association for Health Services and Policy Research (CAHSPR) Conference. Saskatoon, Saskatchewan, Canada. Presenter(s): David Campbell et al. Oral presentation. (Trainee Presentation).
- 2020 May **Co-author.** Diabetes self-management and homelessness: Using concept mapping to understand and prioritize challenges. 2020 Canadian Association for Health Services and Policy Research (CAHSPR) Conference. Saskatoon, Saskatchewan, Canada. Presenter(s): David Campbell et al. Oral presentation. (Trainee Presentation).
- 2020 May **Co-author.** Community-based Participatory Research and Knowledge Translation: Lessons from a Toronto-based client group. 2020 Canadian Association for Health Services and Policy Research (CAHSPR) Conference. Saskatoon, Saskatchewan, Canada. Presenter(s): David Campbell et al. Oral presentation. (Trainee Presentation).
- 2020 Mar **Co-author.** Outcomes of ST-Segment Elevation Myocardial Infarction in a Canadian Homeless Population. ACC Rockies Conference. Banff, Alberta, Canada. Presenter(s): Liauw S, Luong L, Atcha M, Liu S, Fam N, Cheema A, **Hwang S**. Poster presentation. (Trainee Presentation).
- 2019 Nov 4 **Presenter.** Beyond the Advisory: Lessons Learned from a Research Community Expert Group. Canadian Alliance to End Homelessness - 2019 National Conference on Ending Homelessness. Edmonton, Alberta, Canada. Presenter(s): Zewge-Abubaker N, **Hwang S**.
- 2019 May **Co-author.** Characterizing program models for diabetes management among those experiencing homelessness. 2019 Canadian Association for Health Services and Policy Research (CAHSPR) Conference. Halifax, Nova Scotia, Canada. Presenter(s): David Campbell, Kerry McBrien, **Stephen Hwang**, Gillian Booth. Oral presentation. (Trainee Presentation).
- 2019 May **Co-author.** Findings from a scoping review on self-management of problem gambling. 2019 Canadian Association for Health Services and Policy Research (CAHSPR) Conference. Halifax, Nova Scotia, Canada. Presenter(s): Flora Matheson, Sarah Hamilton-Wright, David Kryszajtys, Jessica Wiese, Lauren Cadel, Carolyn Ziegler, **Stephen Hwang**, Sara Guilcher. Poster presentation. (Trainee Presentation).
- 2019 May **Co-author.** Validity of Health Administrative Data in Identifying Individuals Experiencing Homelessness. 4th Annual Canadian Homelessness Data Sharing Initiative - Data That Makes a Difference, Calgary Homeless Foundation and University of Calgary School of Public Policy. Calgary, Alberta, Canada. Presenter(s): Salimah Shariff, Lucie Richard, **Stephen Hwang**, Cheryl Forchuk, Rosane Nisenbaum, Kristin Clemens, Kathryn Wiens, Richard Booth, Mahmoud Azimaee.
- 2018 Nov 6 **Co-author.** Impact of Housing First Interventions on Housing and Well-being Outcomes Among Homeless Individuals with Mental Health Issues in Toronto. Canadian Alliance to End Homelessness - 2018 National Conference on Ending Homelessness. Hamilton, Ontario, Canada. Presenter(s): Mejia-Lancheros C, Lachaud J.
- 2018 Nov 6 **Co-author.** Beyond a Demonstration Project: Evaluating and Supporting Housing First in a Real-World Context. Canadian Alliance to End Homelessness - 2018 National Conference on Ending Homelessness. Hamilton, Ontario, Canada. Presenter(s): Granat S, Dunn J.
- 2018 Nov 6 **Co-author.** The Tools of Housing First: Evaluating a Client Needs Assessment. Canadian Alliance to End Homelessness - 2018 National Conference on Ending Homelessness. Hamilton, Ontario, Canada.

Presenter(s): Raine L, **Hwang SW**.

- 2018 Nov 6 **Co-author**. Capturing an Indigenous Approach to Housing First. Canadian Alliance to End Homelessness - 2018 National Conference on Ending Homelessness. Hamilton, Ontario, Canada. Presenter(s): Francombe-Pridham K, Passmore D.
- 2018 Oct 12 **Co-author**. Ted Giles Clinical Vignettes: "An Unusual Cause of Involuntary Movements". Canadian Society of Internal Medicine 2018 Annual Meeting. Banff, Alberta, Canada. Presenter(s): Prakash V, **Hwang SW**. (Trainee Presentation).
- 2016 Nov 3 **Co-author**. The Effect of the At Home/Chez Soi Housing First program on Database-Documented Health Care Utilization among Homeless Adults with Mental Illness. Canadian Alliance to End Homelessness - 2016 National Conference on Ending Homelessness. London, Ontario, Canada. Presenter(s): Gozdzik A, **Hwang SW**.
- 2016 Jun 15 **Co-author**. Extreme Cold Weather Alerts in Toronto: An Emerging Public Health Issue. Poster presentation. Public Health 2016 - Annual Conference of the Canadian Public Health Association. Toronto, Ontario, Canada. Presenter(s): Coleman P, Bassil K, Ansara D, Gower S, Kim M, Wainberg A, Zhang P, **Hwang S**, Benny R, Campbell M, Shapiro H.
- 2015 Oct 1 **Co-author**. Assessing the Effectiveness of a Brief Case Management Program for Frequent Users of Hospital Emergency Departments. Workshop. 65th Annual Conference of the Canadian Psychiatric Association. Vancouver, British Columbia, Canada. Presenter(s): Stergiopoulos V, Wasylenki D, Leszcz M, O'Campo P, Kurdyak P, Voore P, **Hwang SW**, Guimond T, Alsharafi Z, Gozdzik A.
- 2015 Sep 30 **Co-author**. Does Housing First Decrease Suicidal Behavior Among Homeless Adults with Mental Health Disorders? Oral Presentation. Canadian Academy of Psychiatric Epidemiology 2015 Annual Scientific Symposium. Vancouver, British Columbia, Canada. Presenter(s): Roos L, Distasio J, Katz L, Bourque J, Bolton JM, Bolton SL, Wong J, Chateau D, Somers J, **Hwang S**, Frankish JC, Sareen J, for the At Home Chez Soi Team.
- 2015 Jun 5 **Co-author**. Understanding the lived experiences of housing transitions for homeless and vulnerably housed individuals: A qualitative study. 76th Annual Convention of the Canadian Psychological Association. Ottawa, Ontario, Canada. Presenter(s): Polillo A, Sylvestre J, Aubry T, Klodawsky F, **Hwang SW**. Poster presentation. (Trainee Presentation).
- 2015 May 29 **Senior Author**. End-of-life & Palliative Care Interventions for Homeless People: A Systematic Review (poster presentation; winner of Best Poster Presentation Award). Canadian Society of Palliative Care Physicians, 11th Advanced Learning of Palliative Medicine Conference. Calgary, Alberta, Canada. Presenter(s): Sumalinog R, Harrington K, Dosani N, **Hwang SW**. (Trainee Presentation).
- 2014 Nov 4 **Senior Author**. Measuring progress towards ending homelessness. Canadian Alliance to End Homelessness - National Conference on Ending Homelessness. Vancouver, British Columbia, Canada. Presenter(s): Adamo A. Panel presentation.
- 2014 Sep 11 **Presenter**. Being a psychiatrist practicing evidence-based Housing First approaches with homeless people with severe mental illness. Canadian Psychiatric Association 64th Annual Conference. Toronto, Ontario, Canada. Presenter(s): Lesage A, Farmer O, Musgrave I, Stergiopoulos V, **Hwang S**.
- 2014 May **Co-author**. Hospital Readmissions among Homeless Patients in Toronto. 2014 Canadian Association for Health Services and Policy Research (CAHSPR) Conference. Toronto, Ontario, Canada. Presenter(s): Saab D, Katic M, Dhalla I, Nisenbaum R, **Hwang SW**. Poster presentation. (Trainee Presentation).
- 2014 Apr 30 **Co-author**. Hospital Readmissions among Homeless Patients in Toronto. Canadian Housing Renewal Association (CHRA) 46th National Congress on Housing and Homelessness. Edmonton, Alberta, Canada. Presenter(s): Saab D, Katic M, Dhalla I, Nisenbaum R, **Hwang SW**. Emerging Professional Research Colloquium. (Trainee Presentation).
- 2013 Oct 30 **Senior Author**. Conducting a medical chart review in a homeless mentally ill population: Lessons from the Toronto site of the At Home Study. Canadian Alliance to End Homelessness - National Conference on Ending Homelessness. Ottawa, Ontario, Canada. Presenter(s): Dosani N, Young S, Whisler A, **Hwang S**. Oral presentation. (Trainee Presentation).
- 2013 Oct 29 **Co-author**. Identifying the Patterns of Shelter Stays of Families in Three Canadian Cities of Different

- Sizes. Canadian Alliance to End Homelessness - National Conference on Ending Homelessness. Ottawa, Ontario, Canada. Presenter(s): Aubry T, Farrell S, **Hwang SW**, Calhoun M. Oral presentation. (Trainee Presentation).
- 2013 Apr 12 **Co-author.** Impact of comprehensive harm reduction services on access to and engagement with care at a residential palliative and supportive care program for people living with HIV/AIDS: A qualitative study. 22nd Annual Canadian Conference on HIV/AIDS Research (CAHR 2013). Vancouver, British Columbia, Canada. Presenter(s): Dilley L, McNeil R, Guirguis-Younger M, **Hwang SW**, Small W. Oral presentation.
- 2013 Apr 12 **Co-author.** Impact of Food Insecurity and Housing on Health Outcomes among People Living with HIV from 2006-2009: Longitudinal Findings from Positive Spaces, Healthy Places Cohort Study. 22nd Annual Canadian Conference on HIV/AIDS Research (CAHR 2013). Vancouver, British Columbia, Canada. Presenter(s): Choi S, Globerman JM, Fielden S, Bekele T, Koornstra JJ, Hambly K, Greene S, Sobota M, Watson J, Walker G, O'Brien Teengs D, Tucker R, **Hwang SW**, Rourke SB, and the Positive Spaces, Healthy Places Team. Poster presentation.
- 2012 Nov 26 **Co-author.** Rates and characteristics of traumatic brain injury among homeless civilian men. 3rd Annual Military and Veteran Health Research Forum, Canadian Institute for Military and Veteran Health Research. Kingston, Ontario, Canada. Presenter(s): Topolovec-Vranic J, Ennis N, Johnson P, Michalak A, Masanic C, Ouchterlony D, Distin K, Stergiopolous V, **Hwang S**, Kontos P, Colantonio A, Cusmano M. Poster presentation.
- 2012 Oct 18 **Co-author.** Aging with HIV: Basic Needs and Health Status. 41st Annual Meeting, Canadian Association on Gerontology. Vancouver, British Columbia, Canada. Presenter(s): Sok P, Rourke SB, Tucker R, Greene S, Sobota M, Koornstra J, Byers S, **Hwang S**, Watson J, Bekele T, for the Positive Spaces, Healthy Places Team. Poster presentation. Winner of the Canadian Association on Gerontology Divisional Poster Award for Social Sciences. (Trainee Presentation).
- 2012 Jun 12 **Senior Author.** Discrimination on the Basis of Socioeconomic Status in Access to Primary Care. 4th Canadian National Medical Student Research Symposium, University of Manitoba. Winnipeg, Manitoba, Canada. Presenter(s): Olah M, Gaisano G, **Hwang SW**. (Trainee Presentation).
- 2011 Oct 15 **Presenter.** Discrimination in Access to Primary Care on the Basis of Socioeconomic Status: A Randomized Controlled Audit Study. 2011 Annual Meeting of the Canadian Society of Internal Medicine. Halifax, Nova Scotia, Canada. Presenter(s): **Hwang SW**, Gaisano G, Olah M. Oral presentation.
- 2011 Apr 14 **Co-author.** Housing affordability and sense of community belonging predict health-related quality of life among people with HIV in Ontario: Results from the Positive Spaces, Healthy Places study. 20th Annual Canadian Conference on HIV/AIDS Research (CAHR 2011). Toronto, Ontario, Canada. Presenter(s): Rourke ST, Bekele T, Tucker R, Greene S, Monette L, Koornstra J, Sobota M, Byers S, Watson J, Bacon J, Hambly K, **Hwang S**, Guenter D, Dunn J, Hamilton M, Truax J, Hintzen DB, White P, Kayitesi M, Desbiens M, De Blois S, Cubillos M, and The Positive Spaces, Healthy Places Team. Poster presentation.
- 2009 Apr 24 **Co-author.** Housing Instability Over Time is Associated with Worse Health Outcomes in People Living with HIV in Ontario: The Positive Spaces, Healthy Places Study. 18th Annual Canadian Conference on HIV/AIDS Research. Vancouver, British Columbia, Canada. Presenter(s): Koornstra J, Tucker R, Greene S, Sobota M, Monette L, Guenter D, Byers S, Dunn J, **Hwang SW**, Rourke SB. Poster presentation.
- 2009 Apr 24 **Co-author.** Examining Food Insecurity and its Associated Factors in People Living with HIV in Ontario: The Positive Spaces, Healthy Places Study. 18th Annual Canadian Conference on HIV/AIDS Research. Vancouver, British Columbia, Canada. Presenter(s): Koornstra J, Tucker R, Greene S, Sobota M, Monette L, Guenter D, Byers S, Dunn J, **Hwang SW**, Rourke SB. Oral presentation.
- 2009 Apr 24 **Co-author.** Determinants of health amongst people living with HIV/AIDS in Ontario with and without HCV co-infection: The Positive Spaces, Healthy Places Study. 18th Annual Canadian Conference on HIV/AIDS Research. Vancouver, British Columbia, Canada. Presenter(s): Koornstra J, Tucker R, Greene S, Sobota M, Monette L, Guenter D, Byers S, Dunn J, **Hwang SW**, Rourke SB. Poster presentation.
- 2009 Apr 24 **Co-author.** Social support has direct and indirect effects on health-related quality of life among people living with HIV/AIDS in Ontario: The Positive Spaces, Healthy Places Study. 18th Annual Canadian Conference on HIV/AIDS Research. Vancouver, British Columbia, Canada. Presenter(s): Tsegaye, Koornstra J, Tucker R, Greene S, Sobota M, Monette L, Guenter D, Byers S, Dunn J, **Hwang SW**, Rourke SB. Poster presentation.

- 2009 Feb 18 **Principal Author.** Chronic pain among homeless people. Finding Home: The 2nd National Conference on Housing and Homelessness. Calgary, Alberta, Canada. Presenter(s): Wilkins E. **Hwang SW.** (Trainee Presentation).
- 2008 Jun 7 **Co-Author.** Impact of a Homeless Curriculum on the Attitudes of Medical Trainees Towards Homeless Persons who Present for Care in the Emergency Department. 2008 Annual Meeting of the Canadian Association of Emergency Physicians (CAEP). Ottawa, Ontario, Canada. Presenter(s): Spence JM, Bandiera G, Taback N, Balu-Kakkar P, **Hwang S.**
- 2008 Apr 26 **Co-author.** Positive Spaces, Healthy Places: Health Outcomes at 6 Months. 17th Annual Canadian Conference on HIV/AIDS Research. Montreal, Quebec, Canada. Presenter(s): Tucker R, Greene S, Sobota M, Koornstra J, Monette L, Guenter D, Byers S, Dunn J, **Hwang SW,** Rourke SB. Oral presentation.
- 2008 Apr 26 **Co-author.** Positive Spaces, Healthy Places: Regional Analyses to Put Research into Action. 17th Annual Canadian Conference on HIV/AIDS Research. Montreal, Quebec, Canada. Presenter(s): Koornstra J, Tucker R, Greene S, Sobota M, Monette L, Guenter D, Byers S, Dunn J, **Hwang SW,** Rourke SB. Oral presentation.
- 2007 Apr 26 **Co-author.** Increasing Participation of Community Members at Research Conferences: Evidence from the International Conference on Urban Health, 2005 and the OHTN Research Conference, 2006. 16th Annual Canadian Conference on HIV/AIDS Research. Toronto, Ontario, Canada. Presenter(s): McKay C, Travers R, Meagher A, Wilson MG, O'Campo P, **Hwang SW,** Cowan L, Parris UJ, Globerman J, Rourke SB. Poster presentation.
- 2006 May 25 **Co-author.** Whose Capacity Are We Building Through HIV/AIDS Community-Based Research? 15th Annual Canadian Conference on HIV/AIDS Research. Québec City, Quebec, Canada. Presenter(s): Tucker R, Greene S, Rourke SB, Guenter D, Monette L, Narciso L, Koornstra J, Byers S, Sobota M, Dunn J, **Hwang SW.** Poster presentation.
- 2005 May 19 **Presenter.** REACH3: Research Alliance for Canadian Homelessness, Housing, and Health. Canadian Conference on Homelessness. Toronto, Ontario, Canada. Presenter(s): **Hwang SW,** Aubry T, Dunn J, Palepu A, Roy E, Shiell A, Turnbull J. Poster presentation.
- 2005 May 19 **Presenter.** Group A Streptococcal Carriage Among Residents of an Urban Homeless Shelter. Canadian Conference on Homelessness. Toronto, Ontario, Canada. Presenter(s): Bargh GJM, Hoch J, Speechley M, Willey B, McGeer A, **Hwang SW.** Poster presentation.
- 2005 May 19 **Presenter.** Dyspepsia in Homeless Adults. Canadian Conference on Homelessness. Toronto, Ontario, Canada. Presenter(s): **Hwang SW,** Wong SY, Bargh GJ. Poster presentation.
- 2000 Sep **Co-author.** Prevalence of Helicobacter pylori infection among homeless people in Toronto. 69th Annual meeting of the Royal College of Physicians and Surgeons of Canada, Canadian Association of Teachers of Community Health / National Specialty Society in Community Medicine. Edmonton, Alberta, Canada. Presenter(s): Wong S, **Hwang SW.** Oral presentation.
- 1999 Sep **Co-author.** Barriers to appropriate diabetes management among homeless persons in Toronto. 68th Annual meeting of the Royal College of Physicians and Surgeons of Canada, Canadian Association of Teachers of Community Health / National Specialty Society in Community Medicine. Montreal, Quebec, Canada. Presenter(s): Bugeja A, **Hwang SW.** Oral presentation.
- 1998 Sep **Co-author.** Access to Prescription Medications among Homeless Men in Toronto. 67th Annual meeting of the Royal College of Physicians and Surgeons of Canada, Canadian Association of Teachers of Community Health / National Specialty Society in Community Medicine. Toronto, Ontario, Canada. Presenter(s): Gottlieb J, **Hwang SW.** Oral presentation.

Presented and Published Abstracts

- 2017 Nov 8 **Co-author.** Access to primary care for persons recently released from prison: An audit study. Family Medicine Forum 2017 Family Medicine Innovations in Research and Education Day. Montreal, Quebec, Canada. Presenter(s): Fahmy N.

Publication Details:

N Fahmy, FG Kouyoumdjian, J Berkowitz, S Fahmy, CM Neves, **SW Hwang**, RE Martin. Access to primary care for persons recently released from prison: An audit study. *Canadian Family Physician*. **Coauthor or Collaborator**.

- 2007 Apr 26 **Co-author**. The Effects of Housing Status on Health-Related Outcomes in People living with HIV: A Systematic Review of the Literature. 16th Annual Canadian Conference on HIV/AIDS Research. Toronto, Ontario, Canada. Presenter(s): Leaver CA, Bargh G, Dunn JR, **Hwang SW**. Poster presentation.
- Publication Details:*
The Effects of Housing Status on Health-Related Outcomes in People living with HIV: A Systematic Review of the Literature. *AIDS & Behavior*. 11(S2): 85-100.
- 2001 Socioeconomic barriers to ambulatory mental health services despite universal health care in a Canadian inner-city setting.
- Publication Details:*
Steele LS, Glazier RH, Agha M, Lin E, Cohen MM; Inner City Toronto Time Trends Working Group. Socioeconomic barriers to ambulatory mental health services despite universal health care in a Canadian inner-city setting. *American Journal of Epidemiology*. 2001;153(11):S856. **Member of Research Group**.
- 2000 Aug Prevalence of Helicobacter pylori infection among homeless people in Toronto.
- Publication Details:*
Wong S, **Hwang SW**. Prevalence of Helicobacter pylori infection among homeless people in Toronto. *Clinical and Investigative Medicine*. August 2000; 23(S4):S7. **Senior Responsible Author**.
- 1998 Aug Access to prescription medications among homeless men in Toronto.
- Publication Details:*
Gottlieb J, **Hwang SW**. Access to prescription medications among homeless men in Toronto. *Clinical and Investigative Medicine*. August 1998;21(S4):S23. **Senior Responsible Author**.

Media Appearances

- 2023 Feb 10 **Quoted Source**. Homeless: Search for solution grows more urgent than ever. Interviewer: Michael Swan. *The Catholic Register*. Canada. Available from: <https://www.catholicregister.org/item/35248-homeless-search-for-solution-grows-more-urgent-than-ever>.
- 2023 Jan 14 **Quoted Source**. Code Z59.0: diagnosing the toll of homelessness on health care. Interviewer: Molly Hayes. *The Globe and Mail*. Canada. Available from: <https://www.theglobeandmail.com/canada/article-experts-look-to-diagnose-the-toll-of-homelessness-on-health-care/>.
- 2022 Dec 12 **Quoted Source**. 'People are going to experience frostbite, people are going to have more amputations'. Interviewer: Nazanin Meshkat. *National Observer*. Canada. Available from: <https://www.nationalobserver.com/2022/12/12/news/people-experience-frostbite-people-amputations-homelessness-shelters-Toronto>.
- 2022 Sep 19 **Quoted Source**. St. Michael's research project aims to improve care access for unhoused people. Interviewer: Carly Weeks. *The Globe and Mail*. Canada. Available from: <https://www.theglobeandmail.com/canada/article-st-michaels-research-project-aims-to-improve-care-access-for-unhoused/>.
- 2020 Dec 10 **News Article**. Toronto researchers to study COVID-19 among people experiencing homelessness. Interviewer: Muriel Draaisma. *CBC*. Canada. Available from: <https://www.cbc.ca/news/canada/toronto/researchers-covid-19-homelessness-people-problem-toronto-federal-task-force-1.5835321>.
- 2019 Jan 2 **Quoted Source**. Oshawa addiction clinic takes a stab at opioid crisis with acupuncture treatment. Interviewer: Marcus Gee. *The Globe and Mail*. Canada. Available from: <https://www.theglobeandmail.com/canada/article-acupuncture-treatments-used-to-aid-drug-users-on-road-to-recovery/>.
- 2018 Jun 1 **Quoted Source**. 'Be An Angel' project offers a little taste of humanity for most vulnerable patients. Interviewer: Michael Swan. *Catholic Register*. Ontario, Canada. Available from: <https://www.catholicregister.org/item/27459-be-an-angel-project-offers-a-little-taste-of-humanity-for-most->

vulnerable-patients?platform=hootsuite.

- 2017 Feb 28 **Quoted Source.** Bringing homeless deaths to light. Interviewer: Webster P. CMAJ News. Ontario, Canada. Available from: <http://cmajnews.com/2017/02/28/bringing-homeless-deaths-to-light-109-5399/>.
- 2015 Jul 5 **Opinion / Commentary.** Doctor pushes the boundaries of health-care: Goar. The Toronto Star. Toronto, Ontario, Canada. Available from: <http://www.thestar.com/opinion/commentary/2015/07/02/doctor-pushes-the-boundaries-of-health-care-goar.html>.
- 2014 Apr 25 **Quoted Source.** Solution to homelessness at hand, but it won't be cheap. Interviewer: Swan M. The Catholic Register. Toronto, Ontario, Canada. Available from: <http://www.catholicregister.org/home/canada/item/18022-solution-to-homelessness-at-hand-but-it-won-t-be-cheap>.
- 2013 Oct 2 **Quoted Source.** Leaving hospital against doctor's advice is high risk, Canadian study says. Interviewer: Helen Branswell. The Globe and Mail / Calgary Herald, Canadian Press. Canada. Presenter(s): Helen Branswell.
- 2013 Oct 1 **Quoted Source.** 25,000 a year left hospital despite doctor's order. CBC News. Canada.
- 2013 Feb 4 **Personal Profile.** Homelessness And Health: Toronto Hospital Gets Position Dedicated To Helping Those On Street. Available at: http://www.huffingtonpost.ca/2013/02/04/homelessness-and-health_n_2599740.html. Huffington Post. Canada.
- 2013 Jan 24 **Author of Commentary.** Fixing Homelessness Means Putting Housing First. Available at: http://www.huffingtonpost.ca/stephen-hwang/at-home-homeless-study_b_2536434.html. Huffington Post, Hill Times Online, Hamilton Spectator. Canada. Presenter(s): **Stephen Hwang** & Paula Goering.
- 2013 Jan 21 **Quoted Source.** Homeless Health Care: Helping People On Street Challenging, But Worthwhile For Doctors. Available at: http://www.huffingtonpost.ca/2013/01/21/homeless-health-care_n_2521460.html. Huffington Post, Canadian Press, Victoria Times Colonist, Vancouver Sun, Calgary Herald, Montreal Gazette, Ottawa Citizen, Yahoo! News Canada. Canada. Presenter(s): Sheryl Ubelacker.
- 2012 Dec 13 **Quoted Source.** Want to Help the Homeless Thrive? Give Them Homes. Available at: http://www.huffingtonpost.ca/lindsay-jolivet/at-home-homelessness-program_b_2286441.html. Huffington Post. Canada. Presenter(s): Lindsay Jolivet.
- 2012 Dec 2 **Quoted Source.** City's outreach workers face myriad challenges. Available at: <http://www.montrealgazette.com/news/Unique+hurdles+reaching+risk+youth+city+outreach+workers+face+myriad+challenges/7636486/story.html>. Montreal Gazette. Montreal, Quebec, Canada. Presenter(s): Adam Kovac.
- 2011 May 12 **Quoted Source.** 'Super' bedbugs found in Vancouver's Downtown Eastside. Available at: <http://bc.ctvnews.ca/super-bedbugs-found-in-vancouver-s-downtown-eastside-1.642474>. Canadian Press, CTV News. Canada. Presenter(s): Sheryl Ubelacker.
- 2010 Jan 19 **Personal Profile.** Personal Profile. Doctor Dismisses Profitable Career For The Homeless. 100 Huntley Street. Toronto. Ontario, Canada. Presenter(s): Bridget Antwi. Available at: <http://100huntley.com/video.php?id=gjrRc-GT8Ww> OR <http://www.youtube.com/watch?v=gjrRc-GT8Ww>. (Presentation to Patients/Public).
- 2008 Oct 18 **Personal Profile.** Toronto's Street Saviour. Profile of Dr. Stephen Hwang. The Globe and Mail. Toronto, Ontario, Canada. Presenter(s): Hayley Mick. The Globe and Mail. Page M1.
- 2008 Oct 9 **Quoted Source.** Canadian researchers call for end to 'politicization' of science. CBC News. Toronto, Ontario, Canada. Presenter(s): Paul Jay. <http://www.cbc.ca/technology/story/2008/10/09/scientists-letter.html>.
- 2008 Oct 9 **Quoted Source.** Canadian scientists blast 'suppression of research' by Tories. Canwest News Service. Ontario, Canada. Presenter(s): Margaret Munro.
- 2008 Oct 8 **Quoted Source.** For many, brain injury at root of homelessness. More than half of city's homeless population have experienced severe trauma, researchers find. The Globe and Mail. Toronto, Ontario, Canada. Presenter(s): Caroline Alphonso. The Globe and Mail. Page A11.
- 2008 Oct 6 **Quoted Source.** Traumatic brain injury common among homeless, study finds. CBC News. Toronto,

- Ontario, Canada. Presenter(s): Maureen Brosnahan. <http://www.cbc.ca/health/story/2008/10/06/homeless-head-injury.html>.
- 2008 May 17 **Quoted Source.** Toronto's white underbelly. Curious anomaly: Multiculturalism stops at the street. The Globe and Mail. Toronto, Ontario, Canada. Presenter(s): Kate Hammer.
- 2007 Sep 19 **Interview.** Health study of Toronto homeless demands action, says group. CBC News. Toronto, Ontario, Canada.
- 2007 Sep 15 **Quoted Source.** "Doctors, get tough on drugs": Tony Clement. Minister's mind made up on safe injection site, warn experts. National Review of Medicine. Canada. Presenter(s): Solomon S. Pages 22 and 25.
- 2007 Aug 30 **Quoted Source.** Complicity with evil or social-justice response? Scientists, Catholic ethicists wrestle with funding of safe-injection sites. The Catholic Register. Toronto, Ontario, Canada. Presenter(s): Swan M.
- 2007 Aug 27 **Quoted Source.** Renew Insite's license. The Globe and Mail. Canada. Presenter(s): Editorial. Page A14.
- 2007 Aug 21 **Quoted Source.** 130 Scientists urge Ottawa to base Insite decision on science, not ideology. Canadian Press. Canada. Presenter(s): Branswell H. Article ran in the Globe and Mail, CBC News, CTV News, and Yahoo Canada News.
- 2007 Aug 14 **Quoted Source.** Panhandler panic: over the top? The Globe and Mail. Toronto, Ontario, Canada. Presenter(s): Mick H. Section L1.
- 2007 Feb 21 **Speaker.** Physical and Mental Health on the Street. Homelessness Radio Marathon, CKUT Radio. Montreal, Quebec, Canada. Presenter(s): **Hwang SW.**
- 2006 Dec **Speaker.** Physicians and Discrimination. Omni Television, Omni News Mandarin Weekend Edition. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2005 Jul 12 **Speaker.** Interview on the Impact of Heat Waves on Inner City Populations. CBC News: Morning. Canada. Presenter(s): **Hwang SW.**
- 2002 Nov 5 **Personal Profile.** Homelessness, health link studied. The Medical Post. Canada. Presenter(s): Moulton D.

3. Provincial / Regional

Invited Lectures and Presentations

- 2023 May 11 **Invited Speaker.** Working with vulnerable populations: Challenges in transitions of care. HoPingKong Workshop in Complex Medicine. Toronto, Ontario, Canada. Presenter(s): Andrew Bond, Tracy Warne, **Stephen Hwang.**
- 2023 Mar 29 **Keynote Speaker.** Advancing Health Equity. Catholic Health Sponsors of Ontario (CHSO). Ontario, Canada. Presenter(s): **Hwang SW.**
- 2022 Oct 19 **Invited Speaker.** Lessons from those who experience poverty: Reflections from leaders working in Community Social Services Research and the ER. Catholic Health Sponsors of Ontario (CHSO) - Care for All Webinar Series. Ontario, Canada. Presenter(s): Snider C, **Hwang SW.**
- 2021 Dec 7 **Invited Speaker.** Improving the Health and Wellbeing of People Experiencing Homelessness. McGill University Health Centre - Medical Grand Rounds. Montreal, Quebec, Canada. Presenter(s): **Hwang SW.**
- 2020 Oct 7 **Invited Speaker.** Missed and Late Diagnosis of Concussions in Non-Sport Populations. ECHO Concussion. Ontario, Canada. Presenter(s): **Hwang SW.** Online webinar - Medical education programming for primary care providers in Ontario.
- 2020 Sep 30 **Invited Speaker.** Health, Homelessness, and COVID-19. Ontario Housing First Regional Network Community of Interest. Ontario, Canada. Presenter(s): **Hwang SW.** Online webinar.
- 2019 May 23 **Invited Speaker.** Housing, Health and Policy Conference 2019. McGill University Institute for Health and

- Social Policy. Montreal, Quebec, Canada. Presenter(s): **Hwang SW**.
- 2019 Mar 8 **Invited Speaker**. Screening and Assessment Tools for Housing First. Housing Forum on Evidence-Based Practices, Ontario Housing First Regional Network. Toronto, Ontario, Canada. Presenter(s): Ecker J, **Hwang SW**.
- 2016 Apr 11 **Keynote Speaker**. Ending Homelessness: Dream or Illusion? Grandes Conférences Paul-Bernard sur les Inégalités Sociales de Santé. Léa Roback Centre de Recherche. Montreal, Quebec, Canada. Presenter(s): **Hwang SW**.
- 2015 Apr 2 **Invited Speaker**. Solving the Problem of Homelessness. University of Lethbridge - Discovery Lecture. Lethbridge, Alberta, Canada. Presenter(s): **Hwang SW**.
- 2015 Jan 29 **Invited Speaker**. Assessing Multi-morbidity in Marginalized Populations: A View from the Frontlines. Disability Adjudication Unit, Ontario Ministry of Community and Social Services. Toronto, Ontario, Canada.
- 2014 Nov 22 **Invited Speaker**. "Think Before You Jump in the River". McMaster LIGHT Humanitarian Health Conference. Hamilton, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Nov 20 **Invited Speaker**. Research on Homelessness: Housing First. 2nd Annual Shelter Health Network Retreat. Hamilton, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Jan 31 **Invited Speaker**. Research with Marginalized Populations. Public Health Ontario - Ethics Review Board Retreat. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2013 Nov 28 **Invited Speaker**. The At Home/Chez Soi Project. Ontario Ministry of Municipal Affairs and Housing (MMAH) Homelessness Learning Day. Toronto, Ontario, Canada. Presenter(s): More F and **Hwang SW**.
- 2011 Nov 9 **Invited Speaker**. Canadian Crisis: The Hidden Cost of Homelessness. Portland Hotel Community Service Society - Knowledge Exchange on Homelessness and Health in Canada. Vancouver, British Columbia, Canada. Presenter(s): **Hwang SW**.
- 2011 Nov 9 **Invited Speaker**. Challenges in Understanding the Connections between Housing and Health: The Health and Housing in Transition (HHiT) Study. Centre for Health Evaluation and Outcome Sciences, St. Paul's Hospital, University of British Columbia. Vancouver, British Columbia, Canada. Presenter(s): **Hwang SW**.
- 2011 Oct 29 **Invited Speaker**. Meaningful Measurement of Housing Success. Ontario Non-Profit Housing Association 2011 Annual Conference. Niagara Falls, Ontario, Canada. Presenter(s): Davis B, Witkowski B, Huehn V, **Hwang S**.
- 2010 Nov 19 **Invited Speaker**. Housing Vulnerability and Health: Canada's Hidden Emergency. Ottawa Alliance to End Homelessness 2010 Community Forum on Homelessness. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 Sep 21 **Invited Speaker**. Patterns of Shelter Utilization in Toronto, Ottawa, and Guelph: Implications for Service Delivery. Ontario Municipal Social Services Association (OMSSA) & the Ontario Association of Hostels (OAH) 2010 Housing and Homelessness Conference. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 May 28 **Invited Speaker**. Defining a Typology of Homelessness Based on Shelter Utilization Patterns in Three Ontario Cities. Ottawa Homelessness Roundtable. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 Feb 16 **Invited Speaker**. Homelessness, Housing, and Health. McGill University. Montreal, Quebec, Canada. Presenter(s): **Hwang SW**. McGill University Health Centre, Medical Grand Rounds.
- 2010 Feb 15 **Invited Speaker**. Is Beauty Only Skin Deep? Apparent Age and Health. McGill University. Montreal, Quebec, Canada. Presenter(s): **Hwang SW**. Inter-Division Rounds, Division of General Internal Medicine.
- 2009 Sep 22 **Invited Speaker**. Traumatic Brain Injury and Homelessness. Ontario Municipal Social Services Association. 2009 Forum on Social Housing and Homelessness. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2009 Feb 24 **Invited Speaker**. A survey of domiciliary hostel program tenants in Ontario. Ontario Ministry of Community and Social Services & Ontario Ministry of Health and Long-term Care. Toronto, Ontario,

Canada. Presenter(s): **Hwang SW**. Chiu S.

- 2008 Jun 10 **Invited Speaker**. Research Challenges in Homelessness and Health: Feasibility and Relevance. Ontario Training Centre in Health Services and Policy Research. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2007 Nov 22 **Invited Speaker**. Housing Solutions: The Role of Research. Alliance to End Homelessness in Ottawa. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**. 2007 Community Forum on Homelessness.
- 2007 Sep 25 **Invited Speaker**. CIHR Cafe Scientifique: Home is Where Your Health Is. Canadian Institutes of Health Research, in partnership with Human Resources and Social Development Canada. Edmonton, Alberta, Canada. Presenter(s): **Hwang S**.
- 2007 Jan 26 **Invited Speaker**. Housing, Homelessness, and Health. Ontario Ministry of Community and Social Services. Healthy Communities: A Policy Research Knowledge Exchange. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2007 Jan 19 **Invited Speaker**. Current Investigations: An example of a sister hospital, a model for investigation. INTEGRATION (Interdisciplinary Teams Generating Research on Complex Patients) Workshop. Sponsored by St. Paul's Hospital, University of British Columbia, and Simon Fraser University. Vancouver, British Columbia, Canada. Presenter(s): **Hwang SW**.
- 2006 Nov 17 **Invited Speaker**. Homelessness: Root Causes and Solutions. Keynote Address. 3rd Annual Conference on Diversity and Wellbeing: Taking Action on Homelessness and Health. Sponsored by the Calgary Health Region, United Way of Calgary, and the Calgary Homeless Foundation. Calgary, Alberta, Canada. Presenter(s): **Hwang SW**.
- 2006 Nov 16 **Invited Speaker**. Solving the Problem of Homelessness: Health Care and Beyond. Calgary Health Region. Calgary, Alberta, Canada. Presenter(s): **Hwang SW**.
- 2006 Feb 28 **Invited Speaker**. Homelessness and Health. Ontario Ministry of Health and Longterm Care, Human Resources Branch, Lunch 'N' Learn Program. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2005 Nov 30 **Invited Speaker**. Translating Research on Homelessness and Health into Action and Policy. Queen's University, Department of Community Health and Epidemiology and the School of Urban and Regional Planning. Kingston, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2005 May 3 **Invited Speaker**. Homelessness and Health. The Salvation Army - Ontario Homeless Conference. Jackson's Point, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2005 Mar 7 **Invited Speaker**. Policy Forum on Improving Access to Health Care and Social Services for People Experiencing Homelessness. McMaster University Centre for Health Economics and Policy Analysis (CHEPA) and the Centre for Research on Inner City Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**, Ploeg J, Thomas H, Semogas D.
- 2004 Nov 22 **Invited Speaker**. Translating Research on Homelessness into Policy and Action. Community Forum on Homelessness: Linking Ottawa Research with Action and Policy. Alliance to End Homelessness in Ottawa. Ottawa, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2004 Oct 19 **Invited Speaker**. Mortality among Homeless Women. Ontario Association of Hostels and the Ontario Municipal Social Services Association, 2004 Learning Forum on Homelessness. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2004 Apr 13 **Expert Witness**. Homelessness, Housing, and Health. Office of the Chief Coroner for Ontario, Inquest into the Death of Joseph Teigesser (a homeless man who died of tuberculosis). Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2003 Nov 21 **Invited Speaker**. Inner City Health Research. Ontario Ministry of Health and Long-term Care. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2003 Feb 20 **Invited Speaker**. Homelessness, Health, and Public Policy. Queen's University, Faculty of Medicine, Seminar Series on Medicine and Activism. Kingston, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2003 Jan 10 **Invited Speaker**. A Community-based Program in Increase Cervical and Breast Cancer Screening Among Homeless Women. Cancer Care Ontario, Ontario Cervical Screening Collaborative Group. Toronto,

Ontario, Canada. Presenter(s): **Hwang SW**.

- 2002 Dec 12 **Invited Speaker**. Research on Homelessness and Health. Ontario Ministry of Health and Long-term Care. Toronto, ON, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2002 Jan **Invited Speaker**. Research on Homelessness and Health. University of British Columbia, Centre for Health Evaluation & Outcome Sciences (CHEOS), Health in the City Conference. Vancouver, British Columbia, Canada. Presenter(s): **Hwang SW**.
- 2001 May **Invited Speaker**. Health Research Involving Homeless Persons: Pitfalls and Paradigms. University of Western Ontario School of Medicine and the London InterCommunity Health Centre, Bringing Medicine Into the Community Workshop. London, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2000 Nov **Invited Speaker**. Homelessness: In the Shelters and On the Street. Ontario Ministry of Community and Social Services, Brown Bag Policy Network. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2000 Sep **Invited Speaker**. Ethical and Clinical Issues Affecting the Homeless. Centre for Clinical Ethics, Conference on Affirming an Ethic of Care: Understanding the Needs of Vulnerable Persons. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 1995 Dec **Invited Speaker**. Homelessness and Health. St. Paul's Hospital, Department of Medicine Rounds. Vancouver, British Columbia, Canada. Presenter(s): **Hwang SW**.

Presented Abstracts

- 2010 Nov 15 **Co-author**. Upstream determinants of health and housing are major contributors to health-related quality of life in HIV infection: Findings from the Positive Spaces, Healthy Places study. Ontario HIV Treatment Network (OHTN) 2010 Research Conference. Toronto, Ontario, Canada. Presenter(s): Rourke ST, Bekele T, Tucker R, Greene S, Monette L, Koornstra J, Sobota M, Byers S, Watson J, Bacon J, Hambly K, **Hwang S**, Guenter D, Dunn J, Hamilton M, Truax J, Hintzen DB, White P, Kayitesi M, Desbiens M, De Blois S, Cubillos M, and The Positive Spaces, Healthy Places Team. (Trainee Presentation).
- 2009 Nov 16 **Co-author**. Peer Investigator experiences in a community based research study: expression through creative projects. Ontario HIV Treatment Network (OHTN) 2009 Research Conference. Toronto, Ontario, Canada. Presenter(s): Scott AN, Hayhoe B, Walker D, Ewert R, Parsons J, Worthington C, **Hwang SW**, and Peer Investigators. (Trainee Presentation).
- 2009 Oct 8 **Co-author**. Housing is Health: The Positive Spaces Healthy Places Study. Ministry of Health and Long Term Care 2009 Health Research Showcase. Toronto, Ontario, Canada. Presenter(s): Tucker R, Greene S, Guenter D, Sobota M, Koornstra J, Byers B, Monette L, **Hwang W**, Dunn J, Rourke SB. Poster presentation.
- 2008 Nov 14 **Co-author**. The Positive Spaces, Health Places Study. Ontario HIV Treatment Network 2008 Research Conference. Toronto, Ontario, Canada. Presenter(s): Tucker R, Greene S, Sobota M, Koornstra J, Monette L, Guenter D, Byers S, Dunn J, **Hwang S**, Rourke SB. Oral session (6 abstracts).
- 2008 Nov 13 **Co-author**. Conception of a CBR Project on Pregnancy in Street-Involved Young Women: Development of a Strong Service Provider-Researcher Partnership. Ontario HIV Treatment Network (OHTN) 2008 Research Conference. Toronto, Ontario, Canada. Presenter(s): Scott AN, Hayhoe B, Walker D, Ewert R, Parsons J, Worthington C, **Hwang SW**. (Trainee Presentation).
- 2007 Nov 19 **Co-author**. Positive Spaces, Healthy Places: Health Outcomes at 6 Months. Ontario HIV Treatment Network (OHTN) Research Conference. Toronto, Ontario, Canada. Presenter(s): Tucker R, Greene S, Sobota M, Koornstra J, Monette L, Guenter D, Byers S, Dunn J, **Hwang SW**, Rourke SB.

Media Appearances

- 2023 Jan 18 **Quoted source**. 'A Band-Aid on top of a Band-Aid': Winter-weather alerts are leaving vulnerable Ontarians out in the cold. Interviewer: Justin Chandler. TVO Today. Ontario, Canada. Available from: <https://www.tvo.org/article/the-quick-fix-part-4-how-to-tackle-homelessness-in-ontario>.
- 2021 Aug 19 **Interview**. The quick fix, Part 4: How to tackle homelessness in Ontario. Interviewer: Matt Gurney. TVO. Ontario, Canada. Available from: <https://www.tvo.org/article/the-quick-fix-part-4-how-to-tackle->

homelessness-in-ontario.

- 2016 Oct 11 **Interview.** Rob Snow speaks with Dr. Stephen Hwang, Director for the Centre for Urban Health Solutions at St. Michael's Hospital, about the homeless and housing. Interviewer: Rob Snow. 580 CFRA News Talk Radio. Ottawa, Ontario, Canada. Available from: <http://devel.autopod.ca/chum/181/podcasts/6/>.
- 2009 Jan 28 **Quoted Source.** On health and the homeless. The Edmonton Journal. Edmonton, Alberta, Canada. Presenter(s): Richard Warnica. The Edmonton Journal.
- 2008 Sep 25 **Interview.** Health care for homeless people. CBC Radio: Up to Speed with Margot Watt. Winnipeg, Manitoba, Canada. Presenter(s): **Hwang SW**.
- 2007 Nov 26 **Interview.** Traumatic Brain Injury among Homeless People. CBC Radio: Ontario Morning. Ontario, Canada. Presenter(s): **Hwang SW**.
- 2007 Sep 24 **Interview.** Crack use 'staggering' among homeless. The Globe and Mail. Toronto, Ontario, Canada. Presenter(s): Reinhart A.
- 2007 Sep 1 **Quoted Source.** Conservatives confuse science and moralizing. The Vancouver Sun. Vancouver, British Columbia, Canada. Presenter(s): McKnight P.
- 2004 Apr 20 **Speaker.** Women and Homelessness. Television Ontario (TVO), "More to Life" Program. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.

4. Local

Invited Lectures and Presentations

- 2021 Mar 22 **Invited Speaker.** Just the Facts: Affordable Housing, Homelessness, and Healthcare. Toronto Science Policy Network (TSPN), University of Toronto. Toronto, Ontario, Canada. Presenter(s): **Stephen Hwang**, Mikaela Gabriel and Andrew Boozary (panelists); Victoria Gibson (moderator).
- 2019 Nov 1 **Keynote Speaker.** Caring for People Experiencing Disadvantage and Marginalization. St. Joseph's Health Centre 64th Annual Clinical Day. Toronto, Ontario, Canada.
- 2019 Oct 16 **Keynote Speaker.** Aging in Place Report Launch. Mainstay Housing. Toronto, Ontario, Canada.
- 2019 Apr 5 **Invited Speaker.** From the Streets to Solutions: Tackling Homelessness. CRAM University of Toronto. Toronto, Ontario, Canada. Available from: <https://cramtoronto.com>.
- 2018 Oct 30 **Invited Lecturer.** Transition to Professional Practice - The Causes of Illness & What We Should Do About It. Global Health Education Initiative, University of Toronto Postgraduate Medical Education. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2018 Oct 2 **Panel Member.** Tackling Toronto's Homelessness Crisis. St. Michael's Hospital Foundation. Toronto, Ontario, Canada. Presenter(s): Katz M (keynote speaker); Aston M, Bedard M, **Hwang SW** (discussion panel); Mediwake AM (moderator).
- 2018 Jun 27 **Invited Speaker.** Improving health systems and public policy for disadvantaged populations. Grand Rounds, St. Joseph's Health Centre. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2018 Apr 25 **Invited Speaker.** The Quest for Urban Health Solutions. University of Toronto IHPME Graduate Student Union. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2018 Mar 9 **Invited Speaker.** Homelessness and Urban Health Solutions. Metropolitan United Church, A Great Light: Discussion Series. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2017 Nov 6 **Invited Speaker.** Research metrics and health equity research. St. Michael's Hospital, Research Matters Month & Centre Talks. Toronto, Ontario, Canada. Presenter(s): **Hwang SW** and Nelson LA.
- 2017 Oct 27 **Invited Speaker.** Traumatic Brain Injury in People Experiencing Homelessness. University of Toronto, Department of Surgery - 2017 Interdisciplinary Trauma Conference - Violence Close to Home: Intentional

- injuries in vulnerable populations. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2017 Sep 8 **Invited Lecturer**. Panel on Basic Income. Introduction to Public Health Sciences (CHL 5004H). Dalla Lana School of Public Health, University of Toronto. Toronto, Ontario, Canada. Presenter(s): **Hwang SW** and Stapleton J.
- 2017 Jun 15 **Keynote Speaker**. Five Things That I Wish Someone Had Told Me When I Was Your Age. University of Toronto, Division of General Internal Medicine - 2017 GIM Research Day. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2017 Mar 22 **Invited Speaker**. Housing: A Critical Determinant of Urban Health. Massey Grand Rounds 11th Annual Symposium. Health & Environment: Air, Food and Drugs. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2016 Dec 2 **Invited Speaker**. Cold-related Injuries and Deaths among People Experiencing Homelessness. The Paula Goering Memorial Workshop on Coordinating Care for People who are Homeless, Centre for Addiction and Mental Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2016 Oct 22 **Invited Speaker**. Homelessness: Symptom or Disease? 9th Annual Dalla Lana School of Public Health Student-Led Conference. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2016 Sep 27 **Invited Speaker**. Inner City Health: Physicians & Marginalized Patients. University of Toronto PGY2 Academic Half Day. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2016 Sep 27 **Keynote Speaker**. Homelessness and Housing Solutions. Homes First Foundation. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2016 Apr 23 **Invited Speaker**. A Biblical View of Social Justice. Thinking Conference: Has God Spoken? Mississauga, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2016 Feb 9 **Invited Speaker**. Creating Urban Health Solutions. University of Toronto Senior Alumni Association - Canadian Perspectives Lecture Series. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2016 Jan 27 **Invited Speaker**. Faith, Science, and Effective Advocacy. Multifaith Alliance to End Homelessness. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2015 Sep 29 **Invited Speaker**. Inner City Health: Physicians & Marginalized Patients. University of Toronto PGY2 Academic Half Day. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2015 Apr 9 **Invited Speaker**. The Best Kept Secret: What Really Determines Your Health. Li Ka Shing Knowledge Institute of St. Michael's Hospital, Popular Science Lecture. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2015 Mar 16 **Moderator**. Debate: Has Science Made God Irrelevant? Power to Change, RZIM Canada, University of Toronto Secular Alliance, and The Veritas Forum. Toronto, Ontario, Canada. Presenter(s): Prof. John Lennox and Christopher DiCarlo.
- 2014 Nov 27 **Invited Lecturer**. Understanding the Social Determinants of Health. Interprofessional Health, Arts & Humanities Certificate Program - Humanities Lunch and Learn Session. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Nov 3 **Invited Lecturer**. Homelessness: What's the Real Story? Ryerson University, School of Journalism, JN8104 - Urban Politics and Society for Journalists. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Oct 7 **Invited Speaker**. Homelessness in Downtown Toronto. Street Health, Board of Directors Meeting. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Oct 6 **Speaker**. Academic Promotions at the University of Toronto. North York General Hospital, Department of Medicine Business Meeting. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Sep 21 **Invited Speaker**. Science and Faith: Are they really in conflict? Center for Science and Culture. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Jul 30 **Speaker**. Itchy and Scratchy: A General Internist's Guide to Infestations. St. Michael's Hospital, Medical

- Grand Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Jun 18 **Invited Speaker**. Housing First: A Common Sense Approach. Affordable Housing Halton. Oakville, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Jun 10 **Invited Speaker**. Homelessness and Housing First. Homes First Society, Annual General Meeting. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 May 14 **Keynote Speaker**. Research and Responsibility: The Science of Homelessness. Sunnybrook Health Sciences Centre Department of Medicine Resident Research Day Grand Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Apr 2 **Keynote Speaker**. Homelessness, Housing, and Hope. 2014 Royacker Lecture, Regis College, University of Toronto. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Apr 1 **Invited Speaker**. Homelessness, Science, and Morality. The Art of Medicine Lecture Series, Ho Ping Kong Centre for Excellence in Education and Practice (CEEP), Toronto Western Hospital. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Feb 18 **Invited Speaker**. Inner City Health: Physicians & Marginalized Patients. University of Toronto PGY2 Academic Half Day. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Feb 7 **Invited Speaker**. Housing First and Intensive Case Management for Homeless Adults with Mental Illness: Results from the At Home Randomized Controlled Trial. St. Michael's Hospital Mental Health Grand Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Jan 13 **Invited Speaker**. Solving the Problem of Homelessness. St. Lawrence Supper Club. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2014 Jan 4 **Keynote Speaker**. A Radical Vision for Medical Mission. Richmond Hill Christian Community Church, Ontario Chinese Christian Medical Fellowship, and Education Medical Aid and Service (EMAS). Richmond Hill, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2013 Nov 21 **Invited Speaker**. The Aging Homeless: Best Practices for End of Life Care. The Good Neighbours' Club. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2013 Oct 31 **Invited Speaker**. Housing First and Intensive Case Management for Homeless Adults with Mental Illness: Results from the At Home Randomized Controlled Trial. St. Michael's Hospital Clinical and Population Research Round. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2013 Jul 31 **Speaker**. Improving Health and Healthcare for People who are Homeless: What Really Works? St. Michael's Hospital - Medical Grand Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2013 Jul 24 **Invited Speaker**. Solving the Problem of Homelessness. St. Michael's Foundation - A Legacy of Caring. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2013 May 29 **Invited Speaker**. Bridging the Gap: A Closer Look at Addictions, Mental Health, Brain Injury and the Justice System. Toronto Acquired Brain Injury Network. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. Available from: http://www.abinetwork.ca/news?news_id=52.
- 2013 Apr 11 **Invited Speaker**. Caring for the Whole Person: Insights from the Inner City. The Good Neighbours' Club - Annual General Meeting. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2012 Oct 11 **Invited Speaker**. Putting a Roof over Inadequate Housing: "Home Safe" Documentary Screening and Panel Discussion. Canadian Institutes of Health Research - Institute of Population and Public Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**, Tarasuk V, Richards C, Adams R, Shapcott M.
- 2012 May 17 **Invited Speaker**. 24th Annual Higgins Day - Resident Research Day. St. Michael's Hospital - Department of Medicine. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. Keynote address.
- 2012 Apr 28 **Invited Speaker**. CIHR Cafe Scientifique: No Room for Health? University of Toronto Public Health Social Justice Collective. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2012 Mar 9 **Invited Lecturer**. Homelessness and the Determinants of Health. University of Toronto - University

- College, Health Studies Program. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2012 Mar 7 **Speaker**. Prevention of Clostridium difficile Infection in Hospitalized Patients. St. Michael's Hospital - Medical Grand Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2012 Feb 23 **Invited Speaker**. Traumatic Brain Injury and Homelessness. Sherbourne Health Centre. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2012 Feb 21 **Invited Speaker**. Seeking Solutions Symposium: Access to Health Care for the Uninsured in Canada. Hospital for Sick Children, Women's College Hospital, and Ryerson University. Toronto, Ontario, Canada. Presenter(s): Mason K, **Hwang SW**.
- 2012 Feb 2 **Invited Speaker**. Discrimination in Health Care. St. Michael's Hospital - Clinical and Population Research Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2012 Feb 1 **Invited Speaker**. Pain Management in Homeless and Hard-to-House Patients. Casey House: Physicians and Advanced Practice Clinicians HIV/AIDS Health Care Seminar Series. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2012 Jan 17 **Invited Speaker**. Chronic Pain Management in Homeless and Underhoused Patients. Sherbourne Health Centre. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2011 Dec 5 **Invited Speaker**. Keynote Speaker, "Forty is Too Young to Die: A Call to Action" Report Launch. Mainstay Housing, Early-Onset Illnesses and Mortality Working Group. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2011 May 31 **Invited Speaker**. FitzTalks, in Honor of Graduating Medical Students in the Fitzgerald Academy. "The Patient Appeared Older Than His Stated Age - A Reflection on Curiosity, Empathy, and Privilege.". Faculty of Medicine, University of Toronto. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 Nov 22 **Invited Speaker**. Advocacy Rounds. St. Michael's Hospital - Department of Medicine. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 Nov 3 **Invited Speaker**. Homelessness and Public Health. Public Health Interest Group at University of Toronto. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 Oct 5 **Invited Speaker**. Health care utilization among homeless people. Clinical Epidemiology Unit / Institute for Clinical Evaluative Sciences - Conjoint Evaluative Sciences Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 Oct 4 **Invited Speaker**. Homelessness and Health. IMAGINE Community Awareness Lecture Series, University of Toronto Faculty of Medicine. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 Sep 23 **Invited Speaker**. Homelessness and Palliative Care. Toronto Central Palliative Care Network. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 Jul 22 **Invited Speaker**. Homelessness and Immigration: Toronto's Changing Face. City of Toronto - Immigrant and Refugee Housing Committee. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 Jul 14 **Invited Speaker**. Defining a Typology of Homelessness Based on Shelter Utilization Patterns in Three Ontario Cities. Housing & Homeless Service Network, Toronto Shelter, Support & Housing Administration. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 May 26 **Invited Speaker**. Defining a Typology of Homelessness Based on Shelter Utilization Patterns in Three Ontario Cities. Street Outreach Steering Committee, Toronto Shelter, Support & Housing Administration. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 Mar 1 **Invited Speaker**. Homelessness and Immigration: Toronto's Changing Face. Social Planning Toronto - Research and Policy Forum. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2010 Feb 10 **Invited Lecturer**. Homelessness and Health. Ryerson University, School of Occupational and Public Health (ENH 809). Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2009 Dec 18 **Invited Speaker**. Traumatic Brain Injury and Homelessness. St. Michael's Hospital Mental Health Grand

Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. (Continuing Education).

- 2009 Nov 16 **Invited Speaker**. Research on homelessness: Moving from problems to solutions. Innovation Night at St. Michael's Hospital. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2009 Jun 2 **Invited Speaker**. Traumatic brain injury and the health of homeless people. Toronto Acquired Brain Injury Network. Brain Injury and Homelessness Workshop. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. (Continuing Education).
- 2009 Apr 10 **Invited Speaker**. Good Friday Breakfast Speaker: Homelessness. St. Andrew's Presbyterian Church Humber Heights. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2009 Mar 29 **Invited Speaker**. Lenten Speaker Series: Homelessness. Anglican Church of St. Clement. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2009 Mar 6 **Invited Speaker**. Harm Reduction: A Balanced Approach. Casey House - HIV/AIDS and Mental Health: A Symposium for Health Care Providers. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. (Continuing Education).
- 2009 Mar 5 **Invited Speaker**. Unmet needs for health care among homeless people within a universal health insurance system. St. Michael's Hospital - Clinical and Population Research Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2009 Mar 3 **Invited Lecturer**. Homelessness and Health. Ryerson University, School of Occupational and Public Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2009 Feb 24 **Invited Speaker**. Homelessness & Immigration: Toronto's Changing Face. Let's Get Talking: Community Discussions on Neighbourhoods & Health - Regent Park Community Health Centre. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2008 Oct 20 **Invited Speaker**. Unmet needs for health care among homeless people within a universal health insurance system. Toronto General Hospital - Clinical Epidemiology Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2008 Oct 3 **Invited Speaker**. Poverty and Health: Partnerships in Action 2008 Conference. Workshop on Homelessness and Health. Public Health Sciences Students Association, University of Toronto. Toronto, Ontario, Canada. Presenter(s): Khandor E, Mason K, **Hwang SW**.
- 2008 Sep 12 **Invited Speaker**. Addressing Health Disparities in Toronto: Spotlight on Diabetes and Mental Illness. Toronto Central Local Health Integration Network (LHIN). Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2008 Jun 5 **Invited Speaker**. Health Connections 2008. Health Equity: From Challenges to Solutions. Toronto Central Local Health Integration Network (LHIN). Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2008 May 26 **Invited Speaker**. Supportive Housing: How much does Toronto need; how are we going to get it? Wellesley Institute. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2008 May 26 **Invited Speaker**. Homelessness & Brain Injuries: Cause or Effect? Let's Get Talking: Community Discussions on Neighbourhoods & Health - St. Christopher House. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2008 May 24 **Invited Speaker**. Why care about homelessness in Toronto? Ontario Public Service Employees Union (OPSEU) Educational Forum on Poverty in Toronto. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2008 May 10 **Invited Speaker**. Harm Reduction: A Balanced Approach. Casey House Board of Directors Retreat. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2008 Feb 19 **Invited Speaker**. Homelessness and Health. 11th Annual Toronto Catholic District School Board High School Gifted Program Conference, "Perspectives: Challenges, Ideas and Responses 2008". Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 2007 Oct 9 **Invited Speaker**. Research on homelessness and health. Innovation Night at St. Michael's Hospital. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.

- 2007 Mar 13 **Invited Lecturer.** Homelessness and Health. York University, Faculty of Arts, A Critical Study of Health and Society (AS/SOSC 2110). Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2007 Mar 8 **Invited Speaker.** Lenten Speaker Series: Homelessness. Saint Luke's United Church. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2007 Feb 28 **Invited Lecturer.** Homelessness and Health. Ryerson University, School of Occupational and Public Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2007 Feb 20 **Invited Speaker.** Homelessness and Health. 10th Annual Toronto Catholic District School Board High School Gifted Program Conference, "Perspectives: Challenges, Ideas and Responses 2007". Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2006 Aug 30 **Speaker.** The Discriminating Physician: Does Prejudice Affect the Provision of Health Care? St. Michael's Hospital, Medical Grand Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2006 Apr 13 **Speaker.** Challenges and Rewards of Research with Homeless Persons. St. Michael's Hospital, Clinical Research Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW, Chiu S.**
- 2006 Apr 5 **Invited Speaker.** Forget Chaoulli: Existing financial barriers in our health care system. Student Medical Reform Group and Diversity in Medicine Speaker Series, Faculty of Medicine, University of Toronto. Toronto, Ontario, Canada. Presenter(s): **Hwang SW, Glazier RH.**
- 2006 Mar 31 **Invited Lecturer.** Homelessness and Health. Ryerson University, School of Occupational and Public Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2006 Mar 7 **Invited Lecturer.** Homelessness and Health. York University, Faculty of Arts, A Critical Study of Health and Society (AS/SOSC 2110). Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2006 Feb 21 **Invited Speaker.** Homelessness and Health. 9th Annual Toronto Catholic District School Board High School Gifted Program Conference, "Perspectives: Challenges, Ideas and Responses". Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2005 Sep 14 **Invited Lecturer.** Marginalized Populations: Homelessness. University of Toronto, Dept. of Public Health Sciences, Introduction to Public Health Sciences (CHL 5004). Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2005 Jun 14 **Invited Speaker.** Bed Bugs and Beyond: Infectious Diseases in Homeless Persons. Sunnybrook and Women's College Health Sciences Centre, Infectious Diseases/Microbiology Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2005 Jun 13 **Invited Speaker.** Homeless People's Trust and Interactions with Paramedics and Police in Toronto. Toronto Police Services Board. Toronto, Ontario, Canada. Presenter(s): **Hwang SW, Zakrison T.**
- 2005 May 11 **Invited Speaker.** Bedbug Infestations in Homeless Shelters and Other Locations in Toronto. City of Toronto, Community and Neighbourhood Services, Alternative Housing and Services Committee. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2005 May 9 **Invited Speaker.** Bedbug Infestations in Homeless Shelters and Other Locations in Toronto. Toronto Board of Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2005 Mar 1 **Invited Lecturer.** Homelessness and Health. York University, Faculty of Arts, A Critical Study of Health and Society. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2005 Feb 23 **Speaker.** Homeless People's Use of Health Care: Too Much, Too Little, or Just Right? St. Michael's Hospital, Medical Grand Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2005 Feb 7 **Invited Lecturer.** Homelessness and Health. University of Toronto, Department of Sociology, Introduction to Health and Social Policy. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2004 Nov 29 **Invited Speaker.** The Reemergence of Bedbugs in the Urban Environment. City of Toronto, Advisory Committee on Homeless and Socially Isolated Persons. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2004 Oct 6 **Invited Lecturer.** Access to Health Care in Disadvantaged Populations. Michener Institute for Applied

Health Sciences and University of Toronto Faculty of Medicine, Medical Radiation Sciences Program. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**

- 2004 Jun 21 **Invited Speaker.** The Role of Research in Improving Community Health. St. Michael's Hospital Community Advisory Panels and the Wellesley Central Corporation. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2004 Jun 1 **Invited Speaker.** Alarming Death Rates among Homeless Women in Toronto: What's the Story Behind the Story? Wellesley Central Health Corporation, Wellesley Urban Health Seminar Series. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2004 May 19 **Invited Speaker.** Cardiovascular Risk Factors in Homeless Adults. Institute for Clinical Evaluation Sciences and Sunnybrook and Women's Health Sciences Centre, Clinical Epidemiology Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2004 Apr 19 **Invited Speaker.** Cardiovascular Risk Factors in Homeless Adults. Toronto General Hospital, Clinical Epidemiology Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2004 Mar 29 **Invited Lecturer.** Homelessness and Health. Ryerson University, School of Occupational and Public Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2004 Mar 9 **Invited Lecturer.** Homelessness and Health. University of Toronto, Population Health Course. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2004 Feb 15 **Invited Lecturer.** Homelessness and Health. Ryerson University, School of Occupational and Public Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2004 Jan 14 **Invited Speaker.** Health Care Utilization among Homeless Persons in Toronto. City of Toronto, Community and Neighbourhood Services, Alternative Housing and Services Committee. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2003 Nov 6 **Speaker.** Cardiovascular Risk Factors in Homeless Adults. St. Michael's Hospital, Clinical Epidemiology Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2003 Sep 15 **Invited Speaker.** Keynote Address, 2003 Annual General Meeting. Daily Bread Food Bank Foundation. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2003 Jul 9 **Invited Speaker.** The Health of Rooming House Residents in Toronto. City of Toronto, Community and Neighbourhood Services, Alternative Housing and Services Committee. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2002 Oct **Invited Lecturer.** Community-Based Action Research. Ryerson University, Homelessness in Canadian Society. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2002 Oct **Invited Lecturer.** Access to Health Care: Issues of Class, Ethnicity, and Culture. Michener Institute for Applied Health Sciences and University of Toronto Faculty of Medicine, Medical Radiation Sciences Program. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2001 Dec **Invited Speaker.** Access to Health Care Among the Homeless and Hungry in the Inner City. University Health Network, Clinical Epidemiology Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2001 Nov **Speaker.** Access to Health Care Among the Homeless and Hungry in the Inner City. St. Michael's Hospital, Clinical Epidemiology Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2001 Nov **Invited Speaker.** Leadership. 2nd Annual University of Toronto PGY2 Teaching Residents to Teach Retreat (Millcroft Inn, Alton). Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2001 Oct **Invited Lecturer.** Barriers to Health Care Access for Homeless Persons. Michener Institute for Applied Health Sciences and the University of Toronto, Individual and Social Issues in Health Care Course. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2001 Jul **Invited Speaker.** Health Status of Rooming House Residents in Toronto. Toronto Dept. of Community & Neighbourhood Services, Rooming House Working Group. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**

- 2001 Jul **Invited Speaker.** Homelessness and Health. University of Toronto, Summer Mentorship Program. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2001 May **Invited Speaker.** Homelessness and Health. University of Toronto, Community Medicine Residents' Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2001 May **Invited Speaker.** Screening for Cervical and Breast Cancer in Homeless Women. Toronto Homeless Health Reference Group and Ottawa Inner City Health. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2001 Apr **Speaker.** Screening for Cervical and Breast Cancer in Homeless Women: A Community-Academic Partnership. St. Michael's Hospital, Clinical Epidemiology Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2001 Apr **Invited Speaker.** Health Care at Homeless Shelters. Utilization Information Sharing Day, Greater Toronto Area Hospitals. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2001 Mar **Invited Speaker.** Anemia in High-Risk Adult Populations. Anemia Institute for Research and Education, Anemia and Nutrition Forum. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.** (Continuing Education).
- 2000 Nov **Speaker.** Homelessness: Challenges for Clinical Care and Research. St. Michael's Hospital, Medical Grand Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2000 Nov **Invited Speaker.** Homelessness: Challenges for Clinical Care and Research. University Health Network, Toronto Western Hospital, Medical Grand Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2000 Oct **Invited Speaker.** Deaths among the Homeless. Toronto Disaster Relief Committee, Homelessness Toronto 2000. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2000 Oct **Invited Speaker.** Research in Homelessness and Health. St. Michael's Hospital Foundation, Care & Cure Lecture. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2000 Oct **Invited Lecturer.** Barriers to Health Care Access for Homeless Persons. Michener Institute for Applied Health Sciences and the University of Toronto, Individual and Social Issues in Health Care Course. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2000 Sep **Invited Lecturer.** What is Population Health? University of Toronto, Faculty of Medicine, Determinants of Health Course. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2000 Mar **Speaker.** The Rational Clinical Exam. St. Michael's Hospital, Division of General Internal Medicine, Residents' Educational Retreat Day. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2000 Feb **Invited Speaker.** Patterns of Shelter Use and Mortality Among Homeless Men. University of Toronto, Department of Public Health Sciences, Community Health Research Day. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2000 Feb **Speaker.** Research on Homelessness and Health: Lessons from the McKinney Demonstration Projects. Inner City Health Journal Club, University of Toronto. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2000 Feb **Speaker.** Homelessness and Health in Toronto. St. Michael's Hospital Foundation. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 1999 Dec **Invited Speaker.** The Canadian Health Care System: How Does It Compare to Others? The Course on Gastroenterology and Digestive Endoscopy, The Wellesley Hospital. Toronto, Ontario, Canada. Presenter(s): **Hwang, SW.** (Continuing Education).
- 1999 Oct **Invited Lecturer.** Barriers to Health Care for Homeless Persons. Michener Institute for Applied Health Sciences and the University of Toronto Dept. of Public Health Sciences, Individual and Social Issues in Health Care Course. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 1999 Oct **Speaker.** Patterns of Shelter Use and Mortality Among Homeless Men. St. Michael's Hospital, Inner City Health Research Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 1999 Oct **Speaker.** Disease Probability for Differential Diagnosis. St. Michael's Hospital, Division of General Internal

Medicine, R4 Seminar Series. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.

- 1999 Sep **Invited Speaker**. The Canadian Health Care System: How Does It Compare to Others? The Course on Gastroenterology and Digestive Endoscopy, The Wellesley Hospital. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. (Continuing Education).
- 1999 Aug **Invited Lecturer**. What is Population Health? University of Toronto, Faculty of Medicine, Determinants of Health Course. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 1999 Jun **Invited Speaker**. The Canadian Health Care System: How Does It Compare to Others? The Course on Gastroenterology and Digestive Endoscopy, The Wellesley Hospital. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. (Continuing Education).
- 1999 Feb **Speaker**. Homelessness and Health Research. St. Michael's Hospital, Homeless and Underhoused Community Advisory Panel. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 1999 Jan **Speaker**. What Do Homeless Families Really Need? Inner City Health Journal Club, University of Toronto. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 1998 Dec **Invited Speaker**. The Canadian Health Care System: How Does It Compare to Others? The Course on Gastroenterology and Digestive Endoscopy, The Wellesley Hospital. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. (Continuing Education).
- 1998 Nov **Invited Speaker**. What Happens to Patients Who Leave the Hospital Against Medical Advice? The Toronto Hospital, Clinical Epidemiology Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 1998 Jun **Invited Speaker**. The Canadian Health Care System: How Does It Compare to Others? The Course on Gastroenterology and Digestive Endoscopy, The Wellesley Hospital. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**. (Continuing Education).
- 1997 Oct **Speaker**. Healthy, Wealthy, and Wise: Why Rich People Live Longer. St. Michael's Hospital, Inner City Health Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 1997 Oct **Invited Speaker**. Statistics for Clinicians. University of Toronto, Department of Family and Community Medicine Core Day. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 1997 Sep **Speaker**. Healthy, Wealthy, and Wise: Why Rich People Live Longer. St. Michael's Hospital, Medical Grand Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 1997 Jul **Invited Speaker**. Healthy, Wealthy, and Wise: Why Rich People Live Longer. St. Michael's Hospital, Department of Family and Community Medicine, Grand Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 1997 Jun **Invited Speaker**. Integrated Health Information Systems. Healthy Connections, East Toronto Conference 1997. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 1997 Apr **Invited Speaker**. Finding and Counting the Homeless. University of Toronto, Department of Public Health Sciences, Graduate Student Seminar in Biostatistics. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.
- 1996 Mar **Invited Speaker**. Death on the Street. St. Michael's Hospital, Medical Grand Rounds. Toronto, Ontario, Canada. Presenter(s): **Hwang SW**.

Presented Abstracts

- 2014 Jul 29 **Supervisor**. The effect of advance directive completion on end-of-life care in homeless persons. St. Michael's Hospital, Keenan Research Summer Student Program -- 2014 Research Poster Competition. Toronto, Ontario, Canada. Presenter(s): Matthew To, Linh Luong, and Victor Goncalves. (Trainee Presentation).
- 2013 May 22 **Supervisor**. Measurement of Retention in Primary Care among Vulnerably Housed Populations: The At Home/Chez Soi Project. St. Michael's Hospital, Department of Family and Community Medicine. Toronto, Ontario, Canada. Presenter(s): Dosani N. (Trainee Presentation).

- 2012 Nov 8 **Co-author.** Exploring the link between traumatic brain injury and homelessness: a feasibility study. Toronto Acquired Brain Injury Network Conference. Toronto, Ontario, Canada. Presenter(s): Topolovec-Vranic J, Ennis N, Johnson P, Michalak A, Masanic C, Ouchterlony D, Distin K, Stergiopoulos V, **Hwang S**, Kontos P, Colantonio A, Cusimano M.
- 2007 May 1 **Co-author.** Integrating conceptual frameworks to study pregnancy in street youth. 3rd Annual Epidemiology and Biostatistics Student Society Research Day, McGill University. Montreal, Quebec, Canada. Presenter(s): Scott AN, Boivin JF, **Hwang SW**. Poster presentation.
- 2000 Jan **Co-author.** Barriers to appropriate diabetes management among homeless persons in Toronto. University of Toronto, Medical Student Research Day. Toronto, Ontario, Canada. Presenter(s): Bugeja A, **Hwang SW**. Poster presentation. Winner of Award for Best Health Services Research Project.

Media Appearances

- 2023 Jan 16 **Quoted Source.** Keep Toronto warming centres open 24/7 for rest of winter, Board of Health urges city. Interviewer: Joanna Lavoie. CTV News (Toronto). Toronto, Ontario, Canada. Available from: <https://toronto.ctvnews.ca/keep-toronto-warming-centres-open-24-7-for-rest-of-winter-board-of-health-urges-city-1.6233129>.
- 2022 May 23 **Quoted Source.** Toronto's homeless encampments are back on the fringes. Here's why that's a problem. Interviewer: Victoria Gibson. The Toronto Star. Toronto, Ontario, Canada. Available from: <https://www.thestar.com/news/gta/2022/05/23/torontos-homeless-encampments-are-back-on-the-fringes-heres-why-thats-a-problem.html>.
- 2022 Jan 29 **Quoted Source.** 'People are stranded:' A downtown hospital is seeing a rise in cold-related injuries as shelters struggle to find spots. Interviewer: Megan Ogilvie. The Toronto Star. Toronto, Ontario, Canada. Available from: <https://www.thestar.com/news/gta/2022/01/29/people-are-stranded-a-downtown-hospital-is-seeing-a-rise-in-cold-related-injuries-as-shelters-struggle-to-find-spots.html>.
- 2022 Jan 25 **Televised Interview.** Cold weather and people experiencing homelessness. CP24 News. Toronto, Ontario, Canada. Available from: <https://www.cp24.com/video?binId=1.5364204>.
- 2021 Jul 31 **Quoted Source.** A private community housing provider noticed a spike in premature deaths in one of their buildings. So they decided to do something about it. Interviewer: Donovan Vincent. The Toronto Star. Toronto, Ontario, Canada. Available from: <https://www.thestar.com/news/gta/2021/07/31/a-private-community-housing-provider-noticed-a-spike-in-premature-deaths-in-one-of-their-buildings-so-they-decided-to-do-something-about-it.html>.
- 2019 Oct 23 **Quoted Source.** Who's to blame for youth homelessness in York Region? Interviewer: Sheila Wang. The Richmond Hill Liberal, King Connection, yorkregion.com. Richmond Hill, Ontario, Canada. Available from: <https://www.yorkregion.com/news-story/9637639-analysis-who-s-to-blame-for-youth-homelessness-in-york-region-/>.
- 2017 Jun 25 **Quoted Source.** Toronto faces Catch-22 with impending Seaton House closure. Interviewer: Emma McIntosh. The Toronto Star. Toronto, Ontario, Canada. Available from: <https://www.thestar.com/news/gta/2017/06/25/toronto-faces-catch-22-with-impending-seaton-house-closure.html>.
- 2016 Oct 10 **Quoted Source.** Cities' homelessness plans doomed to fail without federal cash: Report. Interviewer: Laurie Monsebraaten and Hin Alam. The Toronto Star. Toronto, Ontario, Canada. Available from: <https://www.thestar.com/news/gta/2016/10/10/cities-homelessness-plans-doomed-to-fail-without-federal-cash-report.html>.
- 2016 Feb 21 **Quoted Source.** Ontario's uncounted homeless dead. Interviewer: Mary Ormsby and Kenyon Wallace. The Toronto Star. Toronto, Ontario, Canada. Available from: <http://www.thestar.com/news/insight/2016/02/21/ontarios-uncounted-homeless-dead.html>.
- 2015 Jan 26 **Cited.** Toronto experts to advise Ontario on how to end homelessness. Interviewer: Laurie Monsebraaten. The Toronto Star. Toronto, Ontario, Canada. Available from: <http://www.thestar.com/news/queenspark/2015/01/26/toronto-experts-to-advise-ontario-on-how-to-end-homelessness.html>.
- 2015 Jan 15 **Quoted Source.** 780 homeless people have died on Toronto streets since 1985...we think. Interviewer: Ben Spurr. NOW Toronto. Toronto, Ontario, Canada. Available from: <https://nowtoronto.com/news/740->

homeless-people-have-died-on-toronto-streets-since-1985./

- 2014 Mar 5 **Quoted Source.** Make TTC free overnight during cold alerts, Councillor Josh Colle urges. Interviewer: Patty Winsa. The Toronto Star. Toronto, Ontario, Canada. Available from: http://www.thestar.com/news/gta/2014/03/05/make_ttc_free_overnight_during_cold_alerts_councillor_josh_colle_urges.html.
- 2013 Feb 2 **Personal Profile.** St. Michael's Hospital appoints Dr. Stephen Hwang inaugural chair in homelessness, housing and health. The Toronto Star. Toronto, Ontario, Canada. Presenter(s): Laurie Monsebraaten. The Toronto Star. Available at: http://www.thestar.com/news/gta/2013/02/01/st_michaels_hospital_appoints_dr_stephen_hwang_inaugural_chair_in_homelessness_housing_and_health.html.
- 2008 Oct 9 **Quoted Source.** Canadian group protests the 'politicization of science'. The Toronto Star. Toronto, Ontario, Canada. Presenter(s): Anne-Marie Tobin. The Toronto Star.
- 2008 May 5 **Quoted Source.** Outrageous but predictable violence (commentary). The Toronto Star. Toronto, Ontario, Canada. Presenter(s): Nick Falvo.
- 2007 Nov 23 **Interview.** Traumatic Brain Injury among Homeless People. CBC Radio: Metro Morning with Andy Barry. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2007 Jun 28 **Interview.** Infection control measures during the SARS outbreak and death rates in Toronto. Omni 2 Television, Cantonese News. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 2006 Nov 9 **Letter to the Editor.** Homeless Face More Health Risks. The Toronto Star. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.** The Toronto Star, Page A29.
- 2005 Feb 14 **Speaker.** Mental and Physical Health on the Street. 3rd Annual Homelessness Radio Marathon, CKUT Radio. Montreal, Quebec, Canada. Presenter(s): **Hwang SW.**
- 2002 Oct **Speaker.** Daily Bread Food Bank Report: "Turning Our Backs on Our Children: Hunger + Decrepit Housing = Unhealthy, Unsafe Children". Daily Bread Food Bank Foundation. Toronto, Ontario, Canada. Presenter(s): **Hwang SW.**
- 1997 Sep 21 **Personal Profile.** Caring for the street people: Doctor leads St. Michael's Hospital medical program for Metro's homeless. The Toronto Sun. Toronto, Ontario, Canada. Presenter(s): Linton M.

5. Other

Presented and Published Abstracts

- 2009 May The research alliance for Canadian homelessness, housing and health (REACH3).

Publication Details:

Aubry T, Cowan L, Dunn JR, Evans L, Evans S, Farrell S, Flamand S, Gogosis E, Hoch J, Hubley, Hulchanski D, **Hwang SW**, Khandor E, Klodawsky F, MacLaurin B, Muckle W, Palepu A, Roy E, Worthington C, Wyllie K. The research alliance for Canadian homelessness, housing and health (REACH3). *Journal of Urban Health*. May 2009;86(3):386. **Principal Author.**

G. Teaching and Design

1. Innovations and Development in Teaching and Education

- 2007 Jan - 2016 Jun University of Toronto Division of General Internal Medicine Faculty Day, Continuing Education, Faculty of Medicine, Dept of Medicine, General Internal Medicine, University of Toronto
Director. The University of Toronto Division of General Internal Medicine Faculty Day was initiated in 2007. It is now an annual divisional event that brings together 60 faculty members

for updates on clinical topics and the activities of the division.

2006 Jul - 2007 Jun Scenario Rounds. Postgraduate MD, Faculty of Medicine, Dept of Medicine, General Internal Medicine, University of Toronto
Director. Coordinated creation of a university-wide curriculum and evaluation process for these rounds.

H. Research Supervision

1. PRIMARY OR CO-SUPERVISION

Undergraduate Education

2019 Aug - 2020 Aug **Primary Supervisor.** BA. Dylan Balter. *Patient factors affecting family physicians' prescribing decisions for patients with chronic diseases, Non-thesis Project.* Awards: Johns Hopkins University - Second Decade Society - Meg Walsh Award. Completed 2020.

2017 Jun - 2017 Aug **Primary Supervisor.** B. Sc. Linh Luong. Supervisee Position: Summer Research Student, Supervisee Institution: York University. *Readmissions among Homeless Patients.*

2016 Jun - 2016 Dec **Primary Supervisor.** Alexandra Patel. Supervisee Position: Undergraduate Student, Supervisee Institution: University of Toronto. *Factors Affecting 90 Day Readmission to a General Medical Unit in the Homeless Population.*

2014 Jun - 2014 Aug **Primary Supervisor.** B. Sc. Linh Luong. Supervisee Position: Summer Research Student, Supervisee Institution: York University. *The Effect of Advance Directives on the Care of Homeless Persons.*

2012 Jun - 2013 Aug **Primary Supervisor.** B. Sc. Matthew To. Supervisee Institution: Western University. *Health status, healthcare utilization, and criminal incidents following traumatic brain injury in homeless and vulnerably housed adults in 3 Canadian cities.*

2012 Mar - 2012 Jul **Primary Supervisor.** High School. Linh Luong. Supervisee Institution: Richmond Hill High School. *Health and Housing in Transition Study.*

2007 May - 2007 Aug **Primary Supervisor.** B. Sc. Emma Wilkins. Supervisee Institution: University of Alberta. *Barriers to Chronic Pain Management in Homeless People.* Completed 2010.

2007 May - 2007 Aug **Primary Supervisor.** B. Sc. Stephen VanderHerberg. Supervisee Institution: St. Michael's Hospital, Toronto. *Barriers to Chronic Pain Management in Homeless People.*

2005 Sep - 2006 Aug **Primary Supervisor.** B. Sc. Michael Chan. Supervisee Institution: University of Toronto. *Access to Mobile Healthcare Services: A Comparison of Toronto and New York City.*

2005 May - 2006 Jun **Primary Supervisor.** BA. Gabrielle Ramos. Supervisee Institution: Columbia University, NY. *Access to Mobile Healthcare Services: A Comparison of Toronto and New York City.*

2004 May - 2004 Aug **Primary Supervisor.** BA. Toby Shaw. Supervisee Institution: Wesleyan University, Middletown, CT. *Bone Mineral Density in Women using Meal Programs.*

2002 May - 2002 Aug **Primary Supervisor.** B. Sc. Jessica Ben-David. Supervisee Institution: University of Western Ontario. *Risk factors for cardiovascular disease among homeless people.*

2001 - 2003 **Co-Supervisor.** B. Sc. Diana Chislett and Naomi Ross. Supervisee Institution: St. Michael's Hospital. *Do shelters for the homeless in Toronto provide appropriate menus for those with diabetes?.* Collaborator(s): Primary supervisor: Pauline Darling. Completed 2003.

2000 - 2003 **Primary Supervisor.** B. Sc. Carolyn Tram. Supervisee Institution: University of Toronto. *Do graphic illustrations improve patients' comprehension of medication labels?.*

Graduate Education

2021 Mar - present **Co-Supervisor.** MSc. Emma Skolnik, MD, Health Policy, Management and Evaluation. Supervisee Position: Fellow in Minimally Invasive Gynecologic Surgery, Supervisee Institution: St. Michael's Hospital. *Access to Advanced Gynecological Care for Patients Experiencing Disadvantage; A Population Based Study.* Supervisor(s): Andrea Simpson & Stephen Hwang.

2019 Jan - 2019 Mar **Primary Supervisor.** Master of Public Health. Linh Luong, Public Health Sciences.

- Supervisee Position: MPH Student, Supervisee Institution: University of Toronto. *The "At Home" Research Demonstration Project in Mental Health and Homelessness --Toronto Site*. Completed 2019.
- 2017 Nov - 2021 Jan **Co-Supervisor.** PhD. Jesse Jenkinson, Public Health Sciences. Supervisee Position: Graduate Student, Supervisee Institution: University of Toronto. *How does context shape the implementation process of discharging homeless patients from hospitals in Toronto, Canada?*. Supervisor(s): Erica Di Ruggiero and Stephen Hwang. Collaborator(s): Carol Strike. Completed 2021.
- 2016 Sep - 2021 Jun **Primary Supervisor.** PhD. Kathryn Wiens, Public Health Sciences. Supervisee Position: MD Student, Supervisee Institution: University of Toronto. *Healthcare utilization among adults with a history of homelessness: The distribution and determinants of high-cost use of the healthcare system*. Supervisor(s): Laura Rosella, Paul Kurdyak. Completed 2021.
- 2013 Jul - 2015 Dec **Primary Supervisor.** PhD. Jeyagobi Jeyaratnam, Health Policy, Management and Evaluation. Supervisee Position: Graduate Student, Supervisee Institution: University of Toronto. Collaborator(s): Farah Ahmad, Elizabeth Lin.
- 2012 Apr - 2014 Sep **Primary Supervisor.** MSc. Dima Saab, Health Policy, Management and Evaluation. Supervisee Position: Graduate Student, Supervisee Institution: University of Toronto. *Hospital Readmissions among People who are Homeless in Toronto*. Collaborator(s): Rosane Nisenbaum, Irfan Dhalla. Completed 2014.
- 2011 Sep - 2014 Sep **Co-Supervisor.** MSc Dental Public Health. Rafael Figueiredo, Dentistry. Supervisee Position: Provincial Dental Public Health Officer, Alberta Health Services, Supervisee Institution: University of Toronto. *Emergency Department Visits for Dental Problems by Homeless People: A Four-Year Observational Cohort Study using Health Care Databases*. Supervisor(s): Carlos Quinonez. Collaborator(s): Laura Dempster. Completed 2014.
- 2010 Sep - 2014 Sep **Primary Supervisor.** MSc. Gayathri Naganathan, Health Policy, Management and Evaluation. Supervisee Position: Graduate Student, Supervisee Institution: University of Toronto. *The core features and perceived value of family support for ethnoracial homeless individuals with mental illness: Findings from the At Home/Chez Soi Project*. Collaborator(s): Vicky Stergiopoulos, Paul Williams. Completed 2014.
- 2005 Jan - 2012 **Co-Supervisor.** PhD. Allison Scott, Department of Epidemiology and Biostatistics. Supervisee Position: Epidemiologist, Alberta Health Services, Supervisee Institution: McGill University. *Incidence of Pregnancy, Identity, and Constructing Belonging in Street Youth*. Supervisor(s): Jean-François Boivin, Robert Platt, Janet Parsons. Completed 2017.
- 2002 - 2004 **Co-Supervisor.** MSc. Gordon Bargh, Department of Epidemiology and Biostatistics. Supervisee Position: Physician, Supervisee Institution: Western University. *Group A Streptococcus colonization among residents of a homeless shelter*. Supervisor(s): Jeffrey Hoch. Completed 2004.

Undergraduate MD

- 2022 Nov - present **Primary Supervisor.** Year 2. Kaitlyn Ramsay, Hammad Shahid. Supervisee Position: Medical student, Supervisee Institution: University of Toronto. *Dying alone during the COVID-19 pandemic: Mortality among permanent supportive housing residents in Toronto*. Collaborator(s): Parvin Merchant.
- 2019 Mar - 2021 Jun **Co-Supervisor.** Year 2. Patsy Lee. Supervisee Position: Medical student, Supervisee Institution: McMaster University. *A Scoping review on community integration and social inclusion in formerly or current homeless people*. Collaborator(s): Cilia Mejia-Lancheros.
- 2019 - 2022 **Primary Supervisor.** Year 1. Michael Liu. Supervisee Position: Medical Student, Supervisee Institution: Harvard Medical School.
- 2016 Jul - 2017 **Primary Supervisor.** Year 2. David Anderson. Supervisee Position: Medical student, Supervisee Institution: McMaster University. *PICC line for injection drug users*.
- 2015 Sep - 2016 Aug **Primary Supervisor.** Year 2. Mei Wen. Supervisee Position: Medical student, Supervisee Institution: University of Toronto. *Factors Affecting 90 Day Readmission to a General Medical Unit in the Homeless Population*.
- 2014 Sep - 2017 Jun **Primary Supervisor.** Year 2. Paige Zhang. Supervisee Position: Medical student, Supervisee Institution: University of Toronto. *Extreme Weather and Cold- and Heat-related Injuries among Homeless Individuals*.
- 2014 Sep - 2016 Jun **Co-Supervisor.** Year 2. Rafael Sumalinog. Supervisee Position: Medical student, Supervisee

- Institution: University of Toronto. *Palliative Care for Homeless Patients*.
- 2014 Jun - 2014 Aug **Primary Supervisor.** Year 2. Matthew To. Supervisee Position: Summer Research Student, Supervisee Institution: Dalhousie University. *The Effect of Advance Directives on the Care of Homeless Persons*.
- 2014 Jun - 2014 Aug **Primary Supervisor.** Year 3. Victor Lucas Goncalves. Supervisee Position: Summer Research Student, Supervisee Institution: University of Sao Paulo, Brasil. *The Effect of Advance Directives on the Care of Homeless Persons*.
- 2013 Jul - 2016 Jun **Primary Supervisor.** Year 2. Dhruv Nayyar. Supervisee Position: Medical Student, Supervisee Institution: University of Toronto. *Risk of Cardiovascular Disease in Homeless Adults: 10-Year Follow-Up*.
- 2013 Jul - 2014 Jun **Primary Supervisor.** Year 2. Pavan Gill. Supervisee Position: Medical Student, Supervisee Institution: University of Toronto. *Health Needs Assessment of Taxi Drivers in Toronto*. Collaborator(s): Francesca Gany.
- 2013 Jun - 2013 Aug **Primary Supervisor.** Year 2. Manisha Sachdeva and Dhruv Nayyar. Supervisee Position: Medical Students, Supervisee Institution: University of Toronto. *The Effect of Advance Directives on the Care of Homeless Persons*.
- 2012 Oct - 2016 Jun **Primary Supervisor.** Year 2. Alexander Leung. Supervisee Position: Medical Student, Supervisee Institution: University of Toronto. *The Effect of Advance Directives on the Care of Homeless Persons*. Collaborator(s): John Song (University of Minneapolis).
- 2012 Jul - 2012 Sep **Primary Supervisor.** Year 2. Kenneth Lam. Supervisee Position: Medical Student, Supervisee Institution: Western University. *Pragmatic Cluster Randomized Trials as an Evidence Tool for Patient Safety*.
- 2012 Jun - 2013 Sep **Primary Supervisor.** Year 1. Charlotte Hunter. Supervisee Position: Medical Student, Supervisee Institution: Western University. *Barriers to prescription medication adherence among homeless and vulnerably housed adults in three Canadian cities*.
- 2011 Oct - 2013 Dec **Primary Supervisor.** Year 2. Samantha Young. Supervisee Position: Medical Student, Supervisee Institution: University of Toronto. *Influenza vaccination rates among homeless people with mental illness*.
- 2011 Aug - 2012 Dec **Primary Supervisor.** Year 2. Alison Fine & Tony Zhang. Supervisee Position: Medical Students, Supervisee Institution: Western University. *Attitudes towards Homeless People among Medical Students and Emergency Department Staff*.
- 2011 Jun - 2013 Jun **Primary Supervisor.** Year 1. Niran Argintaru. Supervisee Position: Medical Student, Supervisee Institution: Western University. *Unmet health needs among homeless and vulnerably housed adults in three Canadian cities*.
- 2010 Oct - 2012 Dec **Primary Supervisor.** Year 2. Greg Gaisano & Michelle Olah. Supervisee Position: Medical Students, Supervisee Institution: University of Toronto. *The Effects of Socioeconomic Status and Chronic Health Conditions on the Ability to Find a Family Physician in Toronto*.
- 2010 Jun - 2011 May **Primary Supervisor.** Year 2. Matthew Kennedy. Supervisee Institution: University of Toronto, Faculty of Medicine. *Instruments to Assess Food Security among Homeless Individuals*.
- 2010 Apr - 2012 Dec **Primary Supervisor.** Year 2. Mike Fralick & Zane Gallinger. Supervisee Institution: University of Toronto, Faculty of Medicine. *Drowning and the Influence of Foreign-born Status*.
- 2009 Oct - 2011 May **Primary Supervisor.** Year 2. Anna Holland. Supervisee Institution: St. Michael's Hospital. *Instruments to Assess Food Security among Homeless Individuals*.
- 2009 Jan - 2009 Dec **Primary Supervisor.** Year 1. Anna Holland. Supervisee Institution: University of Toronto. *At Home: Research Demonstration Project on Homelessness and Mental Health*. Completed 2012.
- 2008 Oct - 2009 May **Primary Supervisor.** Year 2. Mina Atia. Supervisee Institution: University of Toronto, Faculty of Medicine. *The Relationship between Apparent Age and Health Status*. Completed 2011.
- 2008 Apr - 2008 Aug **Primary Supervisor.** Year 2. Joanna Ueng. Supervisee Institution: Queen's University, School of Medicine. *Unmet needs for health care among homeless people within a system of universal health insurance.*, Completed 2010.
- 2007 Oct - 2008 May **Primary Supervisor.** Year 2. Eileen Estrabillo. Supervisee Institution: University of Toronto, Faculty of Medicine. *Barriers to Chronic Pain Management in Homeless People*. Completed 2009.
- 2006 Oct - 2007 May **Primary Supervisor.** Year 2. Shaqil Kassam. Supervisee Institution: University of Toronto,

	Faculty of Medicine. <i>Infirmity Care for Homeless Adults</i> . Collaborator(s): Co-Supervisor: Alice Broughton.
2006 Oct - 2007 May	Primary Supervisor. Year 2. Anna MacDonald. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Barriers to Chronic Pain Management in Homeless People</i> .
2006 Apr - 2007 Aug	Primary Supervisor. Year 1. Ciara Whelan. Supervisee Institution: Queen's University, School of Medicine. <i>Access to Mobile Healthcare Services: A Comparison of Toronto and New York City</i> .
2005 Oct - 2006 May	Primary Supervisor. Year 2. Andrew Smith. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>The Effects of Supportive Housing on the Health Status and Service Utilization of Homeless and Hard-to-House Adults</i> .
2005 May - 2007 May	Primary Supervisor. Year 2. Cheryl Leung. Supervisee Institution: University of Western Ontario, Schulich School of Medicine. <i>Control of Emerging Infectious Diseases in Homeless Populations</i> .
2004 Oct - 2007 May	Primary Supervisor. Year 2. Chuck Wen. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Perceptions of Unwelcomeness among Homeless People</i> . Collaborator(s): Collaborator: Pam Hudak.
2004 Oct - 2005 May	Primary Supervisor. Year 2. Theepa Sundaralingam. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Bone Mineral Density in Women using Meal Programs</i> .
2003 Oct - 2004 May	Primary Supervisor. Year 2. Emily Lai. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Bone Mineral Density in Women using Meal Programs</i> .
2003 Jan - 2005 Dec	Primary Supervisor. Year 2. Fiona Kouyoumdjian. Supervisee Institution: Dalhousie University Medical School. <i>Systematic review of interventions to improve the health of the homeless</i> .
2002 Oct - 2003 May	Primary Supervisor. Year 2. Melanie Makhija. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Factors affecting women's decisions regarding infertility treatment</i> .
2002 Oct - 2003 May	Primary Supervisor. Year 2. John Hanlon. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Risk factors for cardiovascular disease among homeless people</i> .
2001 May - 2001 Aug	Primary Supervisor. Year 1. Susan Scarrow. Supervisee Institution: University of Western Ontario, School of Medicine. <i>Cervical cancer and breast cancer screening among homeless women</i> .
2001 - 2003	Primary Supervisor. Year 2. Pavi Kundhal. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>The effect of socioeconomic status on waiting time for MRI scans</i> .
2001 - 2002	Primary Supervisor. Year 2. Tony Lee. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Risk factors for cardiovascular disease among homeless people</i> .
2000 - 2003	Primary Supervisor. Year 2. Tanya Zakrison. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Homeless people's interactions with police officers and paramedics</i> . Collaborator(s): Collaborator: Paul Hamel.
2000 - 2002	Primary Supervisor. Year 2. Rohit Bose. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Income and spending among panhandlers</i> .
1999 - 2001	Primary Supervisor. Year 2. Sunny Wong. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Dyspepsia among homeless people</i> .
1999 - 2000	Primary Supervisor. Year 2. Nadia Knarr. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Do graphic illustrations improve patients' comprehension of medication labels?</i>
1998 - 2000	Primary Supervisor. Year 2. Ann Bugeja. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Barriers to appropriate diabetes management among homeless persons in Toronto</i> .
1997 - 1999	Primary Supervisor. Year 2. Jason Gottlieb. Supervisee Institution: University of Toronto, Faculty of Medicine. <i>Drug access among homeless men in Toronto</i> .

Postgraduate MD

2020 Feb - present	Primary Supervisor. Core Program. Alison McFadden, MD. Supervisee Institution: University of Toronto. <i>The effect of a Housing First intervention on COPD management in a population of individuals with mental illness experiencing homelessness in Canada, Non-thesis Project</i> .
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- 2019 Nov - present **Primary Supervisor.** Core Program. Ashley Jensen, MD. Supervisee Institution: University of Toronto. *The Impact of a Housing First Intervention on Substance Use: Follow-up Analysis of the At Home/Chez Soi Randomized Controlled Trial, Non-thesis Project.*
- 2017 Nov - 2021 Jun **Primary Supervisor.** Subspecialty. Samantha Liauw, MD. Supervisee Position: Cardiology Resident, Supervisee Institution: University of Toronto. *Outcomes of ST-Segment Elevation Myocardial Infarction in a Canadian Inner City Population.* Collaborator(s): Shuangbo Liu.
- 2015 Jul - 2017 Jun **Primary Supervisor.** Core Program. Yayi Huang, MD. Supervisee Institution: University of Toronto. *Factors Affecting 90 Day Readmission to a General Medical Unit in the Homeless Population, Non-thesis Project.*
- 2011 Oct - 2014 Sep **Primary Supervisor.** Resident in Family Medicine. Naheed Dosani, MD. Supervisee Institution: University of Toronto. *Measurement of Retention in Primary Care among Vulnerably Housed Populations: The At Home/Chez Soi Project.* Awards: First Place, St. Michael's Hospital Resident Research Day (May 2013).
- 2010 Nov - 2012 Dec **Primary Supervisor.** Core Program. Shail Rawal, MD. Supervisee Institution: University of Toronto. *Is "Looking Chronically Ill" a Sign of Poor Health?.*
- 2008 Jul - 2009 Aug **Primary Supervisor.** Subspecialty. Michelle Grinman, MD. Supervisee Institution: University of Toronto. *The Impact of Drug Problems on Homeless Individuals in Toronto, Ontario.* Completed 2009.
- 2001 - 2002 **Co-Supervisor.** Resident in Family Medicine. Jennifer Ross, MD and Karen Chien, MD. Supervisee Institution: University of Toronto, Faculty of Medicine. *Adherence and hepatotoxicity among homeless men receiving directly observed prophylactic therapy for tuberculosis.* Collaborator(s): Co-supervisor: Tomislav Svoboda.
- 2000 - 2001 **Co-Supervisor.** Resident in Psychiatry. Treena Wilkie, MD. Supervisee Institution: University of Toronto, Faculty of Medicine. *Differential treatment of homeless compared to non-homeless patients.* Collaborator(s): Primary Supervisor: Gordon Duval.

Postdoctoral Research Fellow (PhD)

- 2021 Mar - present **Primary Supervisor.** Postdoctoral Training. Jesse Jenkinson, PhD. Supervisee Position: Postdoctoral Fellow, Supervisee Institution: St. Michael's Hospital. *Health care transitions among people experiencing homelessness.*
- 2020 - present **Co-Supervisor.** Postdoctoral Training. Ambreen Sayani, MD, PhD. Supervisee Position: Postdoctoral Fellow, Supervisee Institution: Women's College Hospital. *Improving access to lung cancer screening in the underserved & Building capacity for future cancer patient-oriented research in Canada, Group Supervision.* Awards: CIHR Patient-Oriented Research Award -- Transition to Leadership stream. Supervisor(s): Aisha Lofters.
- 2018 Sep - 2019 Jul **Primary Supervisor.** Postdoctoral Training. David Campbell MD, PhD. Supervisee Position: Postdoctoral Fellow, Supervisee Institution: St. Michael's Hospital. *Understanding and engaging with individuals experiencing homelessness who have diabetes: A participatory research project.* Supervisor(s): Gillian Booth, Stephen Hwang, Pat O'Campo.
- 2018 May - 2022 Aug **Primary Supervisor.** Postdoctoral Training. James Lachaud, PhD. Supervisee Position: Postdoctoral Fellow, Supervisee Institution: St. Michael's Hospital. *The At Home Research Demonstration Project in Mental Health and Homelessness.* Awards: CIHR Fellowship - Research & Knowledge Translation on Urban Housing and Health.
- 2018 Jan - 2022 Feb **Primary Supervisor.** Postdoctoral Training. Cilia Mejia-Lancheros, PhD. Supervisee Position: Postdoctoral Fellow, Supervisee Institution: St. Michael's Hospital. *The "At Home" Research Demonstration Project in Mental Health and Homelessness --Toronto Site.* Supervisor(s): Stephen Hwang, Pat O'Campo, Vicky Stergiopoulos.
- 2017 Mar - 2018 Oct **Primary Supervisor.** Postdoctoral Training. Naomi Thulien, NP, MN, PhD. Supervisee Position: Postdoctoral Fellow, Supervisee Institution: St. Michael's Hospital. *Tackling Social Exclusion: A Peer Support Intervention for Street-Involved and Homeless Youth.*
- 2014 Jul - 2015 Jun **Co-Supervisor.** Postdoctoral Training. Daniel Poremski, PhD. Supervisee Position: ACHIEVE Postdoctoral Fellow, Supervisee Institution: St. Michael's Hospital. Supervisor(s): Vicky Stergiopoulos.
- 2013 Jul - 2016 Jun **Primary Supervisor.** Postdoctoral Training. Fiona Kouyoumdjian, MD, PhD. Supervisee Position: CIHR Postdoctoral Fellow, Supervisee Institution: St. Michael's Hospital. *Mortality of people incarcerated in provincial facilities in Ontario: A 15 year retrospective cohort study.*

Awards: CIHR Postdoctoral Fellowship.

2. OTHER SUPERVISION

Graduate Education

Thesis Committee Member

2022 Jul - present	PhD. Ayda Agha, Psychology. Supervisee Position: Graduate Student, Supervisee Institution: University of Ottawa. Supervisor(s): Tim Aubry.
2021 Mar - present	PhD. Volletta Peters, Health Sciences. Supervisee Position: Graduate Student, Supervisee Institution: Ontario Tech University. Supervisor(s): Winnie Sun. Collaborator(s): David Rudoler.
2019 Aug - present	PhD. Michael Potvin, Social Work. Supervisee Position: Graduate Student, Supervisee Institution: McMaster University. Supervisor(s): Ann Fudge Schormans. Collaborator(s): Rachel Zhou.
2019 Sep - 2022 Aug	Master of Medical Science. Parisa Dastoori, Medical Science. Supervisee Position: Graduate Student, Supervisee Institution: University of Toronto. Supervisor(s): Flora Matheson. Collaborator(s): Paul Kurdyak, Samantha Anthony.
2013 Oct - 2017 Feb	PhD. Naomi Thulien, NP, MN, Nursing Science. Supervisee Position: Assistant Professor, McMaster University, Supervisee Institution: University of Toronto. <i>Tackling Social Exclusion: A Peer Support Intervention for Street-Involved and Homeless Youth.</i> Supervisor(s): Denise Gastaldo. Collaborator(s): Elizabeth McCay. Completed 2017.
2012 Jun - 2015 Jun	PhD. Carrie Marshall, Rehabilitation Therapy. Supervisee Position: Graduate Student, Supervisee Institution: Queen's University, Kingston, Ontario. <i>Time Use and Health and Wellbeing in the Transition From Homeless to Housed in Chronically Homeless Persons.</i> Supervisor(s): Rosemary Lysaght. Collaborator(s): Stephen Gaetz, Terry Krupa. Completed 2015.
2012 Apr - 2016 Sep	SD (Doctor of Science). Jill Roncarati, MPH, Public Health. Supervisee Position: Graduate Student, Supervisee Institution: Harvard School of Public Health. <i>Sleeping Rough: Morbidity, mortality, and the effects of housing on the health of Boston's street population.</i> Supervisor(s): Glorian Sorensen. Collaborator(s): Nancy Krieger, Fran Cook. Completed 2016.
2011 Oct - 2013 Aug	MSc. Tyler Pettes, Nutritional Sciences. Supervisee Position: Psychiatry Resident, Supervisee Institution: University of Toronto. <i>Responsiveness of Food Provisioning Programs to the Needs of Homeless Populations in Five Canadian Cities.</i> Supervisor(s): Valerie Tarasuk. Collaborator(s): Stephen Gaetz, Anthony Hanley. Completed 2013.
2010 Jan - 2012 Dec	MSc Nursing. Lisa Beames, RN, Nursing. Supervisee Position: Clinical Leader/Manager, Mental Health Services, Supervisee Institution: University of Victoria. <i>Homeless Clients' Perspectives on Health Care Experiences.</i> Supervisor(s): Bernie Pauly. Collaborator(s): Joan MacNeil. Completed 2012.
2009 Oct - 2011 Jun	MSc. Rafael Figueiredo, Dentistry. Supervisee Position: Chief Dental Officer, Alberta Health, Supervisee Institution: University of Toronto. <i>Oral Health of Homeless People in Toronto.</i> Supervisor(s): Carlos Quinonez. Collaborator(s): David Locker. Completed 2011.
2007 May - 2012 Jun	PhD. Aisha Lofters, MD, Health Policy, Management and Evaluation, Clinical Epidemiology. Supervisee Position: Assistant Professor, University of Toronto, Supervisee Institution: University of Toronto. <i>Cervical cancer screening among women who are recent immigrants: A population-based study in Ontario.</i> Supervisor(s): Richard Glazier. Collaborator(s): Rahim Moineddin. Completed 2012.

Thesis Examiner

2016 Feb	MSc. Michelle Sholzberg, Health Policy, Management and Evaluation. Supervisee Institution: University of Toronto. <i>The Influence of Socioeconomic Status on Selection of Anticoagulation for Atrial Fibrillation: A Population-Based Study.</i> Supervisor(s): Andreas Laupacis. Completed 2016.
2015 Jan	PhD. Claire Kendall, MD. Supervisee Institution: University of Ottawa. <i>A Population-Based Evaluation of the Delivery of Care for People Living with HIV in Ontario.</i> Supervisor(s):

William Hogg and Douglas Manuel. Completed 2015.

- 2009 May **MSc.** Patricia Lee, MD. Supervisee Institution: University of Toronto. *Injury and Neighborhood Marginalization: Does it matter where you live?*. Supervisor(s): Avery Nathens. Completed 2009.
- 1998 Sep **MSc.** Wendy Wobeser, MD. Supervisee Institution: University of Toronto. *Risk Factors for Active TB Among Foreign Born Persons Arriving in Ontario*. Completed 1998.

Chair for Thesis Defense

- 2005 Sep **MSc.** Olga Gajic-Veljanoski. Supervisee Institution: University of Toronto. *Predictors of First Clinical Fracture in Patients with Primary Osteoporosis*. Completed 2005.

Collaborator

- 2003 Sep - 2004 Jun **PhD.** Agnieszka (Iggy) Kosny. Supervisee Institution: University of Toronto, Dept. of Public Health Sciences. *Are nonprofit organizations healthy workplaces? Examining working conditions and occupational health and safety of volunteers and paid workers*. Collaborator(s): Primary supervisor: Joan Eakin. Completed 2006.

Primary Supervisor for Research Practicum

- 2022 May - 2022 Aug **MPH.** Chi-Hang Jonathan Sinn, Public Health Sciences. Supervisor(s): Stephen Hwang. Completed 2022.
- 2009 May - 2010 Apr **M.H.Sc.** James Weaver. Supervisee Position: Research Coordinator, Division of Mental Health Services and Policy Research, Department of Psychiatry, Columbia University, New York City. *Hospitalization Costs of Homeless People: Do They Cost More?*. Completed 2010.
- 2006 Jan - 2006 Apr **M.H.Sc.** Minnie Ho. Supervisee Position: Epidemiologist, Institute for Clinical Evaluative Sciences, Toronto (as of 2012), Supervisee Institution: University of Toronto. *Control of Emerging Infectious Diseases in Homeless Populations*. Completed 2006.

Project Advisor

- 2012 Sep - 2013 Jun **Master of Public Health.** Shail Rawal, MD. Supervisee Position: Clinical Associate, Supervisee Institution: University of Toronto. *Translation Services and Outcomes among Non-English Proficient Hospitalized Patients*.

Supervisor for Research Elective

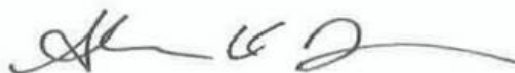
- 2009 Nov - 2010 Jun **Master of Public Policy.** Anna-Maria Cappella. Supervisee Position: Project Advisor & Program Coordinator, Service Ontario (as of 2012), Supervisee Institution: University of Toronto. *An Impact Analysis of Housing First Programs in the United States and Canada*.

Undergraduate MD

Secondary Supervisor

- 2013 Oct - 2014 Aug **Year 2.** Christopher Noel and Henry Fung. Supervisee Position: Medical Students, Supervisee Institution: University of Toronto. *Eye Needs of the Homeless Population*. Collaborator(s): Myrna Lichter.

This is Exhibit "**B**" referred to in
the Affidavit of Dr. Stephen Hwang of
the City of Toronto in the Province
of Ontario, sworn remotely
before me at the City of Waterloo
in the Province of Ontario on March 23, 2024.

A handwritten signature in black ink, appearing to read 'Shannon Down', written over a horizontal line.

Shannon Down
LSO#43894D



Cold-related injuries among patients experiencing homelessness in Toronto: a descriptive analysis of emergency department visits

Lucie Richard¹ · Haley Golding² · Refik Saskin² · Jesse I. R. Jenkinson³ · Katherine Francombe Pridham³ · Evie Gogosis³ · Carolyn Snider⁴ · Stephen W. Hwang³

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Abstract

Purpose Homelessness increases the risk of cold-related injuries. We examined emergency department visits for cold-related injuries in Toronto over a 4-year period, comparing visits for patients identified as homeless to visits for patients not identified as homeless.

Methods This descriptive analysis of visits to emergency departments in Toronto between July 2018 and June 2022 used linked health administrative data. We measured emergency department visits with cold-related injury diagnoses among patients experiencing homelessness and those not identified as homeless. Rates were expressed as a number of visits for cold-related injury per 100,000 visits overall. Rate ratios were used to compare rates between homeless vs. not homeless groups.

Results We identified 333 visits for cold-related injuries among patients experiencing homelessness and 1126 visits among non-homeless patients. In each of the 4 years of observation, rate ratios ranged between 13.6 and 17.6 for cold-related injuries overall, 13.7 and 17.8 for hypothermia, and 10.3 and 18.3 for frostbite. Rates per 100,000 visits in the fourth year (July 2021 to June 2022) were significantly higher than in the pre-pandemic period. Male patients had higher rates, regardless of homelessness status; female patients experiencing homelessness had higher rate ratios than male patients experiencing homelessness.

Conclusion Patients experiencing homelessness visiting the emergency department are much more likely to be seen for cold-related injuries than non-homeless patients. Additional efforts are needed to prevent cold-related exposure and consequent injury among people experiencing homelessness.

Keywords Homelessness · Cold-related injuries · Emergency department

Résumé

Objectif L'itinérance augmente le risque de blessures liées au froid. Nous avons examiné les visites aux urgences pour des blessures liées au froid à Toronto sur une période de quatre ans, en comparant les visites de patients en situation d'itinérance aux visites de patients pas en situation d'itinérance.

Méthodes Cette analyse descriptive des visites aux services d'urgence à Toronto entre juillet 2018 et juin 2022 a utilisé des données administratives de santé liées. Nous avons mesuré les visites aux services d'urgence avec un diagnostic de blessure liée au froid parmi les patients en situation d'itinérance et ceux pas en situation d'itinérance. Les taux ont été exprimés en

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nombre de visites pour les blessures liées au froid par 100 000 visites au total. Le rapport de taux ont été utilisés pour comparer les taux entre les groupes en situation d'itinérance et ceux pas en situation d'itinérance.

Résultats Nous avons identifié 333 visites pour des blessures liées au froid chez les patients en situation d'itinérance et 1126 chez les patients pas en situation d'itinérance. Au cours de chacune des quatre années d'observation, les rapports de taux variaient entre 13,6 et 17,6 pour l'ensemble des blessures liées au froid, 13,7 et 17,8 pour l'hypothermie et 10,3 et 18,3 pour les engelures. Les taux par 100 000 visites au cours de la quatrième année (de juillet 2021 à juin 2022) étaient considérablement plus élevés que pendant la période précédant la pandémie. Les patients de sexe masculin affichaient des taux plus élevés, peu importe leur statut d'itinérance; les patients de sexe féminin en situation d'itinérance affichaient des rapports de taux plus élevés que les patients de sexe masculin en situation d'itinérance.

Conclusion Les patients en situation d'itinérance qui se rendent à l'urgence sont beaucoup plus susceptibles d'être vus pour des blessures liées au froid que les autres. Des efforts supplémentaires sont nécessaires pour prévenir l'exposition au froid et les blessures qui en découlent chez les personnes en situation d'itinérance.

Mots clés L'itinérance · Blessures liées au froid · Service des urgences

Clinician's capsule

What is known about the topic?

People experiencing homelessness are at disproportionate risk for cold-related injuries, but the rate since the COVID-19 pandemic began is unknown.

What did this study ask?

What is the rate of cold-related injury ED visits occurring among patients experiencing homelessness compared to non-homeless patients?

What did this study find?

Patients experiencing homelessness have 14 to 18 times more cold-related injuries compared to non-homeless patients; Rates increased during the pandemic.

Why does this study matter to clinicians?

Additional efforts are needed to prevent cold-related exposure and consequent injury among people experiencing homelessness.

considered to be mild [7, 8]. Recently, healthcare organizations have reported a concerning increase in the utilization of local EDs by individuals experiencing homelessness during the cold season [9, 10].

The COVID-19 pandemic has greatly exacerbated the potential risk for cold-related injury in this group. More individuals than ever are living in encampments or are otherwise unsheltered [11]. Furthermore, with the end of pandemic-related funding, the City of Toronto has closed many of the single-occupancy shelter hotel spaces it had created, starting in the spring of 2022 [12, 13]. While efforts are underway to increase capacity elsewhere [13, 14], there is currently an insufficient number of spaces to accommodate all those seeking shelter [12–15]. In concert, these circumstances that increase the likelihood of cold exposure may have led to an exacerbation of ED utilization for cold-related injuries by people experiencing homelessness in Toronto.

For this reason, healthcare organizations, medical professionals and housing advocates have been urging the City of Toronto to implement additional measures to protect individuals experiencing homelessness during the winter months [9, 10]. Short-term recommendations include increasing the availability and accessibility of winter-related services, such as 24-h drop-in warming centers. However, timely evidence regarding the extent and burden of cold-related injuries among people experiencing homelessness is essential to substantiate the need for additional services. We aim to fill this gap by analyzing Ontario health administrative data to measure cold-related injury visits among patients experiencing homelessness who sought care in Toronto-based EDs between July 1 2018 and June 30 2022. Additionally, we compare these rates to those of patients not identified as experiencing homelessness.

Introduction

Emergency medicine professionals play a crucial role in addressing the healthcare needs of individuals experiencing homelessness, who have a disproportionate reliance on emergency department (ED) resources [1] and face an elevated risk of preventable injuries, particularly cold-related injuries [2–6]. In Toronto, Canada, the risk of cold-related injuries remains significant even during conditions locally

Methods

Study design and setting

We conducted this descriptive analysis in Toronto, Ontario's largest city, using health administrative data from between July 1 2018 and June 30 2022. Years were defined as July 1 to June 30 to integrate cold months into a single year. Datasets were linked using unique encoded identifiers and analyzed at ICES (formerly known as the Institute for Clinical Evaluative Sciences) [16], an independent, non-profit research institute whose legal status under Ontario's health information privacy law allows it to collect and analyze healthcare and demographic data, without explicit consent, for health system evaluation and improvement.

Population and data source

We obtained visits to all 18 Toronto-based EDs between July 1 2018 and June 30 2022 from the Canadian Institute for Health Information's (CIHI) National Ambulatory Care Reporting System (NACRS) database. No exclusions were applied.

Patients attending Toronto-based EDs were classified into two groups. The first group was patients experiencing homelessness ("patients experiencing homelessness"). This group was defined as anyone with at least one visit during the year with International Classification of Diseases, 10th Revision (ICD-10-CA) diagnosis codes Z590 ('Homelessness') or Z591 ('inadequate housing'); whose residential type was listed as 'Homeless' or 'Shelter'; or who provided a postal code that uniquely identifies a shelter (that is, the postal code does not identify other residences). These identifiers were previously validated [17] and show that identification across a year improves sensitivity without reducing specificity. The second group was patients not identified as experiencing homelessness ("non-homeless patients"), defined as anyone not identified in the first group.

We further classified groups by sex. Sex for patients with valid Ontario health insurance was derived from the ICES Registered Persons Database; for patients without Ontario health insurance, it was derived from the hospital record.

Outcomes

We ascertained cold-related injuries as any visit coded with ICD-10-CA codes T33 ('Superficial frostbite'), T34 ('Frostbite with tissue necrosis'), T35 ('Frostbite involving multiple body regions and unspecified frostbite'), or T68 ('Hypothermia') or T69 ('Other effects of reduced temperature') when combined with external code X31 ('Exposure

to excessive natural cold'). Secondary outcomes of interest included frostbite (ICD-10-CA codes T33, T34 or T35) and hypothermia (ICD-10-CA T68 or T69 when combined with external code X31). We considered any diagnosis code as sufficient evidence for the outcome of interest, to avoid missing cases when injuries were not deemed the most responsible diagnosis.

Statistical analysis

We describe characteristics from the visit record, by group membership (however, some important social determinants of health such as race/ethnicity, income level, or educational background, were unavailable). We further determined counts (provided in supplement tables) and rates of each outcome per 100,000 visits, by group, year, and sex. 95% confidence intervals (CI) for rates in the supplements were calculated from the gamma distribution. We also calculated rate ratios and 95% CIs to summarize the excess burden of visits by homeless patients as compared to non-homeless patients.

Finally, we conducted a post-hoc z-score test comparing proportions to assess the significance of a change in cold-related injuries among patients experiencing homelessness between 2018/2019 and 2019/2020 and the pandemic period (2021/2022). We a priori excluded 2020/2021 from this test, as there was a significant drop in emergency department (ED) visits in Ontario during the early pandemic [18], artificially reducing the denominator and rendering this data point non-comparable to the others.

Cells with fewer than six visits were suppressed to protect patient privacy. All analyses were conducted using SAS enterprise guide v7.1 [19]. This study followed the Reporting of Studies Conducted Using Observational Routinely Collected Data (RECORD) reporting guidelines (Supplement Table 1).

Ethical review

The use of data in this project was authorized under Sect. 45 of Ontario's *Personal Health Information Protection Act*, which does not require review by a research ethics board.

Results

Between July 1 2018 and June 30 2022, we identified 4,872,279 ED visits to Toronto-based hospitals (Table 1). 90,165 (1.9%) visits were for patients experiencing homelessness, who were disproportionately 25 to 54 years old and male (73.3%). Visits by patients experiencing homelessness were twice as likely to be 15 or more hours long and more than twice as likely to have arrived by ambulance (47.7%

Table 1 Characteristics of visits, by group membership (patients experiencing homelessness vs. patients not experiencing homelessness)

	Visits from patients identified as experiencing homelessness (90,165)	Visits from patients not identified as experiencing homelessness (N=4,782,114)
Year of visit, %		
July 2018 to June 2019	25.3%	28.0%
July 2019 to June 2020	27.6%	25.4%
July 2020 to June 2021	23.2%	21.9%
July 2021 to June 2022	23.8%	24.7%
Age at visit		
Median (IQR)	40 (31–53)	43 (25–64)
% , 0–24 years old	10.3%	24.0%
% , 25–44 years old	49.0%	27.5%
% , 45–54 years old	18.2%	11.9%
% , 55+ years old	21.8%	36.5%
% Unknown/missing	0.8%	0.0%
Sex, %		
Male	73.3%	48.0%
Female	26.7%	52.0%
Other/missing	0.1%	0.0%
Visit duration in hours		
Median (IQR)	5 (3–10)	4 (3–7)
% , 0- < 4 h	9.6%	9.6%
% , 4- < 10 h	11.4%	10.8%
% , 10- < 15 h	2.9%	1.6%
% , 15+ hours	4.4%	2.1%
Patient arrived by ambulance, %	47.7%	20.0%
Triage level, %		
Non-urgent	4.2%	3.5%
Less-urgent	13.4%	13.8%
Urgent	48.7%	53.9%
Emergent	29.5%	27.3%
Resuscitation	3.9%	1.5%
Unknown	0.2%	0.1%
Visit for cold-related injury, %	0.37%	0.02%

vs 20.0%). Despite this, they exhibited similar CTAS triage levels. Over the 4-year period, we found 333 cold-related injury visits among patients experiencing homelessness, representing 0.37% of their visits overall, compared to 1,126 cold-related injury visits among non-homeless patients, representing 0.02% of their overall visits.

Cold-related injury rates (per 100,000 visits) among patients experiencing homelessness ranged between a low of 268.9 visits/100,000 (in 2019/2020) and a high of 483.9 visits/100,000 (in 2021/2022) (Table 2 and Supplement Table 1). By contrast, rates among non-homeless patients ranged between 15.8 and 30.0 visits/100,000. Rates among patients experiencing homelessness significantly increased ($p < 0.01$) during the pandemic period (2021/2022) from the pre-pandemic period (2018/2019 and 2019/2020). Overall,

patients experiencing homelessness were between 13.6 and 17.6 times more likely to visit EDs for cold-related injuries compared to non-homeless patients (Fig. 1). While female patients experiencing homelessness had lower visit rates than male patients experiencing homelessness, they had higher rate ratios due to the more acute sex disparity present among non-homeless patients.

Supplement table 3 and Fig. 2 summarize visits with coding for hypothermia. Patients experiencing homelessness had visit rates ranging between 256.9 and 479.3 visits/100,000, while non-homeless patients had visit rates ranging between 14.7 and 28.8 visits/100,000. As with cold-related injuries generally, patients experiencing homelessness were much more likely to visit EDs for hypothermia compared to non-homeless patients.

Table 2 Rate per 100,000 visits (95% CI) of emergency department visits to Toronto-based hospitals for cold-related injury, by group, subgroup and year

	Patients experiencing homelessness, Rate per 100,000 visits (95% CI)	Patients not experiencing homelessness, Rate per 100,000 visits (95% CI)	Rate ratio (95% CI)
Overall			
2018/2019	407.0	30.0	13.6 (10.8–17.0)
2019/2020	268.9	15.8	17.0 (12.9–22.5)
2020/2021	330.0	19.8	16.7 (12.7–21.9)
2021/2022	483.9	27.5	17.6 (14.1–21.9)
Female			
2018/2019	243.4	15.2	16.0 (9.2–30.0)
2019/2020	153.7	9.5	16.2 (8.3–31.6)
2020/2021	264.3	10.9	24.2 (13.8–42.7)
2021/2022	375.6	19.2	19.6 (12.5–30.6)
Male			
2018/2019	462.4	46.3	10.0 (7.8–12.8)
2019/2020	310.0	22.5	13.8 (10.1–18.8)
2020/2021	354.6	29.4	12.1 (8.8–16.5)
2021/2022	527.7	36.5	14.4 (11.2–18.7)

¹Years grouped from July 1st to June 30th the following year to group together winter seasons. CI=Confidence Interval. *95% confidence interval calculated from the gamma distribution. Source: Golding H, and Saskin R. Cold-related injuries among people experiencing homelessness visiting Toronto-area hospitals, Applied Health Research Questions (AHRQ) #0950 144 000. Toronto: Institute for Clinical Evaluative Sciences; 2023

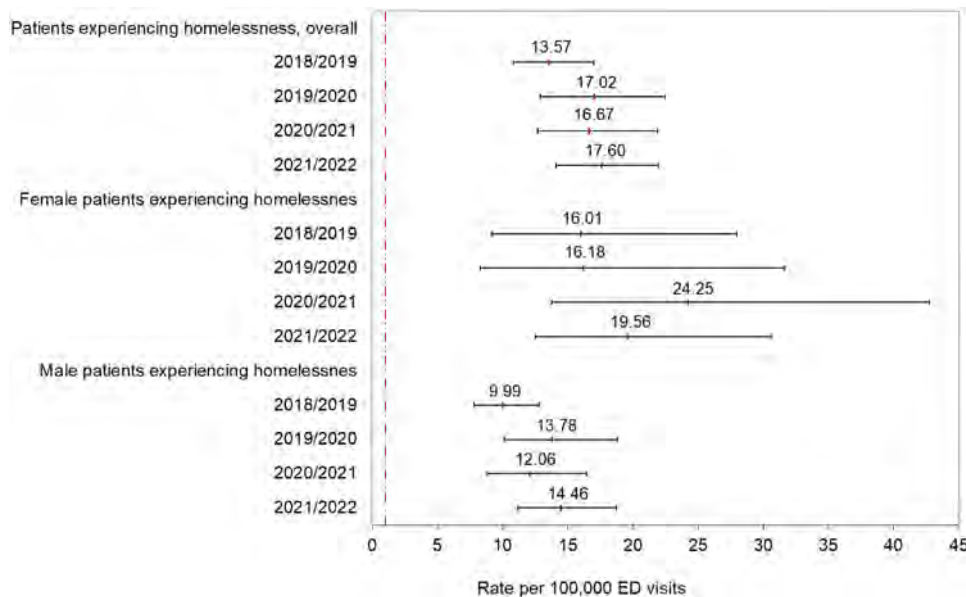


Fig. 1 Rate ratio¹ of cold-related injury visits among patients experiencing homelessness compared to patients not experiencing homelessness, overall and among male or female subgroups, by year. ¹Rate ratio is the rate (per 100,000 visits) of cold-related injury visits by people experiencing homelessness divided by the rate (per 100,000 visits) of cold-related injury visits by people not experiencing home-

lessness. The vertical axis (1.0) represents the point of parity between groups. Source: Golding H, and Saskin R. Cold-related injuries among people experiencing homelessness visiting Toronto-area hospitals, Applied Health Research Questions (AHRQ) #0950 144 000. Toronto: Institute for Clinical Evaluative Sciences; 2023

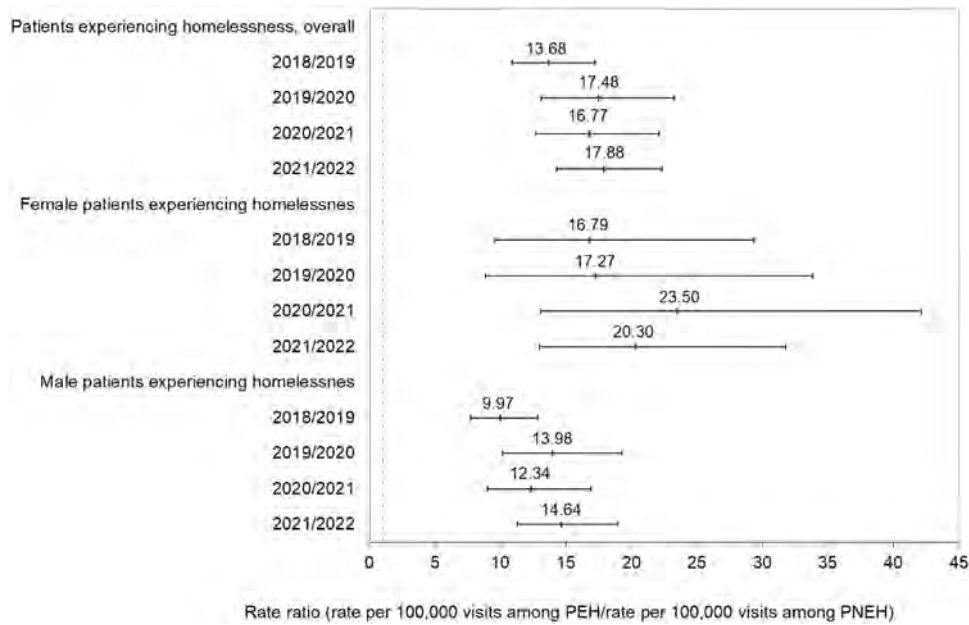


Fig. 2 Rate ratio¹ of hypothermia-related visits among patients experiencing homelessness compared to patients not experiencing homelessness, overall and among male or female subgroups, by year. ¹Rate ratio is the rate (per 100,000 visits) of hypothermia-related visits by people experiencing homelessness divided by the rate (per 100,000 visits) of hypothermia-related visits by people not experiencing

homelessness. The vertical axis (1.0) represents the point of parity between groups. Source: Golding H, and Saskin R. Cold-related injuries among people experiencing homelessness visiting Toronto-area hospitals, Applied Health Research Questions (AHRQ) #0950 144 000. Toronto: Institute for Clinical Evaluative Sciences; 2023

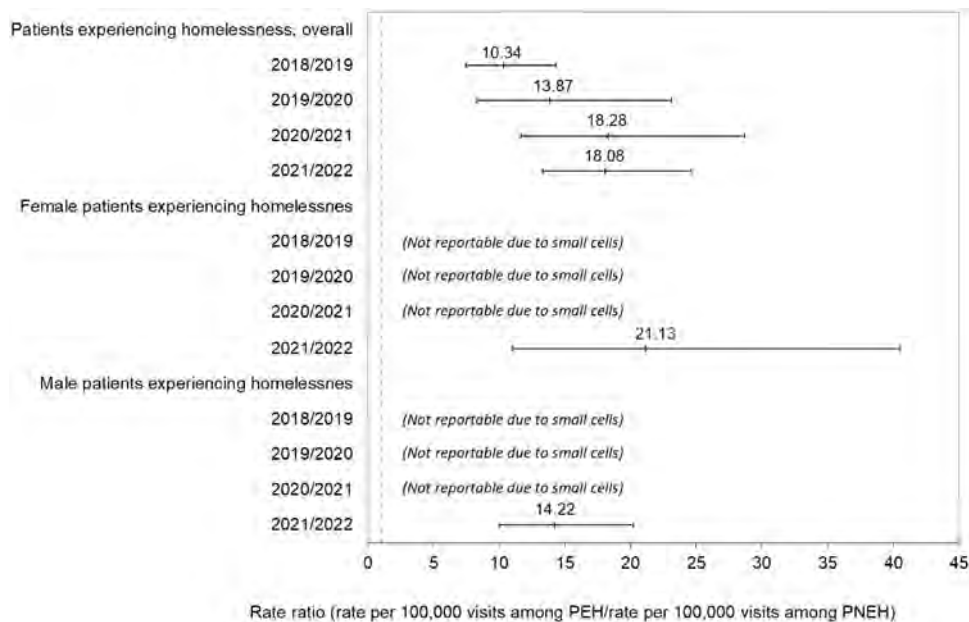


Fig. 3 Rate ratio¹ of frostbite-related visits among patients experiencing homelessness compared to patients not experiencing homelessness, by year, overall and among male or female subgroups. ¹Rate ratio is the rate (per 100,000 visits) of frostbite-related visits by people experiencing homelessness divided by the rate (per 100,000 visits) of frostbite-related visits by people not experiencing homeles-

ness. The vertical axis (1.0) represents the point of parity between groups. Source: Golding H, and Saskin R. Cold-related injuries among people experiencing homelessness visiting Toronto-area hospitals, Applied Health Research Questions (AHRQ) #0950 144 000. Toronto: Institute for Clinical Evaluative Sciences; 2023

Supplement table 4 and Fig. 3 summarize visits coded for frostbite. Fewer patients had visits coded with frostbite than for hypothermia; however, trends between groups persisted. Visit rates for patients experiencing homelessness ranged between 76.3 and 251.3 visits/100,000, compared to 5.5 and 18.2 visits/100,000 among non-homeless patients. Patients experiencing homelessness were between 10.3 and 18.3 times more likely to visit the ED for frostbite compared to non-homeless patients. In the final year (2021/2022), female patients experiencing homelessness were over 21 times more likely to receive care for frostbite compared to female non-homeless patients; Male patients experiencing homelessness were 14.2 times more likely to receive care for frostbite compared to male non-homeless patients.

Discussion

Interpretation

We found that ED visits for cold-related injuries were significantly higher (between 13.6 and 17.6 times higher) among patients experiencing homelessness than non-homeless patients between 2018 and 2022. Our findings suggest that homelessness is a major risk factor for this outcome, both due to the higher prevalence of underlying conditions exacerbating risk (for example, substance use or mental health concerns) and far greater exposure to environmental cold stress. We also found that male patients experiencing homelessness had higher visit rates, but that female patients experiencing homelessness have consistently higher rate ratios, indicating that inequity in the risk for females to be particularly acute. Finally, we found that rates increased in the final year of observation compared to the pre-pandemic period. This might have been due to the lower number of ED visits overall, as patients continued to be relatively avoidant of hospitals due to the perceived risk of COVID-19 infection [18]. It is also possible that 2021/2022 winter had particularly severe winter weather, although summary data does not suggest this to be likely [20]. Finally, recent changes to social and policy conditions in Toronto may have made avoiding cold-exposure increasingly challenging for people experiencing homelessness. Many indoor spaces, like 24-h drop-ins and Out Of The Cold programs, were shut down in response to pandemic-related safety guidelines [21]; distancing between shelter beds increased, which reduced shelter capacity until shelter hotels were leased [13]; and, numerous individuals resided in encampments as they felt unsafe in shelters and shelter hotels [11].

Previous studies

These results extend previous work showing disparities in Toronto existing in prior decades [1, 7], as well as elsewhere [3–6]. In France, 61.7% of medical charts with a primary diagnosis of hypothermia were for individuals experiencing homelessness [3], with 6.4 times risk of death from this injury [6]. In New York, three times more individuals experiencing homelessness were hospitalized for cold-related injury than housed comparators [4]. In Northeastern Poland, deaths caused by hypothermia were thirteen times more frequent among people experiencing homelessness than housed counterparts [5]. In Toronto between 2005 and 2009, there was on average 4.8 cold-related injury visits per 1000 person-years of observation [2]. Our results are not directly comparable to this literature, as our study denominator was ED visits by patients experiencing homelessness (rather than a cohort of participants experiencing homelessness who may not have used hospital-based care, or individuals who died). However, our annual rates expressed per 1000 visits (ranging between 2.7 per 1000 visits in 2019/2020 and 4.8 in 2021/2022) is in the same range as prior work in Toronto [2].

Strengths and limitations

This study benefits from the use of NACRS, which provides standardized ED abstracts across Toronto over the observation period. The use of administrative data to identify homelessness also dramatically increased our sample as compared to studies leveraging primary research data and prevented issues with participation bias common in studies involving people experiencing homelessness.

We also note the following limitations. First, our case definition of homelessness is highly specific but relatively insensitive [17]. Although we restricted our analysis to the period during which coding for homelessness became mandatory [17], it is possible the case definition undercounted visits where homelessness was not documented in the chart. Consequently, our results may underestimate cold-related injuries among patients experiencing homelessness and overestimate them among patients not experiencing homelessness.

Second, this analysis only considered ED care related to cold-related injuries. Every winter, an estimated 15% of ED visits by individuals experiencing homelessness in Toronto are for seeking warmth, and occur due to a lack of alternatives such as shelters and warming centres [22, 23]. As a result, the true level of ED usage for cold exposure by people experiencing homelessness is likely much higher than our analysis indicates.

Third, our results are limited to individuals receiving healthcare at emergency departments and is reflected in our

rate being per 100,000 visits as opposed to rates per 1000 person-years of observation. People experiencing homelessness are disproportionately likely to avoid hospital-based care due to previous stigmatizing experiences and other factors [24]. Thus, any injuries that might have been treated in outpatient clinic settings were missed. This is unlikely to have affected our measured rates and rate ratios; nevertheless, results should only be generalized to homeless patients who use hospital-based healthcare.

Finally, our finding that ED visits significantly increased during the pandemic is based on a post-hoc test that does not account for the large confidence intervals in our measured rates; therefore, this finding should be interpreted with caution until future work can substantiate the result.

Clinical implications

The disproportionate burden of cold-related injuries among people experiencing homelessness is an equity issue of significant relevance for emergency medicine. If we treat the rate of cold-related injuries among non-homeless patients as a baseline level, excess visits for people experiencing homelessness represent avoidable morbidity and strain on emergency departments. To mitigate the risk of recurring morbidity, particularly in cases of frostbite, clinicians treating these injuries must attempt to ensure continuity of services in the community prior to discharge. Yet, this presents a major challenge due to ED surge pressures and the severe, consistent shortage of shelter space to which to discharge patients. Ultimately, individuals experiencing homelessness and the emergency departments that treat them both bear the consequences of policy decisions that fail to prioritize the provision of sufficient, accessible emergency shelter services within the community, such as an adequate number of shelter beds and drop-in warming services. Addressing these issues is vital for the welfare of those experiencing homelessness and the effectiveness of emergency medical care.

Research implications

The use of emergency departments by people experiencing homelessness for avoiding cold exposure is a greatly under-explored topic given its relevance in the pandemic era in Canada. We show that cold-related injuries, acute clinical manifestations of cold-exposure, are vastly overrepresented among patients experiencing homelessness, with female patients bearing the worst inequities. To gain a comprehensive understanding of the impact of homelessness on the preventable use of ED resources, future studies should endeavor to estimate the overall and gender-specific ED usage related to all cold exposure. These studies should also estimate the economic costs associated with excess ED utilization for cold exposure; this measurement would enable meaningful

comparisons between the cost of avoidable healthcare for cold exposure and the cost of providing sufficient community-based services providing emergency shelter.

Conclusions

Cold-related injuries related to cold exposure are largely preventable. People experiencing homelessness in Toronto remain at much higher risk for such injuries compared to their housed counterparts, including after the onset of the COVID-19 pandemic. The findings of this study strongly suggest the need to provide additional alternative services such as shelter beds for all individuals experiencing homelessness seeking shelter and 24-h, accessible and low-barrier warming centres throughout the cold season.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s43678-023-00546-7>.

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Data availability The dataset from this study is held securely in coded form at ICES. While legal data sharing agreements between ICES and data providers (e.g., healthcare organizations and government) prohibit ICES from making the dataset publicly available, access may be granted to those who meet pre-specified criteria for confidential access, available at www.ices.on.ca/DAS (email: das@ices.on.ca). The full dataset creation plan and underlying analytic code are available from the authors upon request, understanding that the computer programs may rely upon coding templates or macros that are unique to ICES and are therefore either inaccessible or may require modification.

Declarations

Conflict of interest The study authors declare no competing interests.

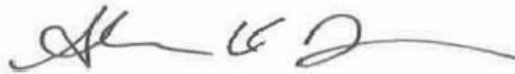
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This is Exhibit "C" referred to in
the Affidavit of Dr. Stephen Hwang of
the City of Toronto in the Province
of Ontario, sworn remotely
before me at the City of Waterloo
in the Province of Ontario on March 23, 2024.

A handwritten signature in black ink, appearing to read 'Shannon Down', written over a horizontal line.

Shannon Down
LSO#43894D

SPECIAL FOCUS ISSUE: CARDIOVASCULAR HEALTH PROMOTION

THE PRESENT AND FUTURE: JACC REVIEW TOPIC OF THE WEEK

Cardiovascular Disease and Homelessness



Travis P. Baggett, MD, MPH,^{a,b,c} Samantha S. Liauw, MD,^d Stephen W. Hwang, MD, MPH^{d,e}

ABSTRACT

Cardiovascular disease (CVD) is a major cause of death among homeless adults, at rates that exceed those in nonhomeless individuals. A complex set of factors contributes to this disparity. In addition to a high prevalence of cigarette smoking and suboptimal control of traditional CVD risk factors such as hypertension and diabetes, a heavy burden of nontraditional psychosocial risk factors like chronic stress, depression, heavy alcohol use, and cocaine use may confer additional risk for adverse CVD outcomes beyond that predicted by conventional risk estimation methods. Poor health care access and logistical challenges to cardiac testing may lead to delays in presentation and diagnosis. The management of established CVD may be further challenged by barriers to medication adherence, communication, and timely follow-up. The authors present practical, patient-centered strategies for addressing these challenges, emphasizing the importance of multidisciplinary collaboration and partnership with homeless-tailored clinical programs to improve CVD outcomes in this population. (J Am Coll Cardiol 2018;71:2585-97) © 2018 by the American College of Cardiology Foundation.

Cardiovascular disease (CVD) is a major cause of death among homeless people and a contributor to excess mortality in this population. The constellation of complex comorbidities and adverse social circumstances seen frequently among homeless people makes the management of CVD in this population uniquely challenging and necessitates a flexible, creative, and multidisciplinary approach. This paper presents an integrated framework for understanding the basis of CVD disparities in homeless people and offers practical management suggestions tailored to the needs of this population, with emphasis on coronary artery disease prevention, diagnosis, and treatment.

OVERVIEW OF HOMELESSNESS

In 2005, the United Nations estimated that 100 million people were homeless worldwide (1). Estimates from

North America (2,3), Europe (4), and Australia (5) have illustrated the heavy footprint of homelessness in the developed world. In the United States, about 550,000 people are homeless on a given night (6), and an estimated 2.3 to 3.5 million people experience homelessness over the course of a year (2).

U.S. definitions of homelessness vary and continue to evolve. The 1987 Stewart B. McKinney Homeless Assistance Act defined a homeless person as someone who lacks a fixed, regular, and adequate nighttime residence and who lives in a shelter or a place not designed for human habitation (7). The 2009 Homelessness Emergency Assistance and Rapid Transition to Housing Act expanded this definition to include people at imminent risk of housing loss within the next 2 weeks and people fleeing from domestic violence with inadequate resources to obtain other permanent housing (8). People who are “doubled-up,” or staying with friends or family without paying



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ABBREVIATIONS AND ACRONYMS

CVD = cardiovascular disease

HCH = Health Care for the Homeless

HRSA = Health Resources and Services Administration

rent because of not having a place of their own, are not included in these federal definitions of homelessness nor included in annual estimates of U.S. homelessness, but are considered homeless by the Health Resources and Services Administration (HRSA) (9) as well as by many advocacy organizations and academic researchers. The U.S. Department of Housing and Urban Development considers people to be *chronically* homeless if they have a disabling condition and have been either continuously homeless for ≥ 1 year or homeless 4 or more times in the past 3 years (10).

Nationally, 68% of homeless people in the United States reside in shelters, and 32% sleep “rough” in unsheltered locations (6). Although 22% of homeless people are children (6), the homeless population as a whole is growing older, with a median age now approaching 50 years (11,12). Men (60%) and African-American individuals (39%) are over-represented in the homeless population (6), as are a variety of marginalized groups such as gender and sexual minorities (13).

The causes of homelessness are wide-ranging and include structural factors such as poverty, unemployment, discrimination, incarceration, and high housing costs, in addition to personal factors such as substance use, mental illness, and traumatic life experiences. Indeed, “the homeless population” is not a single homogeneous entity, but rather a diverse collection of people from all walks of life with varying levels of disability, reflecting the multiple pathways into homelessness. Despite this heterogeneity, all homeless individuals share a common experience of vulnerability that comes with not having a physical place that is safe, reliable, and theirs.

HOMELESSNESS AND CARDIOVASCULAR MORTALITY

Table 1 presents a summary of epidemiological studies reporting CVD mortality in homeless and marginally housed populations across diverse settings and countries (14-22). In an 11-year nationwide study of residents of shelters, rooming houses, and hotels in Canada, age-standardized mortality rates due to all cardiovascular causes were 61% to 71% higher than in the general population and 63% to 80% higher for ischemic heart disease specifically (15). This disparity is even starker among the growing segment of homeless adults ≥ 45 years of age, for whom heart disease is the second-leading cause of death, with mortality rates 2- to 3-fold higher than in similarly aged adults in the general population (14).

Factors contributing to disparities in CVD mortality in homeless populations include late presentation to care, fragmentation of care, competing psychosocial priorities, and a high burden of traditional and nontraditional CVD risk factors. Collectively, these issues contribute to myriad difficulties in predicting, diagnosing, and managing CVD in this vulnerable population. The **Central Illustration** displays an integrated framework for understanding the multiple contributors to CVD disparities in homeless people and serves as a roadmap for the remainder of this discussion.

RISK FACTOR BURDEN

Available evidence indicates that homeless populations may be more likely to have an adverse profile of both traditional and nontraditional CVD risk factors. These risks can be considered under the categories of demographic, medical, substance use, psychiatric, and social factors.

DEMOGRAPHIC FACTORS. As noted in the previous text, men and black individuals are over-represented in homeless populations (6), and these demographic groups experience higher CVD mortality rates (23). In addition, the aging of the homeless population (11,12) suggests that the burden of CVD in this group will likely increase over time. Furthermore, the chronological age of homeless individuals may underestimate their functional age, as several studies have demonstrated that the physical ailments and functional impairments of homeless adults often reflect a level of disability seen among much older individuals in the general population (24-26).

MEDICAL FACTORS. The prevalence of hypertension among homeless people is similar to that among nonhomeless people (27). However, hypertension among homeless individuals often goes undiagnosed or untreated (28), contributing to poorer blood pressure control than that seen in the general population (29). Similarly, although the prevalence of diabetes among homeless individuals is comparable to that in the general population (27,30), multiple barriers to effective glycemic management in the setting of homelessness result in generally worse disease control and greater complications (28,31-36). Although non-U.S. studies have suggested that overweight and obesity may be less common among homeless people (28,37), U.S.-based studies have found a prevalence similar to that in the general population (38-40). In addition, limited access to exercise facilities and constrained dietary options that are frequently lacking in nutritional quality (41-43) present

TABLE 1 Summary of Studies of Cardiovascular Mortality in Homeless Populations

Cause/Category	Data Source, Year (Ref. #)	Study Population	Setting	Years	Findings
Cardiovascular disease					
	Stenius-Ayoade et al., 2017 (21)	617 homeless men age ≥21 yrs	Helsinki, Finland	2004-2014	Age-adjusted HR: 2.5 (95% CI: 1.7-3.8)
	Schinka et al., 2016 (20)	4,475 homeless veterans age ≥55 yrs (99% male)	U.S. Veterans Health Administration	2000-2011	Leading category of death (33% of all deaths)
	Beijer et al., 2011 (18)	2,283 homeless people age ≥18 yrs (77% male)	Stockholm, Sweden	1995-2005	Men: ASMR RR: 2.6 (95% CI: 2.1-3.2) Women: ASMR RR: 3.3 (95% CI: 1.8-3.7)
	Morrison, 2009 (19)	6,757 homeless people age ≥18 yrs (65% male)	Glasgow, Scotland	2000-2005	Age- and sex-adjusted HR: 1.8 (95% CI: 1.1-2.9)
	Hwang et al., 2009 (15)	15,100 homeless and marginally housed adults age ≥25 yrs (70% male)	Canada	1991-2001	Men: Age-adjusted RR: 1.7 (95% CI: 1.6-1.8) Women: Age-adjusted RR: 1.6 (95% CI: 1.4-1.8)
Heart disease					
	Baggett et al., 2013 (14)	28,033 patients age ≥18 yrs (66% male) of a homeless health care program	Boston, Massachusetts	2003-2008	Men: 25-44 yrs: Race-adjusted RR: 5.1 (95% CI: 3.1-8.4) 45-64 yrs: Race-adjusted RR: 3.5 (95% CI: 2.8-4.3) ≥65 yrs: Race-adjusted RR: 1.4 (95% CI: 0.9-2.1) Women: 25-44 yrs: Race-adjusted RR: 3.6 (95% CI: 1.2-11.1) 45-64 yrs: Race-adjusted RR: 3.0 (95% CI: 1.5-6.1) ≥65 yrs: Race-adjusted RR: 1.1 (95% CI: 0.4-3.2)
	Hwang, 2000 (16)	8,933 homeless men age ≥18 yrs	Toronto, Ontario, Canada	1995-1997	25-44 yrs: RR: 2.4 (95% CI: 0.9-6.6) 45-64 yrs: RR: 1.4 (95% CI: 0.7-2.9)
	Hwang et al., 1997 (17)	17,292 patients age ≥18 yrs (68% male) of a homeless health care program	Boston, Massachusetts	1988-1993	Men: 25-44 yrs: Race-adjusted RR: 3.5 (95% CI: 2.1-5.6) 45-64 yrs: Race-adjusted RR: 1.5 (95% CI: 1.1-2.1) Women: 25-44 yrs: Race-adjusted RR: 2.4 (95% CI: 0.7-7.7) 45-64 yrs: Race-adjusted RR: 1.2 (95% CI: 0.4-3.3)
	Hibbs et al., 1994 (22)	10,715 homeless people age ≥15 yrs (63% male)	Philadelphia, PA	1985-1988	Second leading cause of death (19% of all deaths)

ASMR = age-standardized mortality rate; CI = confidence interval; HR = hazard ratio; RR = rate ratio.

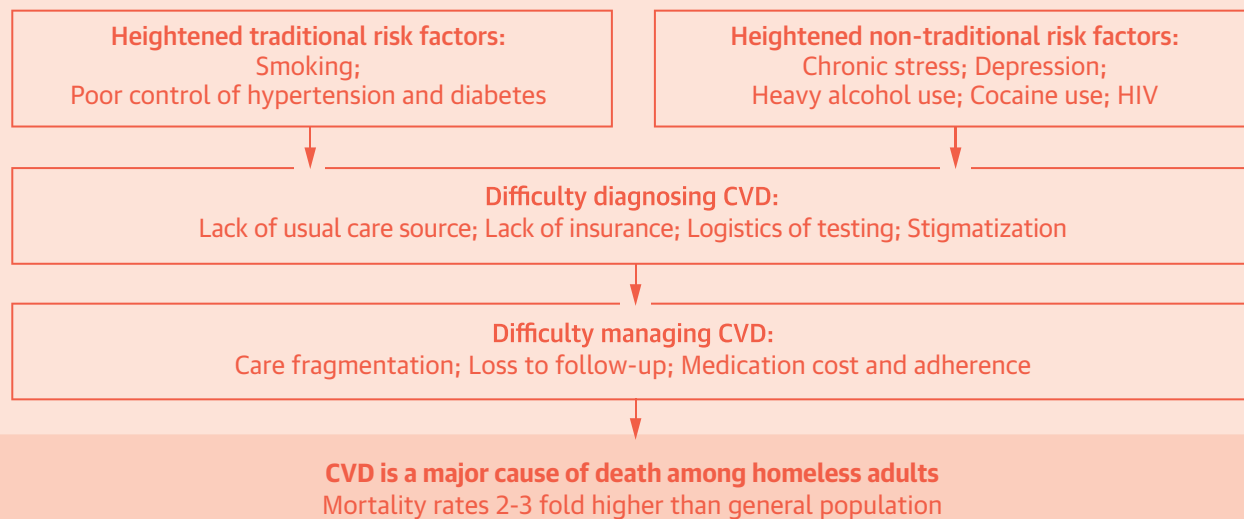
considerable challenges to weight reduction efforts and may independently contribute to CVD risk (44). Studies of lipid profiles among homeless individuals have yielded mixed findings around the prevalence of hypercholesterolemia (28,30,37,45,46). Although total cholesterol and triglyceride levels may be lower in some settings (37), potentially reflecting inadequate diet, high-density lipoprotein levels may also be lower in this population (28). Among those who qualify for lipid-lowering medications, few appear to be receiving them (28). Finally, depending on the subpopulation sampled, an estimated 1.5% to 10.5% of homeless individuals are infected with human immunodeficiency virus (47-49), and this may

contribute to elevated CVD risk through a variety of mechanisms (50).

SUBSTANCE USE FACTORS. The prevalence of cigarette smoking among homeless people is 68% to 80% (46,51-56). An estimated 60% of ischemic heart disease deaths among homeless people are tobacco-attributable (57), making smoking the single largest contributor to CVD mortality in homeless populations. Although light to moderate alcohol use may be protective against CVD (58), heavier drinking has been associated with multiple adverse cardiovascular outcomes, such as cardiomyopathy and congestive heart failure (CHF) (59-61) and is seen more

CENTRAL ILLUSTRATION Framework for Understanding Cardiovascular Disease Mortality Disparities in Homeless Populations

Cardiovascular disease (CVD) in the Homeless Population



Strategies

General approach	Risk factor modification	Diagnostics and Management	Collaborative Care
Emphasize relationship and therapeutic alliance Use non-stigmatizing language	Hypertension: simple regimens Diabetes: insulin by pen once daily Dyslipidemia: encourage statins Smoking: encourage pharmacotherapy	Expedite stress testing No penalties for missed appointments Use medication assistance programs	Involve case management services Connect patients to Health Care for the Homeless or homeless-tailored Veterans Affairs services

Baggett, T.P. et al. *J Am Coll Cardiol.* 2018;71(22):2585-97.

Displayed is an integrated framework for understanding the multiple contributors to cardiovascular disease (CVD) mortality disparities in homeless people. These factors include late presentation to care, fragmentation of care, competing psychosocial priorities, and a high burden of traditional and nontraditional CVD risk factors. Collectively, these issues contribute to difficulties in predicting, diagnosing, and managing CVD in this vulnerable population. HIV = human immunodeficiency virus.

commonly in homeless populations (62-64). About one-quarter of homeless adults have a recent history of cocaine use (65), which has been linked to accelerated atherosclerosis, myocardial ischemia and infarction, and other cardiac complications such as aortic dissection and sudden cardiac death that may be related to dramatic drug-induced fluctuations in blood pressure (61,66-69). Similar cardiovascular effects may be induced by amphetamine use (61),

which is common among selected subgroups of homeless individuals (70,71). In addition to the pharmacological effects of specific drugs, the use of any drug by injection—a practice more common among homeless individuals (72) and especially prevalent during the current opioid crisis that has disproportionately affected this population (14,73)—heightens the risk of infective endocarditis and associated valvular complications.

PSYCHIATRIC FACTORS. Rates of depression (62,74), anxiety (74), and nonspecific psychological distress (72) are high in homeless populations, and these psychiatric conditions may contribute to CVD (75-78). Post-traumatic stress disorder, estimated to affect some 21% to 39% of homeless people (79-83), has also been associated with higher risk for CVD (84). As many as one-fourth of homeless people have chronic serious mental illnesses such as schizophrenia, bipolar disorder, or severe depression (74), and these disorders may complicate the presentation and diagnosis of CVD by interfering with individuals' reporting of symptoms, ability or motivation to seek care, and executive capacity for completing diagnostic testing. In addition, individuals with mental illness have generally high rates of smoking (85,86), and many psychotropic medications cause or exacerbate cardiometabolic risk factors for CVD, such as obesity, dyslipidemia, and diabetes (87,88). These considerations have led to the development of a CVD risk prediction model specific to people with serious mental illness (89), although its applicability to homeless individuals without major psychiatric illness is uncertain. No comparable homeless-specific risk prediction models exist.

SOCIAL FACTORS. A variety of social and environmental stressors commonly experienced by homeless people have been linked to a higher risk for CVD (90). Difficulty meeting needs for shelter, food, clothing, and other basic necessities (91); pervasive exposure to physical and sexual violence (92-96), and high levels of perceived stress (97) may contribute to high allostatic load, or the cumulative physiologic toll of chronic stress that is associated with multiple adverse health outcomes, including incident CVD (98-104). In a study of 25 homeless men, those with high levels of life stress had a lower density of lymphocyte beta-adrenergic receptors (105), introducing a physiological pathway through which the stressful life circumstance of homelessness might impact cardiovascular functioning. Adding to these stressful life circumstances, poor diet (39,41-43,45,106-108) and suboptimal sleep duration and quality (109) are intrinsic to the experience of homelessness and may also contribute to CVD risk (44,110).

BARRIERS TO DIAGNOSIS AND MANAGEMENT

The extreme circumstances of homelessness and unique profile of CVD risk factors among homeless people may contribute to difficulty predicting, diagnosing, and managing CVD in this population. This section presents a summary of these difficulties.

In subsequent sections, we will discuss strategies for overcoming some of these challenges.

DIFFICULTY PREDICTING DISEASE. Studies examining estimated CVD risk among homeless populations have yielded mixed results, with some finding risk scores comparable to those in the general population (28,111) and others finding higher-than-average CVD risk scores (97). To our knowledge, none of the CVD risk prediction models used in clinical practice have been validated in homeless populations. In addition, most CVD risk prediction models, including the pooled cohort risk estimator equation endorsed by the American College of Cardiology (112), do not incorporate the psychosocial risk factors discussed in the previous text that are common among homeless people, which may synergistically produce CVD risk exceeding that predicted based solely on more traditional CVD risk factors. Furthermore, these models may not adequately account for the generally worse control of traditional risk factors such as diabetes.

DIFFICULTY DIAGNOSING DISEASE. Establishing a diagnosis of CVD among homeless people presents several challenges due to health systems barriers in addition to logistical hurdles to diagnostic testing.

Health system barriers. As many as one-half of homeless individuals do not have a usual source of care (113), contributing to difficulty accessing primary and preventive care in a timely manner and high levels of unmet health care needs (72,96,114-117). Lack of health insurance, although less common following Medicaid expansion under the Affordable Care Act (118), is a major driver of these health care access problems (96,116,119,120). However, evidence from Canada suggests that homeless people experience difficulty meeting health care needs even within a system of universal health insurance (114,117). Competing priorities for meeting basic survival needs may be one explanation for this observation (91). Homeless patients may also feel unwelcome in traditional health care settings, prompting intense emotional responses that negatively affect their desire to seek further care (121). As a result, homeless individuals with CVD may present to care at later stages of illness or with "missed events."

Logistics of diagnostic testing. Even when patients can access care and present in a timely manner, diagnostic testing for CVD may be more difficult to accomplish in the setting of homelessness. Such testing may involve referral to hospitals or facilities that are unfamiliar to or inconvenient for homeless people. Diagnostic testing may not be affordable to individuals who lack health insurance. Additionally,

TABLE 2 Recommendations for Preventing, Diagnosing, and Managing Cardiovascular Disease in Homeless Patients

General approach	<ul style="list-style-type: none"> Emphasize interpersonal relationship and therapeutic alliance Assess living situation and personal health habits using nonstigmatizing language
Risk factor modification	<ul style="list-style-type: none"> Diagnose and treat major CVD risk factors as per existing guidelines Hypertension: emphasize simple medication regimens; educate patients on salt content of commonly encountered foods in shelter settings Diabetes: when needed, once-daily insulin via pen device is preferred; may be stored at room temperature for 1 month. Dyslipidemia: high-intensity statins can be safely started, unless there is advanced liver disease, monitoring transaminases in selected cases Smoking: encourage pharmacotherapy; mobile phones can be used to access tobacco quitlines
Diagnostic work-up	<ul style="list-style-type: none"> Aim for balanced pace of work-up that respects both clinical urgency and patient preference Arrange stress testing as soon as possible to maximize the likelihood of completion Carefully explain testing procedures to frame expectations
Management	<ul style="list-style-type: none"> Schedule multiple clinic visits without penalty for missed appointments Use once-daily medications when possible Find information about medication assistance programs in your area: http://www.needymeds.org Explore feasible nonpharmacological strategies, such as building physical activity into daily routine Tailor decisions about PCI and stent selection to the clinical scenario; avoid litmus tests based solely on homelessness
Collaboration	<ul style="list-style-type: none"> Address concurrent psychiatric and substance use disorders through multispecialty/multidisciplinary collaboration Utilize case management services where available to coordinate medical, psychiatric, and social needs across multiple sectors Locate a nearby Health Care for the Homeless clinic: http://findahealthcenter.hrsa.gov Connect eligible patients to homeless-tailored Veterans Affairs services

CVD = cardiovascular disease; PCI = percutaneous coronary intervention.

same-day outpatient diagnostic testing, a strategy we use in general for homeless individuals when available, may not be available at many centers. Finally, certain diagnostic tests, such as those involving nuclear medicine perfusion scans, may involve a lengthy time commitment or require special preparation (e.g., fasting) that pose difficulties for some homeless patients.

DIFFICULTY MANAGING DISEASE. Once a diagnosis of CVD has been made, several practical barriers to management may emerge.

Communication and continuity. The itinerant nature of homelessness makes it difficult to communicate with homeless patients between visits or to recall them for follow-up visits, increasing the risk of loss to follow-up. Depending upon mobility patterns and shelter preferences, care may be fragmented across multiple institutions as homeless individuals move among different locations within a given geographic area. The problem of continuity may be further exacerbated by suboptimal patterns of health service utilization seen more commonly among homeless people, including higher rates of

emergency department use (116,122-126), hospitalization (116,124,125,127), and 30-day hospital readmissions (128), contributing to a cycle of acute care focused on immediate rather than longer-term management strategies.

Medication adherence. Homeless people experience several barriers to medication adherence (129,130). Lack of or inadequate insurance coverage creates an important financial barrier to obtaining prescription medications (96,116). Adherence may also be challenging for medications that require multiple doses per day. Diuretic agents may pose problems for those who lack routine access to bathroom facilities. Lost or stolen medications are also a common problem that may impede adherence (130). Our anecdotal experience suggests that concerns about medication adherence may impact decisions about percutaneous coronary intervention (PCI) and selection of bare-metal versus drug-eluting stents in the care of homeless people with acute coronary syndromes, similar to a phenomenon observed among individuals with drug or alcohol use disorders (131).

RECOMMENDATIONS

Our approach to addressing CVD and CVD risk factors among homeless people integrates evidence-based guidelines developed for the general population, evidence from homeless-specific studies, and our own clinical experience with this population. The resulting recommendations incorporate many of the management principles articulated by leading clinicians and researchers from diverse settings (132,133). An at-a-glance summary of these recommendations is presented in Table 2. Although the pathophysiology of CVD and the fundamentals of its treatment are the same as in any other population, the practical aspects of diagnosing and managing CVD in the setting of homelessness are made unique by the constellation of medical comorbidity, psychiatric complexity, and social vulnerability seen in this population, necessitating flexible, creative, and multidisciplinary approaches to accomplishing tasks that might be regarded as mundane in other settings.

DETERMINING WHO IS HOMELESS. Enacting the management strategies described in the following text requires first determining which patients encountered in clinical practice are homeless. Given the diversity and heterogeneity of homelessness, we favor a universal screening approach (134) over assumptions or conjectures based on how a patient looks. Because of the stigma associated with homelessness, we tend to avoid asking patients whether they consider themselves homeless and focus instead

on understanding and characterizing their living situation. We first ask patients whether they have a place to stay that they rent or own. For those who do not, we ask where they usually sleep at night. Those who report usually sleeping in a shelter, car, hotel or motel, or any public place are homeless. Those who stay with friends or family without paying rent are doubled-up; we approach these individuals in a fashion similar to how we approach those who are homeless.

THE ROLE OF HOUSING. Although the provision of stable housing is clearly an essential goal for people experiencing homelessness, the evidence base is currently insufficient to determine whether providing permanent supportive housing to homeless people favorably affects their cardiovascular health. In the United States, housing interventions for homeless people have been associated with improved residential stability (135), better human immunodeficiency virus outcomes (136), and in selected instances, reduced drug and alcohol use (137,138). These changes might plausibly lead to improved cardiovascular health. To date, however, no published randomized studies have specifically examined whether or not the provision of housing improves traditional CVD risk factors or CVD outcomes. In Canada, a large randomized trial of low-threshold housing for homeless people with mental illness demonstrated improvements in housing stability but found few effects on other health status measures over a 2-year follow-up period (139,140). An analysis of the effect of the housing intervention on CVD risk factors is currently underway. Although we wholeheartedly concur with policy recommendations calling for improved and immediate access to housing for homeless people (141), we cannot assume that housing alone will be sufficient to mitigate the CVD disparities documented in this population.

RISK FACTOR REDUCTION AND PRIMARY PREVENTION. To the greatest extent possible, we follow evidence-based guidelines for treating smoking, diabetes, hypertension, and dyslipidemia. Most homeless smokers want to quit smoking (39,52,142-145), but quit rates in this population are one-fifth of the national average (51). Although several studies have examined smoking cessation interventions for homeless smokers, the negative results (146) or pilot nature (147-151) of these studies means that the optimal approach to addressing tobacco use in this population is uncertain. We strongly encourage the use of pharmacotherapy for smoking cessation, and we offer quitline referrals to individuals with mobile phones.

Only a few pilot studies have examined management interventions for diabetes or its complications in homeless people (152-155), yielding a limited evidence base for tailoring practice to this population. As a result, we generally follow current practice guidelines, with modifications as appropriate to account for homeless patients' unique living circumstances. If insulin is necessary, we preferentially use once-daily long-acting formulations to minimize the risk of hypoglycemia when food supply is uncertain. We cautiously add prandial short-acting insulin only when needed and when the benefits outweigh the risks of doing so. We use insulin pen devices when possible to minimize the burden of carrying and disposing of syringes (155). Insulin can be stored at room temperature for up to 1 month.

No trials have directly addressed blood pressure management interventions for homeless people. We use once-daily medications whenever possible (156) and base initial medication selection on the likelihood of adherence to any needed follow-up testing, such as obtaining a basic metabolic panel following the initiation of a thiazide diuretic or angiotensin-converting enzyme inhibitor. We educate patients about the sodium content of commonly-encountered foods in shelter settings, such as soups and pre-packaged snacks, and explore alternatives to these options where feasible.

In the absence of a homeless-tailored CVD risk prediction model, we use standard CVD risk estimators in our own clinical practice. We supplement this information with our clinical impression of other nontraditional features (e.g., cocaine use, depression) that may additionally elevate risk. We prescribe statins for primary prevention of CVD according to current guidelines. We avoid statins in patients with known or suspected advanced liver disease.

We also advise homeless patients on non-pharmacological approaches to reduce their CVD risk. We encourage them to build physical activity into their daily routines, and we provide pragmatic tips on optimizing their dietary intake within the constraints of what their shelter or meal program offers. We counsel patients on the adverse cardiac effects of cocaine and other stimulant use and heavy alcohol use, and we treat these and other substance use disorders according to standard practice. We encourage injection drug users to make use of harm reduction services such as syringe exchange programs to lower their risk of infective endocarditis.

DIAGNOSTIC WORK-UP. When considering a diagnosis of CVD in homeless patients, we obtain a careful history eliciting both traditional and nontraditional

CVD risk factors, focusing particularly on those summarized in the previous text. If cardiac stress testing is warranted, we attempt to match the testing modality with patients' preferences and abilities. We carefully explain the test in advance, including any required preparation, the amount of time the test will take, whether an intravenous line will be required, and what they will be asked to do while there, so that patients know what to expect from the experience. When feasible, we arrange stress testing as soon as possible to maximize the likelihood of completion. Among patients presenting to the hospital with chest pain and unreliable follow-up, a brief admission for expedited cardiac stress testing may be warranted. In general, we aim to achieve a pace of work-up that respects patients' preferences and comfort level while being appropriate to the clinical urgency. In some cases where the pre-test probability of CVD is high and the patient declines diagnostic testing, we provide empiric medical treatment for CVD and monitor symptoms closely.

CVD MANAGEMENT. When a diagnosis of CVD is confirmed in homeless patients, we continue to aggressively treat contributory conditions (e.g., diabetes) and behaviors (e.g., smoking) in the manner described in the previous text while collaborating with consulting cardiologists to determine the next management steps.

If medical management is deemed most appropriate, we aim to achieve the simplest regimen that will be efficacious, using once-daily medications when possible. For patients who have difficulty affording their medications due to cost or lack of insurance, the use of assistance programs for obtaining discounted or free medications may be necessary. We suggest that clinicians familiarize themselves with medication assistance resources in their practice locations. NeedyMeds is an online nonprofit information resource that helps patients and providers locate medication assistance programs in their area.

We do not view homelessness as a contraindication to PCI or placement of drug-eluting stents if medically indicated. Rather, this decision should be tailored to the circumstances of each patient. Despite the challenges to medication adherence described in the previous text, we have cared for many homeless patients who successfully adhered to dual antiplatelet therapy following PCI with excellent cardiovascular outcomes. If coronary artery bypass grafting is needed, collaboration with a local medical respite program (see the following text) may be necessary to ensure discharge to a safe and supervised recovery environment.

Throughout all steps of the management process, we recommend close collaboration with psychiatric and addiction specialists, when relevant, to provide integrated care targeting these domains of health that can interfere with treatment adherence and increase the risk for adverse cardiovascular outcomes. Case management, an intervention geared toward assisting individuals in accessing services across multiple sectors, has been associated with improvements in psychiatric and substance use outcomes among homeless people (132,157,158) and may be an important component of a multidisciplinary care approach where available. For example, with a patient's consent, case managers can be given information about follow-up appointments, tests, and treatment plans to communicate the plan with the patient's support network and facilitate adherence.

FOLLOW-UP AND COMMUNICATION. Following a new diagnosis of a serious illness such as CVD, we schedule early and frequent follow-up with patients to minimize the risk of being lost to care, and we avoid penalizing patients for missed appointments. We document and regularly update contact information, as this often changes. Recent studies have suggested that 44% to 89% of homeless people have cell phones (159-165), although their allotment of minutes may vary depending upon the time of the month. Studies have suggested that appointment reminders delivered to homeless patients via text messaging may enhance follow-up and care retention (166).

TAILORED MODELS OF CARE

The care of homeless patients with complex health issues need not happen in isolation. Clinicians working in cardiac specialty settings may wish to collaborate with local programs that provide tailored health care services to individuals experiencing homelessness. Evidence from a U.S. study suggests that homeless individuals may have more favorable perceptions of their health care experiences at tailored clinical programs than at mainstream clinical sites (167).

HEALTH CARE FOR THE HOMELESS PROGRAM. The Health Care for the Homeless (HCH) program, administered by the HRSA Bureau of Primary Health Care, supports 295 health center grantees that serve over 934,000 people annually throughout all U.S. states, the District of Columbia, and Puerto Rico (168). Although HCH programs differ somewhat from location to location, these programs generally provide integrated, team-based care through colocated medical, mental health, and substance use treatment services. Several HCH programs embed these services within shelters, daytime drop-in centers, and other

facilities frequented by homeless individuals. Nearby HCH clinics can be located using the HRSA “Find a Health Center” website (169). The use of HCH services has been associated with reductions in inappropriate emergency department use among homeless adults (170).

Many HCH programs operate medical respite units that provide a medically-supervised environment for the care of homeless individuals who are too medically compromised to be on the streets or in a shelter but are not ill enough to require hospitalization (171). Medical respite units for homeless individuals have been associated with lower hospital readmission rates (172,173) and may be a valuable resource for supporting recovery after cardiac procedures or surgeries.

VETERANS AFFAIRS PROGRAMS. Homeless individuals who are veterans may be eligible for specialized services through Veterans Affairs. Since 2012, Veterans Affairs Homeless Patient Aligned Care Teams have provided team-oriented primary care to homeless veterans. These teams use a care model that resembles the HCH approach in emphasizing collocated services across a continuum of health and social needs, including housing placement (174).

SUMMARY AND CONCLUSIONS

Homeless people experience stark disparities in cardiovascular mortality, likely rooted in a unique profile of traditional and nontraditional risk factors combined with difficulties accessing care and adhering to evidence-based treatment. We suggest practical, patient-centered strategies for delivering preventive and therapeutic cardiovascular care to this vulnerable population. Multidisciplinary collaboration with primary care providers and behavioral health specialists may be needed to address homeless patients’ complex needs and to optimize their cardiovascular outcomes. Homeless-tailored care models exist in most U.S. cities and can be a valuable resource for achieving these goals and reducing the burden of CVD morbidity and mortality among those experiencing homelessness.

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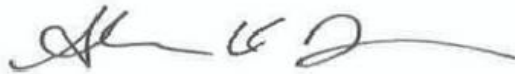
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KEY WORDS cardiovascular diseases, health care disparities, health status disparities, homeless persons, risk factors

This is Exhibit "D" referred to in
the Affidavit of Dr. Stephen Hwang of
the City of Toronto in the Province
of Ontario, sworn remotely
before me at the City of Waterloo
in the Province of Ontario on March 23, 2024.

A handwritten signature in black ink, appearing to read 'Shannon Down', written over a horizontal line.

Shannon Down
LSO#43894D

Healthcare Utilization, Legal Incidents, and Victimization Following Traumatic Brain Injury in Homeless and Vulnerably Housed Individuals: A Prospective Cohort Study

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Objective: To characterize the associations between a history of traumatic brain injury (TBI) and subsequent healthcare utilization, legal involvement, and victimization. **Setting:** Three major Canadian cities. **Participants:** A total of 1181 homeless and vulnerably housed adults who were single and 18 years or older. Data for 968 participants (82%) were available at 1-year follow-up. **Design:** Prospective cohort study. Data were collected using structured, in-person interviews at baseline in 2009 and approximately 1 year after baseline. **Main Measures:** Self-reported TBI, 12-item Short Form Health Survey, healthcare, and criminal justice use questionnaires. **Results:** The lifetime prevalence of TBI was 61%. A history of TBI was independently associated with emergency department (ED) use [adjusted odds ratio (AOR) = 1.5, 95% confidence interval (CI): 1.11–1.96], being arrested or incarcerated (AOR = 1.79, 95% CI: 1.3–2.48) and being a victim of physical assault (AOR = 2.81, 95% CI: 1.96–4.03) during the 1-year follow-up period. **Conclusions:** Homeless and vulnerably housed individuals with a lifetime history of TBI are more likely to be ED users, arrested or incarcerated, and victims of physical assault over a 1-year follow-up period even after adjustment for health status and other confounders. These findings have public health and criminal justice implications and highlight the need for effective screening, treatment, and rehabilitation for TBI in this population. **Key words:** *healthcare utilization, homeless persons, traumatic brain injury, victimization, vulnerably housed*

TRAUMATIC BRAIN INJURIES (TBIs) are common in homeless populations.^{1,2} In a study of

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904 homeless individuals in Toronto, Canada, the lifetime prevalence of self-reported TBI was 53%, with 70% of participants' first TBI occurring before onset of homelessness.³ Among homeless individuals, a history of TBI was associated with many adverse health outcomes such as seizures, mental health problems, alcohol and drug misuse, and poorer physical and mental health status. Given their numerous health problems and lack of access to primary care, homeless individuals are also frequent users of healthcare facilities, particularly hospital emergency departments (EDs).^{4,5} However, whether a history of TBI is associated with subsequent healthcare utilization in homeless and vulnerably housed populations is unknown.

Previous studies have also linked TBI with aggressive and violent behaviors.^{6,7} In the largest study to date to investigate violent crime following TBI, Fazel et al⁸ found that individuals who had experienced a TBI were significantly more likely to have committed a violent

crime compared with population controls. In a recent meta-analysis of 24 studies that investigated the lifetime prevalence of TBI in incarcerated populations, Farrer and Hedges⁹ found a significantly higher prevalence of TBI in incarcerated individuals than in the general population. A previous study also demonstrated that individuals who experience a TBI are more likely to be victims of violent crime.¹⁰ Although numerous studies have demonstrated an association between TBI and criminal incidents, the relations between a history of TBI and subsequent arrests, incarcerations, and experiences of victimization have not been previously investigated in homeless and vulnerably housed populations.

This article reports findings from the Health and Housing in Transition study, a prospective cohort study that is tracking the health and housing status of homeless and vulnerably housed individuals in 3 major Canadian cities.¹¹ The objectives of this article are to characterize the associations between a history of TBI and subsequent healthcare utilization, legal incidents, and victimization over a 1-year follow-up period in homeless and vulnerably housed individuals.

METHODS

Participants

Homeless and vulnerably housed persons 18 years or older who were not living with a dependent child were recruited in Vancouver, Toronto, and Ottawa from January to December 2009. Homelessness was defined as living within the last 7 days at a shelter, public space, vehicle, abandoned building, or someone else's home, and not having a home of one's own. Vulnerably housed was defined as currently living in one's own room or apartment, but having been homeless or had 2 or more moves in the past 12 months. Full-time students and individuals who were visiting the city for 3 months or less were excluded.

Recruitment

The sampling procedure for recruiting homeless participants was based on the design suggested by Ardilly and Le Blanc.¹² Study participants were recruited at homeless shelters and meal programs. Homeless participants who did not use shelters were recruited at meal programs proportionally to the estimated number of homeless persons that slept on the street in each respective city. Vulnerably housed participants were recruited from randomly selected rooming houses in Toronto and Ottawa and from SRO hotels in Vancouver. Because of difficulties in gaining access to some of these locations, the recruitment strategy for vulnerably housed individuals was modified to include meal programs, drop-in centers, and community health centers. All study partic-

ipants provided written informed consent and received CDN\$20 upon interview completion. This study was approved by the Research Ethics Boards at St Michael's Hospital, Toronto; the University of Ottawa; and the University of British Columbia, Vancouver.

Survey instrument

Full details of all survey instruments used in the study have been reported elsewhere.¹¹ Data on demographic characteristics, health status and health conditions, healthcare utilization, quality of life, social support, employment and income, and legal incidents were collected using structured, in-person interviews conducted by research personnel immediately following recruitment. Interviews took approximately 60 to 90 minutes to complete. Participants reported their ethnic background based on categories adapted from the Statistics Canada Ethnic Diversity Survey.¹³

Lifetime prevalence of TBI was determined using questions from a previous study on prison inmates.¹⁴ Participants were asked whether they had ever had "an injury to the head which knocked you out or at least left you dazed, confused, or disoriented?" and when the first such injury of this nature occurred. Health status was determined using the 12-item Short Form Health Survey (SF-12) to generate Physical Component Summary (PCS) and Mental Component Summary (MCS) subscale scores.¹⁵ Chronic health conditions listed in the survey tool were adapted from the Canadian Community Health Survey,¹⁶ and participants were asked to report any chronic health conditions that had lasted or were expected to last 6 months or more and had been diagnosed by a healthcare professional. Past and present mental health diagnoses were also identified by self-report. Alcohol abuse was assessed using the Alcohol Use Disorders Identification Test (AUDIT), with a score of 8 or more representing a positive screen indicative of hazardous or harmful drinking.¹⁷ Drug abuse and the extent of drug-related problems experienced by participants were assessed using the 10-item version of the Drug Abuse Screening Test (DAST-10).¹⁸ Scores of 3 or higher on the DAST-10 indicated moderate, substantial, or severe drug use problems resulting in a positive screen.

Participants provided contact information and secondary contact information during administration of the baseline survey so that they could be located for a follow-up survey administered approximately 1 year later with questions on the outcomes of interest—healthcare utilization (ED, frequent ED use, and hospital admission), legal incidents (arrests and/or incarcerations), and victimization (physical and sexual assault). A frequent ED user was defined as having 3 or more ED visits in the past year.

Data analysis

Data analysis was conducted in 2012. Descriptive statistics were used to summarize all quantitative variables. Comparisons between participants with and without a history of TBI were performed using Student *t* tests for normally distributed continuous variables (SF-12 PCS and MCS scores), Wilcoxon–Mann–Whitney test for continuous variables that were not normally distributed (age, age at first homelessness, lifetime years of homelessness, and income), and χ^2 test or the Fisher exact test when necessary for categorical variables. Multivariate logistic regression models were developed to determine whether a history of TBI was associated with healthcare utilization and legal incidents after adjustment for age, gender, city of recruitment, country of origin, ethnic background, highest level of education, lifetime years of homelessness, housing status (homeless vs vulnerably housed), SF-12 PCS and MCS scores, DAST and AUDIT scores, and having a primary care provider. The multivariate logistic regression models were built using a purposeful selection strategy.¹⁹

Univariate logistic regression models were constructed to evaluate the effect of each covariate on each outcome. Models that met the inclusion criteria of $P \leq .25$ or were of theoretical importance were added into a full model. Through an iterative process, variables were removed or added back into the model if (a) the variable met the retention inclusion criteria of $P \leq .10$ and (b) the parameter estimates of at least 1 remaining variable was altered by 15% or more when a given variable was removed from the full model. When the iterative process of adding and removing variables from the full model was complete, variables that were dismissed at the univariate model stage were added back in to determine whether they had an effect on the final model. The goodness of fit for each model was ensured using the Hosmer–Lemeshow Test. Statistical tests were 2-tailed and $P < .05$ was considered statistically significant for the descriptive statistics and final multivariate models. All statistical analyses were performed using SAS statistical software version 9.3 (SAS Institute, Cary, North Carolina).

RESULTS

Data at baseline were available for 1181 homeless and vulnerably housed adults. Of these, 586 (49.7%) were homeless and 594 (50.3%) were vulnerably housed at baseline. Demographic characteristics of study participants are displayed in Table 1. Overall, the lifetime prevalence of self-reported TBI in the sample was 61% (69% in Vancouver, 64% in Ottawa, and 50% in Toronto). Those with a history of TBI were significantly more likely to be male, White, born in Canada, vulnerably

ably housed at baseline, completed some high school, have first experienced homelessness at a younger age, and to have experienced more lifetime years of homelessness. The median age of the first TBI for participants who reported a history of TBI was 16 years, 58% of whom experienced their first TBI before 20 years of age.

Those with a history of TBI were significantly more likely than those without a history of TBI to be employed ($P < .05$) and to be receiving a higher monthly income ($P < .001$) during the year before the baseline survey. There were no significant differences between participants with and without a history of TBI in age, marital status, and having a primary healthcare provider. Compared with those without a history of TBI, participants with a history of TBI had lower SF-12 PCS scores ($P < .001$), lower SF-12 MCS scores ($P < .001$) and were more likely to be living with another chronic health condition (82.0% vs 66.9%, $P < .001$). Those with a history of TBI were also significantly more likely to have a history of a mental health diagnosis ($P < .05$), be currently smoking ($P < .001$), and have positive DAST ($P < .001$) and AUDIT ($P < .001$) screens.

One-year follow-up data were available for 968 (82%) participants. There was no significant difference between participants who did and did not complete the 1-year follow-up interview in the prevalence of history of TBI at baseline. Over the course of the follow-up period, participants who reported a history of TBI at baseline were significantly more likely to visit an ED ($P < .001$) and be a frequent ED user ($P < .05$). Participants with a history of TBI were also significantly more likely to have reported a hospital admission at follow-up ($P < .05$). At follow-up, participants with a history of TBI were significantly more likely than those without a history of TBI to have reported being arrested or incarcerated ($P < .001$) or to have been victims of physical assault ($P < .001$) in the past year. There were no significant differences in the reporting of sexual assaults between those with and without a history of TBI ($P = .081$).

The results of the multivariate logistic regression models are presented in Table 2. A history of TBI was independently associated with being an ED user at follow-up (AOR = 1.5, 95% CI: 1.11–1.96) but not with frequent ED use (AOR = 1.4, 95% CI: 0.96–2.09) or with hospital admission (AOR = 1.50, 95% CI: 0.99–2.29) at follow-up. In terms of legal incidents and victimization at follow-up, a history of TBI was independently associated with being arrested or incarcerated (AOR = 1.79, 95% CI: 1.3–2.48) and with being a victim of physical assault (AOR = 2.81, 95% CI: 1.96–4.03) but not with being a victim of sexual assault (AOR = 1.63, 95% CI: 0.86–3.09). Additional analyses revealed no evidence of effect modification by gender.

TABLE 1 Baseline characteristics of 1181 homeless and vulnerably housed individuals with or without a history of traumatic brain injury

Characteristic	Total participants (N = 1181), n (%)	Participants with traumatic brain injury, n (%)		P
		Present (n = 718)	Absent (n = 463)	
Age, median (IQR), y	43.0 (14.0)	43.0 (14.0)	42.0 (15.0)	.3071
Gender				
Male	782 (66.2)	512 (71.3)	270 (58.3)	<.0001
Female	382 (32.4)	195 (27.2)	187 (40.4)	
Transgendered	17 (1.4)	11 (1.5)	6 (1.3)	
City				
Toronto	396 (33.5)	199 (27.7)	197 (42.6)	<.0001
Ottawa	390 (33.0)	248 (34.5)	142 (30.7)	
Vancouver	395 (33.5)	271 (37.7)	124 (26.8)	
Ethnic background				
White	716 (62.5)	470 (67.5)	246 (54.8)	<.0001
Black/African-Canadian	105 (9.2)	33 (4.7)	72 (16.0)	
First Nations/Aboriginal	203 (17.7)	131 (18.8)	72 (16.0)	
Mixed ethnicity/other	121 (10.6)	62 (8.9)	59 (13.1)	
Country of origin				
Canada	994 (84.7)	638 (89.5)	356 (77.2)	<.0001
Other	180 (15.3)	75 (10.5)	105 (22.8)	
Highest level of education				
Some high school	522 (44.6)	312 (43.8)	210 (45.9)	.0176
Completed high school or equivalent	275 (23.5)	153 (21.5)	122 (26.6)	
Some postsecondary education or higher	374 (31.9)	248 (34.8)	126 (27.5)	
Marital status				
Currently not partnered	1016 (86.5)	618 (86.7)	398 (86.3)	.8669
Currently partnered	158 (13.5)	95 (13.3)	63 (13.7)	
Housing status				
Homeless	586 (49.7)	337 (47.0)	249 (53.8)	.0230
Vulnerably housed	594 (50.3)	380 (53.0)	214 (46.2)	
Age at first homelessness, median (IQR)	26.0 (24.0)	24.5 (23.0)	30.0 (24.0)	<.0001
Lifetime years of homelessness, median (IQR)	2.84 (5.57)	3.28 (5.92)	2.19 (5.02)	.0021
Employed in the past 12 mo				
Yes	469 (39.8)	301 (42.0)	168 (36.3)	.0487
No	710 (60.2)	415 (58.0)	295 (63.7)	
Monthly income, median (IQR)	900.0 (883.0)	966.3 (990.0)	797.5 (786.0)	.0001
SF-12 PCS, mean (SD)	44.51 (11.3)	43.23 (11.2)	46.49 (11.0)	<.0001
SF-12 MCS, mean (SD)	39.12 (13.0)	37.69 (12.9)	41.35 (12.9)	<.0001
Number of chronic health conditions ^a				
0	282 (23.9)	129 (18.0)	153 (33.1)	<.0001
1-2	469 (39.7)	273 (38.0)	196 (42.3)	
>3	430 (36.4)	316 (44.0)	114 (24.6)	
History of a mental health diagnosis	601 (51.6)	387 (54.5)	214 (47.1)	.0141
Currently smoking	1002 (85.2)	637 (89.2)	365 (79.0)	<.0001
Positive DAST screen	628 (53.5)	429 (60.1)	199 (43.2)	<.0001
DAST risk level				
No drug use in past 12 mo	336 (28.6)	158 (22.1)	178 (38.6)	<.0001
Low level	211 (18.0)	127 (17.8)	84 (18.2)	
Moderate level	287 (24.4)	195 (27.3)	92 (20.0)	
Substantial level	253 (21.5)	170 (23.8)	83 (18.0)	
Severe level	88 (7.5)	64 (9.0)	24 (5.2)	
Positive AUDIT screen	443 (37.6)	301 (42.0)	142 (30.8)	

(continues)

TABLE 1 *Baseline characteristics of 1181 homeless and vulnerably housed individuals with or without a history of traumatic brain injury (Continued)*

Characteristic	Total participants (N = 1181), n (%)	Participants with traumatic brain injury, n (%)		P
		Present (n = 718)	Absent (n = 463)	
AUDIT risk level				
Low risk	734 (62.4)	415 (58.0)	319 (69.2)	<.0001
Hazardous level	196 (16.7)	121 (16.9)	75 (16.3)	
Harmful level	61 (5.2)	42 (5.9)	19 (4.1)	
High risk	186 (15.8)	138 (19.3)	48 (10.4)	
Primary healthcare provider				
Yes	715 (60.6)	433 (60.3)	282 (61.2)	.7667
No	464 (39.4)	285 (39.7)	179 (38.8)	

Abbreviations: AUDIT, Alcohol Use Disorders Identification Test; DAST, Drug Abuse Screening Test; IQR = interquartile range; MCS, Mental Component Summary; PCS, Physical Component Summary; SD = standard deviation.

^aChronic health conditions include high blood pressure; heart disease, asthma; COPD (includes emphysema and chronic bronchitis); cirrhosis; Hepatitis B and C; intestinal or stomach ulcers; urinary incontinence; bowel disorders; arthritis; problems walking, lost limb or other physical disability; HIV/AIDS; epilepsy; fetal alcohol spectrum disorder; glaucoma; cataracts; cancer; diabetes; or anemia.

TABLE 2 *Healthcare utilization, legal incidents, and victimization in 1-year follow-up period of 968 homeless and vulnerably housed individuals with or without a history of traumatic brain injury*

Characteristic	Participants, n (%)	Participants with traumatic brain injury, n (%)		Unadjusted odds ratios	Adjusted odds ratio ^a
		Present	Absent		
Visited emergency department (ED) ^b					
Yes	474 (49.3)	324 (54.6)	148 (40.8)	1.75 (1.34, 2.28)	1.478 (1.113, 1.963)
No	488 (50.7)	269 (45.4)	215 (59.2)		
Frequent ED user ^{b,c}					
Yes	173 (18.0)	122 (20.6)	51 (14.1)	1.58 (1.11, 2.26)	1.418 (0.961, 2.092)
No	789 (82.0)	471 (79.4)	312 (86.0)		
Hospital admission ^d					
Yes	147 (15.3)	103 (17.3)	44 (12.1)	1.52 (1.04, 2.22)	1.502 (0.987, 2.287)
No	816 (84.7)	491 (82.7)	319 (87.9)		
Arrested and/or incarcerated ^e					
Yes	300 (31.1)	217 (36.5)	81 (22.3)	2.01 (1.49, 2.71)	1.791 (1.295, 2.477)
No	664 (68.9)	377 (63.5)	283 (77.8)		
Physical assault victim ^d					
Yes	277 (28.8)	224 (37.7)	53 (14.6)	3.52 (2.52, 4.92)	2.808 (1.957, 4.031)
No	686 (71.2)	371 (62.4)	309 (85.4)		
Sexual assault victim ^d					
Yes	63 (6.5)	45 (7.6)	17 (4.7)	1.66 (0.94, 2.95)	1.629 (0.860, 3.086)
No	900 (93.5)	550 (92.4)	345 (95.3)		

^aIn a multivariable model with adjustment for age, gender, city of recruitment, country of origin, ethnic background, highest level of education, lifetime years of homelessness, housing status (homeless vs vulnerably housed), SF-12 PCS and MCS scores, DAST score, AUDIT score, and having a primary care provider (see text for details on model-building procedure).

^bData missing for 6 participants.

^cFrequent ED users were defined as individuals who had visited the ED 3 or more times in the past 12 months.

^dData missing for 5 participants.

^eData missing for 4 participants.

DISCUSSION

This article presents the findings from one of the largest studies to date investigating TBI in homeless and vulnerably housed populations. Consistent with previous studies, there was a high prevalence of TBI (61%) among homeless and vulnerably housed individuals in the 3 Canadian cities. Lifetime prevalence of TBI in homeless and vulnerably housed participants was 7 times higher than that in the general population (8.5%).²⁰ A higher proportion of participants in Vancouver and Ottawa reported a history of TBI compared to participants in Toronto, but the reasons for this are unclear. Like previous studies,^{3,21} participants who had a history of TBI were more likely to be male and White, and were also more likely to have experienced more years of homelessness over their lifetime.

Participants with a history of TBI were more likely to be in poorer health. Specifically, those with a history of TBI were more likely to be living with a higher number of chronic health conditions and had lower SF-12 PCS and MCS scores. Although this association does not necessarily demonstrate a causal relation between TBI and poor health, these findings are consistent with studies that demonstrated a link between TBI and an increased risk of many health problems such as seizures, dementia, parkinsonism, and depression.^{22,23}

To the authors' knowledge, this is one of the first studies of its kind to investigate healthcare utilization in homeless and vulnerably housed populations with a history of TBI. At follow-up, those with a history of TBI were approximately 1.5 times more likely to have visited an ED than those without a history of TBI, even after adjusting for gender, health status, substance use, primary care access, and other potential confounders. This finding could potentially be attributed to long-term effects of the original TBI, as previous research suggests that use of healthcare services remains high for individuals who have sustained a TBI up to 5 years after the original injury.²⁴ Increased ED use by homeless and vulnerably housed individuals with a history of TBI could be due to acute injuries precipitated by impaired cognition and emotional responses,^{25,26} poorer health as a result of living with multiple chronic health conditions,¹¹ lack of access to primary care,²⁷ and decreased neurocognitive and executive functioning following TBI.²⁸

This study adds to a growing body of literature that has linked TBI with arrests and incarceration.⁸ Participants with a history of TBI were almost twice as likely to be arrested or incarcerated during the year following their baseline interview. The higher prevalence of arrests or incarcerations in the TBI subgroup could possibly be explained by impaired cognition and personality disturbances including increased emotional lability and aggression following TBI.^{6,26,29} Moreover, those with a

history of TBI may have experienced higher rates of legal incidents because of greater difficulties in navigating the criminal justice system. An alternate explanation for these findings is that certain risk-taking behaviors may increase the risk of both TBI and these adverse events. Participants with a history of TBI were almost 3 times more likely to have experienced a physical assault in the follow-up year. This result is consistent with a previous study, which suggested that individuals with a history of TBI were more likely to be victims of violent crime.¹⁰ To the authors' knowledge, this study is one of the first studies of its kind in homeless and vulnerably housed populations to suggest that sustaining a TBI is an independent risk factor for becoming a future victim of physical assault.

TBI is a very common but understudied event that is often overlooked in homeless and vulnerably housed populations.² Given the high costs of ED visits and societal burden of crime, these findings have important public health and criminal justice implications. Targeted efforts to screen for TBI and manage associated neuropsychological sequelae would help to improve health and social outcomes for these individuals and could potentially reduce the use of costly healthcare services, involvement with the legal system, and incidents of victimization.

LIMITATIONS

This study has several limitations. The study sample was limited to adults, and the sampling strategy may not have produced a group that is fully representative of the entire homeless and vulnerably housed populations. Data on TBI, healthcare utilization, and legal incidents were collected retrospectively by self-report, the accuracy of which may have been affected by cognitive impairment, memory lapses, or other sources of reporting bias. In addition, the full history, nature, and severity of TBI among participants were not fully ascertained. Adjusting for the most recent TBI and injury severity in the analysis would have likely revealed an even stronger association between a history of TBI and subsequent healthcare use, legal incidents, and victimization.

CONCLUSIONS

This study is one of the largest studies to investigate TBI in homeless and vulnerably housed individuals. There was a high prevalence of TBI in the sample compared with previously reported rates in the general population. Participants with a history of TBI were more likely to be living with other chronic health conditions and to have lower physical and mental health functioning. In the year following the baseline interview, participants with a history of TBI were also more likely to be

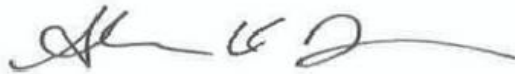
users of the ED, arrested or incarcerated, and victims of physical assault. These findings have implications for service providers to homeless and vulnerably housed persons and highlight the importance of screening and treatment for TBI, given that this subgroup is at particularly high risk for adverse outcomes that might be prevented. These findings also highlight the importance of longitudinal assessment of neurocognitive function and rehabilitation, given that these patients face numerous challenges and are especially at risk for poor outcomes.

Future studies should consider examining TBI in this population in more depth to determine the history and severity of TBI and corroborate findings with medical records. Additional analyses should be conducted to determine the factors associated with poorer health and increased healthcare utilization in participants with a history of TBI. Finally, analyses of data from a longer follow-up period would help to clarify associations between a history of TBI and subsequent healthcare utilization and legal incidents.

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This is Exhibit "E" referred to in
the Affidavit of Dr. Stephen Hwang of
the City of Toronto in the Province
of Ontario, sworn remotely
before me at the City of Waterloo
in the Province of Ontario on March 23, 2024.

A handwritten signature in black ink, appearing to read 'Shannon Down', written over a horizontal line.

Shannon Down
LSO#43894D



Traumatic brain injury in homeless and marginally housed individuals: a systematic review and meta-analysis

Jacob L Stubbs, Allen E Thornton, Jessica M Sevick, Noah D Silverberg, Alasdair M Barr, William G Honer, William J Panenka

Summary

Background Homelessness is a global public health concern, and traumatic brain injury (TBI) could represent an underappreciated factor in the health trajectories of homeless and marginally housed individuals. We aimed to evaluate the lifetime prevalence of TBI in this population, and to summarise findings on TBI incidence and the association between TBI and health-related or functioning-related outcomes.

Methods For this systematic review and meta-analysis, we searched without date restrictions for original research studies in English that reported data on the prevalence or incidence of TBI, or the association between TBI and one or more health-related or function-related outcome measures. Studies were included if they had a group or clearly identifiable subgroup of individuals who were homeless, marginally housed, or seeking services for homeless people. With use of random-effects models, we calculated pooled estimates of the lifetime prevalence of any severity of TBI and the lifetime prevalence of moderate or severe TBI. We used meta-regression to evaluate potential moderators of prevalence estimates and the leave-one-out method for sensitivity analyses. We then summarised findings from all studies that evaluated TBI incidence and the association between TBI and health-related or functioning-related outcomes. All statistical analyses were done using R version 3.5.1. The study is registered with PROSPERO, number CRD42019119678.

Findings Of 463 potentially eligible studies identified by the search, 38 studies were included in the systematic review and 26 studies were included in the meta-analysis. The lifetime prevalence of any severity of TBI in homeless and marginally housed individuals (21 studies, $n=11\,417$ individuals) was 53.4% (95% CI 47.6–59.1; $I^2=97\%$) and the lifetime prevalence of moderate or severe TBI (12 studies, $n=6302$) was 24.9% (16.3–35.9; $I^2=98\%$). The definition of TBI, the method used to ascertain TBI history, and the age of the sample significantly moderated estimated lifetime prevalence of any severity of TBI. TBI was consistently associated with poorer self-reported physical and mental health, higher suicidality and suicide risk, memory concerns, and increased health service use and criminal justice system involvement.

Interpretation The lifetime prevalence of TBI is high among homeless and marginally housed individuals, and a history of TBI is associated with poorer health and general functioning. Health-care providers and public health officials should have an increased awareness of the burden of TBI in this population. Prospective and longitudinal studies are needed to better understand how the health of this population is affected by TBI.

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Introduction

More than 6 million people experience homelessness annually in the USA and the EU.¹ Homeless individuals experience markedly poorer mental and physical health than the general population, including a high prevalence of psychotic disorders, major depression, and drug and alcohol dependence,² and a high prevalence of infectious diseases, including HIV, hepatitis C, and tuberculosis.³ Homeless and similarly marginalised individuals also have substantially higher all-cause mortality than the general population.⁴ Traumatic brain injury (TBI) is a pervasive and under-recognised public health problem.⁵ TBI is associated with a number of deleterious outcomes, with meta-analytic evidence providing a link for the subsequent development of neurological and psychiatric

disorders.⁶ TBI is often preventable, and thus might represent a modifiable risk factor for serious psychiatric illness and neurodegenerative disease.

Obtaining reliable estimates of TBI incidence and lifetime prevalence in the homeless and marginally housed population, as well as in the general population, has been challenging. Reported incidence of TBI varies widely across counties,⁵ and the methods of sampling participants and defining TBI cases differ between reports. Considerably higher rates of TBI have been reported in population-based studies that capture injuries for which medical attention is not sought,^{7,8} as compared with studies that gather data from medical records or emergency departments.^{9,10} Additional sources of bias also exist, including in the common definitions of TBI,⁵

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Research in context

Evidence before this study

Previous studies and a previous systematic review have suggested that the lifetime prevalence and incidence of TBI might be considerably higher in homeless and marginally housed individuals than in the general population. Moreover, many of these studies report that TBI is associated with poorer health or functioning in these individuals. Marked methodological variation exists among previous studies, including in the tools used to ascertain a history of TBI, in the study-specific definitions of TBI, and in the outcome measures assessed. This variation limits our understanding of the prevalence, incidence, and impact of TBI in this population. To date, no meta-analyses have been done to evaluate the prevalence of TBI in homeless and marginally housed individuals, nor have any quantitative analyses of heterogeneity among previous studies been done. In preparation for this review, we did systematic searches in MEDLINE, Embase, PsycINFO, CINAHL, and Web of Science for studies that evaluated TBI in homeless or marginally housed study samples. Specific database search terms are outlined in the appendix. Studies were eligible for inclusion if they evaluated the prevalence or incidence of TBI, or the association between TBI and health-related or functioning-related outcome measures, and they were original peer-reviewed studies in the English language. No date restrictions were applied.

Added value of this study

To our knowledge, this is the first meta-analysis to evaluate the prevalence of TBI in homeless and marginally housed individuals and the first quantitative assessment of

heterogeneity among studies that assess TBI in this population. We show that homeless and marginally housed individuals experience a high lifetime prevalence of TBI, and notably, a lifetime prevalence of moderate or severe TBI that is approximately ten-times higher than estimates in the general population. We found high heterogeneity among studies and our meta-regression analyses identified several factors that moderated individual study findings. Our review also found that TBI is associated with poorer self-reported health, higher suicidality and suicide risk, increased health service use, and increased criminal justice system involvement.

Implications of all the available evidence

TBI is a pervasive and largely under-recognised factor associated with the poorer health and functioning experienced by homeless and marginally housed populations. Our findings suggest that health-care providers who work with these individuals should be aware of the high prevalence of TBI and associated effects on health and functioning. Additionally, given the high prevalence of moderate or severe TBI, and the considerable number of individuals with evidence of traumatically-induced lesions visible with MRI, the threshold for referral to neuroimaging specialists after head injury should be reduced in this population. Further research is urgently needed to address limitations to our understanding of the burden of TBI in at-risk and multimorbid populations. However, in light of the significant moderating factors that we identified, future studies should carefully consider and clearly describe all aspects of study design to maximise validity and clinical relevance.

and sampling or referral biases. Similarly, the method for ascertaining history of TBI has not been unanimously agreed upon and estimates of the lifetime prevalence of TBI vary considerably. Meta-analytic work has found that 12% of the general population reported at least one TBI over the lifespan.¹¹ A 2018 state-wide study in Ohio, USA, which used a modified version of the comprehensive Ohio State University TBI ascertainment method (a short, structured interview based on the Centers for Disease Control definition of TBI and endorsed by the National Institute of Neurological Disorders and Stroke),¹² found an estimated lifetime prevalence of TBI of 21.7% in the general population, and a lifetime prevalence of moderate or severe TBI of 2.6%.⁸ Although several tools designed to ascertain TBI history are available (eg, the Ohio State University TBI ascertainment method¹³ and the Brain Injury Screening Questionnaire¹⁴), these methods have been inconsistently used in studies of homeless and marginally housed individuals.

A previous systematic review that summarised eight studies published between 1996 and 2012 found that estimates of the lifetime prevalence of TBI in homeless populations ranged from 8% to 53%.¹⁵ The most commonly identified methodological limitations included

poor external validity and reporting of power calculations. The authors also noted that TBI was not a primary aim for the majority of studies, and that important factors, such as symptom burden and injury severity, were rarely evaluated. Only three studies identified by the previous review evaluated severity of TBI, precluding systematic evaluation of the effects of more clinically significant brain injuries. The authors concluded that there were considerable methodological limitations and heterogeneity across available studies, and that a strong need existed for larger studies with validated and comprehensive measures, and longitudinal designs.¹⁵ In subsequent years, as the potential importance of TBI in these vulnerable individuals has become increasingly recognised, a number of larger and more comprehensive studies have been published. Several of these more recent studies have specifically examined the impact of moderate or severe TBI in this population, and several have addressed other limitations highlighted by the previous review. However, to the best of our knowledge, no meta-analytic estimates of TBI prevalence in homeless or marginally housed individuals have been reported, nor has there been a comprehensive review of the association between TBI and health or functioning (eg, neurocognitive

function or day-to-day functioning, such as employment) in these individuals.

Evaluating the prevalence and burden of TBI in individuals who are homeless or marginally housed is critical to understanding the unique challenges and health-care needs of this population. Furthermore, identifying factors that contribute to heterogeneity across studies is integral to establishing standardised approaches for future research and in finding targets for the prevention of TBI and treatment of its sequelae in this population. In this study, we aimed to estimate the lifetime prevalence of TBI in homeless and marginally housed individuals, to quantitatively evaluate factors that moderate estimates of prevalence, and to systematically review the association between TBI and health and functioning-related outcome measures in this population.

Methods

Search strategy and selection criteria

We did a systematic review and meta-analysis following the PRISMA and MOOSE guidelines.^{16,17} Studies were included in the review if they had a sample that exclusively comprised individuals of any age who were homeless, marginally housed, or seeking services for homeless people at the time of assessment (or if there was a clearly identifiable subgroup of individuals who were homeless, marginally housed, or seeking services for homeless people at the time of assessment and data was able to be extracted for this subgroup), and if they examined the prevalence of TBI, the incidence of TBI, or the association between TBI and one or more health-related or functioning-related outcome measures. Our definition of functioning was deliberately broad to evaluate the full scope of the effects of TBI in this population, and was considered to be any non-health-related outcome measure or any outcome related to day-to-day functioning in society (eg, neurocognition or involvement in the criminal justice system). Studies were excluded from the review if they were not published in English, were not peer-reviewed, or were not original research studies with unique observational data (ie, reviews or meta-analyses).

The decision to conduct a meta-analysis was made after doing the literature search to ensure that a sufficient number of studies were available that had recorded lifetime prevalence of TBI. Studies were excluded from the meta-analysis if they did not have prevalence data that could be extracted or obtained through corresponding authors, had a sample size smaller than 25, or if they were judged to be from the same study sample as another study included in the analysis by consensus of two study authors (JLS and WJP). For studies that were identifiably from the same study sample, we included the study with the largest sample size in the meta-analysis.

We did a systematic search without date restrictions in MEDLINE, Embase, PsycINFO, CINAHL, and Web of Science using a search strategy developed in conjunction

with a librarian specialising in systematic review searches. The search strategy was piloted in MEDLINE by iteratively adding and refining relevant search terms and by ensuring that the included search terms returned studies we knew to exist on this topic. Our search strategy was consistent across all databases, and the strategy used in MEDLINE (Ovid interface) is reported in the appendix (p 1). Manual forward and backward reference searching was done on studies of particular importance in the opinion of JLS and WJP and on the previous review on this topic.¹⁵ Searches of all databases and retrieval of results from each database were done on Dec 14, 2018, with no date restrictions.

Screening of titles and abstracts of all records returned by the search strategy, screening of full texts eligible for inclusion, and the risk of bias assessment for included studies were independently conducted by two study authors (JLS and JMS). Inter-rater reliability for both the title and abstract and full text screening was calculated using Cohen's κ . Risk of bias for individual studies was assessed using the US National Heart, Lung, and Blood Institute's Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies.¹⁸ Discrepancies were resolved through discussion between study authors to reach a consensus, or with a third study author (WJP) if necessary.

The protocol for our systematic review was registered in the PROSPERO database (CRD42019119678).

Data analysis

All variables of interest were independently extracted by two study authors (JLS and JMS) using a customised form. The form was piloted and refined on ten of the studies selected for inclusion. All extracted variables are described in the appendix (p 2).

For studies included in the meta-analysis, we quantitatively evaluated several potential moderators of estimated prevalence of TBI. First, we evaluated whether the measure of central tendency of age of the sample (subsequently referred to as age of the sample) or the total sample size was associated with estimated prevalence. Second, we assessed whether the method of ascertaining TBI history moderated estimated prevalence by stratifying TBI ascertainment methods into five categories: (1) a non-specific self-report question or series of questions to ascertain TBI; (2) medical record; (3) questionnaire or screening tool specifically designed to ascertain TBI; (4) structured interview designed to ascertain TBI; and (5) other ascertainment method. Third, we evaluated whether studies that used self-reported loss of consciousness as a minimum criterion for defining TBI, as opposed to a more liberal definition (eg, self-report of a period of being dazed or confused), were associated with lower estimated prevalence. Finally, we evaluated whether the site of participant recruitment—stratified into studies that recruited participants from a shelter or hostel versus studies that recruited participants from a service or clinic

See Online for appendix

For the study protocol see https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=119678

for homeless individuals—was associated with different estimates of prevalence.

We did two separate analyses to evaluate the lifetime prevalence of TBI. The first aimed to measure the overall lifetime prevalence of TBI, encompassing all levels of severity, and including studies that did not stratify by severity. The second aimed to measure the lifetime prevalence of moderate or severe TBI, encompassing studies that stratified participants into moderate or severe TBI categories, studies that examined only moderate or severe TBI, or studies that assessed TBI without explicitly defining severity but which we deemed were predominantly focused on more significant brain injury. We deemed that two studies that did not explicitly evaluate TBI severity focused predominantly on moderate or severe TBI; one study assessed “definite TBI” on the basis of MRI evidence and persistent sequelae attributable to the TBI,¹⁹ and the other study defined TBI as brain injury resulting in lasting impairment or contributing to disability.²⁰ Therefore, we evaluated two studies alongside others that explicitly examined moderate or severe TBI. We used random-effects models for each analysis to calculate a pooled estimate of prevalence, with the Clopper-Pearson method used to generate 95% CIs for individual studies and the inverse variance method to weight each study. We also calculated 95% prediction intervals (PIs) for our summary estimates to provide a range for the predicted estimate of prevalence for new studies.²¹

Heterogeneity between studies was quantified with the I^2 statistic.²² For studies that did not report age of the sample, and for which these data could not be obtained from the corresponding author ($n=2$), we imputed the weighted mean age of participants from all other studies that were included in the analysis. We conducted sensitivity analyses using the leave-one-out method. We evaluated small-study effects visually with a funnel plot and statistically with Egger’s test.²³

Finally, we used subgroup analysis and meta-regression to evaluate moderators of individual study estimates of the lifetime prevalence of TBI. We used univariable meta-regression to evaluate unadjusted effects in the analyses of lifetime prevalence and the lifetime prevalence of moderate or severe TBI, and we included all potential moderators in a multivariable meta-regression to evaluate adjusted effects in the analysis of lifetime prevalence. We used mixed effects models for all meta-regression analyses.

All statistical analyses were performed in R (version 3.5.1) with the packages meta (version 4.9-4) and metafor (version 2.0-0).^{24–26}

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had

final responsibility for the decision to submit for publication.

Results

Our database searches identified 463 potentially eligible studies. After removal of duplicates, 260 study titles and abstracts were screened (figure 1). We assessed 51 full text articles for eligibility, of which 13 were excluded from the systematic review (appendix p 1) and an additional 12 were excluded from the meta-analysis. There was a high inter-rater reliability for screening titles and abstracts ($\kappa=0.95$) and full texts ($\kappa=0.96$).

38 studies were included in the systematic review (table 1).^{19,20,27–62} The included studies were published between 1995 and 2018, and recruited participants from Australia, Canada, Japan, South Korea, the UK, and the USA. The predominant recruitment settings were through homeless shelters or hostels (18 studies) and services or clinics that serve homeless populations (16 studies). Six (16%) of 38 studies were conducted in populations of military service members who were homeless or seeking services for homeless people, and the remainder of studies recruited participants from civilian populations. Of the 38 studies included in the systematic review, we included 26 in the meta-analysis (figure 1). 21 (81%) of 26 studies ($n=11417$) assessed the lifetime prevalence of TBI, and 12 (46%, $n=6302$) assessed the lifetime prevalence of moderate or severe TBI.

The risk of bias assessment for all studies included in the systematic review is shown in the appendix (pp 2, 3). In general, studies had a clear research objective, recruited participants from similar populations, and clearly described dependent variables. However, 17 (45%) of 38 studies did not provide a clear definition of homelessness or marginal housing, and 23 (61%) did not report whether the participation rate of eligible persons was more than 50%. Of note, 20 (53%) of 38 studies did not clearly describe the specific definition used to categorise participants as having TBI. Studies were generally comprised of predominantly male samples, and eight studies were comprised of exclusively male samples.

The overall pooled estimate of the lifetime prevalence of TBI was 53.4% (95% CI 47.6–59.1, 95% PI 27.8–77.2; figure 2). There was a significant amount of heterogeneity between studies ($I^2=97%$, $p<0.0001$). The funnel plot is reported in the appendix (p 4) and did not show evidence of small-study effects, which was supported by Egger’s test ($p=0.86$). The results of the leave-one-out sensitivity analyses are reported in the appendix (p 5), and show that no single study, nor the studies for which we imputed mean age, had a disproportionate effect on the pooled estimate of prevalence of TBI.

The results from our univariable and multivariable meta-regression analyses are reported in table 2, with raw coefficients reported in the appendix (p 6). The overall multivariable meta-regression model was significant and

accounted for 68.3% of the heterogeneity ($Q_3=64.04$, $p<0.0001$, $R^2=0.683$). Studies that used loss of consciousness as a minimum criterion for defining TBI ($p=0.014$) and used a screening tool to ascertain history of TBI ($p=0.0041$) were associated with lower estimated TBI prevalence. The age of the study sample ($p=0.0011$), total sample size ($p=0.028$), and using a structured interview (vs a single question or series of questions) to ascertain history of TBI ($p=0.0012$) were associated with higher estimated prevalence. Individual study and pooled estimates of lifetime TBI prevalence stratified by TBI ascertainment method and by whether or not studies used TBI as a minimum criterion for defining TBI are shown in the appendix (pp 7, 8). Heterogeneity among studies that ascertained history of TBI using structured interviews ($I^2=95\%$) and screening tools ($I^2=87\%$) was high, although it was lower than the heterogeneity observed across all studies ($I^2=97\%$). Studies that used loss of consciousness as a minimum criterion for defining TBI had non-significant between-study heterogeneity ($I^2=37\%$, $p=0.17$).

The pooled estimate of the lifetime prevalence of moderate or severe TBI was 24.9% (95% CI 16.3–35.9, 95% PI 4.2–71.7; figure 2). There was high heterogeneity between studies ($I^2=98\%$, $p<0.0001$). The funnel plot is reported in the appendix (p 9) and did not show evidence of small-study effects upon visual inspection; Egger's test showed no asymmetry ($p=0.67$). The leave-one-out sensitivity analyses are reported in the appendix (p 10), and show that no single study, nor the studies that did not explicitly evaluate severity but which we deemed to be focused predominantly on moderate or severe TBI, had a disproportionate effect on the pooled estimate of lifetime prevalence of moderate or severe TBI. None of the moderators (as previously described for overall lifetime prevalence of TBI) were statistically significantly associated with estimated prevalence of moderate or severe TBI in univariable meta-regression analyses.

In this review, 28 (74%) of 38 studies assessed the association between a history of TBI and health-related or functioning-related outcomes. A summary of results is reported in the panel, and a study-level breakdown of results is presented in the appendix (pp 10–13). The association between TBI and many outcome measures was equivocal, whereby findings were either mixed or the outcome was evaluated by only a small number of studies. However, despite the heterogeneity in study methodology and outcomes assessed, history of TBI was consistently associated with poorer self-reported physical^{39,53,58} and mental health,^{39,53,58} increased health service use^{43,58,60} and criminal justice involvement,^{43,53,58–60} and younger age at first experience of homelessness^{39,43,58} in all studies that evaluated TBI and these outcomes. Furthermore, history of TBI was associated with suicidal ideation and higher suicide risk^{31,43,49,51,60} in five of six studies⁵³ that evaluated suicidality, and self-reported memory concerns^{35,38,43,53,61} in five of six studies³⁴ that evaluated memory concerns. The most common mechanism of injury was assault

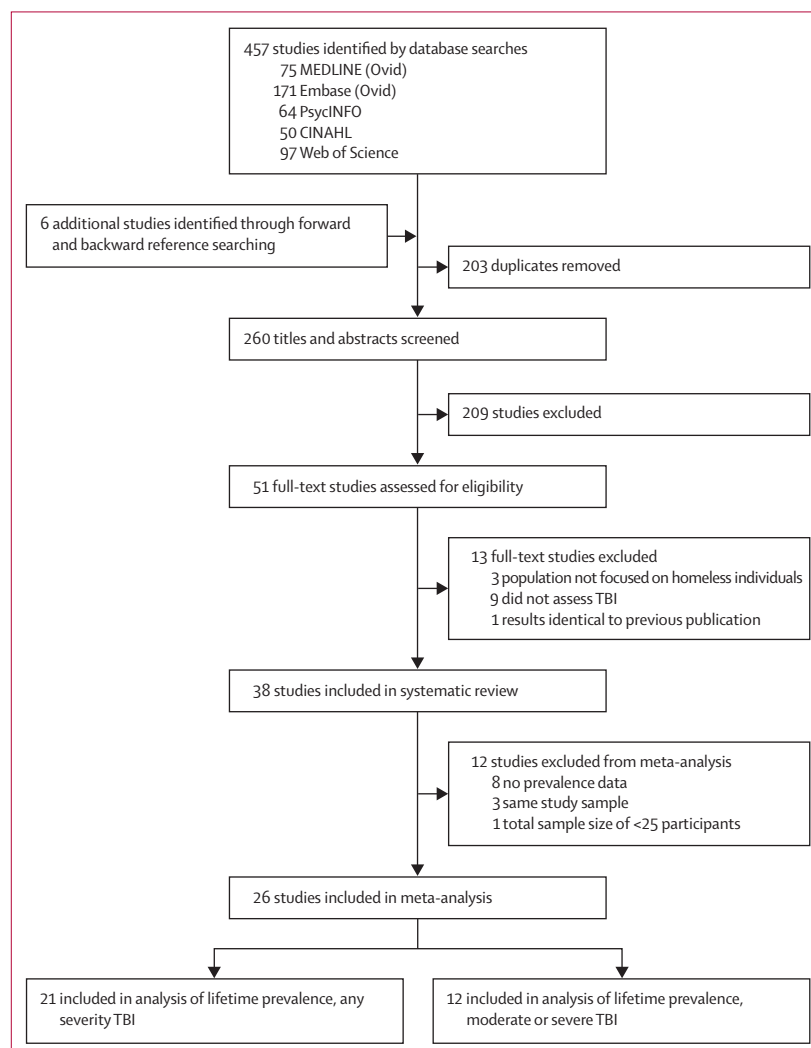


Figure 1: Study selection

TBI=traumatic brain injury.

across all five studies that evaluated mechanism of injury.^{29,33,35,53,59} Age at first TBI ranged from 15 years to 19.9 years, and we calculated a weighted mean age of first TBI of 15.8 years. In one large marginally housed cohort who underwent MRI scans, 28.0% of participants had incidental neuroimaging findings (eg, aneurysms or infarcts), with 6.9% in a largely overlapping sample showing evidence of previous brain trauma.^{19,53}

Only five studies included in this review assessed incident TBI, precluding a methodologically robust meta-analysis of the incidence of TBI in this population. Estimated incidence of TBI in homeless and marginally housed individuals varied considerably between studies and ranged from 0.5% over 1 year⁴² to 28.8% over 1 year.⁵⁶ Although we did not quantitatively assess moderators of these estimates, TBI ascertainment method appeared to be associated with estimated incidence. For example,

Author(s) (Year)	Country	Study design	Population description			Lifetime prevalence of TBI			Incidence of TBI	TBI ascertainment method
			Setting	Sample size	Age, years*	Female, n/N (%)	Any severity, n/N (%)	Moderate or severe, n/N (%)		
Andersen et al (2014) ^{27,†}	Canada	Cross-sectional	Shelter for homeless men	34	58.8	0/34	12/34 (35.3%)	11/34 (32.4%)	..	Questionnaire or screening tool: Brain Injury Screening Questionnaire
Bacciardi et al (2017) ^{34,†}	Canada	Cross-sectional	Community agencies that serve homeless individuals (shelters, drop-in centres, outreach teams, inpatient programmes, and criminal justice programmes)	416	39.9	117/416 (28.1%)	277/416 (66.6%)	108/198 (54.5%)	..	Single question or series of questions: "Have you ever had an injury to the head which knocked you out or at least left you dazed, confused, or disoriented?"
Barnes et al (2015) ¹⁹	USA	Cross-sectional	VA service clinics for veterans seeking homeless services	229	51.8	9/229 (3.9%)	207/229 (90.4%)	63/229 (27.5%)	..	Structured interview: OSU TBI-ID
Bremner et al (1996) ^{39,†}	UK	Cross-sectional	Hostel for homeless men	62	NR	0/62	29/62 (46.8%)	..	..	Single question or series of questions: specific questions NR
Brenner et al (2017) ^{31,†}	USA	Cross-sectional	VA service clinics for veterans seeking homeless services	309	52.3	11/309 (3.6%)	282/309 (91.3%)	90/309 (29.1%)	..	Structured interview: OSU TBI-ID
Brown et al (2013) ^{33,†}	USA	Cross-sectional	Emergency, transitional, and day shelters	250	56.2	48/250 (19.2%)	147/250 (58.8%)	..	..	Single question or series of questions: "Have you ever had an injury to the head which knocked you out or at least left you dazed, confused, or disoriented?"
Bymaster et al (2017) ^{33,††}	USA	Cross-sectional	Health care clinic sites for a US county homeless programme	127	48	40/127 (31.5%)	97/127 (76.4%)	38/127 (29.9%)	..	Structured interview: OSU TBI-ID
Cotman et al (1997) ³⁴	USA	Pre-test/post-test	Residential programme to assist recovery from homelessness	24	30.6	11/24 (45.8%)	2/24 (8.3%)	..	..	Other: NR
Garqato et al (2016) ^{35,†}	Canada	Cross-sectional	Clients seeking support from an Assertive Community Treatment Team in a downtown urban setting	48	43.4	15/48 (31.3%)	27/48 (56.3%)	..	..	Structured interview: OSU TBI-ID
Gonzalez et al (2001) ^{38,†}	USA	Cross-sectional	Health care clinic associated with community shelter and outreach programme for homeless individuals	60	39.8	24/60 (40.0%)	23/60 (38.3%)	..	..	Single question or series of questions: documented instance of LOC or patient self-report of serious blow to the head or LOC; specific questions NR
Hurstak et al (2017) ^{37,†}	USA	Cross-sectional	Overnight shelters, homeless encampments, meal programmes, and recycling centres	343	58	79/343 (23.0%)	149/343 (43.4%)	..	..	Single question or series of questions: participants asked to report the number of lifetime head traumas they had experienced, and detailed information was collected for up to three instances that resulted in LOC or hospitalisation; specific questions NR
Hux et al (2009) ^{3†}	USA	Cross-sectional	Homeless shelters and domestic violence facility	282	34.8	248/282 (87.9%)	69/282 (24.5%)	..	..	Questionnaire or screening tool: HELPS screening tool
Hwang et al (2008) ^{39,††}	Canada	Cross-sectional	Shelters and meal programmes	904	37.4	303/904 (33.5%)	475/904 (52.5%)	109/904 (12.1%)	..	Single question or series of questions: "Have you ever had an injury to the head which knocked you out or at least left you dazed, confused, or disoriented?"; additional injury details for up to three injuries were collected
Kim et al (2007) ⁴⁰	South Korea	Retrospective case-control	Hospital neurosurgical department	76	53% were >50	5/76 (6.6%)	..	49/76 (64.5%)	..	Medical record
Kozloff et al (2016) ^{41,†}	Canada	Cross-sectional	Community agencies that serve homeless individuals (shelters, drop-in centres, outreach teams, inpatient programmes, and criminal justice programmes) in five Canadian cities	2255	40.9	730/2255 (32.4%)	1475/2255 (65.4%)	..	..	Single question or series of questions: "Have you ever had an injury to the head which knocked you out or at least left you dazed, confused, or disoriented?"

(Table 1 continues on next page)

Country	Study design	Population description	Lifetime prevalence of TBI				Incidence of TBI	TBI ascertainment method
			Sample size	Age, years*	Female, n/N (%)	Any severity, n/N (%)			Moderate or severe, n/N (%)
(Continued from previous page)								
USA	Retrospective case-control	VA North Texas Health Care System	2205	53.6	121/2205 (5.5%)	..	0.5% over 1 year	Medical record: ICD-9 codes
USA	Cross-sectional	Homeless shelters, drop-in centres, domestic violence shelters, streets	2732	21.8	1730/2732 (63.3%)	1175/2732 (43.0%)	..	Single question or series of questions: "Have you ever been hit in the head so hard that you saw stars or were knocked unconscious—for example, from a blow, a fall, or a motor vehicle accident?" and "After your head injury, did you start having problems with headaches, concentration or memory, understanding, excessive worry, sleeping, or getting along with people?"
UK	Retrospective case-control	Hospital admissions records	7830 hospital admissions in 2010–11	38.7 over the study period	20% over study period	..	2.1% of hospital admissions (2010–11) in the homeless group were for head injury	Medical record: National Health Service hospital episode statistics in England
UK	Retrospective case-control	Hostels and other designated accommodations for homeless individuals	1590	40.5	347/1590 (21.8%)	..	13.5% over 30 years	Medical record: ICD-9 and ICD-10 codes
USA	Retrospective case-control	Veterans Health Administration clinical and administrative systems	11 909	NR	NR	..	..	Medical record
Australia	Retrospective chart review	Mental health clinics in three hostels for homeless individuals	2388	42.3	156/2388 (6.5%)	..	345/2388 (14.4%)	Medical record
Canada	Cross-sectional	Emergency shelters and streets	500	37.9	200/500 (40.0%)	318/500 (63.6%)	..	Single question or series of questions: specific questions NR
Canada	Prospective longitudinal	Shelters, meal programmes, community health centre, and drop-in centres in three Canadian cities	1190	42.2	385/1190 (32.4%)	718/1190 (60.3%)	19.4% at 1-year follow-up; 17.1% at 2-year follow-up; 17.9% at 3-year follow-up	Single question or series of questions: "Have you ever had an injury to the head which knocked you out or at least left you dazed, confused, or disoriented?"
Canada	Prospective longitudinal	Community agencies that serve homeless individuals (shelters, drop-in centres, outreach teams, inpatient programmes, and criminal justice programmes) in five Canadian cities	497	40.8	138/497 (27.8%)	..	..	Single question or series of questions: "Have you ever had an injury to the head which knocked you out or at least left you dazed, confused, or disoriented?"
UK	Cross-sectional	Dry hostels, wet hostels, and day centres for homeless individuals	100	32.7	25/100 (25.0%)	48/100 (48.0%)	12/65 (18.5%)	Single question or series of questions: "Have you ever had an injury to the head which knocked you out or at least left you dazed, confused, or disoriented?", with additional questions regarding the number of injuries, LOC and whether participants went to the hospital for the first three injuries

(Table 1 continues on next page)

Country	Study design	Population description	Lifetime prevalence of TBI			Incidence of TBI	TBI ascertainment method		
			Sample size	Age, years*	Female, n/N (%)			Any severity, n/N (%)	Moderate or severe, n/N (%)
(Continued from previous page)									
Palladino et al (2017) ⁵¹	USA	Cross-sectional	Homeless outreach services, including a VA medical centre and drop-in centre for veterans experiencing homelessness	103	53.7	0/103	..	..	Structured interview and questionnaire or screening tool: OSU TBI-ID and TBI-4 tools
Russell et al (2013) ^{52†}	USA	Cross-sectional	Metropolitan VA hospital	678	51.9	36/678 (5.3%)	285/313 (91.1%)	..	Structured interview and questionnaire or screening tool: OSU TBI-ID and TBI-4†
Schmitt et al (2017) ^{53††}	Canada	Cross-sectional	Single-room occupancy hotel rooms and downtown community court	283	43.5	47/205 (22.9%)	100/283 (35.3%)	49/283 (17.3%)	Single question or series of questions: "Have you ever had a serious head/face injury?", with additional questions regarding LOC, confusion, or memory loss post injury
Soliday-McRoy et al (2004) ^{54†††}	USA	Cross-sectional	Homeless shelter	90	41	0/90	43/90 (47.8%)	16/90 (17.8%)	Other: NR
Song et al (2018) ^{55†}	Canada	Cross-sectional	Shelters, homeless outreach services, and streets in three Canadian cities	500	38	200/500 (40.0%)	318/500 (63.6%)	..	Single question or series of questions: "Have you ever had an injury to the head which knocked you out or at least left you dazed, confused, or disoriented?"
Stergiopoulos et al (2015) ^{56,4}	Canada	Cross-sectional	Community agencies that serve homeless individuals (shelters, drop-in centres, outreach teams, inpatient programmes, and criminal justice programmes) in five Canadian cities	1500	41.1	477/1500 (31.8%)	..	688/1500 (45.9%)	Single question or series of questions: specific questions NR
Svoboda and Ramsay (2014) ⁵⁷	Canada	Retrospective cohort	Wet shelter programme, hostel for homeless individuals, and three low-income housing sites	170	43.7	0/170	..	..	Medical record: broad criteria to capture "head injury"
To et al (2015) ^{58,†}	Canada	Prospective longitudinal	Shelters and meal programmes for homeless individuals	1181	43	381/1181 (32.3%)	718/1181 (60.8%)	..	Single question or series of questions: "Have you ever had an injury to the head which knocked you out or at least left you dazed, confused, or disoriented?"
Topolovec-Vranic et al (2014) ^{59†††}	Canada	Cross-sectional	Shelter for homeless men	111	54.2	0/111	5/111 (4.5%)	46/111 (41.4%)	Questionnaire or screening tool: Brain Injury Screening Questionnaire
Topolovec-Vranic et al (2017) ⁶⁰	Canada	Cross-sectional	Community agencies that serve homeless individuals (shelters, drop-in centres, outreach teams, inpatient programmes, criminal justice programmes) in five Canadian cities	2088	40.9	657/2088 (31.5%)	1098/2088 (52.6%)	..	Single question or series of questions: "Have you ever had an injury to the head which knocked you out or at least left you dazed, confused, or disoriented?", "Were you, in fact, knocked out or unconscious after this (or any of these if more than 1 head injury(ies))?", and "About how long were you unconscious or knocked out after this head injury (if 1)/these head injuries (if >1)?", with additional questions regarding the length of LOC for up to five injuries

(Table 1 continues on next page)

Country	Study design	Population description		Lifetme prevalence of TBI			Incidence of TBI	TBI ascertainment method
		Setting	Sample size	Age, years*	Female, n/N (%)	Any severity, n/N (%)			Moderate or severe, n/N (%)
(Continued from previous page)								
Vila-Rodriguez et al (2013) ^{39,†}	Prospective longitudinal	Canada	293	44.1	68/293 (23.2%)	..	31/293 (10.6%)	Other: evidence of previous TBI on MRI or history of TBI (LOC for ≥5 min or confusion for ≥1 day) and persistent symptoms referable to TBI, including seizures or organic personality disorder
Zieman et al (2017) ⁶¹	Retrospective chart review	USA	115	37.9	109/115 (94.8%)	..	..	Questionnaire or screening tool: HELPS screening tool
Zlotnick et al (1995) ^{62,†}	Cross-sectional	USA	52	60% were >25	0/52	21/52 (40.4%)	..	Single question or series of questions: specific questions NR

TBI=traumatic brain injury. VA=US Department of Veterans Affairs. OSU TBI-ID=Ohio State TBI identification method. NR=not reported. LOC=loss of consciousness. ICD=International Classification of Diseases. * Measure of central tendency (mean or median), unless otherwise stated. †Included in meta-analysis of lifetime prevalence. ‡Included in meta-analysis of lifetime prevalence of moderate or severe TBI. §21.8 (52.4%) of 416 participants were missing data on severe TBI. ¶Prevalence estimate from the OSU TBI-ID (n=313) used in meta-analysis.

Table 1: Summary of included studies

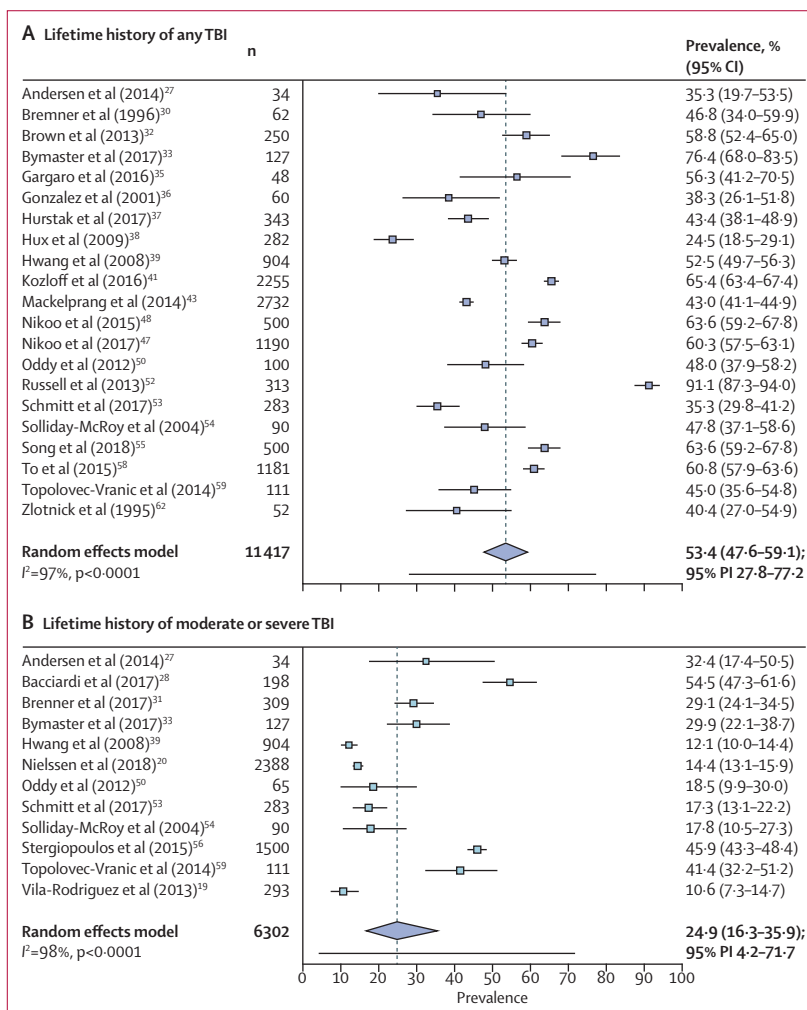


Figure 2: Forest plots of prevalence estimates for any severity of TBI and for moderate or severe TBI. Box size for each study is based on the weight for random-effects analysis, calculated using the inverse of the variance. TBI=traumatic brain injury. PI=prediction interval.

Nikoo and colleagues⁴⁸ did a comprehensive baseline interview with each participant and assessed incident TBI at yearly follow-up interviews, and found that 17.1–19.4% of participants sustained TBI per year.⁴⁸ By contrast, LePage and colleagues⁴² and McMillan and colleagues⁴⁵ used ICD-9 codes, ICD-10 codes, or both to ascertain TBI.^{42,45} LePage and colleagues found that 0.5% of participants sustained TBI over 1 year, and McMillan and colleagues found that 13.5% of participants sustained TBI over the 30-year study period (approximately 0.5% per year). A study-level summary of results from studies evaluating incidence of TBI is presented in the appendix (p 14). Homelessness was associated with a higher incidence of TBI in comparison with non-homeless control groups.^{42,44,45,57} Similarly, residential instability was associated with a higher incidence of TBI.⁴⁸ Lifetime history of TBI, receiving a TBI in the previous year, mental health diagnoses and

	Studies	Participants	Estimated prevalence, % (95% CI)	Heterogeneity		Change in estimated prevalence from univariable meta-regression analyses*		Change in estimated prevalence from multivariable meta-regression analysis*	
				I ²	p value	Change, % (95% CI)	p value	Change, % (95% CI)	p value
Measure of central tendency of age for the study sample	21	11 417	53.4% (47.6–59.1)	97%	<0.0001	-1.0% (-4.0 to 2.3)	0.16	1.7% (0.7 to 2.8)	0.0011
Sample size	21	11 417	53.4% (47.6–59.1)	97%	<0.0001	1.1 × 10 ⁻² % (-1.0 × 10 ⁻² to 3.2 × 10 ⁻²)	0.33	1.6 × 10 ⁻² % (5.6 × 10 ⁻⁵ to 2.6 × 10 ⁻²)	0.028
LOC as minimum criterion for defining TBI									
No	16	10 558	56.9% (50.4–63.3)	97%	<0.0001	Reference	..	Reference	..
Yes	5	859	41.2% (36.7–45.7)	37%	0.17	-33.1% (-61.5 to -4.6)	0.023	-26.5% (-47.5 to -5.4)	0.014
Site of study recruitment									
Service or clinic	14	8 062	64.9% (54.1–74.3)	95%	<0.0001	Reference	..	Reference	..
Shelter or hostel	7	3 355	47.9% (42.0–53.8)	96%	<0.0001	-38.1% (-62.1 to -14.2)	0.0018	-8.7% (-29.2 to 11.8)	0.092
TBI ascertainment method									
Single question or series of questions	15	10 502	51.9% (46.3–57.5)	96%	<0.0001	Reference	..	Reference	..
Screening tool	3	427	34.2% (21.0–50.3)	87%	<0.0001	-49.0% (-83.8 to -14.1)	0.0059	-39.0% (-64.2 to -13.8)	0.0041
Structured interview	3	488	78.0% (53.4–91.6)	95%	<0.0001	71.4% (37.2 to 100.0)	<0.0001	46.8% (15.9 to 77.8)	0.0012

LOC=loss of consciousness. TBI=traumatic brain injury. *For a one-unit change in the predictor variable.

Table 2: Meta-regression results evaluating potential moderators of estimated lifetime TBI prevalence

poorer mental health, drug and alcohol misuse, and younger age were also associated with incident TBI over a 1-year period.^{48,57}

Discussion

The results of our systematic review and meta-analysis suggest that more than half of homeless and marginally housed individuals have a lifetime history of TBI, and that almost a quarter have a history of moderate or severe TBI. Thus, the lifetime prevalence of TBI in homeless and marginally housed individuals is between 2.5-times and 4.0-times higher than estimates in the general population.^{8,11} Moreover, the lifetime prevalence of moderate or severe TBI in this population is nearly ten-times higher than estimates in the general population.⁸ We also found that TBI was associated with increased suicidal ideation and suicide risk, poorer self-reported physical and mental health, and increased health service and criminal justice system involvement. However, heterogeneity across estimates limits our ability to establish the true prevalence of TBI in this population.

We identified high statistical heterogeneity and considerable methodological limitations across many of the included studies, which hinders a clear understanding of the magnitude of the impact of TBI in this population. This heterogeneity can be attributed in part to the age of

the study sample, because study samples with a higher proportion of older individuals evaluate individuals with a longer time at risk of TBI. This heterogeneity is also explained in part by study design factors (ie, the definition of TBI and the tool used to ascertain TBI history), which reflects that standardised and reproducible research methods were not always used in previous studies on this topic. Studies that used loss of consciousness as a minimum criterion for defining TBI had non-significant between-study heterogeneity, suggesting that this method could be a reproducible approach to studying TBI in this population. However, excluding individuals with a head injury and alteration (but not loss) of consciousness would miss approximately 80% of all injuries considered to be TBIs by commonly used definitions.^{5,63,64} Notably, the use of structured interviews (eg, OSU TBI-ID) to ascertain TBI history was associated with an estimated prevalence that was more than 40% higher than in studies that used a single question. Although they have inherent limitations, clinical interviews such as the OSU TBI-ID are considered to be the preferred method for ascertaining TBI history.⁶⁵ Clinical interviews also allow a trained researcher to use an approach tailored to the study population to obtain the level of detail required for an expert assessment of the evidence. Thus, ascertainment method might represent one of the most important design considerations in

Panel: Associations between history of TBI and health-related or functioning-related outcomes

Physical health (12 studies)

- Associated with having seizures in three studies^{19,39,60} and not associated with seizures in two studies^{53,59}
- Associated with poorer self-reported physical health in three studies^{39,53,58} and more chronic health conditions in one study⁵⁸
- Associated with dizziness in two studies^{38,53}
- Associated with headaches or migraine headaches in three studies^{38,53,60}
- Associated with memory problems in five studies^{35,38,43,53,61} and not associated with memory problems in one study³⁴
- Associated with evidence of traumatically induced lesions visible on structural MRI, lower fractional anisotropy, and lower total cortical grey matter in one study³³
- Not associated with geriatric syndromes in one study,³² Charlson comorbidity score in one study,⁵³ or active HIV or hepatitis C infection in one study⁵³

Mental health (11 studies)

- Associated with a diagnosis of schizophrenia in one study,⁴³ bipolar disorder in two studies,^{28,43} manic or hypomanic episodes in one study,⁶⁰ and panic disorder in one study⁶⁰
- Associated with a higher number of psychiatric diagnoses in three studies^{31,43,58}
- Associated with poorer self-reported mental health in three studies^{39,53,58} and a history of mental illness in one study⁵⁹
- Associated with lower odds of psychotic disorder in one study⁶⁰ and not associated with psychotic disorder in one study⁵³
- Associated with polysubstance use in one study³⁵
- Associated with drug misuse in four studies^{39,43,58,60} and not associated with drug misuse in four studies^{35,53,55,59}
- Associated with alcohol misuse in five studies,^{39,43,53,58,60} and not associated with alcohol misuse in two studies^{35,55}
- Associated with mood disorders in one study⁵³ and mood disorder with psychotic features in one study⁶⁰
- Associated with lower odds of self-reported depression in two studies^{35,38} and diagnosed depressive disorder in three studies^{28,43,60}
- Associated with self-reported anxiety in two studies^{35,38} and not associated with diagnosed anxiety disorder in one study⁵³
- Associated with post-traumatic stress disorder in two studies^{43,60} and not associated with post-traumatic stress disorder in one study⁵³
- Associated with trouble controlling violent behaviour in one study³⁵
- Associated with self-reported emotional problems in one study³⁵

Suicidality (seven studies)

- TBI-related symptoms or a history of TBI were associated with higher risk for suicide or suicidal ideation in

five studies,^{31,43,49,51,60} and not associated with suicidal ideation in one study⁵³

- Associated with suicide attempts in two studies^{43,60} and not associated with suicide attempts in one study³⁵

Mortality (two studies)

- The standardised mortality ratio was significantly higher in homeless participants admitted to hospital with head injury than in non-homeless participants in one study⁴⁵
- In another study, 30-day mortality for homeless participants recruited from a neurosurgical unit was not significantly different to that of non-homeless participants⁴⁰

Neurocognition (nine studies)

- Associated with poorer neurocognition in two studies^{27,53} and clinical cognitive impairment in two studies^{19,53}
- Not associated with neurocognition in six studies^{34,36,37,54,56,62}
- Lower neurocognitive scores were found to be associated with lower grey matter volume and poorer white matter integrity of the corpus callosum as assessed with neuroimaging⁵³

Temporal relationship to homelessness (six studies)

- Between 51% and 92% of participants experienced their first TBI before their first experience of homelessness or marginal housing^{29,39,43,50,53,59}

Other outcomes (seven studies)

- Associated with a higher likelihood of reporting victimisation in one study⁴³
- Associated with difficulties with activities of daily living in one study⁴³
- Associated with a history of childhood trauma, physical abuse, and emotional abuse in one study,⁵⁵ and associated with a history of childhood physical abuse, sexual abuse, and neglect in one study⁴³
- Associated with a history of intimate partner violence^{43,53}
- Associated with lower than expected educational attainment in one study⁴³ and a history of special education in one study;⁴³ not associated with education in two studies^{53,59}
- Associated with employment and a higher monthly income in one study⁵⁸ and not associated with employment in one study⁴³
- Associated with higher frequency of emergency room visits and hospital admissions in three studies^{43,58,60} and not associated with outpatient days or the number of emergency room visits in the previous 6 months in one study⁶⁰
- Associated with having access to a physician in two studies^{58,60}
- Associated with arrest, incarcerations, or criminal justice system involvement in five studies^{43,53,58-60}

(Continues on next page)

(Panel continued from previous page)

- Associated with being a victim of physical or sexual assault in two studies^{43,58}
- Associated with a parental history of substance abuse in one study⁵⁹
- Associated with so-called survival sex during homelessness in one study⁴³
- Associated with a history of foster care in one study⁴³
- Associated with a higher number of homeless episodes or a longer lifetime duration of homelessness in two studies,^{43,58}
- and not associated with lifetime duration of homelessness or marginal housing in two studies^{53,59}
- Associated with military service in one study⁴³
- Not associated with having a place to go when sick or in need of health advice in one study⁶⁰
- Not associated with marital status in one study⁴³
- Not associated with screening positive for homelessness in veterans in one study⁴⁶

studies evaluating history of TBI. Consequently, our summary estimate of prevalence in this population is limited by inadequate ascertainment methods that appear to underestimate the prevalence of TBI in this population. If prevalence estimates ascertained through structured interviews represent the most accurate estimate of prevalence, our pooled estimate of prevalence might be a considerable underestimate of the true prevalence of TBI in this population.

Despite considerable statistical and methodological heterogeneity between studies, we found that a history of TBI is associated with various aspects of poor health and functioning. Additionally, several characteristics of homeless and marginally housed populations (eg, residential instability or substance use) were associated with sustaining TBI. Some relationships might be bidirectional: for example, TBI could increase the risk for homelessness, and homelessness could increase the risk for incident TBI. Establishing whether TBI is a risk factor for poor outcomes (eg, homelessness or serious health conditions) will be important to understand and address the impact of TBI in this population.

Our results suggest that physicians and care providers working with homeless and marginally housed populations should have an increased awareness of TBI. Previous studies have shown that homeless and marginally housed individuals have a frequency of actionable incidental findings on brain MRI that substantially exceed that expected of the general population.¹⁹ For example, Vila-Rodriguez and colleagues¹⁹ reported that the prevalence of aneurysms was 8.6% and of brain infarcts was 11% in homeless and marginally housed individuals. By contrast, the expected rates in similarly aged samples from the general population are less than 1% for aneurysms and less than 3% for brain infarcts.⁶⁶ In an overlapping sample, Schmitt and colleagues⁵³ reported visible encephalomalacia on neuroimaging that was deemed likely to be caused by traumatic injury in 6.9% of the cohort, and found that evidence of trauma on neuroimaging was associated with poorer cognition and executive functioning in this population.⁵³ Clinicians might therefore consider lowering the threshold for referral to neuroimaging specialists after head injury in homeless and marginally housed patients, because depending on the resources available, an

assessment that complements self-reporting might be indicated. Confirmation of structural brain damage caused by TBI might facilitate triage and referral to specialised services, such as cognitive rehabilitation, which could improve functional outcomes.^{67,68} Furthermore, imaging findings might positively inform the patient-caregiver relationship (eg, by increasing understanding of challenging behaviours that might be attributable to damage visible on neuroimaging).

To our knowledge, this is the first study to quantitatively evaluate the lifetime prevalence of TBI and to comprehensively summarise the associations between TBI and health-related or functioning-related outcomes in homeless and marginally housed individuals. However, our study has some limitations. Firstly, the included studies were almost exclusively retrospective in design, which precludes interpretation about the directionality of the relationships. Future prospective studies are needed in order to adequately evaluate, for example, whether TBI leads to substance use or homelessness, or whether factors such as substance use or homelessness lead to TBI. Secondly, we limited our search to peer-reviewed publications and elected not to search the so-called grey literature. In the screening process for this study, we encountered several theses and book chapters; however, we elected to exclude these in order to limit our results to only peer-reviewed studies.

TBI is prevalent among homeless and marginally housed individuals and might be a common factor that contributes to poorer health and functioning than in the general population. Primary care providers and those working with this group should be aware of the prevalence and associated consequences of TBI. Evaluating history of TBI might be relevant to a comprehensive assessment of homeless and marginally housed patients, who often have complex comorbidities. In addition, public health research and practice should focus on TBI prevention and more accurately characterising the scope and effects of TBI in this vulnerable population. Although to our knowledge no studies have been done to evaluate whether incident TBI is reduced with housing interventions, randomised trial evidence shows that rent supplements in combination with intensive case management substantially improve

living situation, safety, and community functioning.⁶⁹ These findings suggest that the provision of stable housing might also lower the risk for TBI. High-quality studies are urgently needed to elucidate the true prevalence and incidence of TBI, and the directionality of the relationship between TBI and outcomes in the homeless and marginally housed population.

Contributors

JLS led the title and abstract screening, full-text screening, risk of bias assessment, data extraction, statistical analysis, and drafting of the manuscript. JMS participated in the title and abstract screening, full-text screening, risk of bias assessment, and data extraction. JLS, AET, NDS, AMB, WGH, and WJP interpreted the results and participated in the drafting of the manuscript. All authors approved the final manuscript.

Declaration of interests

NDS has sat on the paid advisory board of Highmark Interactive, received consulting or speaking fees from WorkSafeBC and Yukon WCB, the National Hockey League, and Major League Soccer, and has received fees for expert testimony in neuropsychology. WGH has received consulting fees or sat on paid advisory boards for the Canadian Agency for Drugs and Technology in Health, AlphaSights, Guidepoint, In Silico, Translational Life Sciences, Otsuka, Lundbeck, and Newron. WJP is the founder and chief executive officer of Translational Life Sciences, an early stage biotechnology company. He is also on the scientific advisory board of Medipure Pharmaceuticals and Vitality Biopharma, and in the past has been on the board of directors for Abattis Biocentials and on the advisory board for Vinergy Resources; these companies are early stage biotechnology enterprises with no relation to brain injury. All other authors declare no competing interests.

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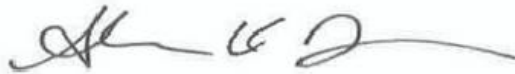
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This is Exhibit "F" referred to in
the Affidavit of Dr. Stephen Hwang of
the City of Toronto in the Province
of Ontario, sworn remotely
before me at the City of Waterloo
in the Province of Ontario on March 23, 2024.

A handwritten signature in black ink, appearing to read 'Shannon Down', written over a horizontal line.

Shannon Down
LSO#43894D

Bed Bug Infestations in an Urban Environment

Stephen W. Hwang,*† Tomislav J. Svoboda,*† Iain J. De Jong,‡ Karl J. Kabasele,§ and Evie Gogosis*

Until recently, bed bugs have been considered uncommon in the industrialized world. This study determined the extent of reemerging bed bug infestations in homeless shelters and other locations in Toronto, Canada. Toronto Public Health documented complaints of bed bug infestations from 46 locations in 2003, most commonly apartments (63%), shelters (15%), and rooming houses (11%). Pest control operators in Toronto (N = 34) reported treating bed bug infestations at 847 locations in 2003, most commonly single-family dwellings (70%), apartments (18%), and shelters (8%). Bed bug infestations were reported at 20 (31%) of 65 homeless shelters. At 1 affected shelter, 4% of residents reported having bed bug bites. Bed bug infestations can have an adverse effect on health and quality of life in the general population, particularly among homeless persons living in shelters.

The common bed bug (*Cimex lectularius*) is a wingless, red-brown, blood-sucking insect that grows up to 7 mm in length and has a lifespan from 4 months up to 1 year (Figure 1) (1). Bed bugs hide in cracks and crevices in beds, wooden furniture, floors, and walls during the daytime and emerge at night to feed on their preferred host, humans.

The common bed bug is found worldwide. Infestations are common in the developing world, occurring in settings of unsanitary living conditions and severe crowding (2,3). In North America and Western Europe, bed bug infestations became rare during the second half of the 20th century and have been viewed as a condition that occurs in travelers returning from developing countries (4). However, anecdotal reports suggest that bed bugs are increasingly common in the United States, Canada, and the United Kingdom (5–10). This study was conducted to document the magnitude and adverse effects of bed bug infestations in homeless shelters and other locations in Toronto.

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Ethical and scientific approval was obtained from Toronto Public Health and the St. Michael's Hospital Research Ethics Board. Shelter staff and residents gave informed consent before participation.

Methods

Toronto Public Health and Pest Control Operators Survey

The log of telephone calls made in 2003 to Toronto Public Health was reviewed to identify calls related to bed bug infestations, the types of locations affected, and the regions of the city where infestations were reported. Toronto is divided into 4 public health regions (north, east, south, and west); the south region includes the downtown core of the city. The population of each region was determined from 2001 census data and ranged from 500,000 to 700,000.

A telephone survey of all pest control operators listed in the Toronto telephone directory was conducted using a structured interview. The survey documented the number of bed bug–related calls received, the number of treatments provided by pest control operators in 2003, and the types of insecticides used to treat bed bug infestations. To protect the confidentiality of persons and establishments affected by bed bugs, we asked each pest control operator to report the number of different locations treated for bed bug infestations by general type (e.g., apartment, single-family dwelling, shelter) and not by specific name or address.

Survey of Homeless Shelter Staff

A telephone interview of the director or supervisor at each homeless shelter in Toronto was conducted to determine which shelters had experienced bed bug infestations. Interviewees were assured that the information they provided would be reported in a way that would not identify their shelter. At affected shelters, follow-up, in-person interviews were conducted with staff from December 2003 to May 2004. A predefined strategy was used to select

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Figure 1. Dorsal and lateral views of a bed bug (*Cimex lectularius*).

shelter managers, front-line staff, and healthcare professionals for interviews. The questionnaire included items on time course, manifestations, and extent of the infestation; control measures undertaken; and effects of the infestation on shelter residents and staff. Bed bug infestations were considered confirmed if an entomologist or pest control operator identified a specimen collected at the shelter as *C. lectularius*. Infestations were considered probable if shelter staff reported resident complaints consistent with bed bug infestations.

Homeless Shelter Resident Survey

As part of a separate study of bacterial colonization among shelter residents, a sample of 243 residents at 1 shelter affected by bed bugs was surveyed in July and August 2003. Participants were selected at random from among persons registered at the shelter, and 80% of those contacted agreed to participate. Participants were asked if they currently had any skin-related illness, injury, or condition, and if so, what type. We obtained permission from

the principal investigator of this study to review participant responses to determine the prevalence of self-reported bed bug bites (G. Bargh, pers. comm.).

Results

Calls to Toronto Public Health

In 2003, Toronto Public Health received insect-related calls from 82 different street addresses; 46 were complaints of bed bug infestations, 11 were requests for information about bed bugs, and 25 were unrelated to bed bugs. The 46 separate locations where infestations were reported are shown in Table 1. In response to these calls, public health staff spent a total of 27 hours providing information, and health inspectors spent a total of 78 hours conducting site visits to confirm complaints and offer assistance. More complaints of infestations were received in the last 6 months (31 calls) than in the first 6 months (15 calls) of 2003. In the south region, which includes the downtown core of the city, 4.7 complaint calls were received per

Table 1. Reports of bed bug infestations in Toronto, 2003

Type of location	Calls to pest control operators			Calls to Toronto Public Health
	No. locations treated (%)*	No. treatments (%)	Mean no. treatments per location	No. locations (%)
Single-family dwelling	588 (70)	641 (49)	1.1	2 (4)
Apartment unit	155 (18)	297 (23)	1.9	29 (63)
Homeless shelter	68 (8)	218 (17)	3.2	8 (17)
Hotel	19 (2)	96 (7)	5.1	1 (2)
Rooming house	6 (0.7)	16 (1)	2.7	5 (11)
Community center	5 (0.5)	5 (0.4)	1.0	1 (2)†
University dormitory	4 (0.5)	36 (3)	9.0	0 (0)
Restaurant	1 (0.1)	1 (0.1)	1.0	0 (0)
Other residential institution	1 (0.1)	5 (0.4)	5.0	0 (0)
Total	847 (100)	1,315 (100)	1.6	46 (100)

*Figures in this column may reflect some double counting of locations (see details in Methods section).

†Infestation located at the clothing bank in a community center.

100,000 population; this rate was 6.1 times higher (95% confidence intervals [CI] 3.3–11.4) than the rate in the rest of the city. A total of 32 complaints (70%) were from locations in the south region.

Survey of Pest Control Operators

We interviewed 34 (89%) of 38 pest control operators listed in the Toronto phonebook; 20 (59%) had provided treatments for bed bugs in 2003. Among these pest control operators, 17 (85%) of 20 reported that they had received an increased number of calls related to bed bugs and had provided more treatments for bed bugs in 2003 than in 2002. The number of locations treated by pest control operators in 2003 and the number of treatments required are shown in Table 1. The mean number of treatments required per affected location was highest at dormitories, hotels, homeless shelters, and rooming houses.

Homeless Shelter Staff and Resident Survey

We contacted all 65 homeless shelters in Toronto and found that 20 (31%) shelters reported previous or current bed bug infestations. Permission was obtained to survey staff at 17 (85%) of 20 affected shelters. Three shelters reporting bed bug infestations either declined or did not respond to our request to interview shelter staff to obtain further information. Forty-three staff members (1–9 per shelter) were interviewed. The time course of the infestation at these shelters is shown in Figure 2. The number of shelters with active bed bug infestations increased steadily from spring 2001 to winter 2003 and then declined. At the end of spring 2004, infestations persisted at 10 shelters. These 10 shelters accounted for 30% of the total shelter bed capacity in the city of Toronto.

At the 17 affected shelters, staff became aware of bed bugs through resident complaints (16 shelters, 94%), visual sightings (14 shelters, 82%), and bite marks on residents (13 shelters, 76%). Staff at 1 shelter (6%) reported that a healthcare provider alerted them to the infestation. A pest control operator or entomologist made a positive identification of the common bed bug at 13 affected shelters (76%). At 3 shelters (18%), residents contacted Toronto Public Health and requested a visit by a health inspector. At 5 locations (29%), shelter staff complained of bed bug bites. Of 243 residents interviewed at an affected shelter in the summer of 2003, 9 persons (4%) had a skin condition that they described as bed bug bites.

The affected locations at homeless shelters and the chemical control measures implemented are shown in Table 2. Professional pest control operators applied insecticides (most commonly, cyfluthrin, bendiocarb, propoxur, and permethrin) at 12 shelters (71%). Shelter staff applied insecticides (most commonly, pyrethrin and propoxur) at 13 shelters (76%).

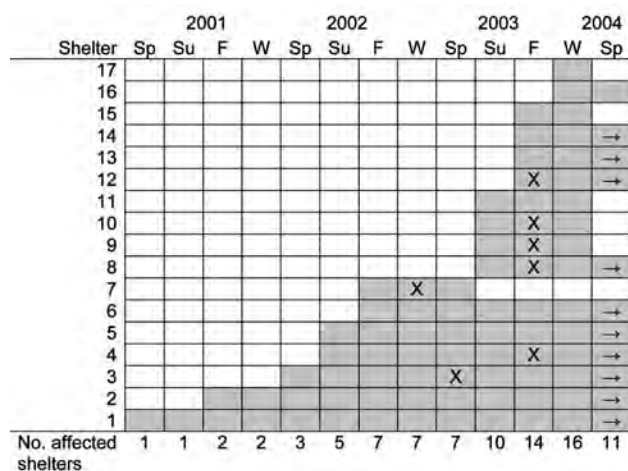


Figure 2. Time course of bed bug infestations in homeless shelters in Toronto. Shaded boxes indicate periods of infestation, X indicates peak period (if reported), and → indicates infestation ongoing as of spring 2004. Sp, spring (March, April, May); Su, summer (June, July, August); F, fall (September, October, November); W, winter (December, January, February).

Shelters implemented a number of environmental control measures (Table 2). To control bed bugs, 6 shelters (35%) made substantial building repairs, including removing floorboards, baseboards, or wood trim; replacing carpets; sealing floor cracks; and painting wooden floors. Two shelters (12%) installed additional washers and dryers to deal with increased laundry demands. The total cost incurred for bed bug control efforts at affected shelters was U.S.\$150–\$15,000, with a mean of U.S.\$3,085 per affected shelter.

Discussion

This study delineates the broad extent of a recent resurgence of bed bug infestations in an urban environment. In light of anecdotal reports from other localities (5–10), we believe that this phenomenon is likely occurring in cities across North America and Europe. The reasons for this resurgence are unknown, although some reports have suggested a role for increasing world travel, reluctance to use insecticides because of concerns regarding toxicity, and insecticide resistance (9,10). Although initial reports in Toronto indicated that bed bug infestations were occurring primarily in homeless shelters, our study showed that bed bugs are found in a wide variety of locations in the urban environment, including single-family dwellings, apartments, and rooming houses.

Data from public health officials and pest control operators provided markedly different perspectives on the extent and localization of infestations. This difference may reflect a tendency for persons experiencing bed bug infestations in single-family dwellings to rely on pest control

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Table 2. Locations at homeless shelters affected by bed bugs and chemical and environmental control measures implemented

Locations and control measures	No. shelters (%), N = 17
Affected locations	
Sleeping rooms	15 (88)
Bed or bed frames	15 (88)
Mattresses	13 (76)
Sheets	13 (76)
Floorboards or walls	9 (53)
Lockers	3 (18)
Other*	11 (65)
Nonsleeping rooms†	11 (65)
Chemical control measures (insecticides)	
Spot treatment only	4 (24)
Treatment of affected rooms	5 (29)
Treatment of entire building‡	8 (47)
All beds dismantled and treated	5 (29)
Environmental control measures	
Residents encouraged to shower and wash belongings	17 (100)
Increased room inspections to detect infestations	13 (76)
Ripped or torn mattresses discarded	8 (47)
Limits on amount of personal belongings	8 (47)
Beds and bedding steam cleaned and vacuumed	6 (35)
Building renovations§	6 (35)
Adhesive boards on the legs of beds to trap bugs	4 (24)
Replacing wooden beds with steel beds	3 (18)

*Other areas consisted of personal belongings, light fixtures, electrical switches and plugs, baseboards, carpeting, and other furniture.

†Affected nonsleeping rooms were the lounge, cafeteria, intake office, or storage room.

‡Treatment of the entire building entailed closing the shelter for 6 to 72 hours.

§See text for details.

operators, whereas apartment dwellers and homeless shelter staff may be more likely to contact public health authorities. The Toronto experience indicates that these calls place a substantial time demand on public health personnel, who in many cities are already struggling with limited resources.

Our data suggest that bed bugs can spread from shelter to shelter, presumably transported in the personal belongings of residents. At an affected homeless shelter, 4% of residents reported having bed bug bites; given the constant turnover of shelter residents, bed bugs could potentially affect a large number of homeless people over the course of a year. In our clinical experience, homeless persons with bed bug bites suffer a substantial degree of emotional distress.

Infestations in shelters are difficult and costly to eradicate. Our observation of a high mean number of pest control treatments per affected location (Table 1) points to the likelihood that infestations will be difficult to control in other communal living settings and in hotels. The pest control literature emphasizes the importance of combining insecticide treatments with environmental measures such as daily laundering of bed linens, vacuuming rooms, and steam cleaning and vacuuming mattresses. Bed bugs can be destroyed by freezing or by heat treatments at temperatures $>50^{\circ}\text{C}$, but these methods are inconvenient to implement (9,10)

Bed bug bites can result in clinical manifestations; the most common are small clusters of extremely pruritic, erythematous papules or wheals that represent repeated feedings by a single bed bug (1). Less common but more severe manifestations include grouped vesicles, giant urticaria, and hemorrhagic bullous eruptions (11). Bites should be managed symptomatically with topical emollients, topical corticosteroids, oral antihistamines, or some combination of these treatments.

Health professionals should be aware of this reemerging urban pest to facilitate prompt diagnosis of affected patients and treatment of the underlying environmental infestation. Bed bug bites must be differentiated from scabies, body lice, and other insect bites. Diagnostic clues include clustering and timing of bed bug bites. Unlike body lice, bed bugs are rarely found on affected persons or their clothing, and persons with good personal hygiene who enter an infested area are likely to be bitten.

Although bed bugs could theoretically act as a disease vector, as is the case with body lice, which transmit *Bartonella quintana* (the causal agent of trench fever) among homeless persons (12), bed bugs have never been shown to transmit disease in vivo (13). Hepatitis B viral DNA can be detected in bed bugs up to 6 weeks after they feed on infectious blood, but no transmission of hepatitis B infection was found in a chimpanzee model (14–19). Transmission of hepatitis C is unlikely, since hepatitis C

viral RNA is not detectable in bed bugs after an infectious blood meal (18). Live HIV can be recovered from bed bugs up to 1 hour after they feed on infected blood, but no epidemiologic evidence for HIV transmission by this route exists (20–22).

This study has certain limitations. Shelter data were based on self-reports from staff at affected shelters. Although we obtained data from multiple informants at each shelter when possible, we did not independently verify the accuracy of these reports. Affected shelters represented 30% of shelter beds in Toronto, but our methods did not determine how many rooms or beds within each shelter were affected. Shelter residents' reports of having bed bug bites were not independently confirmed, and some of these persons may have had other types of insect bites or delusions of parasitosis. The method we used to survey pest control operators may have resulted in double-counting locations that obtained treatments for bed bugs from >1 pest control operator in 2003. As a result, the number of affected locations may be overestimated. Furthermore, the reliability of reports from pest control operators is uncertain. Finally, our results, based on calls to public health and pest control operators, reflect self-initiated complaints from affected locations and therefore do not provide population-based data on the prevalence of bed bug infestations.

In conclusion, our study documents the broad extent of bed bug infestations in an urban environment. This problem could have a substantial adverse effect on health and quality of life, particularly among persons who use homeless shelters. Physicians should be aware of the typical dermatologic signs and symptoms of bed bug bites, which may become increasingly common in the future. Further research is needed to determine the geographic extent of the current reemergence of bed bugs in the industrialized world and the prevalence and risk factors for bed bug infestations in the general population, including those living in both congregate and noncongregate housing.

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We thank Antonia Guidotti for examining and identifying bed bug specimens, Gordon Bargh for providing data on the prevalence of bed bug bites among shelter residents, Liz MacDougall for reviewing telephone logs, and Orkin, Inc. and the University of Tennessee for kindly granting permission to reproduce photographs of bed bugs.

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Dr. Hwang is a research scientist at the Centre for Research on Inner City Health, St. Michael's Hospital, and an assistant professor in the Faculty of Medicine, University of Toronto. His research focuses on homelessness and health, access to health care among marginalized inner-city populations, and other issues related to poverty and health.

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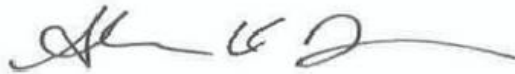
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This is Exhibit "G" referred to in
the Affidavit of Dr. Stephen Hwang of
the City of Toronto in the Province
of Ontario, sworn remotely
before me at the City of Waterloo
in the Province of Ontario on March 23, 2024.

A handwritten signature in black ink, appearing to read 'Shannon Down', written over a horizontal line.

Shannon Down
LSO#43894D

Active Tuberculosis among Homeless Persons, Toronto, Ontario, Canada, 1998–2007

Kamran Khan, Elizabeth Rea, Cameron McDermaid, Rebecca Stuart, Catharine Chambers, Jun Wang, Angie Chan, Michael Gardam, Frances Jamieson, Jae Yang, and Stephen W. Hwang

While tuberculosis (TB) in Canadian cities is increasingly affecting foreign-born persons, homeless persons remain at high risk. To assess trends in TB, we studied all homeless persons in Toronto who had a diagnosis of active TB during 1998–2007. We compared Canada-born and foreign-born homeless persons and assessed changes over time. We identified 91 homeless persons with active TB; they typically had highly contagious, advanced disease, and 19% died within 12 months of diagnosis. The proportion of homeless persons who were foreign-born increased from 24% in 1998–2002 to 39% in 2003–2007. Among foreign-born homeless persons with TB, 56% of infections were caused by strains not known to circulate among homeless persons in Toronto. Only 2% of infections were resistant to first-line TB medications. The rise in foreign-born homeless persons with TB strains likely acquired overseas suggests that the risk for drug-resistant strains entering the homeless shelter system may be escalating.

In Canada's major cities, tuberculosis (TB) is increasingly becoming a disease of persons born outside Canada (foreign-born). In 2009 in the city of Toronto in Ontario, 94% of all persons with active TB were foreign-born (1). Although homeless and marginally housed persons represent a smaller proportion of TB case-patients, they remain a persistent high-risk population. Recent TB outbreaks and disease clusters among homeless persons

have been reported in many cities in the United States (2–5) and have been associated with transmission at shelters, single-room-occupancy hotels, and rooming houses (which provide inexpensive rooms with shared bathrooms), prisons, and bars (6–10).

Toronto is the largest city in Canada; among its population of 2.5 million persons, ≈50% were born outside Canada (11). Each year in Toronto, ≈29,000 persons use emergency shelters, and on any given night ≈5,000 are without homes (12). During 2001–2002, a large shelter-based TB outbreak occurred among homeless persons in Toronto. A coroner's inquest into the death of a homeless man in whom pulmonary TB developed during the course of this outbreak revealed the many challenges of diagnosing and managing TB in homeless populations (13). In response to the inquest and resulting jury recommendations, major changes to the management of homeless TB cases occurred in the public health and shelter systems, and local TB clinic capacity expanded. This case resulted in the creation of a public health team dedicated to case management, contact follow-up, advocacy, education, health promotion, and active case finding among the city's homeless and underhoused population.

A comprehensive review of the population and molecular epidemiology, clinical features, management and health outcomes of homeless persons with TB in Canada is needed but lacking. To better understand and address the extent of disease in this vulnerable population, we studied TB among Toronto's homeless persons over a 10-year period.

Methods

The study population included all persons in Toronto for whom active TB had been reported to Toronto Public Health from January 1, 1998, through December 31,

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2007. Data were extracted from the Reportable Disease Information System and the Integrated Public Health Information System for all case-patients with a risk setting of “shelter/rooming house” or a risk factor of “homeless.” Health case management files were reviewed to ensure accuracy of database entries; additional data were abstracted when necessary. Cases were included in the analysis for persons with active TB who met the following eligibility criteria in the year before diagnosis: 1) any shelter stay, 2) any rooming house stay, 3) no fixed address, or 4) use of services for homeless persons $>1\times$ per week. Cases were excluded for persons with active TB who 1) were foreign-born and received a diagnosis of active TB within 1 month of arrival in Canada, 2) received a diagnosis of active TB while in a shelter designed exclusively for resettlement of newly arrived refugees, 3) were not residents of Toronto when they received a diagnosis of active TB, or 4) had incomplete records.

We collected data on patient demographics, clinical features of TB disease, medical management and health outcomes of patients, and molecular fingerprinting of the TB bacterium. Case types were classified according to the Public Health Agency of Canada definition of new and re-treatment TB cases (14). All chest radiographs were interpreted by radiologists. Susceptibility testing for *Mycobacterium tuberculosis* was performed at the Central Public Health Laboratory of the Ontario Agency for Health Protection and Promotion. All isolates from new TB cases were tested for susceptibility to first-line drugs (isoniazid, rifampin, pyrazinamide, and ethambutol) according to recommended standard protocols, by using the commercial broth system, BACTEC MGIT 960 (Becton, Dickinson and Company, Sparks, MD, USA). Isolates resistant to rifampin or any 2 first-line drugs were also tested for susceptibility to second-line drugs (15). Restriction fragment-length polymorphism was performed for strain genotyping by using established methods (16). Genotypes were analyzed by using Bionumerics 5.0 (Applied Maths, Saint-Martens Latem, Belgium). HIV test results were recorded when available; information about use of antiretroviral therapy for HIV/TB-co-infected patients was not available.

Comparisons were made between Canada-born and foreign-born case-patients and between 5-year periods (1998–2002 and 2003–2007) using the 2-sided Fisher exact test or χ^2 test, as appropriate. Kaplan-Meier plots were generated to determine time to death from all causes during the 12 months after TB diagnosis. The log-rank test was used to compare survival curves between the 2 groups. Because of the small cohort size, multivariate regression analyses were not performed. All analyses were performed by using SAS version 9.1.3 (SAS Institute, Cary, NC, USA). Ethics approval was obtained from St. Michael’s Hospital Research Ethics Board.

Results

From January 1, 1998, through December 31, 2007, a total of 3,685 active TB cases were reported to Toronto Public Health; among these, 102 (2.8%) met the study inclusion criteria. Incomplete records for 11 patients resulted in a final sample size of 91 (Figure 1). Most patients were absolutely homeless (i.e., living on the street or in a shelter); 86 (95%) patients reported staying in a shelter, having no fixed address, and/or using services for homeless persons $>1\times$ per week. Five (5%) patients did not fall into any of these categories but had lived in a rooming house during the past year. Birthplace was available for 88 patients; nearly one third ($n = 28$; 32%) were born outside Canada (Table 1). The proportion of foreign-born patients increased over time from 24% ($n = 10$) in 1998–2002 to 39% ($n = 18$) in 2003–2007 (Table 2). Among the Canada-born homeless persons with TB, 13 (22%) were Aboriginal. The number of reported cases of active TB over the study period by place of birth is shown in Figure 2. Approximately equal numbers of cases were reported during the 2 periods: 44 (48%) during 1998–2002 and 47 (52%) during 2003–2007.

Demographic information, clinical characteristics, and concurrent medical conditions for patients are presented in Tables 2 and 3. Homeless persons with TB were often highly contagious at the time of diagnosis, as demonstrated by the large proportion of patients who had cavitating pulmonary disease and sputum smears with numerous acid-fast bacilli. The median duration of symptoms for persons with pulmonary disease before diagnosis was 2.5 months (interquartile range 0.6–3.1 months). Pulmonary disease was found in 67 (74%) patients, among whom 29 (46%) showed numerous acid-fast bacilli in sputum smear. The proportion of pulmonary TB patients with cavitary disease

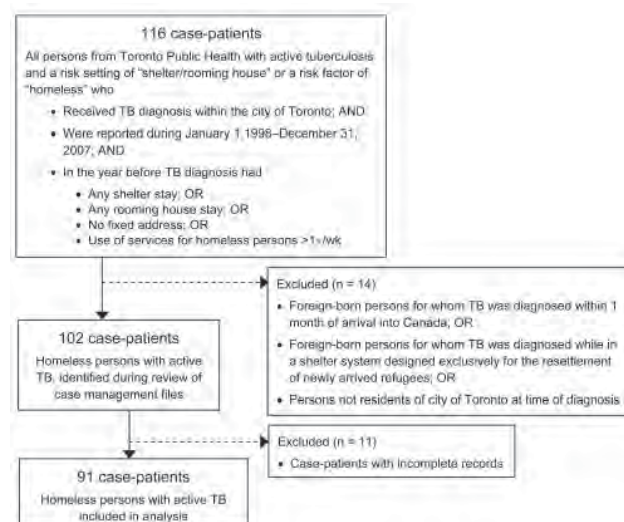


Figure 1. Inclusion–exclusion criteria for study of active tuberculosis (TB) in homeless persons, Toronto, Ontario, Canada, 1998–2007.

Table 1. Country of origin for 28 foreign-born homeless persons with tuberculosis, Toronto, Ontario, Canada, 1998–2007

Country	No.
Burundi	1
Chile	1
China*	1
Costa Rica	1
Ethiopia*	2
Germany	1
Guyana	2
India*	2
Iraq	1
Ireland	2
Nepal	1
Nigeria*	1
Philippines*	1
Poland	1
Somalia	2
Tanzania*	1
Tibet	1
Turkey	1
Uganda*	2
United Kingdom	1
Yemen	1
Former Yugoslavia	1
Zimbabwe*	2

*1 of 22 countries that account for 80% of all new of tuberculosis cases annually (high-burden countries).

increased over time from 14% (n = 5) in 1998–2002 to 32% (n = 11) in 2003–2007.

In terms of treatment information and outcomes, 75% of homeless persons with TB started treatment within 4 days of diagnosis (median 1 day; interquartile range 0–4 days) (Table 4). Most patients received closely monitored treatment within hospitals or as outpatients under directly observed therapy (DOT) (median treatment duration 2.0 and 6.2 months, respectively); few received self-administered therapy for any substantial period of time. Only 1 patient required a court order for treatment in a TB sanitarium.

Almost 1 of 5 (n = 17; 19%) patients died (from any cause) within 12 months of diagnosis (Table 4); most (n = 12; 86%) patients who died were born in Canada; 4 were HIV positive, 1 was HIV negative, and the remaining 12 had unknown HIV status. Among patients who survived, most (n = 70; 96%) homeless persons with TB successfully completed treatment and only 3 were lost to follow-up or refused further care. Probability of survival during the 12 months after diagnosis was lower for Canada-born versus foreign-born homeless persons (p = 0.06; Figure 3). No changes in survival probabilities were seen between the 2 periods, 1998–2002 and 2003–2007 (data not shown).

TB isolates were genotyped and tested for antimicrobial drug resistance (Table 5). Of the 4 strains known to circulate among Toronto's homeless population (A, B, C, or D), isolates from ≈90% of Canada-born patients belonged to one of these strains, and isolates from >50% of foreign-

born patients belonged to none of them. The proportion of isolates not belonging to these 4 strains increased over time, from 14% (n = 4) during 1998–2002 to 32% (n = 12) during 2003–2007. Almost all (n = 84; 98%) isolates were susceptible to first-line TB medications. Only 2 isolates demonstrated evidence of antimicrobial drug resistance: 1, from a Canada-born patient, was resistant to ethambutol only, and 1, from a foreign-born patient, was resistant to isoniazid only.

Discussion

Homeless persons in our cohort received nearly all health care services for TB in hospital or under careful observation in the outpatient environment. All outpatients received DOT, were accompanied by public health staff to all clinic visits, and received intensive social assistance. Despite these efforts, all-cause mortality rates for our cohort were extremely high. Among Canada-born homeless persons with TB in our study, 20% died within 1 year of their diagnosis; in comparison, among all persons with TB in Toronto during 1999–2002, only 7.4% died (17). All-cause mortality rates for homeless populations in general are disproportionately high; rates among men who use shelters in Toronto are 2–8× higher than rates for the general population (18). Homeless persons often have more concurrent medical conditions (e.g., HIV, liver disease), mental health conditions (e.g., schizophrenia), and/or dependence on substances, any of which may raise their risk for primary or reactivated TB, complicate delivery of health services, and negatively affect treatment outcomes.

Our findings reflect the increased rates of illness and death among homeless persons and suggest that urgent measures are needed to improve TB treatment outcomes for this vulnerable population. Recent research suggests that homeless immigrants in Toronto are in general healthier and possess fewer concurrent illnesses than Canada-born homeless persons, which may explain the lower prevalence of concurrent illnesses among foreign-born TB patients and the differences in mortality rates according to place of birth (19).

Homeless TB patients represent ≈3% of all TB patients in Toronto, of which a growing proportion are foreign-born, likely reflecting the changing demographics in the city overall and in the homeless population itself. Our findings suggest that Canada-born patients with TB were more likely to be infected with strains known to circulate within shelters and other social networks in Toronto. In contrast, active TB in foreign-born patients was more likely to result from reactivation of latent infection with strains acquired overseas (20,21).

To date, drug resistance among homeless TB patients is rare; laboratory evidence of drug resistance

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Table 2. Demographic and clinical characteristics of 91 homeless persons with tuberculosis, Toronto, Ontario, Canada, 1998–2007*

Characteristic	All persons, no. (%)	Canada born, no. (%)	Foreign born, no. (%)	p value†	1998–2002, no. (%)	2003–2007, no. (%)	p value‡
Median age, y (IQR)	47 (38–56)	49 (42–58)	38 (30–50)	–	45 (38–59)	48 (40–54)	–
Male sex	81 (89)	53 (88)	25 (89)	1.00	40 (91)	41 (87)	0.74
Origin							0.15
Canada born, not Aboriginal	47 (53)	47 (78)	NA		27 (64)	20 (43)	
Canada born, Aboriginal	13 (15)	13 (22)	NA		5 (12)	8 (17)	
Foreign born	28 (32)	NA	28 (100)		10 (24)	18 (39)	
Case type				0.43			1.00
New	83 (91)	53 (88)	27 (96)		40 (91)	43 (91)	
Re-treated§	8 (9)	7 (12)	1 (4)		4 (9)	4 (9)	
Method of detection				–			–
Signs and symptoms	51 (56)	30 (50)	18 (64)		23 (52)	28 (60)	
Contact tracing	19 (21)	16 (27)	3 (11)		11 (25)	8 (17)	
Diagnosis while under care for other condition	8 (9)	8 (13)	0		4 (9)	4 (9)	
Immigration screening	6 (7)	NA	6 (21)		6 (14)	0	
Active case finding (sputum screening)	3 (3)	3 (5)	0		NA	3 (6)	
Jail	1 (1)	1 (2)	0		0	1 (2)	
Other¶	3 (3)	2 (3)	1 (4)		0	3 (6)	
Site(s) of infection				1.00			0.15
Pulmonary only	67 (74)	45 (75)	21 (75)		33 (75)	34 (72)	
Extrapulmonary only	21 (23)	13 (22)	6 (21)		8 (18)	13 (28)	
Pulmonary and extrapulmonary	3 (3)	2 (3)	1 (4)		3 (7)	0	
Chest radiograph at diagnosis#							0.08
No abnormalities	9 (13)	7 (15)	2 (9)	0.86	7 (19)	2 (5)	
Abnormal without cavitation	45 (65)	30 (64)	15 (68)		24 (67)	21 (62)	
Abnormal with cavitation	15 (22)	10 (21)	5 (23)		5 (14)	11 (32)	
Self-reported symptoms	73 (80)	50 (83)	20 (71)	0.26	34 (77)	39 (83)	0.60
Median time from symptom onset to diagnosis, mo (IQR)	1.9 (0.6–3.1)	1.8 (0.6–2.6)	2.6 (0.8–5.8)	–	1.8 (0.6–3.1)	2.2 (0.6–3.2)	–
Sputum smear results at diagnosis**				0.39			0.58
Negative	21 (33)	12 (29)	9 (43)		12 (40)	9 (27)	
Scarce/moderate	13 (21)	8 (20)	5 (24)		5 (17)	8 (24)	
Numerous	29 (46)	21 (51)	7 (33)		13 (43)	16 (49)	
Method of diagnosis				0.59			0.18
Positive culture	86 (95)	55 (92)	28 (100)		40 (91)	46 (98)	
Positive AMTD	3 (3)	3 (5)	0		3 (7)	0	
Clinical	2 (2)	2 (3)	0		1 (2)	1 (2)	

*Birthplace information available for 88 persons. IQR, interquartile range; NA, not applicable; –, no statistical test performed; AMTD, amplified *Mycobacterium tuberculosis* direct test.

†Probability of a significant difference between Canada-born and foreign-born persons for each variable; calculated by using the 2-sided Fisher exact test or χ^2 test, as appropriate.

‡Probability of a significant difference between the 2 periods for each variable; calculated by using the 2-sided Fisher exact test or χ^2 test, as appropriate.

§Public Health Agency of Canada definition: documented evidence or adequate history of previously active tuberculosis (TB) that was declared cured or treatment completed by current standards, AND at least 6 mo have passed since the last day of previous treatment, AND a diagnosis with a subsequent episode of TB that meets the active TB case definition.

¶Includes shelter screening, routine screening at other centers, and other detection methods.

#Results for only the 70 persons with pulmonary disease.

**Sputum smears available for 63 patients with pulmonary disease.

was demonstrated for only 2% of homeless TB patients compared with 14% of all culture-positive TB patients in Toronto (1). Because being born outside Canada is a known risk factor for drug-resistant TB, the rise in foreign-born homeless TB patients and the corresponding increase in heterogeneity of strain genotypes are concerning and may pose serious and growing threats to the homeless shelter system (20,22–25). The outbreaks of multidrug

resistant TB in New York City during the 1980s and early 1990s highlight the potential dangers of introducing drug-resistant infections into the shelter system and call for increased prevention and control efforts (26).

Despite the increase in foreign-born homeless persons with TB over time, most homeless TB patients in our sample were Canada-born (68%), a substantial proportion of whom were of Aboriginal origin (22%). By comparison,

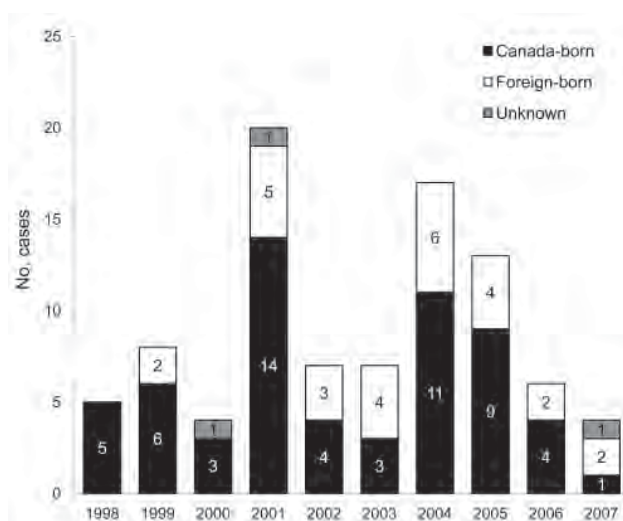


Figure 2. Number of reported cases of active tuberculosis in homeless persons, Toronto, Ontario, Canada, 1998–2007.

in 2008, only 6% of persons with active TB in Toronto were Canada-born (1). Although TB in Canada is primarily a disease of foreign-born persons (14), our results suggest that TB transmission persists among Canada-born inner city homeless populations. These findings also underscore the need to address TB transmission within the homeless shelter system. Furthermore, the disproportionately high prevalence of Canada-born Aboriginal persons in our sample suggests that further efforts are needed to address the high incidence of TB in this population.

Homeless TB patients tend to seek care when disease is advanced and highly contagious, defined by abnormal chest radiographic findings (cavitation) and numerous

acid-fast bacilli in sputum smear. Although many homeless patients had pulmonary disease, the number was proportional to the prevalence of pulmonary disease among all TB patients in Toronto (1). In patients with pulmonary TB, nearly half had numerous acid-fast bacilli in sputum smear. An increasing prevalence of cavitory disease on chest radiographs was observed over time, despite increasing intervention and active case-finding initiatives during the more recent 5-year period of this study. However, the increase in cavitory disease could be related to delays in seeking health care, as indicated by the increase in median time from symptom onset to diagnosis over the 2 periods of the study.

Homeless TB patients often have difficulty accessing the health care system and may prioritize subsistence needs such as food and shelter over health services, especially those perceived as discretionary (27). These factors, as well as cultural and language barriers among foreign-born patients (28,29), may contribute to delays in seeking health care, which lead to advanced disease and hospitalization (27,30,31). For our sample, hospitalization rates were high; >80% of patients were hospitalized. This is noteworthy in Canada, where most TB patients are treated as outpatients, even at the time of diagnosis (32). The inability to isolate infectious homeless patients in outpatient settings such as shelters largely explains the high rate of hospitalization for patients in our sample.

Adherence to treatment is often challenging for patients who are homeless or living in transient, substandard housing and who may have concurrent substance use or mental health problems. Consequently, DOT is usually implemented for homeless persons with TB in Canada (32). In the province of Ontario, all patients with active

Table 3. Concurrent conditions of 91 homeless persons with tuberculosis, Toronto, Ontario, Canada, 1998–2007*

Condition	All persons, no. (%)	Canada born, no. (%)	Foreign born, no. (%)	p value†	1998–2002, no. (%)	2003–2007, no. (%)	p value‡
HIV infection				0.52			0.33
Positive	11 (12)	9 (15)	1 (4)		5 (11)	6 (13)	
Negative	6 (7)	4 (7)	2 (7)		1 (2)	5 (10)	
Unknown	74 (81)	47 (78)	25 (89)		38 (87)	36 (77)	
Psychiatric disease§	10 (11)	7 (12)	2 (7)	0.71	2 (5)	8 (17)	0.09
COPD	8 (9)	7 (12)	0	0.09	6 (14)	2 (4)	0.15
Liver disease¶	29 (32)	24 (40)	4 (14)	0.03	12 (27)	17 (36)	0.38
Cancer	5 (5)	4 (7)	1 (4)	1.00	3 (7)	2 (4)	0.67
Congestive heart failure	1 (1)	0	0	–	1 (2)	0	0.48
Diabetes	11 (12)	5 (8)	5 (18)	0.28	1 (2)	10 (21)	0.01
Chronic alcohol abuse	29 (32)	23 (38)	6 (21)	0.15	12 (27)	17 (36)	0.38
Injection drug use	12 (13)	10 (17)	1 (4)	0.16	6 (14)	6 (13)	1.00
Noninjection drug use	6 (7)	6 (10)	0	0.17	0	6 (13)	0.03
Other	1 (1)	0	1 (4)	0.32	0	1 (2)	1.00

*Birthplace information available for 88 persons. –, no statistical test performed; COPD, chronic obstructive pulmonary disease.

†Probability of a significant difference between Canada-born and foreign-born persons for each variable; calculated by using the 2-sided Fisher exact test or χ^2 test, as appropriate.

‡Probability of a significant difference between the 2 periods for each variable; calculated by using the 2-sided Fisher exact test or χ^2 test, as appropriate.

§Includes schizophrenia, severe mental illness, and dementia.

¶Includes cirrhosis, viral hepatitis B or C.

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Table 4. Treatment-associated characteristics of 91 homeless persons with tuberculosis, Toronto, Ontario, Canada, 1998–2007*

Characteristic	All persons, no. (%)	Canada-born, no. (%)	Foreign born, no. (%)	p value†	1998–2002, no. (%)	2003–2007, no. (%)	p value‡
Days from diagnosis to initiation of treatment, median (IQR)	1 (0–4)	0.5 (0–4)	1 (0–6)	–	1 (0–3)	1 (0–4)	–
Duration of treatment, mo, median (IQR)							
Total	9.9 (6.5–12.7)	10.0 (6.8–12.5)	8.6 (6.0–12.9)	–	9.0 (6.1–12.2)	10.8 (6.7–13.1)	–
Treatment in institution	2.0 (0.2–4.0)	2.4 (0.5–3.9)	0.6 (0–4.2)		0.9 (0.2–3.9)	2.2 (0.0–4.1)	
Treatment under directly observed therapy	6.2 (0.8–8.8)	6.4 (0.9–9.0)	6.0 (2.4–7.2)		5.7 (0.2–7.0)	6.6 (4.5–9.0)	
Treatment by self-administered therapy	0.1 (0.1–0.9)	0.1 (0.1–0.6)	0.3 (0.1–2.1)		0.2 (0.0–1.1)	0.1 (0.1–0.6)	
Admission to hospital	76 (84)	55 (92)	19 (68)	0.01	35 (80)	41 (87)	0.40
Treatment under public health order§	15 (16)	9 (15)	6 (21)	0.55	4 (9)	11 (23)	0.09
Court-ordered detention for treatment¶	1 (1)	1 (2)	0	–	1 (2)	0	–
Outcome#				0.13			0.74
Treatment completed	70 (78)	45 (75)	25 (93)		33 (75)	37 (80)	
Died while receiving treatment**	17 (19)	12 (20)	2 (7)		9 (20)	7 (16)	
Lost to follow-up	2 (2)	2 (3)	0		1 (2)	1 (2)	
Refused further care	1 (1)	1 (2)	0		1 (2)	0	

*Birthplace information available for 88 persons. IQR, interquartile range; –, no statistical test performed.

†Probability of a significant difference between Canada-born and foreign-born persons for each variable; calculated by using the 2-sided Fisher exact test or χ^2 test, as appropriate.

‡Probability of a significant difference between the 2 periods for each variable; calculated by using the 2-sided Fisher exact test or χ^2 test, as appropriate.

§Referred to in Ontario as a Section 22.

¶Referred to in Ontario as a Section 35.

#1 patient continues treatment at the time of this report.

**One foreign-born case-patient from 2003–2007 period died 14 mo after onset of treatment. Study considers death from all causes within 12 mo of TB diagnosis. After 12 mo, causes of death other than TB become more relevant; therefore, deaths occurring after 12 mo are not included in this estimate.

TB are eligible to receive either inpatient or outpatient TB treatment, regardless of their insurance coverage. Most patients in our sample received their entire treatment closely monitored within hospitals, with outpatient DOT, or both. A few patients self-administered treatment for short periods. Despite the common perception that homeless TB patients are noncompliant with treatment (33–35), ~80% of patients in our sample completed treatment, which is equivalent to the treatment completion rate for all TB patients in Toronto receiving DOT (1). Intensive case management by public health and clinic staff as well as small incentives and enablers (e.g., food vouchers or cash) helped ensure high completion rates for this population. For most homeless TB patients who did not complete treatment, the reason was that they died; only a few were lost to follow-up or refused further care.

The strength of this study is that it provides a comprehensive description of all cases of TB among homeless persons in a large, ethnically diverse city in Canada over a 10-year period. However, the study also has limitations. Only patients who were residents of the city of Toronto at the time of diagnosis were included in the analysis; consequently, homeless persons with active TB who may have been exposed in Toronto shelters or

rooming houses and later moved elsewhere were not detected. Furthermore, homeless persons with TB were not included in the analysis if they had a history of shelter use >1 year before diagnosis with active TB. As a result, some patients who acquired TB infection while homeless but who subsequently acquired housing may have been missed. Furthermore, our retrospective study used public health surveillance data; consequently, our analyses are subject to limitations in how the data were originally collected. We excluded 14 patients with active TB because their records were incomplete; hence, we were unable to determine whether they differed demographically from included patients. This limitation could have influenced the results of our analyses that were stratified by birthplace.

Molecular fingerprinting data were unavailable for 20 isolates, which may have influenced the genotyping trends we observed over time. Because we were unable to definitively determine the number of patients who died directly or indirectly as a result of TB, the mortality rates represent death from all causes in the year after TB diagnosis. Although our study was conducted in a single metropolitan urban center, our findings and recommendations may be relevant to other large cities where levels of immigration and poverty are high.

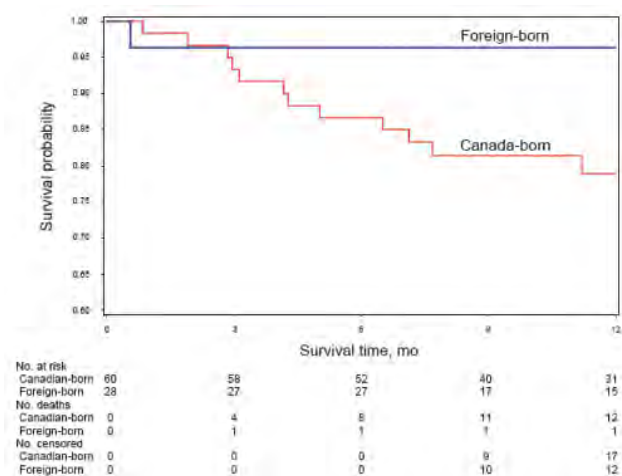


Figure 3. Probability of death from all causes during the 12-month period after tuberculosis diagnosis among Canada-born and foreign-born homeless persons with active tuberculosis, Toronto, Ontario, Canada, 1998–2007. Birthplace information available for 88 persons. Censored are patients who completed treatment for tuberculosis or were lost to follow up.

Prior research among homeless persons in New York City shows decreasing trends in rates of active TB during 1992–2006 and demonstrates that public health prevention and control efforts (e.g., latent TB infection screening) in this population can be effective (36). In our study, several homeless patients were originally identified as tuberculin skin test–positive contacts before active TB developed, but they were unwilling to start treatment for latent TB infection, were deemed poor candidates for treatment because of serious underlying medical or mental health conditions, or could not complete a course of treatment because of adverse drug reactions. Lack of treatment for latent TB occurred despite substantial incentives and enablers for persons to initiate and continue therapy (e.g., cash for attending clinic visits, free passes for taxis or public

transit, use of DOT for latent TB infection). Hence, for this cohort the opportunity to mitigate the risk for development of active TB through the treatment of latent TB infection was limited by the above challenges.

Primary prevention efforts should focus on shelter-based control measures, which have proven effective at reducing person-to-person spread of drug-resistant TB in other urban centers (37). Improved ventilation systems at shelters will help reduce the spread of TB during an outbreak (38,39). Smaller shelter sizes and strategies to reduce mobility (e.g., eliminating length of stay restrictions at shelters) may also help limit the extent of transmission. Additionally, expansion of sustainable housing program for homeless and marginally housed populations will help reduce the number of persons needing to use shelters, subsequently decreasing the likelihood of TB exposure at these congregate settings.

Control of TB in homeless populations within Canada will require further progress in primary prevention (e.g., improved ventilation and other infection control measures in shelters), secondary prevention (e.g., earlier detection and treatment of TB infection or disease through greater access to primary care), and tertiary prevention (e.g., treatment of active TB by health care providers with experience treating TB in homeless persons) (17). Furthermore, Canada's interconnectedness with the global community, and consequent interdependence with global TB, necessitates continued vigilance to confront the emerging threat of drug-resistant TB in the world (40).

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Table 5. Characteristics of isolates from 91 homeless persons with tuberculosis, Toronto, Ontario, Canada, 1998–2007*

Characteristic	Culture-confirmed case, no. (%)	Canada-born, no. (%)	Foreign born, no. (%)	p value†	1998–2002, no. (%)	2003–2007, no. (%)	p value‡
RFLP type				<0.001			0.13
Strain A	32 (48)	25 (52)	6 (38)		17 (59)	15 (41)	
Strain B	8 (12)	7 (15)	1 (6)		3 (10)	5 (14)	
Strain C	7 (11)	7 (15)	0		5 (17)	2 (5)	
Strain D	3 (5)	3 (6)	0		0	3 (8)	
Other strain	16 (24)	6 (13)	9 (56)		4 (14)	12 (32)	
Not tested	20	7	12		11	9	
Antimicrobial drug resistance				1.00			0.21
No	84 (98)	54 (98)	27 (96)		38 (95)	46 (100)	
Yes§	2 (2)	1 (2)	1 (4)		2 (5)	0	

*Birthplace information available for 88 persons. RFLP, restriction fragment-length polymorphism.

†Probability of a significant difference between Canada-born and foreign-born persons for each variable; calculated by using the 2-sided Fisher exact test or χ^2 test, as appropriate.

‡Probability of a significant difference between the 2 periods for each variable; calculated by using the 2-sided Fisher exact test or χ^2 test, as appropriate.

§Represents 1 Canada-born person whose isolate was resistant to ethambutol only and 1 foreign-born case whose isolate was resistant to isoniazid only.

RESEARCH

Toronto. His clinical and research interests pertain to TB and other infectious diseases affecting immigrant and refugee populations.

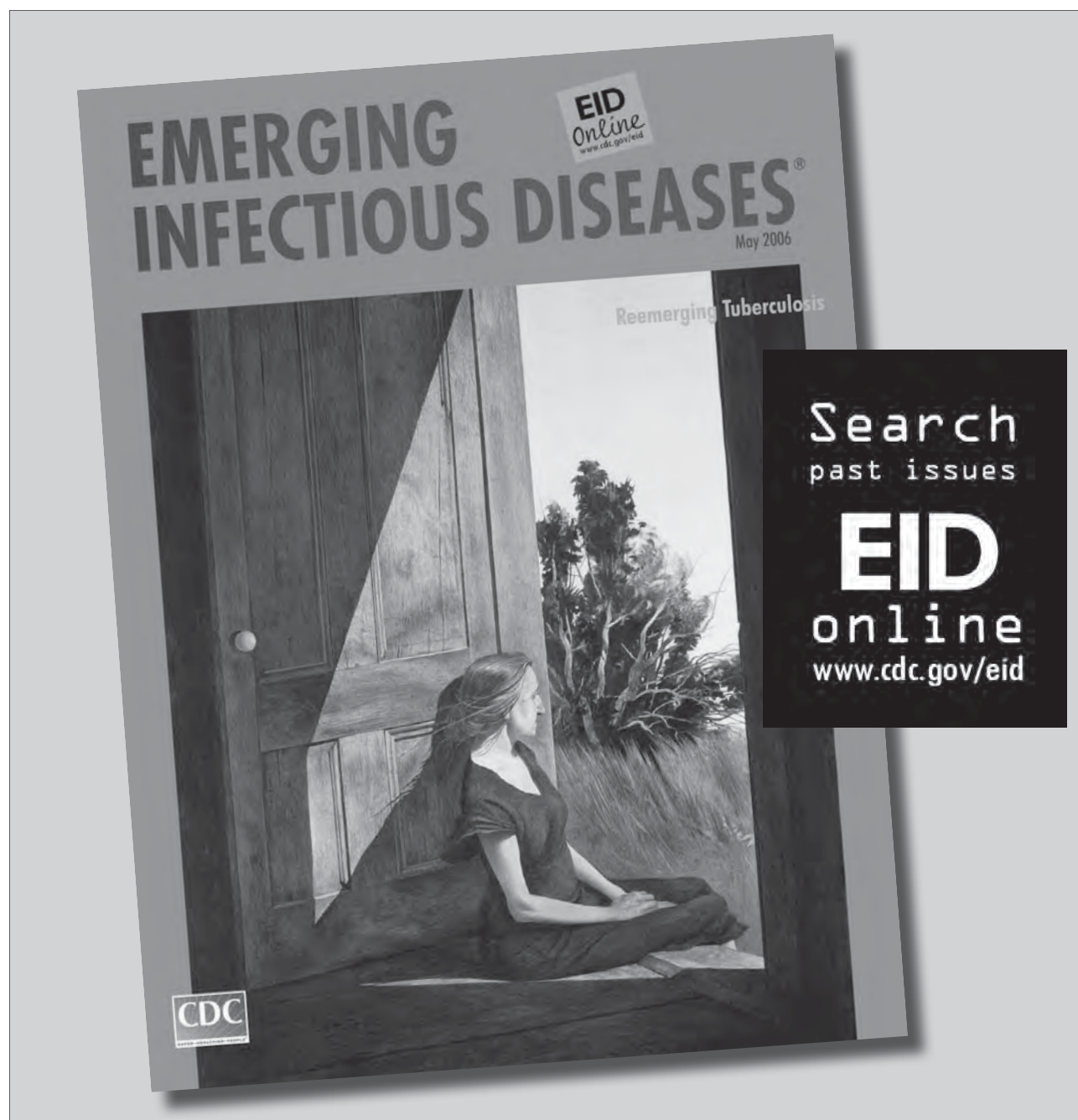
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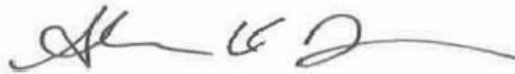
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Use of trade names is for identification only and does not imply endorsement by the Public Health Service or by the US Department of Health and Human Services.



This is Exhibit "H" referred to in
the Affidavit of Dr. Stephen Hwang of
the City of Toronto in the Province
of Ontario, sworn remotely
before me at the City of Waterloo
in the Province of Ontario on March 23, 2024.

A handwritten signature in black ink, appearing to read 'Shannon Down', written over a horizontal line.

Shannon Down
LSO#43894D

COVID-19 and people experiencing homelessness: challenges and mitigation strategies

Melissa Perri MPH, Naheed Dosani MD, Stephen W. Hwang MD MPH

■ Cite as: *CMAJ* 2020 June 29;192:E716-9. doi: 10.1503/cmaj.200834

Infectious disease epidemics and pandemics have a disproportionate impact on people experiencing poverty, marginalization, stigmatization and discrimination.¹⁻³ Amid the current coronavirus disease 2019 (COVID-19) pandemic, this disparity is particularly relevant for individuals who experience homelessness. Homeless shelters are an ideal environment for transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) because of shared living spaces, crowding, difficulty achieving physical distancing and high population turnover.⁴ People who are homeless also have a high prevalence of chronic health conditions that increase the risk of poor outcomes if they develop COVID-19.⁵

We discuss the unique effects of COVID-19 on those experiencing homelessness, specific challenges to be addressed and strategies to mitigate disease spread within the homeless population, focusing on emerging trends in North America from the perspective of equity-informed action. We highlight interventions and adaptations that may lessen the adverse impact of the COVID-19 pandemic on people experiencing homelessness.

How has COVID-19 affected the homeless population and its service providers?

Homeless individuals are at increased risk of infection with SARS-CoV-2 owing to their lack of safe housing and conditions in shelter and drop-in facilities.^{1,6} In a shelter population, spread of SARS-CoV-2 may be rapid and the detection of illness delayed because of limited access to health care and social services.^{7,8} The risk of severe COVID-19 is increased for people experiencing homelessness owing to the high prevalence of medical comorbidities including heart disease, respiratory conditions, liver disease and high rates of smoking in homeless populations.⁹⁻¹¹ An increasing proportion of people experiencing homelessness are older than 65 years, a factor that also exacerbates the risk of developing severe COVID-19.¹²

Given these factors, modelling of the potential effect of SARS-CoV-2 among the US homeless population showed a potential peak infection rate of 40%, with an estimated 4.3% of individuals who experience homelessness likely to require admission to

KEY POINTS

- Individuals experiencing homelessness are at increased risk of infection with severe acute respiratory syndrome coronavirus 2 owing to their lack of safe housing and are also at higher risk of severe coronavirus disease 2019 (COVID-19), given the high prevalence of risk factors in homeless populations.
- People experiencing homelessness often find it difficult to adhere to public health directives such as physical distancing, isolation and quarantine because of shelter conditions and other challenges.
- Several cities and regions have taken measures to provide spaces for people experiencing homelessness, to ensure physical distancing, isolation or quarantine; however, service providers must focus on building relationships and rapport, and take a trauma-informed approach to care, to persuade individuals to follow advice.
- Closure of regular services may put people experiencing homelessness at risk of other harms, such as those related to unsafe substance use and intimate partner violence.
- The COVID-19 pandemic has highlighted the importance of housing as a social determinant of health and raises the question of whether current approaches to addressing homelessness should be re-evaluated.

hospital.⁶ Among 408 individuals experiencing homelessness who were in shelters in Boston, Massachusetts, 36% tested positive for SARS-CoV-2.¹³ Rapid transmission has also been reported among staff at shelters, with 1 study showing that 30% of staff working in a Boston shelter tested positive for COVID-19.¹⁴ Projected COVID-19 mortality rates among individuals experiencing homelessness range from 0.3% to 1.9%, which is higher than population averages.⁶

Staff and organizations that provide services for people experiencing homelessness have identified the following particular problems: lack of timely and ongoing public health communications, difficulties in maintaining adequate infection control measures because of limitations in staffing and physical facilities, lack of sufficient personal protective equipment, and challenges to achieving effective screening of clients.¹ Furthermore, the obvious difficulty of maintaining self-isolation or

quarantine in shelters or drop-in sites makes it essential to plan early and proactively to create isolation sites for people experiencing homelessness.¹

What changes to the homeless services sector may reduce the spread of COVID-19?

A framework created by the Canadian Network for Health and Housing for People Experiencing Homelessness notes 6 essential pillars in response to this pandemic: enhanced screening methods, sentinel surveillance, coordination of health and shelter systems, COVID-19 risk stratification, isolation shelters for persons under investigation and cohorting SARS-CoV-2-positive cases for community-based shelter care.¹⁵ Given that homeless people represent a group that is particularly vulnerable to COVID-19, it is prudent to offer homeless people priority testing for SARS-CoV-2.

In keeping with general public health recommendations to prevent the spread of SARS-CoV-2, shelters, meal programs and other organizations that serve individuals experiencing homelessness must create conditions that enable physical distancing. Opening new shelter spaces and increasing spacing between beds has the potential to reduce the risk of spread of SARS-CoV-2.^{7,16} Additional strategies to allow for physical distancing in shelters and drop-in sites include moving individuals who experience homelessness into hotels and motels, which has been implemented by government and shelter personnel in locations such as Montréal, Calgary, Los Angeles and the Region of Peel in Ontario.¹⁷⁻²⁰ Such efforts require commitment to additional funding and human resources.

Seattle reportedly created 1893 new spaces in shelter services to address the unique needs of individuals experiencing homelessness,¹⁶ including increased number of beds in emergency shelters (95 beds), access to areas for physical distancing (709 expansion spaces), areas for isolation or quarantine (432 beds) and areas designed for recovery (612 beds).¹⁶ A dedicated site for individuals with COVID-19 and experiencing homelessness was created in the Region of Peel and in Toronto, Canada, to allow for isolation along with health and social support care.^{7,20}

What special challenges arise in the management of people who are suspected of having or confirmed to have COVID-19?

Intersecting factors such as mental illness, substance use, involvement in sex work and distrust of service providers may contribute substantially to difficulties faced by individuals in engaging with pandemic-specific protocols.⁴ Additional challenges include limited access to health or social services.⁴ Screening and treatment services such as primary care clinics may have been less accessible for individuals experiencing homelessness. The transient nature of homeless populations adds further complexities with respect to contact tracing to contain the spread of SARS-CoV-2 and reduce community transmission.⁴ Additionally, the limited availability of services relative to the needs of the population poses major constraints on control

efforts, as inadequate resources (e.g., space and personal protective equipment) make enforcing public health protocols extremely difficult at many shelters.^{7,8}

Individuals experiencing homelessness who do not adhere to advice to self-isolate or quarantine pose a particular challenge. When individuals with SARS-CoV-2 re-enter the community, risk of disease transmission is high. Absent legal and restrictive measures to address this issue, health and social homeless service providers must focus on building relationships and rapport, and take a trauma-informed approach to care, to persuade individuals to follow advice.

As discussed, individuals experiencing homelessness are likely to be at high risk for clinically severe COVID-19 yet are also unlikely to have engaged in any advance care planning. However, as a result of alienation from the health care system, many individuals experiencing homelessness may resist transfer to hospital if their condition deteriorates. Work is under way to establish consistent protocols for advance care planning for homeless people before admission to COVID-19 sites. Clinicians caring for this population should be trained and equipped to provide pandemic palliative care, including compassionate and trauma-informed end-of-life care.²¹

How might physical distancing and isolation interventions negatively affect individuals experiencing homelessness?

Physical distancing has substantial negative implications for individuals who are homeless or precariously housed. Abrupt closure of drop-in services and community centres, and resulting disruption in social relationships and support, may lead to deterioration in mental health for many. Similarly, reduced access to public spaces such as libraries, community centres and malls, and a reduction in resources such as peer counselling services, disproportionately affect individuals experiencing homelessness.

Among individuals who are experiencing homelessness and have substance use disorders, the added stress imposed by the closures of related services may contribute to increased alcohol or drug use and high rates of substance-related morbidity or mortality.^{22,23} For individuals who are opioid dependent, experiences of physical distancing and the resulting limited supply of opioid products may increase risks of overdose because of intermittent use and loss of drug tolerance. Reduced access to supervised consumption services increases risk of harms associated with unsafe drug use, including acquisition of blood-borne infections such as HIV and hepatitis C.²³

For many individuals who experience homelessness, sources of income include activities such as panhandling or sex work. Among women, girls and gender-diverse people, engaging in sex work or survival sex is often necessary to maintain shelter or to avoid intimate partner violence.²⁴ With physical distancing in place, individuals may have a reduced ability to engage in these activities and therefore may suffer substantial loss of income. Furthermore, homeless women and gender-diverse people may be at increased risk of experiencing intimate partner violence during the pandemic.

Individuals who experience homelessness are also likely to face criminalization of their daily life. For example, it is difficult, if not impossible, for homeless individuals to avoid infractions of physical distancing orders when they line up to enter a shelter or meal program or when they sit on a park bench. Homeless people in both Canada and the US have reportedly received fines ranging from \$500 to \$10 000 for such violations,²⁵ which is highly problematic.²⁵

How can COVID-19 care for individuals who experience homelessness be made more equitable?

As described above, interventions that are designed to house, isolate and treat people experiencing homelessness can begin to address the challenges, yet gaps remain. Programs and policies for addressing COVID-19 should be developed with and by Indigenous organizations to ensure that stigmatization, racism and ongoing colonialization experienced by Indigenous people is not compounded by public health approaches to the pandemic and that the unique needs of Indigenous people experiencing homelessness are met.

Health, social and government agencies must collaborate in a coordinated approach when developing and implementing services within the homeless sector. Funding is needed to ensure adequate supply of resources such as personal protective equipment, to enhance shelter space and to ensure harm reduction approaches in isolation and quarantine facilities for individuals experiencing homelessness. The latter includes providing managed alcohol programs, overdose prevention support and access to opioid antagonist therapy or safer supply.

Finally, as the pandemic wanes and is ultimately controlled, governments and service providers should take the opportunity to overhaul the way that people experiencing homelessness are treated and sheltered, and to transition to approaches that focus on long-term recovery through permanent housing and supports.^{8,25} The feasibility of the latter approach will be influenced by ongoing shifts in the housing market, public priorities and government budgets as a result of the COVID-19 pandemic.

Conclusion

COVID-19 and associated public health control measures pose particular challenges and increased risks of harm for people experiencing homelessness. Measures have been implemented across the US and Canada to increase capacity to allow safe physical distancing for homeless people, including arranging temporary housing, enlarging shelter spaces and creating isolation sites for homeless people with COVID-19. However, the diverse needs of various subgroups of people experiencing homelessness must be considered to ensure implementation of effective and equity-focused interventions. The COVID-19 pandemic has highlighted the importance of housing as a social determinant of health and raises the question of whether current approaches to addressing homelessness should be re-evaluated.

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Competing interests: Stephen Hwang and Naheed Dosani receive sessional payments from Inner City Health Associates for providing and directing medical care for people experiencing homelessness in Toronto. No other competing interests were declared.

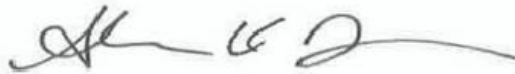
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Contributors: All of the authors contributed to the conception and design of the work, drafted the manuscript, revised it critically for important intellectual content, gave final approval of the version to be published and agreed to be accountable for all aspects of the work.

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This is Exhibit "I" referred to in
the Affidavit of Dr. Stephen Hwang of
the City of Toronto in the Province
of Ontario, sworn remotely
before me at the City of Waterloo
in the Province of Ontario on March 23, 2024.

A handwritten signature in black ink, appearing to read 'Shannon Down', written over a horizontal line.

Shannon Down
LSO#43894D

The health and housing in transition study: a longitudinal study of the health of homeless and vulnerably housed adults in three Canadian cities

Stephen W. Hwang · Tim Aubry · Anita Palepu · Susan Farrell ·
Rosane Nisenbaum · Anita M. Hubley · Fran Klodawsky · Evie Gogosis ·
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Abstract

Objectives While substantial research has demonstrated the poor health status of homeless populations, the health status of vulnerably housed individuals is largely unknown. Furthermore, few longitudinal studies have assessed the impact of housing transitions on health. The health and housing in transition (HHiT) study is a prospective cohort study that aims to track the health and housing status of a representative sample of homeless and vulnerably housed single adults in three Canadian cities (Toronto, Ottawa, and Vancouver). This paper discusses the HHiT study methodological recruitment strategies and follow-up procedures, including a discussion of the limitations and challenges experienced to date.

Methods Participants ($n = 1,192$) were randomly selected at shelters, meal programmes, community health centres, drop-in centres, rooming houses, and single-room occupancy hotels from January to December 2009 and are being re-interviewed every 12 months for a 2-year period. **Results** At baseline, over 85% of participants reported having at least one chronic health condition, and over 50% reported being diagnosed with a mental health problem. **Conclusions** Our findings suggest that, regardless of housing status, participants had extremely poor overall health.

Keywords Homeless persons · Vulnerable populations · Housing · Health · Mental health · Quality of life · Longitudinal studies

This paper belongs to the special issue 'Housing for health promotion'.

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Introduction

Homelessness, defined as living in a shelter, on the street, in other places not intended for human habitation, or in temporary accommodations with family or friends, is an increasingly visible problem that affects thousands of Canadians (Hwang 2001). On any given night, about 5,000 people in Toronto, 900 people in Ottawa, and 2,700 people in Vancouver are homeless (City of Toronto 2009; Dinning and Davis 2008; SPARC BC et al. 2008). Over the course of a year, an estimated 150,000–300,000 Canadians will experience homelessness (Laird 2007; Human Resources and Skills Development Canada 2010). Less visible, but equally important, are the large number of people in Canada who are ‘vulnerably housed’, a term that includes low-income, socially marginalized individuals living in single room occupancy (SRO) hotels and rooming houses. These individuals often have unstable living arrangements, resulting in frequent transitions between homelessness and vulnerable housing. For many, homelessness is an episodic, often temporary, experience as opposed to a chronic state (Aubry and Klodawsky 2003; Culhane et al. 1994).

Housing is a key social determinant of health. A substantial body of research over the last two decades has shown that single adults who experience episodes of homelessness suffer from high rates of physical and mental illness, substance abuse, injuries and assaults, and mortality (Aubry et al. 2011; Frankish et al. 2005; Hwang and Dunn 2005). A recent longitudinal study of Canadian adults found that mortality rates from all causes were 2.01 times higher among men living in shelters, rooming houses, and hotels compared to men in the general population and 1.79 times higher among women (Hwang et al. 2009).

The majority of studies on housing and health among homeless and vulnerably housed populations have used a cross-sectional design, despite the fact that housing status is a dynamic state with frequent transitions between homelessness and vulnerable housing. We identified a relatively small number of studies that accounted for longitudinal changes in the health and housing status of representative samples of homeless populations over time (Table 1).

Overall, previous research demonstrates that a substantial number of homeless individuals make a transition into some form of housing over follow-up periods ranging from 18 to 60 months. However, most of these studies have been conducted in the United States, and extrapolation of these findings to others settings is problematic for a number of reasons, not the least of which is the different health care systems that operate in the two countries. In Canada, homeless individuals retain their access to health care, in contrast to the United States, where more than half of all homeless people do not have health insurance (Kushel et al. 2001). Other factors that highlight the need for

additional data include the substantial differences between the United States and other countries in terms of ethnicity and race, climate, housing markets, social housing policies, extent of the social safety net, and severity of geographic concentration of extreme urban poverty (Dunn et al. 2005; Ross et al. 2000, 2005). For these reasons, longitudinal research of homeless and vulnerably housed people from settings such as Canada is needed to better understand the complex connections between housing and health.

The health and housing in transition (HHiT) study is a longitudinal cohort study that aims to track the health and housing status of a representative sample of homeless and vulnerably housed single adults in three Canadian cities (Toronto, Ottawa, and Vancouver) over a two-year follow-up period. The specific objectives of this study are:

1. To determine the incidence of housing transitions in these populations, defined as (a) the rate at which homeless individuals exit homelessness, (b) the rate at which vulnerably housed individuals become homeless, and (c) the rate at which vulnerably housed individuals attain residential stability by the end of the follow-up period;
2. To identify risk factors and individual, interpersonal, and community-level resources associated with (a) the attainment of residential stability among homeless individuals, (b) the onset of homelessness among vulnerably housed individuals, and (c) the attainment of residential stability among vulnerably housed individuals; and
3. To ascertain whether changes in housing status are associated with subsequent changes in physical and mental health functioning and major health determinants (including access to health care, alcohol and drug use, food security, and social supports).

Methods

Study setting

Toronto, Ottawa, and Vancouver are large, urban cities in Canada that vary in terms of their climate, geographic location, population size, and housing markets. Vancouver (pop. 2.2 million) is located in the province of British Columbia, on the west coast of Canada. Toronto (pop. 5.4 million) and Ottawa (pop. 1.2 million) are located in the province of Ontario in eastern Canada, approximately 3,500 km from British Columbia. Average monthly rents for a private one-bedroom apartment in these three cities range from \$853 to \$926 CDN, while vacancy rates range from 1.4 to 3.0% (Canada Mortgage and Housing Corporation 2009). Social assistance rates range between \$585 and \$610 CDN per month for a single adult and between

Table 1 Summary of longitudinal studies (follow-up \geq 12 months) of representative samples of homeless single adults

Author (year)	Citation	City	Population description (n)	Follow-up duration	Follow-up rate	Housing status at the end of follow-up	Observed housing and health associations
<i>U.S. studies</i>							
Buchanan et al. (2009) ^a	Am J Public Health 99 Suppl 3: S675–S680	Chicago, IL	HIV-positive homeless inpatients (n = 105) Race/ethnicity: 88% African-American, 4% Latino, 3% White, 4% Other	12 months	83%	Among the 54 participants in the intervention group, 39 (72%) reached interim housing and 35 (65%) reached permanent housing	Survival with intact immunity was higher among participants receiving permanent housing with intensive case management (vs. usual care) at 12-month follow-up A significantly higher proportion of participants in the intervention group had undetectable viral loads at the end of follow-up
Caton et al. (2005); Schanzer et al. (2007)	Am J Public Health 95:1753–1759; Am J Public Health 97:464–469	New York City, NY	Newly homeless adults (n = 445) Race/ethnicity: 62% African-American, 18% Hispanic, 20% White or Other	18 months	85%	307 participants (81%) returned to community housing during the follow-up period	Younger age, better psychosocial adjustment, recent or current employment, adequate family support, earned income, no current drug treatment, and no arrest history were associated with shorter duration of homelessness Significant improvements in health status (visual, dental, podiatric, and blood pressure) were observed over the follow-up period. The use of health care services was comparable among those who found housing and those who remained homeless
Cohen et al. (1997)	Gerontologist 37:67–74	New York City, NY	Older homeless female adults (n = 237) Race/ethnicity: 51% African-American, 34% White, 10% Hispanic	24 months	85%	94 participants (47%) achieved stable housing	Higher perceived social supports and greater contact with community agencies were associated with achievement of stable housing
Dasinger and Speigman (2007)	AIDS Behav 11:128–139	San Francisco Bay Area, CA	Very low income people with HIV or AIDS and their families (n = 185); eligible controls (n = 218) Race/ethnicity: 60% Black, 28% White, 8% Hispanic, 4% Asian/Pacific Islander, 1% Native American	Max. 4 years, 8 months	Not reported	99% of participants (vs. 65% of controls) maintained rental housing at 6 month follow-up; 99% (vs. 32%) at 1 year follow-up; 96% of participants (vs. 10%) at 2 year follow-up	Adjusted hazard ratio for time spent in independent rental housing was 3.8 times higher among participants vs. controls; time spent in rental housing significantly lower among individuals with mental health issues or hepatitis
Sadowski et al. (2009)	JAMA 301:1771–1778	Chicago, IL	Homeless adults with chronic medical illnesses (n = 405) Race/ethnicity: 78% African-American, 8% Hispanic, 8% White, 5% Mixed or other	18 months	90% for intervention group and 73% for usual care group (excl. deaths)	116 participants (66%) in the intervention group (vs. 10 in usual care group) reached stable housing	Compared to the usual care group, participants receiving housing and case management had reduced hospitalizations, hospital days, and emergency department visits during the follow-up period

Table 1 continued

Author (year)	Citation	City	Population description (n)	Follow-up duration	Follow-up rate	Housing status at the end of follow-up	Observed housing and health associations
Schwarz et al. (2009)	BMC Public Health 9:220	San Francisco, CA	Homeless adults and adolescents (≥ 13 years old) diagnosed with AIDS ($n = 676$) Race/ethnicity: 41% White, 39% Black, 16% Latino, 4% Other	Various (over a 10-year period)	Not reported	70 participants (10%) received stable housing	Obtaining stable housing was associated with an 80% reduction in mortality
Toro et al. (1997) ^a	J Consult Clin Psychol 65:476–484	Buffalo, NY	Homeless adults and families ($n = 202$), of whom 158 were single adults Race/ethnicity: 54% African-American, 34% White, 11% Other	18 months	49%	Controlled study of an intervention (intensive case management). In the control group, number of days homeless in the last 6 months decreased from 95 to 10 days	In the control group, little change was observed in housing quality despite a decrease in number of days homeless In the intervention and control groups combined, significant improvements were observed over time in physical health and stressful life events
Weinreb et al. (2006)	J Health Care Poor Underserved 17:180–199	Worcester, MA	Low-income housed and homeless female adults ($n = 436$) Race/ethnicity: 41% White, 32% Hispanic, 19% African-American	24 months	70%	Not reported	Associations between housing and health status were not reported Poor health status, non-white race, and few social supports were associated with frequent emergency department visits
Wolitski et al. (2010); ^a	AIDS Behav 14:493–503;	Baltimore, MD;	Homeless and unstably housed persons living with HIV/AIDS ($n = 630$)	18 months	85%	82% of participants in the intervention group (rental assistance with case management) were in stable housing in the past 90 days compared to 51% for participants in control group (usual care with case management)	Significantly greater improvements in housing stability in intervention vs. control group. Significant treatment effect observed for depression, perceived stress, and SF-12 physical health
Kidder et al. (2007) ^a	AIDS Behav 11:149–161	Los Angeles, CA	Race/Ethnicity: 78% Black, 22% Other				Being homeless for at least 1 night in the past 90 days was associated with more ER visits, higher perceived stress, and higher detectable viral load
Zlotnick et al. (1999);	J Community Psychol 27:209–224;	Alameda County, CA	Homeless adults ($n = 564$) Race/ethnicity: 68% African-American, 22% White, 9% Other	15 months	70%	80% of participants exited from homelessness at least once, but only 15% obtained stable housing	Shorter duration of homelessness, consistent receipt of entitlement benefits, and obtaining government subsidized housing were associated with obtaining stable housing
Zlotnick et al. (2003)	Subst Use Misuse 38:577–599						
<i>Canadian studies</i>							
Aubry et al. (2003);	City of Ottawa;	Ottawa, ON	Mixed population of homeless youth, single adults, and families ($n = 412$), of whom 160 were single adults	24 months	62%	47% of single men and 73% of single women obtained housing	Physical and mental health did not change significantly among people who obtained housing
Aubry et al. (2007);	University of Ottawa;					Only 10% of housed single men were in subsidized housing	Higher quality of housing, as perceived by respondents at follow-up, was related to positive changes in mental health functioning
Aubry et al. (2011)	Am J Community Psychol 2011 May 10 [Epub ahead of print]						

Table 1 continued

Author (year)	Citation	City	Population description (n)	Follow-up duration	Follow-up rate	Housing status at the end of follow-up	Observed housing and health associations
Palepu et al. (2010)	PLoS One 5:e11697	Vancouver, BC	Homeless and vulnerably-housed injection drug users (n = 992)	Min. 12 months; Max. 48 months	Not reported	211 participants (21%) attained stable housing during the follow-up period	Daily crack use, daily heroine injection use, and current enrollment in addiction treatment at baseline were negatively associated with attaining stable housing
Roy et al. (2003); Roy et al. (2010)	J Urban Health 80:92–105; J Urban Health 87:95–101	Montreal, QC	Cohort 1: Street youth, aged 14–25 years; Cohort 2: Street youth aged 14–23 years (n = 1,687)	Average of 33 months (Cohort 1)	87% completed at least 1 follow-up (Cohort 1)	Not reported	Youths who reported recent homelessness at a follow-up visit had an adjusted mortality hazard ratio of 3.0 during the subsequent observation period for Cohort 1 and 2.8 for Cohort 2. Standardized mortality ratios compared to the general population were 11.6 for Cohort 1 and 3.0 for Cohort 2. Mortality rates were significantly lower among Cohort 2
<i>International studies</i>							
Fichter and Quadffieg (2003); Fichter and Quadffieg (2005)	Subst Use Misuse 38:395–427; Eur Arch Psychiatry Clin Neurosci 255:111–120	Munich, Germany	Homeless male adults (n = 265) Race/ethnicity: Not reported	36 months	75%	103 participants (56%) achieved stable housing	Men with lower education, history of inpatient alcohol treatment, no history of inpatient psychiatric hospitalization, and shorter duration of homelessness were more likely to remain homeless
Solorio et al. (2008); Rosenthal et al. (2007)	J Adoles Health 42:401–409; AIDS Behav 11:831–841	Los Angeles, CA; Melbourne, Australia	Newly homeless youth aged 12–20 (n = 261 in Los Angeles; n = 165 in Melbourne) Race/ethnicity (Los Angeles data only): 47% Hispanic, 21% African American, 17% White, 15% other ethnicities	24 months	Los Angeles: 70% Melbourne: 79%	59 (32%) youth in Los Angeles and 31 youth (24%) in Australia had experienced ≥5 moves during follow-up	Drug use at the 24 month assessment was associated with an increased number of moves during follow-up Among males, living in a non-family setting was associated with more sexual partners and among females living in a non-family setting was associated with decreased odds of always using condoms (Los Angeles data only)

^a Studies that examined the effects of an intervention

\$906 and \$1,053 CDN per month for a single adult with a disability (City of Toronto 2010; Ministry of Housing and Social Development 2007). As can be seen in these figures, affording a market-rent unit is moderately to extremely difficult for an individual living on social assistance. As a result, many marginalized individuals depend on a limited supply of lower-cost alternative housing, such as SRO hotels (in Vancouver) and rooming houses (in Toronto and Ottawa) to meet their shelter needs.

Target populations

Participants were eligible for the study if they were age 18 years or older and did not live with a partner or dependent child (i.e. were single adults). Participants were considered homeless if they were currently living in a shelter, public place, vehicle, abandoned building, or someone else's place and did not have their own place. Participants were considered vulnerably housed if they reported living in their own room, apartment, or place *and* had been homeless in the past 12 months and/or had two or more moves in the past 12 months. Participants who were temporarily living with friends and family and were paying rent were considered vulnerably housed, while those who were not paying rent were considered homeless. Full-time students and individuals who were visiting the city for less than or equal to 3 months were excluded.

Recruitment strategy

Participants were recruited between January and December 2009. We aimed to recruit 600 homeless and 600 vulnerably housed single adults in total (200 homeless and 200 vulnerably housed participants in each of the three cities); however, due to some participants completing more than one interview (using a different name), our final sample was 1,192 participants. In instances where duplicate interviews were identified, we included the first interview only.

Our sampling plan for recruiting homeless adults was adapted from the design proposed by Ardilly and Le Blanc (2001). Recruitment of homeless adults took place at both shelters and meal programmes. Because the purpose of recruitment at meal programmes was to recruit homeless people who did not use shelters, single adults at meal programmes were eligible if they were homeless but had not stayed at a shelter more than three nights in the last 7 days. The target number of homeless participants recruited at meal programmes was proportional to the approximate number of homeless adults in each city who slept on the street.

Homeless participants were sampled using a two-stage cluster strategy. Primary sampling units included all

shelters and meal programmes in each city. In the first stage of sampling, shelters were randomly selected according to probabilities proportional to the number of shelter beds (Kish 1995). Meal programmes were selected through a similar process based on location and the estimated number of individuals who were served meals each week. At shelters, participants were selected on the basis of their bed number using a random number list. At meal programmes, research and agency staff screened individuals who were in the meal line or had used the meal programme and were in the vicinity of the site and invited those eligible to participate.

The sampling frame for recruiting vulnerably housed participants included all official SROs in Vancouver and licensed rooming houses in Toronto and Ottawa. At SROs and rooming houses where our research team could gain access, we approached all individuals who were living at the site and who were available at the time of the site visit. Due to feasibility challenges associated with sampling at SROs and rooming houses (see 'Discussion'), the target number of vulnerably housed participants (200 in each city) could not be recruited at these sites. Our sampling strategy for recruitment of vulnerably housed participants was therefore modified to include meal programmes, drop-ins centres, and community health centres in the sampling frame.

Selected individuals were told about the nature of the study and assessed for their eligibility and willingness to participate. Individuals who declined to participate or who were not available at the time of recruitment were not re-contacted and were replaced by another randomly selected individual at that site. Duplicate interviews that were identified during the recruitment period were replaced with interviews from another randomly selected individual. All eligible and willing participants provided informed consent and were reimbursed for their time (\$20 CDN) following the baseline interview and at each subsequent interview. Ethical approval for this study was obtained from the Research Ethics Board at St. Michael's Hospital (Toronto), the University of Ottawa, and the University of British Columbia (Vancouver).

Follow-up procedures

At the present time, participants are being re-interviewed approximately every 12 months over the 2-year period following their baseline interview. The goal of our study is to achieve an 80% retention rate, using methods shown to be effective at tracking and retaining homeless and vulnerably housed participants (McKenzie et al. 1999). Efforts were made to establish trust and rapport with participants at first contact and to explain the importance of their participation in follow-up interviews. At the time of enrolment,

participants were asked to provide contact information not only for themselves but also for friends, relatives, service providers, and case workers who were most likely to know their future whereabouts and who could be contacted in order to locate them. Participants were asked to give consent for municipal social services departments, hospitals, homeless shelters, prisons, and treatment centres to disclose their updated contact information to the research team (Aubry et al. 2004, 2007; Aubry and Klodawsky 2003). Tracking efforts were modified during the study period and were further tailored to the individual circumstances in each city.

Survey instrument

Data were obtained using structured in-person interviews, which took approximately 60–90 min to complete. The survey instrument (Table 2) contains validated scales and questions that were selected on the basis of relevance to and previous successful use among homeless and vulnerably housed people, having very good to excellent psychometric properties, being sensitive to change over time, and being easy to administer. Open-ended questions were also included to further probe participants' understandings of causal interactions between homelessness and health. A pilot study conducted in 2007 included 55 participants and demonstrated the feasibility of sampling, recruitment, and survey administration strategies. Based on our experiences during pilot testing, the questionnaire was shortened and revised for greater reliability and ease of administration.

Age was calculated by subtracting the participants' reported date of birth from their date of interview. Health status was assessed using the Short Form 12-item health survey (SF-12), which provided reliable physical and mental health summary measures, according to the publishers' specifications (Ware et al. 1995). SF-12 Summary Component Scores range continuously from 13 to 69 for physical health (PCS) and 10 to 70 for mental health (MCS) and are standardized to the general population in the United States (mean score of 50 and standard deviation of 10) (Ware et al. 1995). Higher scores represent better overall health status. Health conditions, use of health services, and barriers to accessing health care were assessed using self-report items adapted from the National Survey of Homeless Assistance Providers and Clients (Burt et al. 1999) and the Canadian Community Health Survey (Statistics Canada 2010). A history of previous mental health diagnoses was assessed through self-report.

Alcohol abuse was assessed using the Alcohol Use Disorders Identification Test (AUDIT), which is used to identify the preliminary signs of hazardous drinking and mild dependence, and scores were calculated according to

the publisher's specifications (Babor et al. 2001; Piccinelli et al. 1997). AUDIT scores of eight or more were considered indicative of hazardous or harmful alcohol use, as well as possible alcohol dependence. Drug abuse and the degree of problems related to drug use were assessed using the 10-item version of the Drug Abuse Screening Test (DAST-10), and scores were calculated according to the publisher's specifications (Gavin et al. 1989). DAST-10 scores of three or higher were considered indicative of moderate, substantial, or severe drug use problems. The use of injection and non-injection drugs was assessed using items developed by Roy et al. (2004). Smoking was assessed using items from the Canadian Community Health Survey (Statistics Canada 2010).

Quality of life was assessed using two complementary instruments. The Quality of Life for Homeless and Hard to House Individuals (QoLHHI) Instrument addresses general and specific quality of life issues that have been identified as important to homeless people (Hubley et al. 2009; Russell et al. 2008). The EuroQol (EQ-5D) is a standardized health-related quality of life instrument that generates a weighted composite score reflecting the preference value associated with a given health state, and a global rating of current health using a visual analogue scale (VAS) (Krabbe and Weijnen 2003; Rabin and de Charro 2001). EQ-5D scores range between -0.11 and 1.00 for the U.S. general population, where a score of 0.0 represents death and 1.0 represents perfect health (Shaw et al. 2005). VAS scores range from 0 to 100 . Further details regarding participants' perceptions and experiences about various aspects of their lives (e.g. food quality/availability, neighbourhood, etc.) were obtained through open-ended questions.

Social support was assessed using two instruments: (1) the Social Provisions Scale, which examines the provision of social relationships (Cutrona and Russell 1987) and (2) the Social Support Network Inventory (SSNI), a self-report questionnaire that measures the size of a person's social network and perceived social support (Flaherty et al. 1983). Social services utilization in the past 12 months was assessed through self-report.

Housing status over the preceding 2 years was determined using the Housing Timeline Follow-Back Calendar (HTFBC), a validated method that allows for the collection of detailed and accurate information on housing history (Tsemberis et al. 2007). The Housing Quality Score developed by Toro et al. (1995) was used to determine the self-reported quality of the current living environment in terms of comfort, safety, spaciousness, privacy, friendliness, and overall quality. If the participant was housed, we determined whether they were living in market-rent or subsidized rent-g geared-to-income housing using questions developed for the Ontario Community Mental Health Evaluation Initiative (Dewa et al. 2002; Dewa et al. 2004).

Table 2 Components of baseline survey instrument for the health and housing in transition (HHIT) study

Category/variable	Measure(s) utilized	Selected survey question(s)	Values	Scales
<i>Demographics</i>				
Sex	Self-report	Your gender is...?	Male/Female/Transgendered	
Age	Self-report	What is your date of birth?	Years	
Marital status	Self-report	What is your marital status?	Single, never married/Separated, divorced/Widowed/Married, incl. common law/Partnered	
Relationship status	Self-report	Do you have a partner?	Yes/No	
Race	Self-report	To which racial or cultural group(s) do you belong?	White/Black/First Nations/East Asian/South Asian/Southeast Asian/West Asian/Hispanic/Other	
Country of birth	Self-report	What country were you born in?	Citizen/Landed Immigrant/Refugee	
Citizenship	Self-report	What is your citizenship status?	Days/Weeks/Months/Years	
Length of time in [Toronto, Ottawa, Vancouver]	Self-report	How long have you lived in [Toronto, Ottawa, Vancouver]?	English/French/Other	
Language first learned at home	Self-report	What is the language that you first learned at home and still understand?		
<i>Housing</i>				
Proportion of time housed	HTFBC ^a	Tell me where you have been living for the past 2 years	Detailed housing history	
History of homelessness	Self-report	Have you ever been homeless? How old were you the first time you were homeless? Excluding the past 2 years, how many days, weeks, months, or years have you been homeless? Were you homeless with your family?	Yes/No Age Length of time Yes/No	
<i>Individual resources</i>				
Education	Self-report	How much school have you completed? Are you currently enrolled in a school or training programme?	Elementary/Middle school/High school/Post-secondary Full-time/Part-time	
Employment	Self-report	Have you worked at a paid job? Hours/week How many different paid jobs did you have? What are your sources of income?	Yes/No Number of hours Number of paid jobs Type and amount per month	
Income	Self-report			
<i>Interpersonal resources</i>				
Social network size	SSNI ^b	Are there any people with whom you feel at ease and can talk to about personal issues?	Number of persons identified and relationship to individual	Count
Provision of social relationships	SPS ^c (8 items)	If something went wrong, no one would help me	Strongly Agree/Agree/Disagree/Strongly Disagree	Total score (range: 8–32)

Table 2 continued

Category/variable	Measure(s) utilized	Selected survey question(s)	Values	Scales
<i>Community resources</i>				
Social service use	Self-report	Which services did you use?	Type and services used	
Subsidized housing	Self-report Cross-reference municipal list	Is your rent subsidized?	Number of times used Yes/No	
<i>Risk factors</i>				
Physical health	SF-12 ^d (12 items) EQ-5D ^e (5 items)	In general, would you say your health is...?	Excellent/Very good/Good/Fair/Poor	Weighted score (range: 13–69) Weighted score (range: –0.11–1.00) Range: 0–100
Overall satisfaction (quality of life)	VAS ^f NSHAPC ^g CCHS ^h	Describe your health in terms of mobility, self-care, usual activities, pain, anxiety Rate your state of health Do you have any of the following medical conditions? Have you had a...Toothache? Pain in/around the jaw joints? Other pain in the mouth?	Yes/No Yes/No	
Impact of current health	QoLHHI ⁱ (13 items) QoLHHI ⁱ (12 items)	How do you feel about your current health Rate the impact of your physical health on you	Very dissatisfied–Very satisfied Large negative impact–Large positive impact	Average score (range: 1–7) Average score (range: 1–7)
Mental health	SF-12 ^d (12 items) Self-report	How much of the time have you felt down? Have you been diagnosed with a mental health problem? If yes, what was the diagnosis?	All of the time–None of the time Yes/No List of diagnoses	Weighted score (range: 10–70)
Unmet need for care	Self-report	Do you have a regular medical doctor? Have you needed care but were not able to get help? What were the reasons you were unable to get help?	Yes/No Yes/No List of reasons	
Cigarette smoking	CCHS ^h	How often do you smoke?	Daily/Occasionally/Not at all	
Substance use	Self-report	Which drugs have you used/injected?	List of drugs used, frequency of use, and injected use	
Legal and other events	AUDIT ^j (10 items) DAST-10 ^k (10 items) Montreal Street Youth Study Self-report	How often did you have a drink containing alcohol? Did you abuse more than one drug at a time? What types of resources did you use for your alcohol/drug use problems? Were you...Arrested by the police? Incarcerated? Beaten or physically attacked? Forced into unwanted sex?	Never–4 or more times per week Yes/No List of resources and frequency of use Yes/No Number of times	Total score (range: 0–40) Total score (range: 0–10)
Housing and neighbourhood quality	HIST ^l (6 items)	How would you rate the place where you currently live in terms of...Comfort? Safety? Spaciousness? Privacy? Friendliness? Quality?	Very bad/Bad/Somewhat bad/ Neither good nor bad/Somewhat good/Good/Very good	Total score (range: 7–49)

Table 2 continued

Category/variable	Measure(s) utilized	Selected survey question(s)	Values	Scales
Satisfaction with place currently living or staying	QoLHHI ⁱ (14 items)	How do you feel about the place you currently live or stay?	Very dissatisfied–Very satisfied	Total score (range: 0–28)
Impact of place currently living or staying	QoLHHI ⁱ (1 item)	Rate the impact of the place where you live or stay on you	Large negative impact–Large positive impact	Total score (range: 0–10)
Satisfaction with neighbourhood	QoLHHI ⁱ (5 items)	Do you feel safe in your neighbourhood?	Yes/No/Yes and No	Total score (range: 0–10)
Impact of neighbourhood	QoLHHI ⁱ (1 item)	Rate the impact of your neighbourhood on you	Large negative impact–Large positive impact	Total score (range: 0–10)
Satisfaction with food	QoLHHI ⁱ (5 items)	Are you usually able to get food that you like?	Yes/No/Yes and No	Total score (range: 0–10)
Impact of food	QoLHHI ⁱ (1 item)	Rate the impact that the food you eat has on you	Large negative impact–Large positive impact	Total score (range: 0–10)

^a Housing Timeline Follow-Back Calendar

^b Social Support Network Instrument

^c Social Provisions Scale

^d 12-item Short Form Health Survey

^e EuroQoL 5-Dimension Questionnaire

^f EuroQoL 5-Dimension Visual Analogue Scale

^g National Survey of Homeless Assistance Providers and Clients

^h Canadian Community Health Survey

ⁱ Quality of Life for Homeless and Hard-to-House Individuals Instrument

^j Alcohol Use Disorders Identification Test

^k 10-item Drug Abuse Screen Test

^l Toro's Housing, Income, and Services Timeline (HIST) Instrument

Additional open-ended questions were included to explore participants' past experiences of housing and homelessness, and their perception of the links between housing and health.

Statistical analyses

Comparisons were made between participants who were homeless at baseline to those who were vulnerably housed. The two-sample *t* test was used for continuous variables, and Chi-square test was used for categorical variables. In instances where distributions for continuous variables were skewed, the nonparametric Wilcoxon rank-sum test was used. All analyses were performed using SAS statistical software version 9.2 (SAS Institute, Cary, NC).

Results

In total, 1,192 participants were recruited into our study: 396 (33.2%) in Vancouver, 399 (33.5%) in Toronto, and 397 (33.3%) in Ottawa. Our final sample consisted of 595 (49.9%) homeless participants and 597 (50.1%) vulnerably housed participants. Selected baseline comparisons between homeless and vulnerably housed participants are provided in Table 3. Significant differences between the two groups were noted for certain demographic characteristics. Compared to homeless participants in our sample, vulnerably housed participants were more likely to be born in Canada, be of First Nations/Aboriginal ethnicity, and have lower education levels. Vulnerably housed participants were less likely to be female; however, this difference likely results from our sampling design, which over-sampled females at homeless shelters to ensure adequate sample size, rather than a true difference in population characteristics.

Among the vulnerably housed sample, 222 (40.0%) reported living in subsidized housing. Participants who were vulnerably housed reported spending a median of \$388 Canadian dollars per month on rent, which corresponds to approximately 43% of the median monthly income for this sample. However, we expect that, in reality, this proportion is even higher, as many participants may have been unaware that they were living in subsidized housing and/or were unaware of what portion of their income was being put towards their housing subsidies. Both samples reported spending a considerable amount of time without housing in their lifetimes; the median lifetime duration of homelessness among all participants was 2.8 years.

In terms of baseline health status, over 85% of participants reported having at least one chronic health condition, and over 50% reported being diagnosed with a mental

health problem. The mean health composite scores from the SF-12 health survey were 44.5 (standard deviation = 11.3) for physical health and 39.1 (standard deviation = 13.0) for mental health. Vulnerably housed participants had slightly lower SF-12 PCS and were more likely to report a greater number of chronic health conditions than homeless participants, whereas homeless participants reported very slightly lower SF-12 MCS than vulnerably housed participants.

Discussion

Our baseline findings suggest that—regardless of housing status—participants had extremely poor overall health. Compared to the U.S. general population, SF-12 PCS were 0.5 standard deviations lower than expected, and MCS were more than one standard deviation lower than expected (Ware et al. 1995). While substantial prior research has demonstrated the poor health status of homeless populations in Canada (Aubry et al. 2011; Frankish et al. 2005; Hwang and Dunn 2005), minimal research is available regarding the health status of individuals living in socially marginalized, inadequate housing. In our study, we show that vulnerably housed participants had equally poor, and in some cases worse, health status than individuals who had no housing at all.

The HHiT study is an ambitious multi-site study that aims to address a gap in the research around the impact of housing transitions on health. The strengths of this study include the longitudinal design, the multi-site approach, the relatively large sample size, the inclusion of both homeless and vulnerably housed populations, and the use of validated survey instruments and scales. Additionally, we are using recruitment and tracking methods that have been shown to be effective for these populations and that have been used previously by our research team (Ardilly and Le Blanc 2001; Aubry et al. 2004).

However, despite these strengths, a number of challenges have been encountered to date. Among our biggest challenges has been gaining access to SROs and rooming houses to recruit vulnerably housed participants. These challenges include the following: difficulties obtaining up-to-date, accurate lists of SROs and rooming houses from municipal sources; physical barriers such as missing buzzers or inaccurate tenant lists; landlords who would not respond to multiple requests to visit the site for the purpose of recruiting participants; and sites no longer being in operation at the time of recruitment. Furthermore, at sites that were accessible, very few residents were available, willing, or eligible to participate, despite multiple visits on different days and times. Many individuals who were located at SROs and rooming houses had lived at these

Table 3 Characteristics of homeless and vulnerably housed participants at baseline in Vancouver, Toronto, and Ottawa, Canada, 2009

Variable	All participants (<i>n</i> = 1,192)	Homeless (<i>n</i> = 595)	Vulnerably housed (<i>n</i> = 597)	<i>P</i> value
Age group (years), <i>n</i> (%)				0.171
<30	160 (13.5)	91 (15.4)	69 (11.6)	
30–39	295 (24.8)	150 (25.3)	145 (24.3)	
40–49	443 (37.2)	207 (34.9)	236 (39.5)	
≥50	292 (24.5)	145 (24.5)	147 (24.6)	
Gender, <i>n</i> (%)				0.034
Male	781 (65.7)	373 (62.7)	408 (68.8)	
Female	389 (32.7)	215 (36.1)	174 (29.3)	
Transgender	18 (1.5)	7 (1.2)	11 (1.9)	
Marital status, <i>n</i> (%)				0.301
Single/never married	687 (58.0)	339 (57.4)	348 (58.6)	
Divorced/separated	309 (26.1)	164 (27.8)	145 (24.4)	
Widowed	30 (2.5)	18 (3.1)	12 (2.0)	
Married/common law	82 (6.9)	35 (5.9)	47 (7.9)	
Partnered, not married	77 (6.5)	35 (5.9)	40 (7.1)	
Born in Canada, <i>n</i> (%)	1,002 (84.6)	474 (79.8)	528 (89.3)	<0.001
Racial/cultural group, <i>n</i> (%)				<0.001
White	722 (62.5)	358 (62.1)	364 (62.9)	
Black/African–Canadian	106 (9.2)	66 (11.4)	40 (6.9)	
First Nations/Aboriginal	205 (17.7)	74 (12.8)	131 (22.6)	
Mixed ethnicity	64 (5.5)	38 (6.6)	26 (4.5)	
Other	59 (5.1)	41 (7.1)	18 (3.1)	
Highest level of education, <i>n</i> (%)				<0.001
Some high school	529 (44.7)	231 (39.0)	298 (50.5)	
Completed high school or equivalent	277 (23.4)	146 (24.6)	131 (22.2)	
Some post-secondary education or higher	377 (31.9)	216 (36.4)	161 (27.3)	
Employed in past 12 months, <i>n</i> (%)	474 (39.8)	245 (41.3)	229 (38.4)	0.320
Monthly income, (CDN dollars) median (Q1–Q3)	900 (543–1,427)	900 (385–1,600)	900 (600–1,330)	0.078
Current monthly rent, (CDN dollars) median (Q1–Q3)	– ^a	– ^a	388 (343–450)	
Currently living in subsidized housing, <i>n</i> (%)	– ^a	– ^a	222 (40.0)	
Lifetime duration of homelessness (in years), median (Q1–Q3)	2.8 (1.1–6.6)	2.7 (1.1–6.6)	3.0 (1.0–6.6)	0.992
SF-12 PCS, ^b mean (SD)	44.5 (11.3)	45.3 (11.8)	43.7 (10.7)	0.016
SF-12 MCS, ^b mean (SD)	39.1 (13.0)	38.3 (13.1)	39.9 (13.0)	0.040
Number of chronic health conditions, ^c <i>n</i> (%)				<0.001
0	151 (12.7)	94 (15.8)	57 (9.6)	
1	250 (21.0)	138 (23.2)	112 (18.8)	
2	198 (16.6)	91 (15.3)	107 (17.9)	
≥3	593 (49.8)	272 (45.7)	321 (53.8)	
Ever diagnosed with a mental health problem, <i>n</i> (%)	607 (51.7)	288 (49.0)	319 (54.3)	0.066

^a Not applicable^b On a scale where 50 is the mean and 10 is the standard deviation in the US general population^c Chronic health conditions include high blood pressure; heart disease; asthma; COPD (includes emphysema and chronic bronchitis); cirrhosis; Hepatitis B or C; intestinal or stomach ulcers; urinary incontinence; bowel disorders; arthritis; problems walking, lost limb, or other physical handicap; HIV/AIDS; epilepsy; foetal alcohol syndrome or foetal alcohol spectrum disorder; head injury; glaucoma; cataracts; cancer, diabetes; or anaemia

residences for numerous years and, in this sense, were stably housed and deemed ineligible for our study. For these reasons, we modified our sampling strategy to include

sampling of vulnerably housed participants at meal programmes, community health centres, and drop-in centres, which proved to be more accessible for our research staff.

Additional challenges included participants not arriving at scheduled interview times, difficulty in finding private and safe locations to conduct interviews, shelter restrictions that limited the times when participants were present at the site, and identification of individuals who completed the interview more than once, as some participants gave false names so that they could participate multiple times. In order to overcome these challenges, whenever possible, we conducted interviews immediately after a participant was recruited and deemed eligible, used nearby community-based locations to conduct interviews, and cooperated with shelter staff to help with random selection of homeless participants at shelters. Thorough checks based on name, sex, date of birth, and health card number were performed each day; however, despite these efforts, we identified 8 individuals who were interviewed more than once following the end of our recruitment period, resulting in a lower sample size than originally planned.

This study has certain limitations that should be acknowledged. Our study design does not sample homeless populations who do not use either shelters, meal programmes, community health centres, or drop-in centres; however, prior research suggests that this subgroup of homeless people is very small (Crowe and Hardill 1993; Hardill 1993). As well, due to the recruitment issues noted above, our study does not include a random sample of vulnerably housed participants. Individuals considered vulnerably housed who do not use meal programmes, drop-in centres, or community health centres and/or who reside in inaccessible or unidentified SROs or rooming houses may have been missed. In this sense, our sampling strategy may have overlooked extremely marginalized or hard-to-reach populations. We also restricted our sample to single adults who were not living with a partner or dependent children. However, as this study was meant to examine the effect of housing transitions on health over time rather than provide an overall assessment of the health status of vulnerably housed populations in Canada, concerns over the generalizability of our sample are lessened. Our sample may be biased towards only those individuals who are fluent in English or French (the two official languages in Canada). Although interpretation services for other languages were available, it was often not possible to determine a potential participants' preferred language and frequently difficult to re-locate the participant when the interviewer returned with an interpreter.

While we made efforts to ensure that participants were unaware of our eligibility criteria, some participants may have lied about their housing status in order to participate. This issue was especially true during recruitment at meal programmes where potential participants were approached within a common area. While this study attempts to explore individual-level factors associated with housing transitions,

contextual factors such as concurrent programmes and policies occurring at the municipal- or provincial-levels that differ across study sites may influence our incidence rate calculations. For example, the 2010 Olympic Games in Vancouver may have resulted in a precipitous loss of low-cost housing options during our follow-up period, as developers sought to provide profitable accommodations for Olympic visitors and gentrify the neighbourhoods where affordable housing was located (Lenskyj 2002). In order to address this issue, we will stratify our incidence rate calculations by study site.

The paucity of longitudinal research on homelessness and health in Canada restricts our understanding of the course of homelessness, the factors that help individuals escape homelessness, and the effectiveness of services and supports to address homelessness. Identification of these factors holds significant promise as a source of information to guide the creation of effective social and health programmes and policies (Hartig and Lawrence 2003). This multi-site longitudinal study of the health and housing status of homeless and vulnerably housed adults in Canada will provide important insights into the role of housing as a social determinant of health for disadvantaged populations. Data from this study will be used to determine the incidence of housing transitions among homeless and vulnerably housed adults over a 2-year period, the resources and risk factors associated with the attainment of stable housing and the onset of homelessness, and whether changes in housing status are associated with changes in health status, quality of life, and major health determinants.

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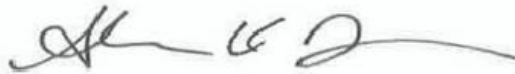
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This is Exhibit "J" referred to in
the Affidavit of Dr. Stephen Hwang of
the City of Toronto in the Province
of Ontario, sworn remotely
before me at the City of Waterloo
in the Province of Ontario on March 23, 2024.

A handwritten signature in black ink, appearing to read 'Shannon Down', written over a horizontal line.

Shannon Down
LSO#43894D

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Harms of encampment abatements on the health of unhoused people

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A B S T R A C T

Introduction: Abatements, or “sweeps,” are key instruments used by local governments to address increasing numbers of homeless encampments, but they are controversial, underdocumented, and understudied. To examine how social policies, such as abatements, impact the health of people who are unhoused, we interviewed unhoused people on their recent experiences with local abatement practices.

Materials and methods: Between 2018 and 2020, we used community-based participatory research approaches and the docent method to conduct participant-guided, in-depth, semi-structured interviews with unhoused people in Santa Clara County (n = 29). We used grounded theory approaches to analyze interview data.

Results: Abatements harmed unhoused people's health through four key mechanisms. First, forced relocation and property seizures stripped people of health resources and necessities (e.g., personal belongings, social support) required to survive unhoused. Second, abatements drove unhoused people into hazardous, isolated, less visible spaces, which increased health risks while reducing access to health outreach workers and support systems. Third, abatements were the grounds for frequent negative encounters between unhoused people and authorities such as law enforcement - interactions that produced anger, stress, and distrust. Finally, distrust of authorities and law enforcement led to people's reluctance to seek or accept formal forms of support and protection. The necessity of self-policing in encampments created cycles of interpersonal violence that resulted in suffering, injury, and premature death.

Discussion: Sweeps undermined or directly harmed unhoused people's health, leading to serious health consequences. Common abatement practices are social policies that may be causal factors in the declining health of unhoused people. Improved documentation, reporting, and tracking of abatement practices are needed.

1. Introduction

For the thousands of people in Santa Clara County (SCC) who have no option but to live outdoors due to the lack of shelters and affordable homes, there are few places one can exist uncontested. Laws and systems labeling unhoused people as vagrants, transients, trespassers, and suspicious persons make their presence a perpetual struggle, even a crime, in most spaces. A key battleground in this struggle is the encampment. Encampments are the tents, wooden pallets, tarps, cars, vans, or other materials set up by unhoused people in order to survive without shelter (Cohen et al., 2019). People who are unhoused, housed residents in the community, business interests, and various local government agencies, including public health, criminal justice, and law enforcement, are stakeholders in the social struggle over the existence of encampments and the right to live outdoors when there is nowhere else to live.

A central apparatus in this struggle is *the sweep*. The definition of a sweep (i.e., encampment sweep, abatement, “move-along” order) is

varied, but in general, the term refers to authorities removing one or more persons from a location in adherence to ordinances that ban staying on a wide range of public or private spaces. If an individual refuses or cannot move, they are subject to citation and potential arrest, and their belongings can be confiscated and discarded. Abatements, and the controversies surrounding them, have a long history in the United States (Baker, 1990; Simon, 1991). The magnitude of abatements has escalated in many cities since the 1990s due to substantial increases in anti-homeless ordinances and technologies facilitating the reporting of neighbor complaints (Craven et al., 2021; Herring, 2019; Herring et al., 2020; Rankin, 2019; Wilking et al., 2018), despite ongoing legal concerns surrounding the constitutionality of sweeps. One example of a constitutional concern is a Ninth Circuit decision banning local governments from citing and arresting people sleeping on public property in the absence of adequate shelter space (Martin v. City of Boise, 2019). The court's underlying conclusion was that the abatement of unhoused people is cruel and unusual punishment when there is no reasonable alternative place to stay.

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Beyond legality, there are debates surrounding the efficacy, cost, and consequences of abatements. Academic studies examining the effects of abatements are limited, but research emerging around the United States, including from government reports and advocacy organizations, consistently show that abatements are costly to city budgets and ineffective at reducing homelessness. In 2019, the City of San Jose spent \$8,557,000 on encampment responses, 57% of which was used for encampment abatements, versus 17% for encampment prevention, and 10% for homeless outreach (Dunton et al., 2020). Due to the lack of effective coordinated documentation and reporting systems, most cities and counties are unable to assess the effectiveness of abatements. However, available detailed reports and audits have shown that abatements result in the dispersal and destabilization of unhoused people, rather than long-term removal from public spaces (e.g. Office of the City Auditor San Diego, 2020; Office of the City Auditor of San Jose, 2018). Arrest records in Chico, California showed that following the passage of anti-homeless “sit-lie” prohibition policies, there were substantial increases in arrests and relocation of unhoused people, at almost twice the cost of official estimates. Locations of arrests occurred incrementally further from the downtown area over time, suggesting that abatement practices pushed unhoused people away from city centers (Wilking et al., 2018). In Greensboro, North Carolina, anti-homeless policies resulted in increased contacts between unhoused people and law enforcement. There were also racial disparities, as Black people who were unhoused reported high rates of racial profiling in police contacts (Craven et al., 2021). During abatements, unhoused people are rarely introduced to viable shelter or housing options. In San Francisco, California, the vast majority (91%) of unhoused people remained outdoors following an abatement, and relocation into housing was rare (Herring et al., 2020). In Denver, Colorado, unhoused survey respondents reported that in over 80% of “move-along” encounters with police, they were forced to move without receiving any information about supportive services (Robinson, 2019).

In health research, there is strong epidemiological evidence that being *unsheltered* while unhoused is a major health risk (Anderson et al., 2021; Lee et al., 2016; Levitt et al., 2009) that is associated with premature mortality (Montgomery et al., 2016; Romaszko et al., 2017; Roncarati et al., 2018). However, evidence specifically linking sweeps to health outcomes is limited. In Denver, Colorado, unhoused people's experiences with abatements led to a range of physical and mental health issues, including poorer sleep, isolation, risk of interpersonal violence, and weather-related health hazards (Westbrook & Robinson, 2021). Ethnographic researchers (Bourgois & Schonberg, 2009; Knight, 2015; Lopez, 2020; Stuart, 2016) have chronicled the ways that policing and criminalization of homelessness - frequently interconnected with policing drug use - have resulted in prolonged exclusion and harassment of unhoused individuals. These ethnographies report a range of poor health outcomes ensuing, from languishing health to overt physical violence. Outside of health research, qualitative studies have examined the effects of abatements on quality of life, justice, and safety. Researchers have shown that abatements result in the loss or destruction of people's property, causing excessive cost and stress for those living unsheltered (Darrah-Okike et al., 2018). The loss of property and continuous relocation are underlying factors in crime and safety risks, as unhoused people are forced to undergo extreme lengths to regain necessities (Herring et al., 2020; Langegger, 2016). Criminalization of homelessness through abatements creates forms of hidden homelessness, as well as a direct pipeline into the criminal justice system, causing additional harm to the unhoused individual (Rankin, 2019, 2021). All together, these studies show that policies that criminalize homelessness are a structural driver of the pervasive destabilization, suffering, and violence that unhoused people experience, which lead to a range of legal, health, and social consequences.

In this study, we set out to investigate the social environmental mechanisms and dynamics created by abatement policies, which set the stage for unhoused people's exposure to health issues and ability to protect themselves. Drawing on community-based participatory research

(CBPR) principles, we explored this topic in a place-based, participatory manner to center the often invisible lived experiences and personal narratives of people who are unhoused.

2. Materials and methods

This study was approved by the Institutional Review Board at Santa Clara University. The data used for this manuscript are a subset of an ongoing qualitative study investigating how local policies surrounding abatements shape people's health in the San Francisco Bay Area. Here we report on in-depth, semi-structured interviews conducted with people who are unhoused recruited between 2018 and 2020 ($n = 29$). We also report based on observations and notes from several months of ethnographic data collection conducted in encampments in SCC during the study period, during which at least one of the authors met and discussed the study topics with unhoused people and wrote detailed memos, but did not formally enroll participants. To be eligible for the study, participants had to be an adult who was unhoused in SCC for at least six months within the last 5 years of enrollment. All participants had personal experiences with encampment abatements.

2.1. Community-based participatory research and the Docent method

Community-based participatory research is a research approach that acknowledges, challenges, and attempts to dismantle the current and historical harm done by academic privilege in health research. It is a set of interrelated principles (Israel et al., 2013; Minkler & Wallerstein, 2011) that informed the study design of this research. Based on CBPR principles, we involved members of the unhoused community as co-leaders of the study development and implementation. We relied on unhoused people's expertise to make decisions about the study, including what topics/concepts to focus on, and what spaces to visit. Based on CBPR, the academic-community partnerships and relationships are ongoing, as we continue to build and strengthen ties between academics and people in the unhoused community.

We used the *docent method* (Chang, 2017) to focus the data collection and analysis on the role of social and built environments, which is a central concept in CBPR. The docent method is a place-based, participant-guided, walking interview approach rooted in grounded theory (Charmaz, 2014) and CBPR principles. The docent method was designed to challenge or reverse the power dynamics of traditional interviews by 1) privileging the leadership and expertise of study participants, and 2) incorporating the everyday spaces and settings that are consequential to health into the semi-structured interviewing process. In the docent method, participants act as docents - resident experts - who guide the researcher on walking interviews through key conceptual sites. In this study, the three “sites of interest” were 1) the personal space of the unhoused person (e.g., tent, vehicle, shelter bed/space), 2) the community space (e.g., shared or open spaces in or around the encampments and shelters), and, for people in encampments, 3) the routes/pathways to and around the encampments. By visiting these conceptual sites guided by the expertise of each participant, the docent method enabled a systematic, participant-led investigation of the environmental, social, neighborhood, and structural factors that impacted people's health.

2.2. Participant recruitment and data collection

Participants were recruited in three stages. First, in Summer 2018, we recruited people living in encampments and vehicles ($n = 14$) using a convenience sample and snowball sampling approaches. R.J.A., who was formerly unhoused and has longstanding relationships with members of several key encampments, contacted or approached potential participants to inform them about the study. We focused on three semi-durable encampments for recruitment, locally known as the Bassett, Tully, and Roosevelt encampments. Interviews took place on-site at the encampments, in a semi-private location selected by the participant.

Next, we recruited people staying in shelters ($n = 9$), all of whom had prior experience living in encampments and/or vehicles. Participants were recruited at a large shelter facility in San Jose with the support of staff who posted flyers advertising the study, distributed information sheets, and provided interview rooms. Study participants were interviewed in a private room, then each participant guided us around their personal spaces (e.g., cot, room), and around the facility, including shared spaces and outdoor recreation areas.

In March 2019, at the start of the COVID-19 pandemic, we redesigned the study into a virtual format in order to comply with restrictions to in-person research. Participants ($n = 6$) were recruited by two community-based organizations that provide services to people who are unhoused. Eligible participants were given information sheets about the study, and asked to contact the researchers, who then set up virtual interviews on Zoom or by telephone.

All study participants provided informed consent prior to enrollment. Interviews were recorded using a digital audio-recorder. We used a semi-structured interview guide to cover interview topics, focusing on experiences with shelters, encampments, abatements, and health. The interview process took between one to two hours. During the docent method interviews, we took photos of the physical surroundings using a cell phone camera, avoiding identifying photographs of people's faces. At the end of the interview, we gave each participant twenty dollars in cash or gift card, and in-person interview participants received a care package containing food and personal care items.

2.3. Data analysis

All audio files were transcribed verbatim with identifying information removed. All participants were assigned pseudonyms. All transcripts were uploaded into ATLAS.ti for storage, coding, and analysis. The transcribed data were analyzed by three researchers using grounded theory data analysis approaches (Charmaz, 2014). First, we listened to all of the interview audio files as we reviewed transcripts and field notes for each interview. Reviewing the transcribed data, we conducted initial line-by-line inductive coding of a portion of the interviews. We wrote memos on broad theoretical and substantive topics drawn from initial impressions and interpretations, and organized these memos into an initial set of inductive codes. Next, we used this initial set of inductive codes to code all transcripts in ATLAS.ti. The initial set of inductive codes was supplemented by emerging concepts from the transcript coding. We then listened to the original audio files while reviewing and re-coding interview transcripts. Some codes clustered thematically and were analyzed together. We focused on queries for the codes "encampment experiences" and "encampment abatements" for analysis.

3. Results

For context, in SCC, abatements are initiated based on neighbor complaints, but also on grounds of environmental protection and sanitation. Santa Clara County, known as Silicon Valley, is a large, 1300 square mile, geographically diverse region, and a substantial portion of unhoused people stay in fairly remote outdoor spaces, such as in sites near the forested hills, rivers, creeks, abandoned lots, and industrial spaces interspersed throughout the county. Santa Clara County has among the highest proportions of *unhoused-unsheltered* people in the United States (Turner, 2017). The 2019 unhoused point-in-time count estimated that approximately 9700 unhoused people live in SCC, with 82% living unsheltered. The unhoused-unsheltered population increased 45% (5448 in 2017 to 7922 in 2019) since the 2017 point-in-time count (Applied Survey Research, 2019).

An audit of homeless service programs in San Jose showed a sharp increase in abatements following a 2015 lawsuit to keep waterfronts clean (Office of the City Auditor of San Jose, 2018). Abatements involve a constellation of city departments (e.g., housing, transportation, police, fire, parks and recreation, etc.), abatement contractors, and community

organizations. Though the protocols and practices involved vary, in general, unhoused people are required to remove themselves and their property from a location within 72-hour following notification ("getting posted"). Abatement workers are typically accompanied by law enforcement, who have the authority to seize and discard belongings, issue citations, or even arrest people who do not comply with orders to move (Office of the City Auditor of San Jose, 2018).

The study participants were closely split between women (51.7%) and men (48.3%). Almost half of participants self-identified as Latino (48.3%), 31% as White, 17.2% as Black, and 3.4% Asian Pacific Islander. At the time of the interview, 15 (51.7%) participants were living in encampments, 9 (31%) in shelters, 4 (13.8%) in vehicles, and 1 (3.4%) recently in supportive housing. Most participants were older than 50 (27.6% age 50–59, 31% age 60+), 9 (31%) were in their forties, 2 (6.9%) in their thirties, and 1 (3.4%) was in their twenties.

We report on our grounded theory analysis of participants' experiences with encampments and abatements, focusing on the social environmental mechanisms through which abatements affected their health.

3.1. Forced removal and property seizure destabilized people, and dispossessed them from resources (belongings, social support) needed to survive unhoused

At a basic level, abatements harmed the physical and emotional health of unhoused people by dispossessing them of the belongings they need to survive outdoors - belongings that were often painstakingly procured. Participants reported that during sweeps, their personal belongings of all kinds were taken and discarded by authorities (Image 1). Belongings that were necessities for survival (e.g., medications, tents, blankets, essential records/documents) were routinely seized. Nina, a Latina woman in her fifties and a San Jose native, had been living intermittently in her encampment located in a forested area near Coyote Creek for eleven years. She stayed in a tent, situated under a tarp strung between tree branches. During her interview, she thought back on the destabilizing effects of the prior year when her area was swept every few weeks. She became hypervigilant and unable to let her guard down, because sometimes, her camp would be given a 72-hour notification of an impending sweep, and other times, abatement contractors came without warning. If Nina could not carry her belongings away, everything she needed to survive would be gone, decimating her ability to stay healthy:

Every two weeks ... They would come, and they would sweep. Sometimes they would put up [72-hour] notices, sometimes they wouldn't. A few times, they came and wiped out everything of everybody's. Clothes, food ... It didn't matter what it was. If you had it there, they took everything. Tents. Then you were left with no clothes, no food, nowhere to stay, no blankets or anything. What they're doing is, they're keeping us down. Because then you gotta work harder. You're not able to go to work and make money.

Another participant, Sammy, exemplified the dehumanization and psychological stress of abatement property seizures, and used the term "inhumane" to describe them. Sammy is a White woman in her thirties, and a U.S. Military Veteran, who we met while she was staying at a shelter. During her service and following discharge, Sammy experienced a series of violent traumas and became addicted to opioids. She was a young mother, but tragically lost her youngest son when he was an infant. Sammy, a poised and articulate soldier, choked back tears as she recounted the first major sweep she endured, during which the only remaining photograph she had of her son was discarded. Her account of personal, irreplaceable possessions being seized and tossed away was common among participants. Sammy thought she had an arrangement with the abatement authorities - if she kept the area tidy, they would not sweep the encampment. One day, she discovered the deal was off:

Our first real experience with being swept, we had a guy come up and check our camp out. He goes, "If you clean it up and it looks good, you



Image 1. July 2019. The final day of the abatements at Bassett encampment, after most residents, including Maria, had vacated. Pictured is a tent being discarded as abatement workers cleared the site.

can stay.” And I said, “Okay! I’ll have it cleaned.” We got it spotless. There was not a piece of paper anywhere in the half block radius of my spot. We made it habitable. Well, they took everything. They took the last picture I had of my son. One of their workers ripped it up, in front of me. It’s just inhumane.

Beyond causing material losses, psychological distress, and emotional trauma, encampment sweeps disrupted social connections. Encampments are frequently depicted as nuisances or dangerous spaces, but participants were clear that, in the absence of alternatives, their encampment site was the safest place available to them. We recorded numerous examples of unhoused individuals bonding at their sites, watching out for one another’s property, gathering for meals, and checking in on each other regularly. Even strangers, tacitly understanding their common circumstances, went out of their way to help one another. For example,

Ted is a White man in his late thirties, a U.S. Military Veteran, and the informal leader of his tight-knit encampment. Abatements break up communities, which, Ted explained, were cautiously constructed over time. In his encampment, people supported one another, a dynamic that was hard to come by:

We enclose this area to people that we know, or that we can trust. Because you start getting a camp full of people you don’t know, then you don’t know what’s going on with your stuff while you’re gone. People start stealing your things. So we try to keep it a community here. We’ve got a group of people around us that we’ve known for a while, so we consider it more of a community. We help each other out with food. Some of these people who get food stamps pitch in for food during dinner and we all throw in something to cook, so that helps out with the people who don’t get stamps.

These participants described how common abatement practices resulted in the increased destabilization of unhoused people through the seizure of health necessities and irreplaceable personal belongings, and displacement of community support needed to survive outdoors.

3.2. Abatements pushed unhoused people into hazardous, isolated, often remote areas that were less accessible to health outreach workers

To avoid being swept or forced to move along, unhoused people need to be invisible in plain sight. In response to the threat of abatement orders, unhoused people in SCC have adapted by moving to more isolated, secluded areas that are less likely to be seen and swept. Largely through personal experiences and word of mouth, they have deciphered some of the myriad of abatement patterns and practices, and learned what areas are safer from frequent sweeps. Oftentimes, places that are safer from abatement are those that are difficult to access and less visible to the public. In SCC, these are hazardous spaces, such as the land along train tracks, along or under freeways, behind industrial buildings, on construction sites or empty lots, and deep in forested creeks and hills. That is, sweeping practices effectively push unhoused people into acutely risky places that are isolated, remote, and largely out of reach from public health services and homeless service providers.

For example, Maria, a Latina woman in her fifties, is one of the original members of the Bassett encampment whom we interviewed on several occasions. She settled on the spot alongside the train tracks upon figuring out that three local jurisdictions, who did not coordinate their efforts, owned different parts of the property - the City of San Jose, Union Pacific Railroad, and CalTrans. An abatement by one jurisdiction simply meant that encampment residents could relocate across the street to another jurisdiction's property. As she guided us along the stretch of land occupied by tents, the health risks were apparent. There were no sources of water or bathrooms nearby. Tents, which were often on dirt and gravel, flooded in the rain. Staying alongside the train tracks exposed residents to smog and pollution, including noise pollution, as screeching freight trains passed through every hour, every day, around the clock.

The location put the encampment residents at risk of mortal injury. Maria recounted several incidents of people being injured or killed by trains. Media reports have shown that in California, the number of unhoused people dying from collisions with trains is increasing (Swan, 2019). Yet amid these risks, Maria lived twenty unprotected feet from a moving freight train line because it was a good place to avoid abatements (Image 2). She put herself at risk to reduce the impact of sweeps:

Interviewer: How did you decide on this particular site, out of all of the places in San Jose, to set up?

Maria: Because they can't come over here and give us a paper and tell us to move. They can't. They can't sweep up. This belongs to the train company. So if the train company comes and tells us, "Out!", because it's dirty or whatever, then we have to leave. But we've been here going on five months. All the other camps they had to leave [because it was] too messy, and it wasn't a proper place to be.

The Bassett encampment was fairly conspicuous, visible to residents in an adjacent apartment complex and office building. For most unhoused people, reducing visibility was an essential adaptation to abatements. For example, Martha, a White woman in her fifties, lived in a van with her spouse. The couple was unhoused and unsheltered in encampments for years, but five years ago purchased the van. They equipped it with a narrow twin mattress, mini-fridge, storage, and a hotplate. They usually stayed in the parking lot of a mall, where Martha got informal "permission" from the store manager to park occasionally. In her van, Martha could stay hidden from public judgment, and drive away if detected. She informed us that people staying in visible encampments did not fare well:

They sweep them all the time. There's a small encampment over there at that park over there, Columbus Park. There's one in the middle of the field, and then there's another one across the way in the trees over there. You can see them from the street, that's why they're not going to last that long ... That's just the way it is. [Abatement authorities] say, "I don't care where you go, but you can't stay here."



Image 2. June 2018. Peering out of Maria's tent at Bassett encampment. A man sleeps under a blanket on the reclining couch as a freight train screeches by. Maria stayed in this community with several dozen other individuals because the site was swept less frequently.

The risk of visibility forced unhoused people into living long term in environments that were unsustainable and inadequate for maintaining health (Image 3). Nina, introduced above, lived near the creek, in a spot sheltered by tarps tied to tree branches. Residents staying by the creek explained that the location had no access to electricity or clean water for cooking, cleaning, or bathing. The cellular phone signal was spotty. Without electricity, it was pitch black most nights. We saw several camps burned to the ground from campfires, and other sites were washed away by the creek during seasonal floods (Image 4). Amid these hazards, fifty or more people lived in small camps on a half-mile footpath along the creek. The invisibility and inaccessibility of the location - which could only be accessed by hiking along a dirt path, crossing car gates and wire fences - exposed Nina to health and safety risks, but it appealed to her because it was safer from abatements. When looking for a place to set up in the forest, she said, “You look for the flattest spot. The almost hidden, but not hidden. And you look for who you’re living next to you, because that truly matters ... You want to try to get a spot where it’s not that accessible.”

When unhoused people become invisible to escape abatements, they are also invisible to health outreach workers and other “outside” support systems, cutting off a lifeline. For example, in SCC, public health workers, such as the Backpack Homeless Healthcare Program (“backpack medicine” teams) - a street medicine program run through the county hospital - play an essential role in homeless outreach. Teams of health care providers travel to encampments and provide on-site emergency and basic health care services, as well as providing referrals. Several participants knew the backpack medicine providers by name and eagerly anticipated their visits. However, because unhoused people’s risk assessment favored remaining hidden, medical teams encountered persistent issues locating patients in encampments. In one example, Ted, introduced above, told us he suffered from injuries related to his time in the military. The backpack medicine team visited his encampment every few months, but Ted had not seen them in a year because he had to move to a more secluded location (Image 5):

There is a really great group of doctors who come through here on foot. I think they come through maybe every few months ... I haven’t seen them in a little while and it seems like every time they do, they’ve asked about me, but I haven’t actually talked to them. My sister has talked to them ... I don’t know if they’ve been down here or not. Or if I’ve just missed them because I’m off in the bushes now, further away, or if they just haven’t been here in a while.

In adapting to sweeps, unhoused people relocated to hazardous, riskier, often less visible spaces, an outcome that had detrimental impacts on health. Moreover, this was at odds with public health efforts to locate people, provide on-site services, and maintain consistent contact, further magnifying the harm of social exclusion on unhoused people’s health.

3.3. Abatements increased hostility and distrust between unhoused people and authorities, especially law enforcement

Orders to move were commonly carried out by or alongside law enforcement, resulting in frequent tense, hostile interactions between unhoused people and police. Several participants mentioned their efforts to be friendly and stay on the “good side” of police and abatement workers. Some recounted positive interactions, in which specific police officers offered support. However, such interactions were rare. Most commonly, participants reported that police officers used their authority to harass, disrupt, and, notably, to send the message that unhoused people were unwelcome. Ted, introduced above, was convinced that the purpose of the sweeps was not to clean up encampment sites or promote sanitation, but to cause suffering to the extent that unhoused people do not, or cannot, return. From his perspective, causing distress to unhoused people was itself the objective. He referred to abatements as a form of “state-sponsored harassment.” He told us about one morning when he returned to his encampment to find his tent and belongings were gone:

Slowly but surely, [abatement workers] have come more frequently, but cleaned up less. They’re just trying to bounce us from place to



Image 3. June 2021. A small section of the Columbus Park encampment, referenced by Martha as a site that will eventually be swept. The large encampment is located on empty, open lots adjacent to San Jose Mineta International Airport, which were razed and abandoned decades ago to create a flight path. The encampment population swelled during the COVID-19 pandemic.



Image 4. July 2018. The remainder of a campsite near the Guadalupe River, a secluded, forested area where Nina preferred to stay hidden from sweeps. Sites at the bank of the river were prone to being swept away by seasonal flooding.



Image 5. August 2018. Ted's former encampment under the freeway overpass, occupied by his younger brother. We reached this site by traversing the unpaved path between the freeways and creek system. We hiked along the creek, crossed an abandoned train rail, and jumped over security gates to access this location. Ted relocated from this section to an even more secluded area in a nearby field.

place hoping that we don't come back Most of the time the cops come down the minute the [abatement workers] are here. Cops let anyone who's still around know that they can no longer grab their stuff. Whatever is left now belongs to [the abatement workers]. People gotta get out of here or they'll be arrested ... Now, they don't clean up any of the garbage. What they do is they just take our personal property if we haven't been able to move it out in time.

Ted's descriptions of the aggravation and grief caused by law enforcement during abatements were echoed by several other participants. Izza is a Latinx transgender woman in her fifties who has been unhoused in SCC for over ten years. When we met her, she and her partner were staying in a collection of tents, cardboard, shopping carts, and tarps alongside a fence surrounding a vacant lot that had been cleared for a construction project. During the daylight hours, the couple

pushed a shopping cart with five-gallon water containers and a small dog to a sidewalk with tree shade near a strip mall parking lot. By moving to the shade, Izza risked being noticed and encountering police, but decided it was worth the momentary reprieve from the heat. She told us that from her perspective, the police were the source of instability and greatest misery:

(Translated from Spanish) Things have been awful. There has been a lot of trouble. Not only with other people, but with the police. They are very cruel. They give me citations for no reason, they tell me to move - all in the same day. Throw me out, and look through my things for no reason. They treat me like I am a criminal. I will tell you, my only crime is not having a place to live or sleep in. Even on rainy days they don't have compassion, they kick me out, too, and we get all wet. We have had to move too many times in the same night.

Steven, a Black man in his fifties, occasionally stayed at the Bassett encampment when he was unable to get a bed at the large homeless shelter. He became unhoused four years prior, when his wife's terminal illness put their family in major medical debt. Staying near the train tracks in a tent, working to recover from financial and emotional grief, Steven grappled with what he viewed as law enforcement's indifference toward people's personal hardships. He viewed sweeps as a form of harassment that worsened an already painful period in his life:

The police, when they [sweep], they come on the premises at 6 o'clock or 7 o'clock in the morning, beating on people's tents, say, "Hey. Come on out here. We've got some goodies for you." And then you find out it's the police. They serve you, put a notification on your tent. That's their strategy. They come in their gear and all that. And there's nothing you can do. [Police,] why are you bothering me? You see what I'm going through. Why are you over here bothering me? Some of these encampments are clean. Some of these encampments are kept well up. The police are aware, but it's harassment.

Maria, introduced above, described her efforts to de-escalate the stressful encounters with abatement authorities at the Bassett encampment, back when the site was swept every three months. She recalled when the police tried to intimidate her into leaving ("running"), but she remained, refusing to be treated like a criminal when she had done nothing wrong in her mind:

Packing our bags, packing our carts, and moving to a different spot, that's tough ... I bribe [abatement authorities]. I make them burritos. I give them a sandwich and water ... But they bring a [police] officer. They don't scare us! Maybe they can help us instead of trying to scare people! The [unhoused] people that get scared, they all run. They see a cop, they run. But why are you guys running? They'll go, "Run, Maria, run." Why am I gonna run? Why should I run? I haven't been in trouble since 1988, and that was just for tickets.

The psychological stress and dehumanization experienced by unhoused people, resulting from abatement practices oriented around law enforcement, fortified participants' skepticism and distrust of authorities.

3.4. Distrust in law enforcement increased self-policing and interpersonal violence in unhoused communities

I want the police officers to apologize for all these years, for degrading my humanity ... I'm just so angry every time I see them. Oh, my God, if I could just ... Maybe they'll disappear, because you made my life pure hell, every time I walk down the street. Every time. Every time.

Alexa, a Black woman in her forties, who is quoted above, expressed her outrage at the treatment she received from the police while living unsheltered on the streets. Partly due to the hostility spurred by abatements, law enforcement was largely viewed by participants as a threat and risk. As a result, participants often refused or were reluctant to

contact or interact with police, even in serious, life-threatening situations. To participants, contact with police placed them at greater risk of harassment and arrest, which outweighed the potential benefit of protection. For example, Miranda is a Latina woman in her fifties who was born and raised in San Jose, and was unhoused for several years, but was living in supportive housing when we met her. She recalled the day, five years prior, when her ex-husband was fatally stabbed in a large encampment north of downtown San Jose, known as the Jungle. Miranda called 911 for an ambulance, angering other residents of the encampment:

Because of everything that is going on, a lot of [unhoused] people take justice into their own hands. Which they shouldn't ... They don't trust the cops at all ... Before my ex passed away, they stabbed him up there in the Jungle. I had to [call] 911. Had to wait for enough officers to go down there. They had 15 officers behind me carrying their guns ... I pointed out the direction where my ex was, because he didn't want to get help. He had been stabbed six times ... Everybody was mad at me because I called the cops. Dude, I didn't call the cops, I called the ambulance! But they assume I sent the whole city of San Jose. Still, I think I did the right thing.

In the absence of police, Miranda described that people "take justice into their own hands" in encampments. Over the course of the interviews, several participants described brutal accounts of violence in the encampments, including sexual violence. Sammy, who is introduced above, informed us in detail that in the prior year, she was kidnapped, and physically and sexually assaulted by a stranger. Not trusting law enforcement, and viewing them as ineffective, she did not inform the police or file a police report. One morning, months after the assault, she saw the attacker on the street. When she told her husband, he was determined to seek retribution and settle matters himself. She pleaded with him that retribution was not worth the risk of being caught by law enforcement:

[In encampments] you have no restrictions, you have no rules, except for the rules of law. Even those have been bent, broken, and moseyed around. Even the law will overlook you sometimes. I didn't report [the attack], but [the police] already knew [about the attacker], and that guy's still out there. I encountered him once riding my bike. I almost crashed my bike as soon as I saw him. I rode back as fast as I could, and [my husband was] like, "what was that about?" I told him, "that was him." My husband was like, 'I will chop his head off right now.' I said, "you can't do that. There's too many cameras, you can't do that. I'm not condoning the [assault], but you just can't do that." That's just too much to have to put up with, and I don't want that on my conscience, or on his conscience.

As noted in Finding 1, many congregate encampments were self-managed, with residents developing their own cultures and systems for surviving. There were several examples of self-managed encampments that were operated by tight-knit and supportive communities, such as the one Ted described. In most cases however, self-management in encampments involved self-policing, and, at times, forceful and violent enforcement of informal rules. Nina, who is introduced above, told us about the unofficial "leader" of her encampment by the creek, who created and enforced rules. Interpersonal violence between unhoused people frequently erupted as a result:

Everybody has their little ways. Just recently, we've been having a problem with Little Hitler, I call him. He's trying to be a Hitler here. He has a new rule, and I don't live by his rules ... Basically we're all together, and we try to live together. If we can't, then we either tell the person higher up. If [higher ups] don't do anything, then we try to not be vigilantes. But me? I'm tired. I'm going to hit you if I feel threatened. I'm going to hit you. It's not like I want to do it, but I'm going to do it. If I feel like you're going to come and ruin my space or ruin anything for me or mess with mine, I'm going to do it.

Nina resorts to physical violence to protect herself because she cannot rely on others to help her - not the police, or even others in her encampment. In this context of exclusion from forms of support, she described that encampments can become susceptible to influence from organized crime.

[The gangs] had their laws down there. If you weren't wanted there, they would get your stuff, pack you up, and throw you out. You were gone. A lot of killings, a lot of bodies. Lots of, lots of bodies. That is MS-13's territory. What do they do when they do something? There were a lot of murders, a lot of things like that.

With no formal ways to pursue justice, these conditions entangled some unhoused people into cyclical, entrenched forms of violence, with serious health outcomes. For these individuals, encampment sweeps were an upstream, fundamental cause of downstream interpersonal violence, injury, and death.

4. Discussion

Drawing from unhoused people's narratives of their lived experiences in encampments in SCC, we described four interconnected ways abatements harmed their health: 1) forced relocation and property seizures severed people from possessions, resources, and social supports needed to sustain health; 2) abatements were the underlying reason people relocated into more isolated, hazardous, and remote spaces, which amplified health risks while reducing access to support systems such as health outreach workers; 3) abatements were viewed as a form of harassment, a persistent source of distress and tension between unhoused people and authorities; and 4) distrust caused unhoused people to avoid law enforcement and other authorities altogether, increasing self-policing and the risk of interpersonal violence in encampments. In these ways, we argue that unhoused people's health is harmed directly through encampment sweeps, or through the perilous social environmental conditions created by them.

There are several implications of this research and areas of needed future inquiry. First, in light of the health harms of abatements, we hypothesize that abatement practices may be a key structural factor explaining the soaring numbers of people who are dying while unhoused in SCC. The number of unhoused people dying annually in SCC has increased from 60 deaths per year in 2011, to 203 deaths in 2020 - rising almost every year (Jordan & Wells, 2017), a stark indication of worsening health in this population. Abatement rates are not routinely reported, but an audit of San Jose homeless services showed that in an overlapping time frame, there was a sharp increase in abatements taking place - one estimate indicating a leap from 49 sites in 2013 to 564 sites in 2018 (Office of the City Auditor San Jose, 2018). Overlapping increases do not necessarily indicate a relationship, but given our findings on the health harms of abatements, further research is warranted investigating the scope, dimensions, and directionality of the relationship between abatement practices and health outcomes such as mortality.

Given the growing body of research showing the consequences of abatements on human health, findings like these call into question the practical effectiveness and acceptability of common abatement practices. Abatements have been shown to have destabilizing effects, major health consequences, and cause psychological suffering to unhoused people. They create logistical burdens to public health outreach efforts. Abatements also counter public health logic and street medicine practice recommendations for unhoused people, which call for increasing stability, developing trust, and maintaining ongoing contact with outreach workers and health systems (Stefanowicz et al., 2021; Withers, 2011). In some regions, moratoriums and restrictions on abatements have been enacted given the potential health harms. In California, some counties (e.g., Alameda County) placed limitations on encampment abatement practices, restricting abatements when there are no shelter beds available (per the 2018 decision by the 9th U.S. Circuit Court of Appeals cited

above). In response to COVID-19, several counties in California, including SCC, initially enacted moratoriums on encampment abatements to reduce capacity in the shelter system and allow unhoused people to practice social distancing outside. However, since March 2021, abatements have resumed.

One theme that is apparent through the interviews is that society's heavy reliance on law enforcement in the management of encampments has long term, serious ramifications on people's health. As an alternative to current practices, researchers and advocacy organizations have supported restructuring abatements in favor of models that are less police-oriented and more driven by public health. These can involve specialized police units that exclusively focus on homelessness (e.g., Wichita, Kansas), that respond alongside providers or social workers (e.g., Philadelphia, Pennsylvania; Eugene and Portland, Oregon), and models where service providers or social workers respond to calls without automatic police involvement (e.g., San Francisco, California; New York, New York) (Batko et al., 2020; Townley & Leickly, 2021). In 2020, the San Jose Police Department began a small new pilot program, Mobile Crisis Assessment Team (MCAT), partnering police officers with behavioral health teams to provide a police presence in encampments geared toward de-escalating conflict, crisis management, and harm reduction, instead of only enforcement. These alternative models to police-focused abatements are promising strategies in reducing the health harms of abatements if they are appropriately scaled.

There is also an urgent need for improved documentation, reporting, and tracking of abatement practices, such as types of outreach efforts provided, prevention efforts, demographics of unhoused people who are posted and swept, and abatement-related incidents. In most counties, there is no integrated system for documenting abatements, and sweeps are conducted by a network of organizations - public, private, non-profit. There is no systematic, coordinated way to track, analyze, or report the effectiveness of abatements, nor to assess accountability during abatements. Such data and coordinated tracking systems are needed in local governments to understand the impact of sweeps on unhoused people and the broader community.

Fundamentally, the vast majority of people who are unhoused are living in encampments because there is no alternative when the cost of living is substantially higher than wages. A home is a necessity for basic health and safety. There is an urgent need for long term housing for unhoused people, an issue that requires stronger housing policies beyond the local level, needing to be addressed at the state and federal levels. At the local level in SCC, there is a commendable focus on prioritizing permanent supportive housing, but given the severity of the current housing crisis, there is also an immediate need for wide ranging solutions to unhoused people's health needs. Recognizing the persistent harms that stem from living on the streets for thousands of people, alternative interventions include moving people into hotels, expanding capacity in the shelter systems, providing basic health services in encampments (e.g., food, water, bathrooms, hygiene, medical services), creating safe parking locations with supportive services, funding substance use treatment outreach, and bolstering street medicine outreach. Policy efforts should also focus on interventions that prevent low income individuals from losing housing, such as investments in affordable housing and stronger eviction protections for renters.

There are limitations to this study that require future research. One limitation is that we focused on the health effects of abatements in encampment settings and did not examine how abatements shape people's medical care in health care settings. People of different genders, races, ethnicities, sexualities, and documentation statuses have wide-ranging experiences with encampment dynamics, law enforcement, and abatement authorities that we were not able to analyze fully for this manuscript. In the interviews with unhoused participants, we did not differentiate between abatement practices of different magnitudes (e.g., large-scale abatement of congregant, durable encampments; routine move-along orders of individuals).

The health harms of encampment abatements are preventable. It is common in health research to focus on individual-level factors, such as age or health comorbidities, including substance use or mental health. Another frequent area of focus is social determinants of health, which can include built environments or social networks. This analysis contributes to a growing body of evidence that demonstrates how structural determinants - such as *social policies* created to manage homelessness - ultimately undermine their health. As the numbers of unhoused people's deaths continue to soar every year, there is an urgent need to reimagine social policies with the goal of reducing preventable suffering and untimely deaths of unhoused people.

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**MICHAEL NANOS AND JOSEPH
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and

**THE CORPORATION OF THE CITY OF
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Defendant

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MOTION RECORD - VOL. I

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