

Health Quality Ontario

Ontario Health Technology Assessment Series

Interventions to Improve Access to Primary Care for People Who Are Homeless: A Systematic Review

KEY MESSAGES

People who are homeless are more likely to become ill and die early than are people who are not homeless. They need more health care, but also have problems getting it (e.g., many do not have a family doctor). Some reasons for this are fear of discrimination, problems getting around, and putting other needs, such as food and shelter, before health care. We reviewed studies of programs meant to improve access to a primary health care provider, such as a doctor, nurse, or nurse practitioner, compared with not receiving such programs. We looked at how many people had a health care provider or had visited a health care provider. We reviewed five studies looking at a variety of programs, including outreach (an examination by a health care professional, typically a nurse, along with a review of the results of the examination), orientation (the provision of information about services at the clinic), combining health care with other services that people who are homeless seek, and housing with supportive services. The most reliable study showed that people who receive either outreach plus clinic orientation or clinic orientation alone have better access to a primary health care provider than those who do not.

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SYSTEMATIC REVIEW AT HEALTH QUALITY ONTARIO

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ABSTRACT

Background

People who are homeless encounter barriers to primary care despite having greater needs for health care, on average, than people who are not homeless. We evaluated the effectiveness of interventions to improve access to primary care for people who are homeless.

Methods

We performed a systematic review to identify studies in English published between January 1, 1995, and July 8, 2015, comparing interventions to improve access to a primary care provider with usual care among people who are homeless. The outcome of interest was access to a primary care provider. The risk of bias in the studies was evaluated, and the quality of the evidence was assessed according to the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) Working Group criteria.

Results

From a total of 4,047 citations, we identified five eligible studies (one randomized controlled trial and four observational studies). With the exception of the randomized trial, the risk of bias was considered high in the remaining studies. In the randomized trial, people who were homeless, without serious mental illness, and who received either an outreach intervention plus clinic orientation or clinic orientation alone, had improved access to a primary care provider compared with those receiving usual care. An observational study that compared integration of primary care and other services for people who are homeless with usual care did not observe any difference in access to a primary care provider between the two groups. A small observational study showed improvement among participants with a primary care provider after receiving an intervention consisting of housing and supportive services compared with the period before the intervention. The quality of the evidence was considered moderate for both the outreach plus clinic orientation and clinic orientation alone, and low to very low for the other interventions.

Despite limitations, the literature identified reports of interventions developed to overcome barriers in access to primary care in people who are homeless. The interventions studied are complex and include multiple components that are consistent with proposed dimensions of access to care (availability, affordability, and acceptability).

Conclusions

Our systematic review of the literature identified various types of interventions that seek to improve access to primary care by attempting to address barriers to care encountered by people who are homeless. Moderate-quality evidence indicates that orientation to clinic services (either alone or combined with outreach) improves access to a primary care provider in adults who are homeless, without serious mental illness, and living in urban centres.

TABLE OF CONTENTS

LIST OF TABLES	5
LIST OF FIGURES	5
BACKGROUND	6
Interventions.....	7
Context	7
Research Question	7
EVIDENCE REVIEW	9
Objective	9
Methods.....	9
<i>Population</i>	9
<i>Intervention</i>	9
<i>Comparator</i>	9
<i>Outcomes</i>	9
<i>Timing</i>	9
<i>Sources</i>	9
<i>Literature Screening</i>	10
<i>Inclusion Criteria</i>	10
<i>Exclusion Criteria</i>	10
<i>Outcomes of Interest</i>	10
<i>Data Extraction</i>	11
<i>Statistical Analysis</i>	11
<i>Risk of Bias</i>	11
<i>Quality of Evidence</i>	11
Results	12
<i>Literature Search</i>	12
<i>Study Design and Characteristics</i>	13
<i>Methodologic Quality of Included Studies</i>	14
<i>Results for Outreach Interventions</i>	15
<i>Results for Integration of Services</i>	18
<i>Results for Housing and Supportive Services Interventions</i>	18
Discussion	21
<i>Strengths and Limitations</i>	21
Conclusions.....	23
ABBREVIATIONS	24
APPENDICES	25
Appendix 1: Interventions to Improve Access to a Primary Care Provider Among People Who Are Homeless	25
Appendix 2: Literature Search Strategies	27
Appendix 3: Design and Characteristics of the Studies Included	31
Appendix 4: Risk of Bias in Studies Identified.....	35
Appendix 5: Baseline Characteristics of Study Participants	38
Appendix 6: Results of Studies Included	41

Appendix 7: Evidence Quality Assessment	46
REFERENCES	47

LIST OF TABLES

Table 1: Definition of Homelessness in Studies Identified	14
Table 2: GRADE Evidence Profile for Comparison of Outreach and Clinic Orientation Intervention and Usual Care	16
Table 3: GRADE Evidence Profile for Comparison of Integration of Services and Usual Care ..	20
Table 4: GRADE Evidence Profile for Comparison of Housing Plus Supportive Services and Usual Care	20
Table A1: Description of Types of Interventions to Improve Access to a Primary Care Provider Among People Who Are Homeless	25
Table A2: Studies Evaluating Effectiveness of Outreach Interventions.....	31
Table A3: Studies Evaluating Effectiveness of Integration of Services for People Who Are Homeless	33
Table A4: Studies Evaluating Effectiveness of Housing and Supportive Services for People Who Are Homeless.....	34
Table A5: Risk of Bias for Studies With Separate Control Group ^a	35
Table A6: Risk of Bias for Before-After Studies With No Control Group ^a	37
Table A7: Baseline Characteristics of Participants in Studies Identified	38
Table A8: Results of Randomized Controlled Trials Evaluating Effectiveness of Outreach Interventions.....	41
Table A9: Results of Observational Studies Evaluating Effectiveness of Outreach Interventions.....	42
Table A10: Results of Observational Study Evaluating Effectiveness of Integration of Services	43
Table A11: Results of Observational Studies Evaluating Effectiveness of Housing Services Interventions.....	44

LIST OF FIGURES

Figure 1: Logic Model.....	8
Figure 2: PRISMA Flow Diagram	13

BACKGROUND

The definition of homelessness is broad and includes people living on the streets or other places not intended for human habitation; living in shelters; lacking a fixed, regular, and adequate nighttime residence^{1,2}; temporarily staying with friends and relatives; and even those at risk for homelessness.^{3,4} The definitions include single men and women, youth, families with children, people of different ethnicities, immigrants, and refugees.³ For most, homelessness represents a single short-lived event.^{3,4} Some, however, remain homeless for long periods (chronically homeless) or experience multiple episodes of homelessness.⁴

Studies have shown that people who are homeless have higher morbidity and mortality and a higher prevalence of substance abuse and mental illness than the general population.⁵ Even within a context of universal health insurance and despite a higher need for care, people who are homeless encounter barriers to obtaining primary care.⁵ Barriers include a lack of proof of health insurance, difficulty making appointments, fear of discrimination from health care providers, lack of transportation, long wait times, and competing priorities, such as food and shelter needs, over health care.^{6,7} Mental illness diagnosis, substance abuse,⁸ and a longer duration of homelessness further diminish the likelihood of receiving medical care. People who are homeless also have a high rate of emergency department visits, are more frequently hospitalized as inpatients,⁹ and receive less preventive care than people with stable homes.⁸

An estimated 150,000 to 300,000 Canadians are homeless in a given year.¹ In 2002, approximately 32,000 persons in Toronto slept in homeless shelters.¹⁰

Primary health care has been defined by the World Health Organization as “the first level of contact of individuals, the family and community with the national health system bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care process.”¹¹ Having a primary health care provider is important, as it represents the entry point to the health care system and provides continuity of care.¹⁰

Access to health care was defined by Levesque et al as “the opportunity to reach and obtain appropriate health care services in situations of perceived need for care.”¹² Access to health care is complex and can be a factor in meeting a person’s health care needs, the ability to perceive such needs, the desire for care, the person’s health care-seeking behaviour, the ability to reach health care, and obtain the appropriate service.¹²

According to McIntyre et al,¹³ “access to health care represents the *empowerment* of an individual to use health care and reflects an individual’s capacity to benefit from services given the individual’s circumstances and experiences in relation to the health care system.” Their conceptual framework for understanding access to health care defines access to care as a multidimensional concept determined by the interaction between different domains:¹³

- Availability: provision of services in the right place and time to meet the prevailing needs of the population¹³
- Affordability: fees, transportation costs, and loss of productivity¹³
- Acceptability: fit between provider and patient attitudes (type of patient/provider, age, sex, ethnicity, language) and expectations of each other (patients’ compliance with prescribed treatment, providers listening to patients’ symptoms, concerns, etc.)¹³

Interventions

Interventions reported in the literature that aim to improve access to primary care among people who are homeless include standard or intensive case-management strategies, assertive community treatment, integration of primary care clinics where other services for people who are homeless (mental health and social services) are provided, fixed or mobile outreach, orientation of primary care clinic services available, and housing and supportive services. These interventions are described in more detail in Appendix 1.

Context

The Street Health survey conducted in Toronto in 2007 found that 59% of the 368 homeless adults interviewed did not have a family doctor. In contrast, the Street Health researchers estimated that 9% of the Toronto population did not have a family doctor (on the basis of data from the 2005 Canadian Community Health Survey).¹⁰

The Street Health Survey results also showed that people who are homeless do not have a stable, comprehensive source of primary health care.¹⁰ For instance, 29% of respondents had no usual source of care and 20% had two or more health care providers as their usual source of care.¹⁰ For the remaining respondents, the usual source of care was a doctor (29%); shelter, drop-in, or health bus (6%); community health centre (5%); emergency department (5%); walk-in clinic (4%); or a nurse, nurse practitioner, hospital outpatient department, or aboriginal health centre (2%).¹⁰

Figure 1 shows a logic model that proposes a framework for how different factors interact and affect access to primary care in people who are homeless and the hypothesized effects of interventions.

Research Question

Compared with usual care, how effective are interventions designed to improve access to primary care providers among people who are homeless?

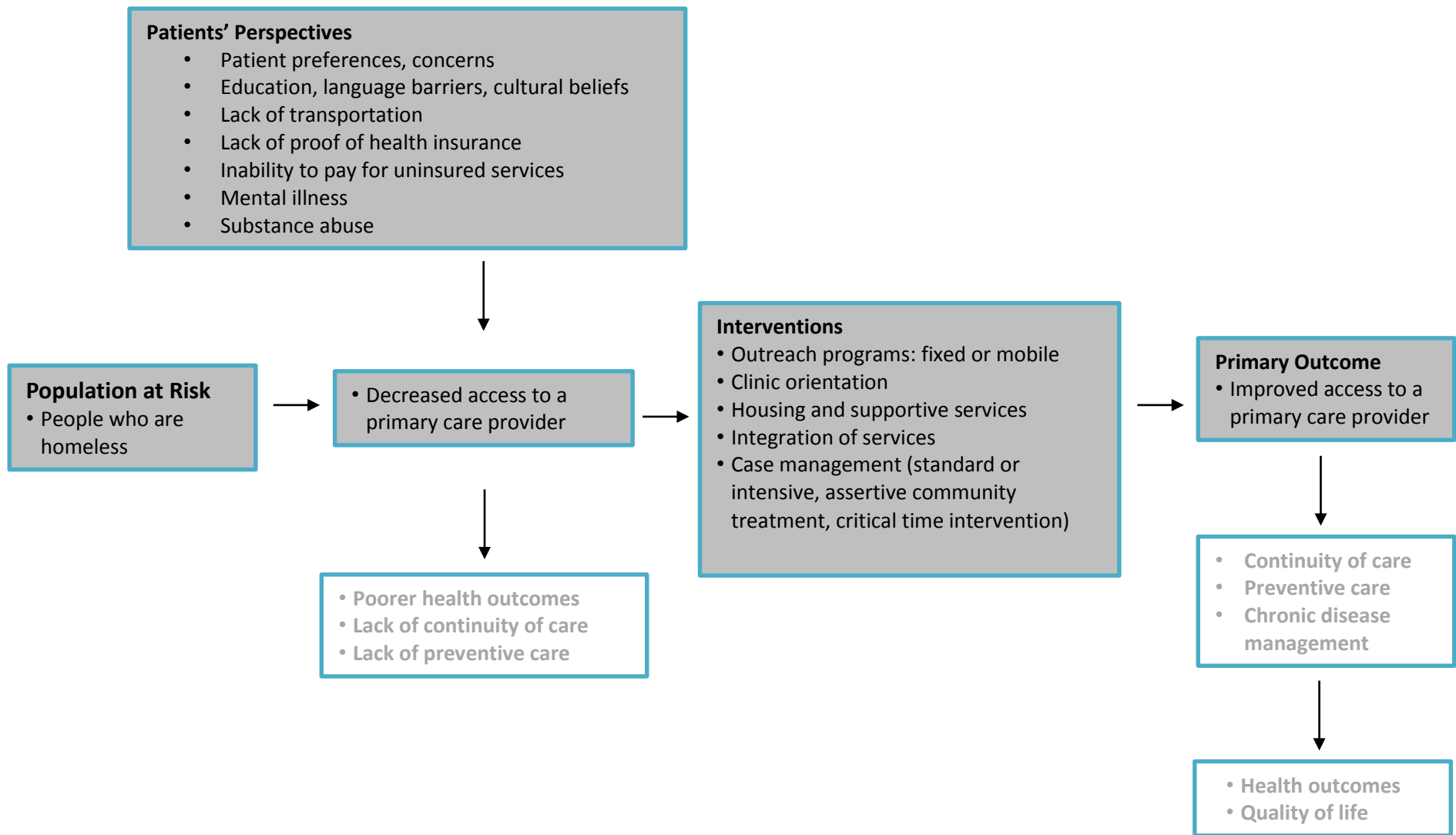


Figure 1: Logic Model

Information in shaded boxes reflects focus of this report. White boxes represent assumptions of the hypothesized effects of access to care and interventions that were not assessed in this report. Adapted from Tugwell et al.¹⁴

EVIDENCE REVIEW

Objective

Our primary objective in conducting this systematic review was to evaluate the effectiveness of interventions to improve access to primary care compared with usual care. Because people who are homeless often rely on emergency departments for health care and are admitted to hospital more often than people who are not homeless,⁹ a secondary objective was to describe the use of these services, as described by studies that evaluated the effect of interventions on access to primary care.

Methods

Population

The population of interest for this report is people who are homeless, both adults and children, defined as those who lack a fixed, regular, and adequate night-time residence, including people living in supervised shelters, supported housing, or places not intended for human habitation, and those at risk for losing their housing and lacking resources to obtain other permanent housing.^{1,15}

Intervention

Interventions that seek to improve access to a primary care provider for people who are homeless as described above were included.

Comparator

We compared the interventions of interest with either usual care or no intervention.

Outcomes

The main outcome of this report was access to a primary care provider. A primary care provider was defined as a physician, a nurse, or a nurse practitioner. Access to a primary care provider was defined as either having a primary care provider or having access to a primary care provider.

Timing

No specific follow-up period was set for this review.

Sources

We performed a literature search on July 8, 2015, using Ovid MEDLINE, Ovid MEDLINE In-Process, Ovid Embase, EBSCO Cumulative Index to Nursing & Allied Health Literature (CINAHL), Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects (DARE), Centre for Reviews and Dissemination (CRD) Health Technology Assessment Database, and National Health Service (NHS) Economic Evaluation Database, for studies published from January 1, 1995, to July 8, 2015.

Search strategies were developed by medical librarians using medical subject headings (MeSH). See Appendix 2 for full details, including all search terms.

The websites of organizations working with people who are homeless were also searched to identify studies published in the grey literature.

Literature Screening

A single reviewer reviewed the abstracts and, for those studies meeting the eligibility criteria, we obtained full-text articles. We also examined reference lists for any additional relevant studies not identified through the search.

Inclusion Criteria

- English-language full-text publications
- Published between January 1, 1995, and July 8, 2015
- Studies in adults and children who are homeless, as defined above
- Quantitative, comparative studies that might include randomized controlled trials (RCTs), observational studies, systematic reviews, or meta-analyses
- Studies evaluating at least one intervention aimed at improving access to a primary care provider

Exclusion Criteria

- Studies evaluating the effects of interventions on the number of primary care visits were excluded because differences in numbers of services received could be confounded by other factors, such as differences in underlying medical conditions
- Studies evaluating the effects of interventions on access to psychiatric care, screening, prenatal/postnatal care, and drug and substance abuse treatment without evaluating access to a primary care provider

Outcomes of Interest

Primary

Access to a primary health care provider, defined as:

- Having a primary care provider, or
- Seeking an appointment with a primary care provider, or
- Having an appointment with a primary care provider

Secondary

The following outcomes were extracted only from studies that evaluated the effects of the interventions on access to a primary care provider:

- Unintended effects of interventions
- Emergency department visits
- Hospital admissions
- Visits for mental health or substance abuse treatment
- Having a provider for mental health or substance abuse treatment
- Visits for preventive services or preventive services received

Data Extraction

We extracted relevant data on study characteristics, risk of bias items, and PICOT (population, intervention, comparison, outcome, time) using a standardized data form. The form collected information about:

- Source (i.e., citation information, contact details, study type)
- Methods (i.e., study design, study duration and years, participant allocation, allocation sequence concealment, blinding, reporting of missing data, reporting of outcomes, and whether or not the study compared two or more groups)
- Baseline patient characteristics (age, sex, ethnicity, length of homelessness, education, employment/income, medical conditions, mental health disease, and substance abuse)
- Outcomes (i.e., outcomes measured, number of participants for each outcome, number of participants missing for each outcome, outcome definition, and points at which the outcome was assessed)

We contacted authors of the studies to provide clarifications when required.

Statistical Analysis

The results for each type of intervention were presented as reported in the studies. Subgroup analyses were undertaken if necessary according to context (country, urban vs. nonurban setting), disease, mental health, and substance abuse status. We did not perform a meta-analysis of the studies identified because of the heterogeneity of study design, interventions, comparators, and outcomes across the studies.

Risk of Bias

The risk of bias criteria set by Cochrane's Effective Practice and Organisation of Care (EPOC) Group¹⁶ were used to assess the quality of RCTs and observational studies. Because the EPOC assessment tool does not include criteria for uncontrolled before-and-after studies, we used the National Heart, Lung, and Blood Institute criteria¹⁷ for the latter.

Quality of Evidence

The quality of the body of evidence for the outcome "access to a primary health care provider" was examined according to the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) Working Group criteria.¹⁸ The overall quality was determined to be high, moderate, low, or very low using a step-wise, structural methodology (details in Appendix 7).

The GRADE Working Group criteria were not used to evaluate the outcomes measured by the number of emergency department and mental health treatment visits, hospital admissions, or preventive services. These outcomes were assessed for exploratory purposes and were extracted only from studies that reported on access to a primary health care provider.

Results

Literature Search

The database search yielded 6,707 citations published between January 1, 1995, and July 8, 2015. After removing duplicates, we reviewed titles and abstracts to identify potentially relevant articles. We obtained the full texts of these articles for further assessment. Five studies (one RCT and four observational studies) met the inclusion criteria.^{8,9,19-21} We hand-searched the reference lists of the included studies, along with health technology assessment websites and other sources to identify additional relevant studies; however, the search did not identify any additional eligible studies.

Figure 2 presents the flow diagram for the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).²²

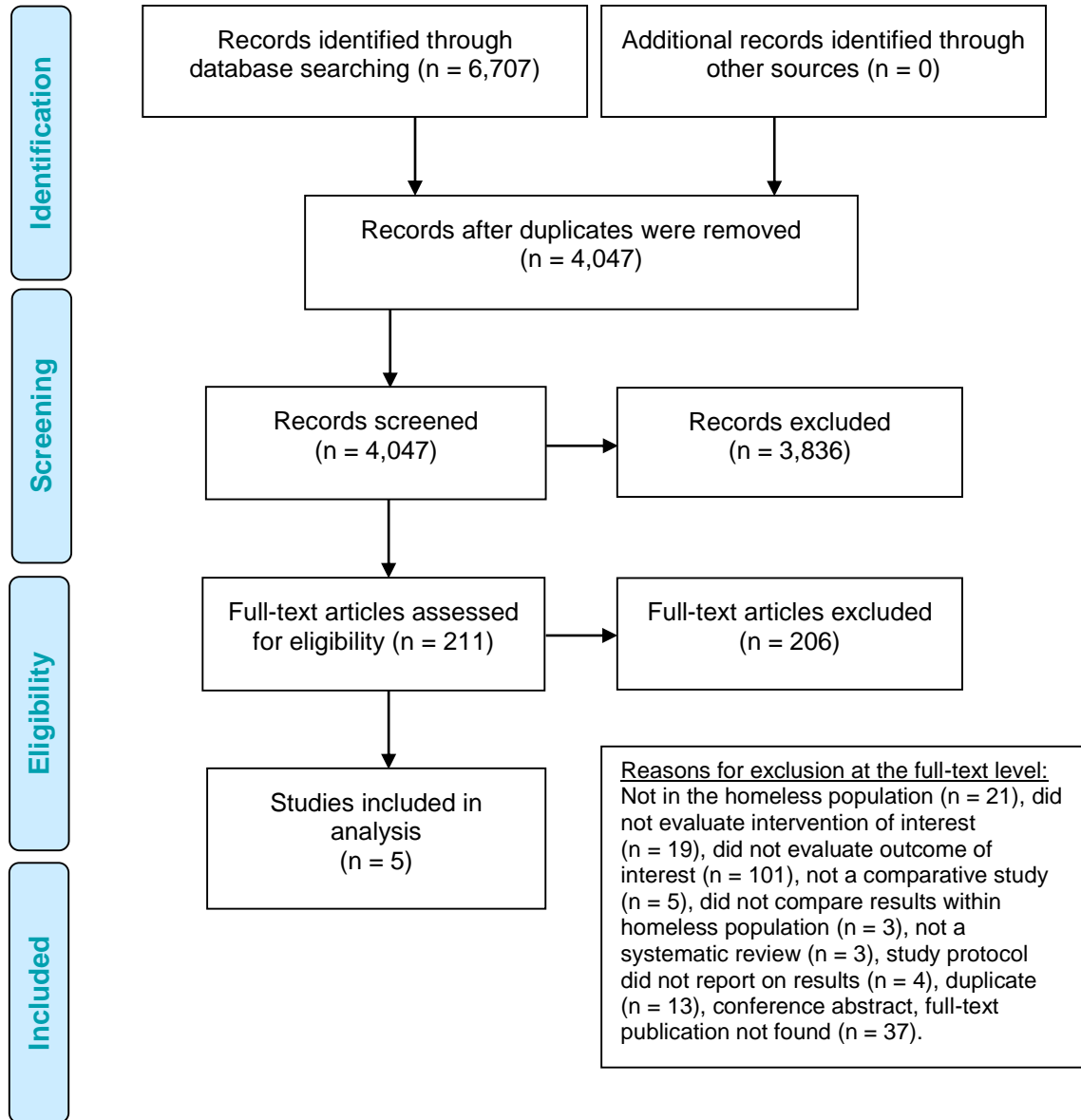


Figure 2: PRISMA Flow Diagram

Abbreviation: PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.
 Source: Adapted from Moher et al.²²

Study Design and Characteristics

All studies identified were conducted in the United States and included adults who met the homelessness definition. Table 1 provides the definition of homelessness used in each study.^{8,9,19-21}

Table 1: Definition of Homelessness in Studies Identified

Author, Year	Definition of Homelessness
O'Toole et al, 2015 ⁹	<ul style="list-style-type: none"> • Lacking a fixed, regular, and adequate nighttime residence • Primary nighttime residence is a car, park, abandoned building, bus or train station, airport, or campground • In a shelter or transitional housing facility • In unstable, doubled-up arrangements
Mares and Rosenheck, 2011 ²⁰	Chronically homeless: unaccompanied person with a disabling condition who has either been homeless 1 year or more or who experienced 4 occurrences of homelessness in the last 3 years
Parker, 2010 ²¹	Chronically homeless: unaccompanied adult who has been homeless 1 year or more or who experienced 4 occurrences of homelessness in the last 3 years
McGuire et al, 2009 ⁸	Spent the night before study enrolment in 1 of several locations: <ul style="list-style-type: none"> • Outdoor location (street, car, abandoned building) • Emergency homeless shelter • Hotel or motel • Jail or prison • Homeless residential care program entered within the previous 30 days • Temporarily doubled up with a friend or family member
Ciaranello et al, 2006 ¹⁹	<ul style="list-style-type: none"> • Living in a transitional housing facility

Two studies, the RCT⁹ and an observational study,¹⁹ evaluated the effectiveness of outreach interventions. Additionally, the RCT evaluated a primary clinic orientation strategy.⁹ One observational study evaluated the effectiveness of integration of primary care services within locations where other services for people who are homeless are provided,⁸ and two observational studies evaluated the effectiveness of housing plus supportive services.^{20,21}

The amount of health care and other support provided to the control group varied depending on the study. For instance, in two studies, some health care and social supportive services were provided to the control group^{8,9}; other support was unclear in the three remaining studies. None of the studies we identified reported any negative effects of the interventions.

The mean age of the study participants ranged from 41 to 54 years. Most, 62% to 100%, were nonwhite males (Appendix 5).

Additional information on the study design and methodology, population, interventions, comparators, and outcomes is provided in Appendix 3.

Methodologic Quality of Included Studies

The risk of bias was considered high in the studies identified (with the exception of the RCT, which we deemed to have a low risk of bias), mainly due to the lack of randomization, heterogeneity in baseline characteristics between the study groups, and losses to follow-up. In some studies, the types of supportive health care and social services received by the control group were unclear.¹⁹⁻²¹ One study reported heterogeneity of delivery of interventions, differences in criteria for enrolment of participants, and differences in the population served across study sites.²⁰ In some studies, it was unclear whether and to what extent participants were receiving primary care before study enrolment and whether that differed between the

intervention and control group.^{19,20} One study used a before–after design without controlling for time trends through an interrupted time series analysis.²¹ Details are in Appendix 4.

Results for Outreach Interventions

The RCT by O’Toole et al⁹ included homeless veterans in the United States without serious mental health conditions who were eligible to receive Veterans Affairs’ services and who were not receiving any primary care at the time of enrolment. Participants recruited from community sites and social service agencies were first randomized to receive either usual care or an outreach intervention including a nurse’s examination and feedback plus usual care.⁹ Usual care consisted of health system orientation by a social worker.⁹ Subsequently, participants in both groups were randomly assigned to receive either an orientation of the primary care and other services available at the clinic or no clinic orientation.⁹ Therefore, the study included four groups: (a) outreach intervention plus usual care, (b) outreach intervention plus clinic orientation plus usual care, (c) clinic orientation plus usual care, and (d) usual care.

The interventions were administered once. Participants were then followed up for 6 months to measure the percentage that received primary care within 4 weeks and 6 months of enrolment, the hazard ratio (HR) of time to receipt of primary care, and the number of health care services received.⁹

Additional details about the interventions are provided in Appendix 3.

In general, participants spent almost 2 years homeless in the 5 years before enrolment.⁹ At enrolment, 12% were unsheltered, approximately a quarter were staying in emergency shelters, 26% were in transitional housing (temporary accommodation that bridges the gap from homelessness to permanent housing), and 28% were living in unstable arrangements in other people’s residences.⁹ Almost three quarters of participants presented with non-serious mental health problems, including depression, anxiety, and post-traumatic stress disorder (Appendix 5).⁹ The follow-up rate at 6 months was 71%.⁹

Results of the study showed a statistically significant improvement in access to primary care with outreach plus clinic orientation: 77%, compared with 31% in the usual care arm at 4 weeks (Table 2). According to our calculations, the differences were not statistically significant for clinic orientation or outreach alone compared with usual care at 4 weeks. At 6 months, 89%, 80%, 56%, and 37% of participants accessed primary care in the outreach plus clinic orientation, clinic orientation, outreach, and usual care groups, respectively.⁹ The difference from usual care was statistically significant for all groups except outreach alone. Time-to-receipt of primary care was also improved among people receiving outreach plus clinic orientation and clinic orientation alone compared with usual care.⁹

Participants who sought the care of a primary care provider within the first 4 weeks of treatment continued to access medical care services throughout the follow-up period, regardless of study group.⁹ Therefore, the authors concluded that the health care–seeking behaviour was sustained for the duration of the study.⁹

Additional information is provided in Table 2 and Appendix 6.

Table 2: GRADE Evidence Profile for Comparison of Outreach and Clinic Orientation Intervention and Usual Care

Quality Assessment						Summary of Findings		
Number of Studies (Design)	Risk of Bias	Inconsistency	Indirectness	Imprecision	Publication Bias	Number of Patients	Absolute Difference Compared With Usual Care (95% CI) ^a	Quality
							HR (95% CI)	
Access to Primary Care Within 4 Weeks of Enrolment (Urban setting)								
1 RCT ⁹	No serious limitations	No serious limitations	Serious limitations (-1) ^b	No serious limitations	Undetected	<ul style="list-style-type: none"> • Outreach + orientation: 34/44 (77.3%) • Usual care: 19/62 (30.6%) 	<ul style="list-style-type: none"> • Outreach + orientation: 46.7% (27.4–66.0) 	⊕⊕⊕ Moderate
1 RCT ⁹	No serious limitations	No serious limitations	Serious limitations (-1) ^b	Serious limitations (-1) ^c	Undetected	<ul style="list-style-type: none"> • Orientation: 20/40 (50.0%) • Usual care: 19/62 (30.6%) 	<ul style="list-style-type: none"> • Orientation: 19.4% (0.09–38.7) 	⊕⊕ Low
1 RCT ⁹	No serious limitations	No serious limitations	Serious limitations (-1) ^b	Serious limitations (-1) ^c	Undetected	<ul style="list-style-type: none"> • Outreach: 16/39 (41.0%) • Usual care: 19/62 (30.6%) 	<ul style="list-style-type: none"> • Outreach: 10.4% (-8.7 to 29.5) 	⊕⊕ Low
Access to Primary Care Within 6 Months of Enrolment (Urban Setting)								
1 RCT ⁹	No serious limitations	No serious limitations	Serious limitations (-1) ^b	No serious limitations	Undetected	<ul style="list-style-type: none"> • Outreach + orientation: 39/44 (88.7%) • Usual care: 23/62 (37.1%) 	<ul style="list-style-type: none"> • Outreach + orientation: 51.6% (32.6–70.6) • HR: 3.41 (2.02–5.76) 	⊕⊕⊕ Moderate
1 RCT ⁹	No serious limitations	No serious limitations	Serious limitations (-1) ^b	No serious limitations	Undetected	<ul style="list-style-type: none"> • Orientation: 32/40 (80.0%) • Usual care: 23/62 (37.1%) 	<ul style="list-style-type: none"> • Orientation: 42.9% (23.1–62.7) • HR: 2.64 (1.54–4.53) 	⊕⊕⊕ Moderate
1 RCT ⁹	No serious limitations	No serious limitations	Serious limitations (-1) ^b	Serious limitations (-1) ^c	Undetected	<ul style="list-style-type: none"> • Outreach: 22/39 (56.4%) • Usual care: 23/62 (37.1%) 	<ul style="list-style-type: none"> • Outreach: 19.3% (-0.6 to 39.2) • HR not provided (not statistically significant) 	⊕⊕ Low

Abbreviations: CI, confidence interval; GRADE, Grading of Recommendations Assessment, Development, and Evaluation; HR, hazard ratio; RCT, randomized controlled trial.

^aAbsolute difference between intervention and usual care groups and 95% CI was calculated by report authors on the basis of information provided in study publication.

^bGiven concerns that results obtained in a population of homeless veterans might not be directly applicable to other people who are homeless.

^cGiven insufficient power to detect a statistically significant difference between groups. This finding is based on a statistical power calculation by report authors because study publication did not report on power calculation.

Ciaranello et al¹⁹ evaluated the effects of an outreach intervention for single adults who were homeless enrolled in a program providing transitional housing and supportive services for a period of 6 to 24 months. Transitional housing sites serving the same population but not participating in the outreach intervention were selected as controls.

The study consisted of a series of cross-sectional surveys conducted at three different points in time: baseline, 6 months, and 18 months.¹⁹ Participants were randomly selected from the list of residents at each facility at the time of each survey. Therefore, participants interviewed at each time point were not necessarily the same.¹⁹ Outcomes measured included the percentage of patients who could not get medical care when needed, receipt of care as soon as needed, emergency department visits, hospital admissions, and receipt of preventive services over 18 months of follow-up (Appendix 3).¹⁹

Participants had been living in transitional housing facilities for a mean of approximately 7 months (Appendix 5).¹⁹ No information on the number of participants with mental health illness or substance abuse issues was provided.

At enrolment, the two groups seemed to differ in participants' level of access to primary care, although it is unclear if the difference was statistically significant (Appendix 6).¹⁹

Results of adjusted analyses did not identify any statistically significant differences between the intervention and control groups either in the percentage of people who did not receive needed medical care or in the percentage of people who usually or always received care as soon as needed at both 6 and 18 months.¹⁹

At 18 months, fewer participants in the outreach group had two or more emergency department visits in the previous 6 months than in the control group (adjusted odds ratio [OR]: 0.30, 95% confidence interval [CI]: 0.12–0.74).¹⁹ No statistically significant differences were observed between the groups in the number of participants with two or more emergency department visits at 6 months or in the number of participants with one or more hospital admissions throughout the study.¹⁹ At 18 months, more participants in the outreach group had a Pap smear in the previous year than in the control group (adjusted OR: 4.61, 95% CI: 1.31–16.20).¹⁹ The groups showed no statistically significant difference in participants having a mammogram in the previous 2 years.¹⁹

The intervention and control groups did not appear to be comparable with regard to baseline characteristics, especially baseline use of primary care and other health care services. Although the authors adjusted the analyses for differences in baseline characteristics, it is unknown if this accounts for all differences between the study groups.¹⁹

According to the GRADE evidence profile, the quality of the evidence from O'Toole et al⁹ for the outcome of access to primary care was considered moderate for both the outreach intervention plus orientation and clinic orientation alone when considering an urban population and persons without serious mental health issues (Table 2). Because of the small sample size, the study did not have enough statistical power to detect a difference between the outreach intervention alone and usual care.⁹ The results may not be applicable to nonurban populations and people who are homeless with serious mental health disease. The authors commented that those with serious mental health illnesses were excluded from the study as they often require more intensive interventions (Table 2 and Appendix 6).⁹

Results for Integration of Services

McGuire et al⁸ evaluated the effectiveness of integrating a primary care clinic within an outpatient treatment centre for veterans who are homeless with serious mental health or substance abuse problems. Homeless veterans who had not received primary care in the year before enrolment and who sought the drop-in centre for people who are homeless were included.⁸ Those seeking care after integration of services were included as the intervention group (February 2003–April 2004), and those seeking care before integration (May 2001–March 2002) as the control group.⁸ While the control group received support from a case manager to engage in primary care, the services' integration also included a medical examination, referral to services, and transportation to other services (Appendix 3).⁸

Participants were followed for 18 months to evaluate the percentage receiving primary care service, days to enrolment in primary care, emergency department visits, and preventive services.⁸ Primary care was provided to both groups by a multidisciplinary team.⁸

Thirty-nine percent had been homeless for 2 or more years.⁸ Participants had had an average of two serious psychiatric problems in their lifetime.⁸ The follow-up rate throughout the study was 72% (Appendix 5).⁸

Ninety percent of participants in the services' integration group were receiving primary care at the end of the study. This rate, however, did not differ from that of the control group (Table 3, Appendix 6).⁸ The control group received support from case managers for engagement in primary care; this could explain, at least partially, the lack of differences between the two groups.

The intervention group had fewer emergency department visits than the control group and received more preventive services.⁸ There was no statistically significant difference in the number of days of medical or surgical hospitalization (Appendix 6).⁸

The quality of the evidence for access to a primary care provider in subjects receiving integrated services was considered very low (Table 3).⁸

Results for Housing and Supportive Services Interventions

Mares and Rosenheck²⁰ evaluated the effectiveness of providing housing in shelters and hotels for people who are homeless, health care, and intensive case management versus providing usual care. Those who sought shelter in each of the participating sites were enrolled in the intervention group. The control group generally included those recruited from health care centres for people who are homeless.²⁰ The type of care provided to the control group was unclear.²⁰ Each site enrolled and treated participants independently, which resulted in some sites using different recruitment criteria and in differences in delivery of interventions between sites (Appendix 3).

Percentages of participants having a primary care provider, participants having a mental health treatment provider, and the number of outpatient mental health visits during the 2-year follow-up were evaluated.²⁰

The lifetime duration of homelessness was approximately 7 years.²⁰ Overall, 76% of participants had a substance abuse problem.²⁰ Compared with the control group, the intervention group had a higher rate of mental health problems (75% vs. 56%, $P < .01$), schizophrenia (18% vs. 11%,

$P < .05$), and bipolar disorder (17% vs. 6%, $P < .05$).²⁰ The authors did not report on the number of participants who were receiving primary care and other health care services at baseline.²⁰ Sixty-nine percent and 55% of participants in the intervention and control groups, respectively were followed for 2 years (Appendix 5).²⁰

The results indicate a higher percentage of people in the intervention group with a primary care provider than in the control group within the 2 years of follow-up (Table 4).²⁰ Similarly, the results show that the intervention group had a higher percentage of participants with a usual mental health or substance abuse treatment provider and a higher number of outpatient medical, mental health, and substance abuse outpatient visits than the control group (Appendix 6).²⁰

These results are difficult to interpret, however, given that it is unclear whether the two groups were comparable in terms of access to care at baseline. For instance, it is impossible to determine whether differences observed in the intervention group were indeed a result of the intervention or whether these differences were already present at baseline.

Parker²¹ retrospectively evaluated the effectiveness of providing housing and supportive services to 20 single adults who were homeless and presenting with long-term mental health illness, substance abuse, or other diseases. Only residents housed for at least 6 months were included.²¹ The publication provided insufficient information on the types of health care and social services provided to participants before enrolment (control period). After 6 months of follow-up, the number of participants with a primary care physician, the number with mental health or substance abuse issues, and the number of emergency department visits, hospital admissions, and hospitalization days were evaluated.²¹

Participants had been homeless for a mean of 8 years (range 2–22). Sixty percent of participants had a mental health illness, and 80% had been diagnosed with substance abuse (Appendix 5).²¹

The results of uncontrolled analyses demonstrated that, after 6 months of housing and supportive services intervention, 95% of participants were receiving care from a primary care physician, compared with 25% before the intervention ($P = .01$).²¹ There was also a statistically significant increase in the receipt of mental health services after 6 months of intervention.²¹ No statistically significant differences were observed in the number of emergency department visits or hospital admissions after versus before the intervention (Appendix 6).

Given the difficulties interpreting the results of the Mares and Rosenheck study,²⁰ we based our conclusions for housing interventions on the Parker study.²¹ The quality of evidence for access to primary care in participants receiving housing plus supportive services was considered very low on the basis of Parker's study²¹ because of a high risk of bias (Table 4).

Table 3: GRADE Evidence Profile for Comparison of Integration of Services and Usual Care

Quality Assessment						Summary of Findings		
Number of Studies (Design)	Risk of Bias	Inconsistency	Indirectness	Imprecision	Publication Bias	Number of Patients	Results	Quality
Receipt of Primary Care Within 18 Months of Follow-Up								
1 Observational ⁸	No serious limitations	No serious limitations	Serious limitations (-1) ^a	No serious limitations	Undetected	<ul style="list-style-type: none"> • Postintegration: 117/130 • Preintegration: 117/130 	<ul style="list-style-type: none"> • Postintegration: 90.0% • Preintegration: 90.0% <p><i>P</i> = .98</p>	⊕ Very Low

Abbreviation: GRADE, Grading of Recommendations Assessment, Development, and Evaluation.

^aGiven concerns that the results obtained in a population of veterans who are homeless might not be directly applicable to other people who are homeless.

Table 4: GRADE Evidence Profile for Comparison of Housing Plus Supportive Services and Usual Care

Quality Assessment						Summary of Findings		
Number of Studies (Design)	Risk of Bias	Inconsistency	Indirectness	Imprecision	Publication Bias	Number of Patients	Results	Quality
Having a Primary Health Care Provider								
2 Observational ^{20,21}	Very serious limitations (-2) ^a	No serious limitations	No serious limitations	No serious limitations	Undetected	<p>2-year follow-up²⁰</p> <ul style="list-style-type: none"> • Intervention: 138/281 • Usual care: 42/104 <p>6-month follow-up²¹</p> <ul style="list-style-type: none"> • Intervention: 19/20 • Usual care: 5/20 	<p>2-year follow-up²⁰</p> <ul style="list-style-type: none"> • Intervention: 49.0% • Usual care: 40.0% <p><i>P</i> < .05</p> <p>6-month follow-up²¹</p> <ul style="list-style-type: none"> • Intervention: 95.0% • Usual care: 25.0% <p><i>P</i> = .01</p>	⊕ Very Low

Abbreviation: GRADE, Grading of Recommendations Assessment, Development, and Evaluation.

^aHeterogeneity in baseline characteristics between study groups, lack of clarity in supportive health care and social services received by the control group.²⁰ Heterogeneity of delivery of interventions, differences in criteria for enrolment of participants, and differences in population served across study sites, lack of clarity on whether and to what extent participants were receiving primary care before study enrolment and whether that differed between intervention and control groups were also reported in one study.²⁰ Before-after study did not control for temporal trends.²¹

Discussion

In a single randomized controlled trial of high methodologic quality, an outreach intervention encompassing a personal health assessment, education, and discussion of the health care needs combined with orientation on health care and other services available, and orientation alone improved access to a primary care provider compared with usual care. It is important to note that, although some participants included in the study did present with mental illness and substance abuse, those with serious mental health issues were excluded. The quality of the evidence was downgraded to moderate owing to concerns that results obtained in a population of United States veterans who are homeless might not be directly applicable to other people who are homeless.

A well-conducted observational study on the effects of integration of health care and social services for adults who were homeless and presenting with serious mental health disease or substance abuse observed an improvement in access to a primary care provider. However, the difference was not statistically significant for engagement in primary care when compared with a control group receiving support from case managers. The quality of the evidence was considered very low, mainly owing to the observational nature of the study and concerns with generalizability beyond veterans.

A small observational study in people who were homeless demonstrated an increase in access to primary care among those receiving housing and supportive services compared with a control period before the intervention. Quality of the evidence was considered very low because the results were based on an uncontrolled before-after study.

The literature identified suggests that interventions can result in fewer emergency department visits and more preventive services than usual care; however, a full literature review was not conducted for these outcomes.

We identified few studies that were relevant to our research question. Our systematic review had a specific focus on evaluating access to primary care based on quantitative studies. We therefore excluded studies evaluating similar interventions but whose goal was not to measure access to primary care. Qualitative studies were considered out of scope for our review, but are important, as they can provide important information on patient experiences with, barriers to, and facilitators of access to care.

Strengths and Limitations

Our systematic review identified few relevant studies. Limitations of the literature included a relative lack of randomized studies, scarce information regarding health care and social supportive services received by the control groups, possible heterogeneity between the intervention and control groups, and lack of clarity on whether participants were receiving primary care before enrolment.

The studies were conducted outside of Canada and in urban centres, which could affect generalizability of results to Canada and especially to nonurban areas. Study participants were mostly adult men; therefore, results might not be applicable to women and families who are homeless. Similarly, results might not be applicable to people with levels of mental illness or substance abuse that differ from those in the study.

Despite its limitations, research identified by this systematic review reports interventions developed to overcome barriers in access to primary care in people who are homeless. The interventions studied are complex and include multiple components that are consistent with the dimensions of access to care proposed by McIntyre et al (availability, affordability, and acceptability).¹³

Conclusions

Our systematic review of the literature identified various interventions that seek to improve access to primary care by attempting to address barriers to care encountered by people who are homeless.

Moderate-quality evidence indicates that orientation to clinic services available either alone or combined with outreach improves access to primary care providers among adults who are homeless, without serious mental illness, and living in urban centres.

ABBREVIATIONS

CI	Confidence interval
CINAHL	EBSCO Cumulative Index to Nursing & Allied Health Literature
CRD	Centre for Reviews and Dissemination
DARE	Database of Abstracts of Reviews of Effects
EPOC	Effective Practice and Organization of Care
GRADE	Grading of Recommendations Assessment, Development, and Evaluation
HR	Hazard ratio
MeSH	Medical Subject Headings
NHS	National Health Service
OHTAC	Ontario Health Technology Advisory Committee
OR	Odds ratio
PICOT	Population, intervention, comparison, outcome, time
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	Randomized controlled trial

APPENDICES

Appendix 1: Interventions to Improve Access to a Primary Care Provider Among People Who Are Homeless

Table A1: Description of Types of Interventions to Improve Access to a Primary Care Provider Among People Who Are Homeless

Intervention	Usual Description/Components; Models May Vary
Case management ¹⁵	<p>Standard case management</p> <p>Coordinated and integrated approach to service delivery with the goal of providing ongoing supportive care:</p> <ul style="list-style-type: none"> • outreach • needs assessment, planning, and linkage • practical support, help with developing independent living skills and advocacy • support with medical and psychiatric treatment • medication management • monitoring • temporary assistance with housing
	<p>Intensive case management</p> <p>Similar to case management, but:</p> <ul style="list-style-type: none"> • targeted to people with the greatest service needs • more intensive services, contact, smaller caseloads
	<p>Assertive community treatment</p> <p>As above plus multidisciplinary team approach accessible 24 hours/day</p>
	<p>Critical time intervention</p> <ul style="list-style-type: none"> • Intensive, time-limited case management approach • Psychosocial model bridging gap during transition between institutional and community living • Emotional and practical support • Help maintaining continuity of care • Home visits or accompaniment to appointments
Integration of services ⁸	Primary care clinic located together with social services and mental health programs
Fixed or mobile outreach ²³	<ul style="list-style-type: none"> • Care provision in nontraditional settings frequented by, or convenient to, people who are homeless • Regular scheduled visits by multidisciplinary teams that can include nurses, physicians, and social workers • Individual people are seen once or on a regular basis • Referrals to general and specialty care and social agencies can be provided • Fixed outreach refers to care delivered in community drop-in centres or homeless shelters • Mobile outreach refers to care delivered from vehicles at locations convenient to people who are homeless, such as shelters
Orientation of services available at primary care clinic ⁹	<ul style="list-style-type: none"> • Introduction to the clinic's multidisciplinary team • Orientation on how to navigate the clinic • Information on types of services available, such as food and clothing • Can include transportation to the clinic
Housing and supportive services ²⁴	Provision of housing without requiring sobriety or receipt of mental health treatment as prerequisites

	<p>Provision of supportive services:</p> <ul style="list-style-type: none">• Primary care• Mental health and substance abuse treatment• Support from social workers and employment services• Case management
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Appendix 2: Literature Search Strategies

Search date: July 8, 2015

Databases searched: All Ovid MEDLINE, Embase, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, CRD Health Technology Assessment Database, Cochrane Central Register of Controlled Trials, NHS Economic Evaluation Database, and CINAHL

Database: EBM Reviews - Cochrane Central Register of Controlled Trials <May 2015>, EBM Reviews - Cochrane Database of Systematic Reviews <2005 to May 2015>, EBM Reviews - Database of Abstracts of Reviews of Effects <2nd Quarter 2015>, EBM Reviews - Health Technology Assessment <2nd Quarter 2015>, EBM Reviews - NHS Economic Evaluation Database <2nd Quarter 2015>, Embase <1980 to 2015 Week 27>, All Ovid MEDLINE(R) <1946 to Present>

Search Strategy:

-
- 1 exp Homeless Persons/ (15520)
 - 2 (homeless* or "lack of housing" or squatter* or rough sleep* or "no fixed address" or roofless or ((street or transient*) adj2 (population or person or persons or people* or individual or individuals or adult or adults or child* or youth* or men or man or women or woman)) or ((temporary or unstabl* or vulnerabl*) adj2 (hous* or accommodation* or shelter* or hostel* or dwelling*))).tw. (21942)
 - 3 or/1-2 (25713)
 - 4 exp Primary Health Care/ (205269)
 - 5 *Physicians, Family/ (25257)
 - 6 *Physicians, Primary Care/ (16555)
 - 7 *General Practitioners/ (17152)
 - 8 (Primary care or primary health care or primary healthcare or primary health or (general adj (practice or practise or practices or practises or practician or practitioner*))).tw. (348482)
 - 9 *Family Practice/ (74688)
 - 10 (family adj (practice or practise or medicine or physician* or doctor*)).tw. (59542)
 - 11 Community Health Services/ (77995)
 - 12 Community Health Nursing/ (44718)
 - 13 Community Health Workers/ (7263)
 - 14 ((community adj (health or healthcare or nurs* or outreach or case manage* or multidisciplinary team*)) or ((student run or student led) adj2 clinic*) or health visit*).tw. (49729)
 - 15 exp Community Health Centers/ (34988)
 - 16 ((community or neighbo?rhood) adj (health centre* or health center* or healthcentre* or healthcenter*)).tw. (6584)
 - 17 *Family Nursing/ (1558)
 - 18 exp Nurse Practitioners/ (35499)
 - 19 *Primary Nursing/ (1473)
 - 20 ((nurs* adj (family or practitioner* or primary or advance* practice*)) or (family adj (centred or centered) adj nurs*) or (nurse* adj (manage* or run or lead or led) adj (center* or centre*))).tw. (20896)
 - 21 Mobile Health Units/ (25889)
 - 22 (((mobile or fixed) adj outreach program*) or (mobile adj (hospital* or health unit* or health van* or clinic*) or field hospital*).tw. (2262)
 - 23 Case Management/ (17683)
 - 24 ((case adj (management* or manager*)) or assertive community treatment* or critical time intervention* or ((coordinat* or integrat* or co-locat*) adj3 (health service* or health care or healthcare))).tw. (36085)
 - 25 Health Services Accessibility/ (192439)
 - 26 "Health Services Needs and Demand"/ (178187)
 - 27 "Delivery of Health Care"/ (206431)
 - 28 "Delivery of Health Care, Integrated"/ (16979)

29 ((health service* adj2 (accessibility or availability)) or ((healthcare or health care) adj2 deliver*) or program accessibility or access to health care or access to healthcare or (integrated adj delivery adj system*) or (integrated adj (healthcare or health care) adj system*)).tw. (45688)

30 or/4-29 (1117780)

31 3 and 30 (6520)

32 limit 31 to english language [Limit not valid in CDSR,DARE; records were retained] (6190)

33 limit 32 to yr="1995 -Current" [Limit not valid in DARE; records were retained] (5028)

34 33 use pmoz,cctr,coch,dare,clhta,cleed (2321)

35 homelessness/ (14546)

36 (homeless* or "lack of housing" or squatter* or rough sleep* or "no fixed address" or roofless or ((street or transient*) adj2 (population or person or persons or people* or individual or individuals or adult or adults or child* or youth* or men or man or women or woman)) or ((temporary or untabl* or vulnerabl*) adj2 (hous* or accommodation* or shelter* or hostel* or dwelling*))).tw. (21942)

37 or/35-36 (25457)

38 exp primary health care/ (205269)

39 *general practitioner/ (17152)

40 (Primary care or primary health care or primary healthcare or primary health or (general adj (practice or practise or practices or practises or practician or practitioner*))).tw. (348482)

41 *general practice/ (40103)

42 (family adj (practice or practise or medicine or physician* or doctor*)).tw. (59542)

43 community care/ (49736)

44 community health nursing/ (44718)

45 health auxiliary/ (3575)

46 ((community adj (health or healthcare or nurs* or outreach or case manage* or multidisciplinary team*)) or ((student run or student led) adj2 clinic*) or health visit*).tw. (49729)

47 health center/ (23748)

48 ((community or neighbo?rhood) adj (health centre* or health center* or healthcentre* or healthcenter*)).tw. (6584)

49 *family nursing/ (1558)

50 exp nurse practitioner/ (35499)

51 *primary nursing/ (1473)

52 ((nurs* adj (family or practitioner* or primary or advance* practice*)) or (family adj (centred or centered) adj nurs*) or (nurse* adj (manage* or run or lead or led) adj (center* or centre*))).tw. (20896)

53 (((mobile or fixed) adj outreach program*) or (mobile adj (hospital* or health unit* or health van* or clinic*) or field hospital*).tw. (2262)

54 case management/ (17683)

55 ((case adj (management* or manager*)) or assertive community treatment* or critical time intervention* or ((coordinat* or integrat* or co-locat*) adj3 (health service* or health care or healthcare))).tw. (36085)

56 health care access/ (40453)

57 health care delivery/ (206431)

58 integrated health care system/ (16979)

59 ((health service* adj2 (accessibility or availability)) or ((healthcare or health care) adj2 deliver*) or program accessibility or access to health care or access to healthcare or (integrated adj delivery adj system*) or (integrated adj (healthcare or health care) adj system*)).tw. (45688)

60 or/38-59 (922075)

61 37 and 60 (4889)

62 limit 61 to english language [Limit not valid in CDSR,DARE; records were retained] (4648)

63 limit 62 to yr="1995 -Current" [Limit not valid in DARE; records were retained] (3882)

64 63 use emez (2417)

65 34 or 64 (4738)

66 65 use pmoz (2099)

67 65 use emez (2417)

68 65 use cctr (123)

- 69 65 use coch (53)
- 70 65 use dare (21)
- 71 65 use clhta (2)
- 72 65 use cleed (23)
- 73 remove duplicates from 65 (3147)

CINAHL

#	Query	Results
S1	(MH "Homeless Persons")	3,622
S2	(homeless* or "lack of housing" or squatter* or rough sleep* or "no fixed address" or roofless or ((street or transient*) N2 (population or person or persons or people* or individual or individuals or adult or adults or child* or youth* or men or man or women or woman)) or ((temporary or unstabl* or vulnerabl*) N2 (hous* or accommodation* or shelter* or hostel* or dwelling*)))	7,618
S3	S1 OR S2	7,618
S4	(MH "Primary Health Care")	40,647
S5	(MM "Physicians, Family")	6,205
S6	(Primary care or primary health care or primary healthcare or primary health or (general N1 (practice or practise or practices or practises or practician or practitioner*)))	80,940
S7	(MM "Family Practice")	10,782
S8	(family N1 (practice or practise or medicine or physician* or doctor*))	32,536
S9	(MH "Community Health Services")	14,599
S10	(MH "Community Health Nursing")	24,878
S11	(MH "Community Health Workers")	1,512
S12	((community N1 (health or healthcare or nurs* or outreach or case manage* or multidisciplinary team*)) or ((student run or student led) N2 clinic*) or health visit*)	65,645
S13	(MH "Community Health Centers")	3,750
S14	((community or neighbo?rhood) N1 (health centre* or health center* or healthcentre* or healthcenter*))	5,221
S15	(MM "Family Nursing")	941
S16	(MH "Nurse Practitioners+")	17,288
S17	(MM "Primary Nursing")	1,020
S18	((nurs* N1 (family or practitioner* or primary or advance* practice*)) or (family N1 (centred or centered) N1 nurs*) or (nurse* N1 (manage* or run or lead or led) N1 (center* or centre*)))	37,307

S19	(MH "Mobile Health Units")	1,488
S20	((mobile or fixed) N1 outreach program*) or (mobile N1 (hospital* or health unit* or health van* or clinic*)) or field hospital*)	2,090
S21	(MH "Case Management")	13,749
S22	((case N1 (management* or manager*)) or assertive community treatment* or critical time intervention* or ((coordinat* or integrat* or co-locat*) N3 (health service* or health care or healthcare)))	27,276
S23	(MH "Health Services Accessibility+")	54,868
S24	(MH "Health Care Delivery")	31,665
S25	(MH "Health Care Delivery, Integrated")	6,409
S26	(MH "Health Services Needs and Demand+")	17,615
S27	((health service* N2 (accessibility or availability)) or ((healthcare or health care) N2 deliver*) or program accessibility or access to health care or access to healthcare or (integrated N1 delivery N1 system*) or (integrated N1 (healthcare or health care) N1 system*))	95,808
S28	S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27	291,469
S29	S3 AND S28	2,244
S30	S3 AND S28 Limiters - Published Date: 19950101-20151231; English Language	1,969

Appendix 3: Design and Characteristics of the Studies Included

Table A2: Studies Evaluating Effectiveness of Outreach Interventions

Author, Year, Country, N, Setting	Methods	Study Population	Intervention(s)	Comparator	Outcomes
<p>O'Toole et al,⁹ 2015 United States N = 185 11 sites</p> <p>Without serious mental illness Urban area</p>	<ul style="list-style-type: none"> • RCT • Random number generator for initial assignment • Subsequent assignment to clinic orientation or usual care by calendar day of enrolment • Participants recruited from common areas of community sites (shelters, drop-in centres, soup kitchens) and social service agencies • Recruitment close (2–3 miles) to medical facilities • No recruitment when health care services were being offered to avoid participants that were seeking care at the time • Participants were reimbursed \$20 USD for each survey response • Analyses: Chi-squared tests for proportions and Cox proportional hazards for time to receipt of care • Follow-up: 6 months 	<ul style="list-style-type: none"> • Homeless veterans • Eligible to receive VA services • Cognitively intact • Not currently receiving primary or continuing care for a chronic condition^a • Without serious mental illness 	<p>Interventions received once</p> <ul style="list-style-type: none"> • Outreach intervention: personal health assessment/brief intervention + usual care <ul style="list-style-type: none"> • Research nurse interview and feedback on medical history, chronic conditions, high-risk behaviours, smoking history, living arrangements, etc. • Outreach nurse examination: blood pressure, pulse, weight, height, BMI • Summary of findings presented to participant with explanations on untreated conditions or possible risk factors • Clinic orientation arm + usual care <ul style="list-style-type: none"> • Transportation to clinic for orientation • Introduction to multidisciplinary Patient-Aligned Care Team^b (specific to people who are homeless or not) • Participants are informed about how to navigate clinic and about additional resources available (clothing, food, etc.) • Outreach + clinic orientation + usual care 	<p>Usual care</p> <ul style="list-style-type: none"> • Social worker assessed homelessness history and social needs • Description of services appropriate to participants' needs and how to access them • Verbal and written descriptions of clinical services (includes both primary care services for people who are homeless available at VA centres and general clinical services) • Instructions about how to access care 	<ul style="list-style-type: none"> • Receipt of primary care within 4 weeks of enrolment (primary)^c • Hazard ratio of receiving care • Number of services received among those who received primary care within 4 weeks of enrolment <p>Primary care provided at primary care clinics for people who are homeless at 2 sites on an open-access basis. There was also an option to sign up for appointments; 95% of patients were being seen within 30 days of appointment request</p>

Author, Year, Country, N, Setting	Methods	Study Population	Intervention(s)	Comparator	Outcomes
Ciaranello et al, 2006 ¹⁹ United States N = 252 6 sites Urban area	<ul style="list-style-type: none"> Series of cross-sectional surveys performed at 3 time points Participants randomly selected from list of housing residents at time of interview Participants in intervention and control groups selected from same population base Analysis of covariance adjusting for baseline characteristics Follow-up: 18 months 	<ul style="list-style-type: none"> Single adults Living in transitional housing facilities 	Transitional housing Multidisciplinary team: medical director, nurse practitioner, clerk, and social worker Weekly visits to sites for: <ul style="list-style-type: none"> Comprehensive health assessments Health care Social work services Health education and counselling Evaluation of mental health and substance abuse and referral for treatment Referral to dental services, specialty medical services, diagnostic studies, brief problem-focused psychotherapy Transportation to other appointments Nurse available for advice by telephone 24 hours/day Additional clinics scheduled for HIV and tuberculosis testing and influenza vaccines 	<ul style="list-style-type: none"> Transitional housing <p><i>Supportive services received by control group were unclear</i></p>	<ul style="list-style-type: none"> Could not get medical care when needed Receipt of care as soon as needed Emergency department visits Hospital admissions Receipt of preventive services

Abbreviations: BMI, body mass index; HIV, human immunodeficiency virus; RCT, randomized controlled trial; VA, Veterans' Affairs.

⁹No visits to an ambulatory care clinic in previous 6 months or self-identifying as using ambulatory care for usual care.⁹

⁷Integrated primary care services, with coordination of primary care and housing services.⁷

^cCare-on-demand provided at primary care clinics in the area, no appointment necessary.

Table A3: Studies Evaluating Effectiveness of Integration of Services for People Who Are Homeless

Author, Year, Country, N, Setting	Methods	Study Population	Intervention(s)	Comparator	Outcomes
McGuire et al, 2009 ⁸ United States N = 260 Urban area	<ul style="list-style-type: none"> • Cohort study • Noncontemporaneous controls • Intervention and control groups recruited from drop-in centre for people who are homeless • Intervention: all veterans entering the Homeless Program since start of MHOTC, February 2003, until April 2004 were recruited • Controls: all veterans seen at the Homeless Program before MHOTC inception (May 2001–March 2002) • Participants received \$20 USD for each interview (not linked to the medical visits) • Analysis: regression adjusting for baseline differences • Follow-up: 18 months 	<ul style="list-style-type: none"> • Homeless veterans • Serious mental illness or substance abuse diagnosis • Not seen by either community or VA primary care provider during year before study 	<p>Integration of primary care within MHOTC</p> <ul style="list-style-type: none"> • Colocation of a primary care clinic with social services and mental health programs for people who are homeless • Evaluation in screening clinic • Evaluation and referral to needed colocated services • Primary care appointment in the same building • First multidisciplinary^a primary care appointment to occur on the same day • Primary care providers received training for engaging and treating people who are homeless^b • Case managers involved since enrolment • Tokens provided for transportation to appointments 	<p>Preintegration</p> <ul style="list-style-type: none"> • Case managers made primary care clinic appointment in participant's presence • Card with appointment information provided • Multidisciplinary^a primary care clinic in another location (half mile away) • First appointment within 2 months 	<ul style="list-style-type: none"> • Primary care service use • Days to primary care enrolment • Emergency department visits • Preventive services received

Abbreviations: MHOTC, Mental Health Outpatient Treatment Centre; VA, Veterans' Affairs.

^aOne lead primary care physician and 3 nurse practitioners.

^bIncludes training on infectious disease screening and treatment, chronic pain, and hypertension management.

Table A4: Studies Evaluating Effectiveness of Housing and Supportive Services for People Who Are Homeless

Author, Year, Country, N, Setting	Methods	Study Population	Intervention(s)	Comparator	Outcomes
<p>Mares and Rosenheck, 2011^{20,25}</p> <p>United States</p> <p>N = 385</p> <p>5 sites from 11 sites that agreed to have a comparison group</p> <p>Urban area</p>	<ul style="list-style-type: none"> • Cohort study • Participants for both groups recruited from shelters, street, etc. • Different sites could have used different selection criteria for recruitment and could have served a different population • Participants in both groups were paid (\$15 USD) per interview • Regression analysis did not adjust for confounders for outcomes of interest • Follow-up: 2 years 	<ul style="list-style-type: none"> • Chronically homeless people or living in supported housing • Participants in 1 site included people who were “believed to be more ill and in need of much more direct and ongoing support” than people who typically seek shelter at that facility • 1 site included people with substance abuse disorders • No additional recruitment criteria provided for other sites 	<p>Collaborative Initiative to Help End Chronic Homelessness: Housing + supportive services</p> <ul style="list-style-type: none"> • Housing in shelters or hotels for people who are homeless, either scattered or congregated, following a Housing First model • Comprehensive primary care, mental health and substance abuse treatment • Facilitated access to primary care, mental health and substance abuse treatment • Intensive case management <p><i>Delivery of intervention and housing differed among sites</i></p>	<p>Usual care</p> <p>Standard local services; further details not provided</p>	<ul style="list-style-type: none"> • Having a primary care provider • Having a mental health treatment provider • Number of outpatient mental health visits
<p>Parker, 2010²¹</p> <p>United States</p> <p>N = 20</p> <p>Urban area</p>	<ul style="list-style-type: none"> • Retrospective before-after study • Participants recruited through outreach for a Housing First program • Data collected from program database • Analysis: uncontrolled before-after • Follow-up: 6 months 	<ul style="list-style-type: none"> • Chronically homeless • Adults • Housed by the Housing First study for ≥ 6 months • No other option for housing • Long-term disability (mental health illness, substance abuse, infectious diseases) 	<p>Housing + Supportive services</p> <ul style="list-style-type: none"> • Housing • Mental health and substance abuse treatment • Employment services • Medical care • Case management 	<p>Prehousing period</p> <p>Information about health care services received was not provided</p>	<ul style="list-style-type: none"> • Use of a primary care physician • Mental health services • Substance abuse treatment • Emergency department use • Hospitalizations • Number of hospitalization days

Appendix 4: Risk of Bias in Studies Identified

Table A5: Risk of Bias for Studies With Separate Control Group^a

Author, Year Study Design	Allocation Sequence Adequately Generated?	Allocation Concealment	Baseline Outcome Measurements Similar?	Baseline Characteristics Similar?	Incomplete Outcome Data Adequately Addressed?	Knowledge of Allocated Interventions Adequately Prevented?	Adequate Protection Against Contamination?	Selective Reporting	Other Bias
O'Toole et al, 2015 ⁹ 2x2 RCT	• Low risk Random sequence generation	• Low risk	• Low risk	• Low risk	• Low risk	• Low risk	• Low risk	• Low risk	N/A
Mares and Rosenheck, 2011 ²⁰ Observational study	• High risk Not a randomized study	• High risk No allocation concealment	• High risk Each site could have served a different population both within and between intervention and control groups Different sites could have used different selection criteria for recruitment	• High risk As per previous column	• High risk 31% and 45% losses to follow-up at 2 years in intervention and control groups, respectively Unclear if differences in rates between groups was nonrandom	• High risk	• High risk Both intervention and control groups treated at same sites, and no procedures to protect against contamination were described Interventions and housing facilities differed from site to site	• Low risk	• High risk Limited information on health care services provided to control group

Author, Year Study Design	Allocation Sequence Adequately Generated?	Allocation Concealment	Baseline Outcome Measurements Similar?	Baseline Characteristics Similar?	Incomplete Outcome Data Adequately Addressed?	Knowledge of Allocated Interventions Adequately Prevented?	Adequate Protection Against Contamination?	Selective Reporting	Other Bias
McGuire et al, 2009 ⁸ Observational study	• High risk Not a randomized study	• High risk No allocation concealment	• Low risk	• Low risk Analyses adjusted for baseline differences	• Low risk 24% and 33% losses to follow-up at 18 months in intervention and control groups, respectively However, outcome of interest for this report was measured early in study	• Low risk Unblinded, but failure to mask might not lead to bias for outcomes included	• Low risk Intervention and usual care did not occur at different times, with exception of 3-month overlap	• Low risk	N/A
Ciaranello et al, 2006 ¹⁹ Observational study	• High risk Not a randomized study	• Low risk Allocation by site	• Low risk Different rates reported at baseline; however, researchers attempted to control for these differences by incorporating a baseline control predictor in regression analysis	• Low risk As per previous column	• High risk Data not collected longitudinally. Cross-sectional surveys at 3 points in time resulted in different participants contributing with data at each survey	• Low risk Allocation by site	• Low risk Allocation by site	• Low risk	• High risk Limited information on health care services provided to control group

Abbreviations: N/A, not applicable; RCT, randomized controlled trial.

^aCriteria for risk of bias in EPOC reviews from Effective Practice and Organization of Care (EPOC).

Table A6: Risk of Bias for Before-After Studies With No Control Group^a

Questions to Assess Risk of Bias	Risk of Bias in Parker, 2010 ²¹
1. Was the study question or objective clearly stated?	• Yes
2. Were eligibility/selection criteria for study population prespecified and clearly described?	• Yes
3. Were participants in study representative of those who would be eligible for intervention in the general or clinical population of interest?	<ul style="list-style-type: none"> • Unclear The study consisted of a sample of Housing First Program participants. Criteria for selecting sample were not provided
4. Were all eligible participants who met prespecified entry criteria enrolled?	<ul style="list-style-type: none"> • No As above
5. Was sample size sufficiently large to provide confidence in findings?	• Yes
6. Was intervention clearly described and delivered consistently across study population?	• Unclear
7. Were outcome measures prespecified, clearly defined, valid, reliable, and assessed consistently across all study participants?	• Unclear
8. Were people assessing outcomes blinded to participants' exposures/interventions?	• No
9. Was loss to follow-up after baseline 20% or less? Were those lost to follow-up accounted for in the analysis?	<ul style="list-style-type: none"> • Yes However, only participants followed for duration of study were included
10. Did statistical methods examine changes in outcome measures from before to after intervention? Were statistical tests done that provided <i>P</i> values for pre-to-post changes?	• Yes
11. Were outcome measures of interest assessed multiple times before intervention and multiple times after intervention (i.e., did they use an interrupted time-series design)?	• No
12. If intervention was conducted at a group level (e.g., a whole hospital, a community), did statistical analysis take into account use of individual-level data to determine effects at group level?	Not applicable

^aCriteria for quality assessment of risk of bias in before-after (pre-post) studies with no control group from National Heart, Lung, and Blood Institute.¹⁷

Appendix 5: Baseline Characteristics of Study Participants

Table A7: Baseline Characteristics of Participants in Studies Identified

Variables	O'Toole et al, 2015 ⁹ N = 185 (Outreach: 39, Outreach + Clinic Orientation: 44, Clinic Orientation: 40, Usual Care: 62)	Mares and Rosenheck, 2011 ²⁰ N = 385 (Collaborative Initiative: 281, Usual Care: 104)	Parker, 2010 ²¹ N = 20 (Before: 20, After: 20)	McGuire et al, 2009 ⁸ N = 260 (Colocation: 130, Preintegration: 130)	Ciaranello et al, 2006 ¹⁹ N = 252 (Outreach: 202, Control: 50)
Age in years, mean (SD)	<ul style="list-style-type: none"> • Outreach: 51 (9) • Outreach + orientation: 47 (13) • Orientation: 49 (12) • Usual care: 48 (9) 	<ul style="list-style-type: none"> • Housing + services: 45 (9) • Usual care: 46 (10) 	<ul style="list-style-type: none"> • 54 (range: 36–78) 	<ul style="list-style-type: none"> • Postintegration: 46 (7) • Preintegration: 46 (7) 	<ul style="list-style-type: none"> • Outreach: 42 (10) • Control: 41 (10)
Male sex, n (%)	<ul style="list-style-type: none"> • Outreach: 36 (92) • Outreach + orientation: 41 (93) • Orientation: 39 (98) • Usual care: 58 (95) 	<ul style="list-style-type: none"> • Housing + services: 210 (75) • Usual care: 83 (80) 	<ul style="list-style-type: none"> • 18 (90) 	<ul style="list-style-type: none"> • Postintegration: 130 (100) • Preintegration: 129 (99) 	<ul style="list-style-type: none"> • Outreach: 125 (62) • Control: 39 (78)
Ethnicity, n (%)	<p>Nonwhite</p> <ul style="list-style-type: none"> • Outreach: 17 (44) • Outreach + orientation: 19 (43) • Orientation: 16 (40) • Usual care: 27 (44) 	<p>Racial/Ethnic minority</p> <ul style="list-style-type: none"> • Housing + services: 163 (58) • Usual care: 66 (63) 	<p>Black American</p> <ul style="list-style-type: none"> • 14 (70) <p>White American</p> <ul style="list-style-type: none"> • 6 (30) <p>Hispanics</p> <ul style="list-style-type: none"> • 0 	<p>Black</p> <ul style="list-style-type: none"> • Postintegration: 64 (49) • Preintegration: 66 (51) 	<p>Nonwhite, n (%)</p> <ul style="list-style-type: none"> • Outreach: 81 (40) • Control: 14 (28)
Length of homelessness	<p>Months in the past 5 years, mean (SD)</p> <ul style="list-style-type: none"> • Outreach: 22 (56) • Outreach + orientation: 25 (57) • Orientation: 24 (60) • Usual care: 34 (56) 	<p>Years in lifetime, mean (SD)</p> <ul style="list-style-type: none"> • Housing + services: 8 (6) • Usual care: 7 (6) 	<p>Years since permanent housing</p> <ul style="list-style-type: none"> • 8 (range: 2–22) 	<p>≥ 2 years, n (%)</p> <ul style="list-style-type: none"> • Postintegration: 48 (37) • Preintegration: 51 (39) 	<p>Living in transitional housing (months), mean (SD)</p> <ul style="list-style-type: none"> • Outreach: 9 (8) • Control: 7 (6)
Type of housing, n (%)	<ul style="list-style-type: none"> • Unsheltered: 22 (12) • Emergency shelter: 47 (25) • Transitional housing: 48 (26) • Doubled-up: 51 (28) • Other: 17 (9) 	Not available	Not available	Not available	<ul style="list-style-type: none"> • Transitional housing: 252 (100)

Variables	O'Toole et al, 2015 ⁹ N = 185 (Outreach: 39, Outreach + Clinic Orientation: 44, Clinic Orientation: 40, Usual Care: 62)	Mares and Rosenheck, 2011 ²⁰ N = 385 (Collaborative Initiative: 281, Usual Care: 104)	Parker, 2010 ²¹ N = 20 (Before: 20, After: 20)	McGuire et al, 2009 ⁸ N = 260 (Colocation: 130, Preintegration: 130)	Ciaranello et al, 2006 ¹⁹ N = 252 (Outreach: 202, Control: 50)
Education	Not available	<u>Years of education, mean (SD)</u> • Housing + services: 12 (3) • Usual care: 12 (2)	• Not available	<u>Years of education, mean (SD)</u> • Postintegration: 13 (2) • Preintegration: 13 (2)	<u>High school or less, n (%)</u> • Outreach: 115 (57) • Control: 36 (72)
Employment/income	<u>Monthly available cash: \$500 USD, n (%)</u> • Outreach: 24 (62) • Outreach + orientation: 33 (77) • Orientation: 29 (73) • Usual care: 49 (80)	<u>Employed in regular job (past 3 years), n (%)</u> • Housing + services: 39 (14) • Usual care: 14 (13)	• Not available	<u>Employed, n (%)</u> • Postintegration: 98 (75) • Preintegration: 105 (81) <u>Income (USD);, last month, mean (SD)</u> • Postintegration: 602 (1,137) • Preintegration: 696 (1,088)	<u>Currently employed (full-or part-time), n (%)</u> • Outreach: 67 (33) • Control: 22 (44)
Medical conditions	<u>Any medical problems, n (%)</u> • Outreach: 32 (82) • Outreach + orientation: 32 (73) • Orientation: 30 (77) • Usual care: 39 (64)	<u>Any physical health problem, n (%)</u> • Housing + services: 191 (68) • Usual care: 66 (63)	<u>Number of major diagnoses</u> • 6 (range 2–15)	<u>Number of serious physical health problems, mean (SD)</u> • Postintegration: 2 (2) • Preintegration: 2 (2)	Not available
Mental health disease	<u>Any mental health problem, n (%)</u> • Outreach: 29 (74) • Outreach + orientation: 31 (71) • Orientation: 31 (80) • Usual care: 40 (66)	<u>Any mental health problem, n (%)</u> • Housing + services: 211 (75) • Usual care: 58 (56)	<u>Mental illness diagnosis</u> • 12 (60)	<u>Number of serious psychiatric problems, mean (SD)</u> • Postintegration: 2 (2) • Preintegration: 2 (2)	Not available

Variables	O'Toole et al, 2015 ⁹ N = 185 (Outreach: 39, Outreach + Clinic Orientation: 44, Clinic Orientation: 40, Usual Care: 62)	Mares and Rosenheck, 2011 ²⁰ N = 385 (Collaborative Initiative: 281, Usual Care: 104)	Parker, 2010 ²¹ N = 20 (Before: 20, After: 20)	McGuire et al, 2009 ⁸ N = 260 (Colocation: 130, Preintegration: 130)	Ciaranello et al, 2006 ¹⁹ N = 252 (Outreach: 202, Control: 50)
Substance abuse	<p><u>Alcohol in past 6 months, n (%)</u></p> <ul style="list-style-type: none"> • Outreach: 24 (62) • Outreach + orientation: 32 (73) • Orientation: 26 (65) • Usual care: 46 (75) <p><u>Cocaine in past 6 months, n (%)</u></p> <ul style="list-style-type: none"> • Outreach: 4 (10) • Outreach + orientation: 6 (14) • Orientation: 2 (5) • Usual care: 10 (16) 	<p><u>Any substance abuse problem, n (%)</u></p> <ul style="list-style-type: none"> • Housing + services: 208 (74) • Usual care: 84 (81) 	<p><u>Substance abuse diagnosis</u></p> <ul style="list-style-type: none"> • 16 (80) 	<p><u>Alcohol abuse, n (%)</u></p> <ul style="list-style-type: none"> • Postintegration: 68 (52) • Preintegration: 51 (39) <p><u>Drug abuse, n (%)</u></p> <ul style="list-style-type: none"> • Postintegration: 64 (49) • Preintegration: 59 (45) 	Not available

Abbreviations: Collaborative Initiative, Collaborative Initiative to Help End Chronic Homelessness; SD, standard deviation.

Appendix 6: Results of Studies Included

Table A8: Results of Randomized Controlled Trials Evaluating Effectiveness of Outreach Interventions

Author, Year			Results	
N, Design	Design/Analysis	Nonparticipation/Losses to Follow-Up	Access to a Primary Care Provider	Emergency Department Visits, Hospital Admissions, and Mental Health and Preventive Care Services Received
O'Toole et al, 2015 ⁹ N = 185 RCT United States Urban Without serious mental health issues Veterans	<ul style="list-style-type: none"> • RCT • Chi-squared tests • Cox proportional hazards 	<ul style="list-style-type: none"> • 36 (16.3%) owing to ineligibility • Losses to follow-up: 19% (1 month), 29% (6 months) 	<p><u>Primary care access within 4 weeks:</u></p> <ul style="list-style-type: none"> • Outreach + orientation: 77.3% • Orientation: 50.0% • Outreach: 41.0% • Usual care: 30.6% <p><i>P</i> < .001</p> <p><u>Primary care access within 6 months:</u></p> <ul style="list-style-type: none"> • Outreach + orientation: 88.7% • Orientation: 80.0% • Outreach: 56.4% • Usual care: 37.1% <p><i>P</i> < .001</p> <p><u>Time-to-treatment (Cox proportional hazards), HR (95% CI), reference group: usual care</u></p> <ul style="list-style-type: none"> • Outreach + orientation: 3.41 (2.02–5.76) • Orientation: 2.64 (1.54–4.53) <p>Outreach: not statistically significant (HR not provided)</p>	<p><u>Number of visits received within 6 months among patients who accessed primary care within first 4 weeks</u></p> <p>Primary care, mean (SD)</p> <ul style="list-style-type: none"> • Outreach + orientation: 3.1 (2.0) • Orientation: 2.9 (3.4) • Outreach: 3.4 (2.7) • Usual care: 2.4 (2.0) <p><i>P</i> = .52</p> <p>Emergency department (medical), mean (SD)</p> <ul style="list-style-type: none"> • Outreach + orientation: 0.4 (0.6) • Orientation: 0.6 (1.3) • Outreach: 0.5 (1.1) • Usual care: 0.4 (0.6) <p><i>P</i> = .61</p> <p>Outpatient substance abuse treatment, n (%)</p> <ul style="list-style-type: none"> • Outreach + orientation: 12 (27.9) • Orientation: 9 (25.0) • Outreach: 9 (37.5) • Usual care: 8 (26.7) <p><i>P</i> = .75</p> <p>Medical inpatient, mean (SD)</p> <ul style="list-style-type: none"> • Outreach + orientation: 0 (0.2) • Orientation: 0.2 (0.7) • Outreach: 0.4 (1.1) • Usual care: 0 (0) <p><i>P</i> = .07</p>

Abbreviations: CI, confidence interval; HR, hazard ratio; RCT, randomized controlled trial; SD, standard deviation

Table A9: Results of Observational Studies Evaluating Effectiveness of Outreach Interventions

Author, Year N Country/Setting	Design/Analysis	Nonparticipation/Losses to Follow-Up	Results	
			Access to a Primary Care Provider	Emergency Department Visits, Hospital Admissions, and Mental Health and Preventive Care Services Received
Ciaranello et al, 2006 ¹⁹ N = 252 United States Urban Severity of mental health disease not provided	<ul style="list-style-type: none"> Series of cross-sectional surveys performed at 3 time points Logistic regression adjusting for covariates and controlling for baseline differences between groups 	<p>Nonparticipation: < 30% for all 3 surveys Losses to follow-up were not applicable:</p> <ul style="list-style-type: none"> Participants were not followed up for duration of study Data gathered through cross-sectional surveys included population available at site at each time point 	<p><u>Could not receive needed medical care</u></p> <p>Baseline</p> <ul style="list-style-type: none"> Outreach: 85 (42%) Control: 17 (33%) <p>6 months</p> <ul style="list-style-type: none"> Outreach: 61 (29%) Control: 14 (28%) <p><u>AOR: 1.07 (95% CI: 0.35–3.31)</u></p> <p>18 months</p> <ul style="list-style-type: none"> Outreach: 53 (24%) Control: 10 (23%) <p><u>AOR: 0.78 (95% CI: 0.39–1.6)</u></p> <p><u>Usually/always received care as soon as needed</u></p> <p>Baseline</p> <ul style="list-style-type: none"> Outreach: 97 (48%) Control: 20 (40%) <p>6 months</p> <ul style="list-style-type: none"> Outreach: 127 (61%) Control: 30 (59%) <p><u>AOR: 1.55 (95% CI: 0.44–5.40)</u></p> <p>18 months</p> <ul style="list-style-type: none"> Outreach: 120 (55%) Control: 20 (47%) <p><u>AOR: 2.26 (95% CI: 0.61–8.32)</u></p>	<p><u>≥ 2 emergency department visits in past 6 months</u></p> <p>Baseline</p> <ul style="list-style-type: none"> Outreach: 42 (21%) Control: 4 (8%) <p>6 months</p> <ul style="list-style-type: none"> Outreach: 31 (15%) Control: 5 (10%) <p><u>AOR: 1.05 (95% CI: 0.37–2.98)</u></p> <p>18 months</p> <ul style="list-style-type: none"> Outreach: 28 (13%) Control: 6 (14%) <p><u>AOR: 0.30 (95% CI: 0.12–0.74)</u></p> <p><u>≥ 1 hospitalizations in past 6 months</u></p> <p>Baseline</p> <ul style="list-style-type: none"> Outreach: 36 (18%) Control: 4 (8%) <p>6 months</p> <ul style="list-style-type: none"> Outreach: 29 (14%) Control: 5 (10%) <p><u>AOR: 1.00 (95% CI: 0.23–4.29)</u></p> <p>18 months</p> <ul style="list-style-type: none"> Outreach: 24 (11%) Control: 1 (2%) <p><u>AOR: 3.00 (95% CI: 0.22–41.46)</u></p>

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval.

Table A10: Results of Observational Study Evaluating Effectiveness of Integration of Services

Author, Year		Results		
N (Intervention/Control)				Emergency Visits, Hospital Admissions, and Mental Health and Preventive Care Services Received
Country/Setting	Design/Analysis	Nonparticipation/Losses to Follow-Up	Access to a Primary Care Provider	
McGuire et al, 2009 ⁸ N = 260 (130/130) United States Urban Serious mental illness or substance abuse Veterans	<ul style="list-style-type: none"> Cohort study Noncontemporaneous controls (enrolled 2 years apart) Regression analysis adjusting for baseline confounders 	<p><u>Nonparticipation</u></p> <ul style="list-style-type: none"> None <p><u>Losses to follow-up at 18 months</u></p> <ul style="list-style-type: none"> Postintegration: 24% Preintegration: 33% 	<p>18-month follow-up</p> <p><u>Receipt of primary care service, n (%)</u></p> <ul style="list-style-type: none"> Postintegration: 117 (90%) Preintegration: 117 (90%) <p>P = .98</p> <p><u>Days to primary care enrolment, mean (SE)</u></p> <ul style="list-style-type: none"> Postintegration: 0.3 (1.8) Preintegration: 53.2 (1.7) <p>P = .00</p>	<p>18-month follow-up</p> <p><u>Patients with emergency care service use, n (%)</u></p> <ul style="list-style-type: none"> Postintegration: 70 (54%) Preintegration: 104 (80%) <p>P = .00</p> <p><u>Number of emergency department visits, mean (SE)</u></p> <ul style="list-style-type: none"> Postintegration: 2.4 (0.5) Preintegration: 4.0 (0.5) <p>P = .00</p> <p><u>Participants with hospital admissions, n (%)</u></p> <ul style="list-style-type: none"> Postintegration: 113 (89%) Preintegration: 125 (96%) <p>P = .09</p> <p><u>Number of hospital days, mean (SE)</u></p> <ul style="list-style-type: none"> Preintegration: 14.2 (1.5) Postintegration: 14.7 (1.6) <p>P = .06</p>

Abbreviation: SE, standard error of the mean.

Table A11: Results of Observational Studies Evaluating Effectiveness of Housing Services Interventions

Author, Year			Results	
N	Design/Analysis	Nonparticipation/Losses to Follow-Up	Access to a Primary Care Provider	Emergency Department Visits, Hospital Admissions, and Mental Health and Preventive Care Services Received
<p>Mares and Rosenheck, 2011²⁰ N = 385 (281/104) United States Urban</p> <p>Participants in some sites had mental health and substance abuse conditions</p>	<ul style="list-style-type: none"> Cohort study Regression analyses adjusting for time and group (not potential confounders) 	<p><u>Nonparticipation</u></p> <ul style="list-style-type: none"> 41% of persons enrolled in housing program did not consent to participate in national evaluation (based on all 11 sites) <p><u>Losses to follow-up (intervention/control)</u></p> <ul style="list-style-type: none"> 3 months: 3%/19% 24 months: 31%/45% 	<p>2-year follow-up</p> <p><u>Had a primary care provider, n (%), SE</u></p> <ul style="list-style-type: none"> Housing + services: 138 (49%, 2) Control: 42 (40%, 3) <p><i>P</i> < .05</p>	<p>2-year follow-up</p> <p><u>Had a usual mental health/substance abuse provider, n (%), SE</u></p> <ul style="list-style-type: none"> Housing + services: 155 (55%, 2) Control: 24 (23%, 3) <p><i>P</i> < .001</p> <p><u>Outpatient mental health visits, mean (SE)</u></p> <ul style="list-style-type: none"> Housing + services: 2.84 (0.17) Control: 0.95 (0.29) <p><i>P</i> < .001</p> <p><u>Outpatient substance abuse visits, mean (SE)</u></p> <ul style="list-style-type: none"> Housing + services: 6.40 (0.55) Control: 3.56 (0.65) <p><i>P</i> < .01</p>

Author, Year			Results	
N	Design/Analysis	Nonparticipation/Losses to Follow-Up	Access to a Primary Care Provider	Emergency Department Visits, Hospital Admissions, and Mental Health and Preventive Care Services Received
Parker, 2010 ²¹ N = 20 United States Urban Substance abuse/mental illness	<ul style="list-style-type: none"> Uncontrolled before-after study Descriptive unadjusted analysis 	Not applicable: only participants who were housed for duration of study were included	<u>Use of a primary care physician, n (%)</u> <ul style="list-style-type: none"> Before: 5 (25%) 6 months: 19 (95%) <i>P</i> = .01	<u>Mental health services, n (%)</u> <ul style="list-style-type: none"> Before: 5 (25%) 6 months: 12 (60%) <i>P</i> = .01 <u>Substance abuse treatment, n (%)</u> <ul style="list-style-type: none"> Before: 1 (5%) 6 months: 0 <i>P</i> = .32 <u>6-month emergency department visits, mean (range)</u> <ul style="list-style-type: none"> Before: 4.79 (0–23) 6 months: 2.16 (0–24) <i>P</i> = .14 <u>6-month hospital admissions, mean (range)</u> <ul style="list-style-type: none"> Before: 0.63 (0–3) 6 months: 0.37 (0–4) <i>P</i> = .31 <u>6-month hospitalization days, mean (range)</u> <ul style="list-style-type: none"> Before: 3.32 (0–17) 6 months: 3.00 (0–34) <i>P</i> = .90

Abbreviation: SE, standard error of the mean.

Appendix 7: Evidence Quality Assessment

Our first consideration was study design; we started with the assumption that randomized controlled trials are high quality, whereas observational studies are low quality. We then took into account five additional factors—risk of bias, inconsistency, indirectness, imprecision, and publication bias. Limitations in these areas resulted in downgrading the quality of evidence. Finally, we considered three main factors that can raise the quality of evidence: the large magnitude of effect, the dose-response gradient, and any residual confounding factors.¹⁸ For more detailed information, please refer to the latest series of GRADE articles.¹⁸

As stated by the GRADE Working Group, the final quality score can be interpreted using the following definitions:

High	We are very confident that the true prognosis (probability of future events) lies close to that of the estimate
Moderate	We are moderately confident that the true prognosis (probability of future events) is likely to be close to the estimate, but there is a possibility that it is substantially different
Low	Our confidence in the estimate is limited: the true prognosis (probability of future events) may be substantially different from the estimate
Very Low	We have very little confidence in the estimate: the true prognosis (probability of future events) is likely to be substantially different from the estimate

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About Health Quality Ontario

Health Quality Ontario is the provincial advisor on the quality of health care. We are motivated by a single-minded purpose: **Better health for all Ontarians.**

Who We Are.

We are a scientifically rigorous group with diverse areas of expertise. We strive for complete objectivity, and look at things from a vantage point that allows us to see the forest and the trees. We work in partnership with health care providers and organizations across the system, and engage with patients themselves, to help initiate substantial and sustainable change to the province's complex health system.

What We Do.

We define the meaning of quality as it pertains to health care, and provide strategic advice so all the parts of the system can improve. We also analyze virtually all aspects of Ontario's health care. This includes looking at the overall health of Ontarians, how well different areas of the system are working together, and most importantly, patient experience. We then produce comprehensive, objective reports based on data, facts and the voice of patients, caregivers and those who work each day in the health system. As well, we make recommendations on how to improve care using the best evidence. Finally, we support large scale quality improvements by working with our partners to facilitate ways for health care providers to learn from each other and share innovative approaches.

Why It Matters.

We recognize that, as a system, we have much to be proud of, but also that it often falls short of being the best it can be. Plus certain vulnerable segments of the population are not receiving acceptable levels of attention. Our intent at Health Quality Ontario is to continuously improve the quality of health care in this province regardless of who you are or where you live. We are driven by the desire to make the system better, and by the inarguable fact that better has no limit.

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