Primary Care Engagement Among Veterans with Experiences of Homelessness and Serious Mental Illness: An Evidence Map

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PREFACE

The VA Evidence Synthesis Program (ESP) was established in 2007 to provide timely and accurate syntheses of targeted healthcare topics of importance to clinicians, managers, and policymakers as they work to improve the health and healthcare of Veterans. These reports help:

- Develop clinical policies informed by evidence;
- Implement effective services to improve patient outcomes and to support VA clinical practice guidelines and performance measures; and
- Set the direction for future research to address gaps in clinical knowledge.

The program comprises three ESP Centers across the US and a Coordinating Center located in Portland, Oregon. Center Directors are VA clinicians and recognized leaders in the field of evidence synthesis with close ties to the AHRQ Evidence-based Practice Center Program and Cochrane. The Coordinating Center was created to manage program operations, ensure methodological consistency and quality of products, and interface with stakeholders. To ensure responsiveness to the needs of decision makers, the program is governed by a Steering Committee composed of health system leadership and researchers. The program solicits nominations for review topics several times a year via the program website.

Comments on this evidence report are welcome and can be sent to Nicole Floyd, Deputy Director, ESP Coordinating Center at Nicole.Floyd@va.gov.

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This topic was developed in response to a nomination by the National Center on Homelessness Among Veterans to inform development of a new program to enhance primary care utilization among Veterans with experiences of homelessness and serious mental illness (SMI). The scope was further developed with input from the topic nominators (*ie*, Operational Partners), the ESP Coordinating Center, the report team, and the technical expert panel (TEP).

In designing the study questions and methodology at the outset of this report, the ESP consulted several technical and content experts. Broad expertise and perspectives were sought. Divergent and conflicting opinions are common and perceived as healthy scientific discourse that results in a thoughtful, relevant systematic review. Therefore, in the end, study questions, design, methodologic approaches, and/or conclusions do not necessarily represent the views of individual technical and content experts.

Operational Partners

Operational partners are system-level stakeholders who have requested the report to inform decision-making. They recommend Technical Expert Panel (TEP) participants; assure VA relevance; help develop and approve final project scope and timeframe for completion; provide feedback on draft report; and provide consultation on strategies for dissemination of the report to field and relevant groups.

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Technical Expert Panel (TEP)

To ensure robust, scientifically relevant work, the TEP guides topic refinement; provides input on key questions and eligibility criteria, advising on substantive issues or possibly overlooked areas of research; assures VA relevance; and provides feedback on work in progress. TEP members are listed below:

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Peer Reviewers

The Coordinating Center sought input from external peer reviewers to review the draft report and provide feedback on the objectives, scope, methods used, perception of bias, and omitted evidence. Peer reviewers must disclose any relevant financial or non-financial conflicts of interest. Because of their unique clinical or content expertise, individuals with potential conflicts may be retained. The Coordinating Center and the ESP Center work to balance, manage, or mitigate any potential nonfinancial conflicts of interest identified.

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EXECUTIVE SUMMARY

INTRODUCTION

Adults with experiences of homelessness, both those who have been homeless and those with housing insecurity, are more likely to suffer from higher rates of chronic illness and early mortality compared with those who are not homeless. Adults with experiences of homelessness experiences also have a higher mental health burden than the general population; about 20-25% of people who experience homelessness in the United States also have been diagnosed with serious mental illness (SMI). The VA National Psychosis Registry defines SMI as the presence of schizophrenia, other psychotic disorders, or bipolar disorder. Mental and behavioral health disorders threaten household stability, which, in turn, leads to poor community integration and engagement with medical care. Hence, both experiences of homelessness and mental illness are vulnerabilities that negatively impact health and receipt of health care. Individuals with experiences of homelessness and SMI would benefit greatly from longitudinal medical care delivered in the context of a population-tailored clinical setting, yet the underlying context of both experiences of homelessness and SMI create notable barriers to accessing and engaging with traditional clinic-based primary care. As a result, these individuals receive less preventive care and chronic disease management and often receive the majority of their health care in episodic acute care visits delivered in more costly locations such as emergency departments, which are ill equipped for the complexity of this patient population.

Previously developed interventions have focused on collaborations between primary care and either persons with SMI or persons with experiences of homelessness, but few interventions have targeted both populations simultaneously. To date there have been no systematic examinations of the breadth of the literature about interventions that attempt to improve engagement in care for populations with intersecting needs related to SMI and experiences of homelessness. For health systems to better meet the health care needs of this complex population, it is critical to learn about the types of interventions, strategies that have been tested, and outcomes evaluated to better connect patients with housing insecurity and SMI to primary care. In this evidence map, we systematically examine the literature and provide an overview of the quantity and distribution of intervention types and components that were assessed to improve engagement in primary care for individuals with experiences with homelessness and SMI.

The Key Questions (KQs) for this evidence map were:

KQ 1: What intervention strategies have been studied among adults with experiences of homelessness or who are at high risk of becoming homeless and who have serious mental illness (SMI) to promote engagement in primary care?

KQ 2: What measures have been used to evaluate interventions among adults with experiences of homelessness or at high risk of becoming homeless and who have SMI to promote engagement in primary care?

METHODS

We followed a standard protocol for this evidence mapping review developed in collaboration with our operational partners and a technical expert panel. The protocol was developed prior to

the conduct of the review, and there were no significant deviations after registration. The methods for this systematic review followed standards described in the Cochrane Handbook.

Data Sources and Searches

We collaborated with an expert medical librarian to conduct a primary search of the literature from database inception to May 15, 2020, in MEDLINE® (via Ovid®), EMBASE (via Elsevier), and PsycINFO (via Ovid®). We also hand-searched the bibliographies previous systematic reviews related to primary care for patients with SMI and those related to primary care for patients with experiences of homelessness for potential inclusion.

Study Selection

Studies identified through our primary search were classified independently by 2 investigators for relevance to the KQs based on our *a priori* eligibility criteria. We accepted any definition of homelessness or housing insecurity as used by the authors. Studied interventions had to be designed to target patients with serious mental illness (SMI), include at least 75% of patients meeting diagnostic criteria for SMI, or include a subgroup analysis of patients with SMI. While studies were not required to be solely or primarily focused on engaging target patients to primary care, they were required to have some direct connection or ability to link patients with primary care clinics. A standard dual-reviewer approach to identifying eligible articles was used at title and abstract levels as well as full-text levels.

Data Abstraction and Quality Assessment

Data from included studies were abstracted into a customized DistillerSR database by 1 reviewer and over-read by a second reviewer. We approached data abstraction in 2 phases. First, study characteristics such as key descriptors to assess applicability, high-level intervention details, and outcomes were abstracted. Second, a subgroup of the larger team abstracted specific strategies used by each intervention or program. As this is an evidence mapping review, we did not assess the methodological quality of individual studies.

Data Synthesis and Analysis

We used summary tables to describe the key study characteristics of the primary studies: study design, patient demographics, and details of the intervention. In order to systematically characterize the complexity of included interventions and programs, we used the intervention Complexity Assessment Tool for Systematic Reviews (iCAT_SR). Next, we categorized each intervention's degree of integration with primary care informed by existing frameworks for the integration of behavioral and physical health care. Data were summarized narratively. Data presentations include tabular and graphical formats, as appropriate, to convey the breadth of the extant literature.

RESULTS

Results of Literature Search

We identified 7,904 articles; after removing duplicates, there were 4,650 unique citations, 191 of which were eligible for full-text review. Twenty-two articles ultimately met our inclusion criteria as evaluating 15 unique interventions to promote engagement in primary care for unhoused or

housing-insecure adults with SMI. Seven studies evaluated the multi-site comparative federal demonstration program, Access to Community Care and Effective Services and Support (ACCESS), and 15 studies evaluated 14 other eligible interventions. Study designs varied widely from randomized controlled trials and cohort studies to single-site program evaluations. All studies were conducted in either the United States or Canada. Most of the included studies were not designed primarily to promote primary care engagement of the target population despite featuring interventions that included engagement with primary care.

Summary of Results for Key Questions

Key Question 1

We identified all intervention strategies described in each included study. Individual studies typically combined multiple intervention strategies, often at multiple levels (*ie*, patient, clinic, system). We identified a total of 31 unique intervention strategies across patient (n=22), clinic (n=4), and systems levels (n=5). The most frequently described patient-level strategies were health education, motivational interviewing, interdisciplinary intake, service navigation, and material assistance for housing. The most frequently described clinic-level strategies were multidisciplinary teams, employee training to care for this population, and established relationships with partner agencies. The most frequently described system-level strategies were data sharing and client monitoring technology. Primary care integration strategies were evenly distributed across studies and included the following not mutually exclusive categorizations: co-location, interdisciplinary care planning, standard referral, and enhanced referral (pre-existing relationships without regular structured contact). ACCESS sites evaluated tailored systems integration strategies to promote care coordination across social and medical care for persons with experiences with homelessness and mental illness. Strategies used by ACCESS sites ranged from information sharing across agencies, co-location, use of interagency service delivery teams, and use of standardized eligibility criteria. The median duration of these intervention was 12 months and ranged from 6 weeks to 2 years, although 6 studies and 7 ACCESS studies report did not report information about duration.

We categorized the complexity of included interventions using the iCAT_SR tool. Common intervention areas of moderate to high complexity included having multiple active intervention components that targeted a complex collection of behaviors, employing a high degree of tailoring or flexibility for individual patient needs, being susceptible to significant impact from patient- and provider-level factors, and potential for interactions between intervention components (*eg*, interdisciplinary care across multiple facets patient care). In contrast, we found aspects of low-level complexity around skill requirements for patients, and program staff needing little training beyond their discipline specific skills.

While in keeping with an evidence map, we did not seek to synthesize the effects of interventions described in the included articles. However, we report the findings of included articles as reported by the authors which suggest possible benefit in the areas of improved health outcomes, reduced emergency room/hospital utilization, increased primary care use, and reduced criminal recidivism; in addition, reported findings suggest that integration of care across agencies within a larger system is complex and requires intentional efforts.

Key Question 2

We also mapped measured outcomes to the patient, clinic, and systems level. Patient-level outcomes were most frequently assessed. We categorized patient-level outcomes as mental and physical health; community functioning; care utilization, patient experiences; and unmet needs and barriers to care. The most commonly reported outcomes included mental health, substance use, criminal justice involvement, housing, and hospitalizations. Outcomes that specifically addressed primary care engagement included number of primary care visits and number of days to primary care engagement. The clinic-level outcomes varied widely and only fidelity to care model was measured in more than 1 study. System-level outcomes were reported least frequently, though integration strategies and service link were measured in more than 1 study. While validated self-report measures were used for many of the patient-level outcomes, in general, the same outcome measures were not used consistently across studies.

DISCUSSION

Key Findings

We identified 22 publications describing 15 unique studies. We categorized integration strategies to promote primary care engagement for adults with experiences of homelessness and SMI. Strategies used across studies varied, but primarily targeted patient levels (*eg*, health education, evidence-based interactions such as motivational interviewing) with fewer strategies at the clinic (*eg*, employee training, multidisciplinary teams) or system levels (*eg*, data sharing). Almost all studies used strategies at multiple levels. The most common outcomes assessed included patient mental health, substance use, criminal justice involvement, housing, and inpatient utilization. Interventions evaluated by included studies displayed notable complexity around aspects such as the number of behaviors targeted, number and interaction of intervention components, and individual patient-level tailoring allowed.

Applicability

While some included studies were conducted in VA clinical settings, the majority were not. As such, readers should use caution when generalizing these findings to a Veteran population.

Research Gaps/Future Research

We identified several areas for future research. First, these interventions have high relevance for patients who have been involved in the justice system and there is a need for more work with this population. Second, interventions should focus on maintaining primary care engagement over time as a critical focus for improving long-term health outcomes. Third, there is a need to validate outcome measures used in these studies to allow synthesis across future studies, particularly in relation to primary care engagement.

Conclusions

We mapped the breadth of literature seeking to engage adults with experiences of homelessness and SMI with primary care, including localized interventions to national multi-site demonstration projects. In general, primary care engagement was not the primary objective of these studies. We found that programs are typically highly complex and employ multiple intervention strategies, usually across patient, provider, and system levels. This literature could be improved by rigorous

study designs, standardized descriptions of intervention components, and a uniform and validated approach to measuring primary care engagement. Organizations seeking to optimize the health care of this vulnerable patient population can use this map to inform program strategy choices during development and reevaluation.

EVIDENCE REPORT

INTRODUCTION

Adults with experiences of homelessness, both those who have been homeless and those with housing insecurity, are more likely to suffer from higher rates of chronic illness and early mortality compared with those who are not homeless.[1-3] The homeless population also experiences a higher mental health burden than the general population; about 20-25% of people who experience homelessness in the United States also have diagnosed serious mental illness (SMI).[4,5] Moreover, Veterans who experience homelessness and have used the emergency department have a 3.4-fold higher likelihood of being diagnosed with schizophrenia.[6] The VA National Psychosis Registry defines SMI as the presence of schizophrenia, other psychotic disorders, or bipolar disorder. Mental and behavioral health disorders threaten household stability, which, in turn, leads to poor community integration and treatment dropout.[7] Hence, both homelessness and mental illness are key vulnerabilities that undermine health and access to health care for this population. Individuals with experiences of homelessness and SMI would benefit greatly from medical care to help manage their chronic health needs, yet the underlying context of both homelessness and SMI restrict their engagement in traditional, clinic-based primary care. For example, stigma in the health system,[8] lack of transportation, and prioritizing basic needs above health concerns limit their ability to obtain primary health care.[9] Further, the risks of homelessness and SMI together likely amplify barriers to health care. For example, SMI increases housing insecurity,[10] and housing insecurity impedes engagement in health care,[11,12] which in turn increases SMI symptoms. As a result, these individuals receive less preventive care and chronic disease management and often receive the majority of their health care in acute care settings such as emergency departments.[6]

Thoughtful interventions have been developed to directly address some of the barriers to engaging in primary care for populations with housing instability and populations with SMI.[13] However, despite the high prevalence of SMI among people who experience homelessness, most interventions tailored to this population currently focus on either SMI or homelessness and few efforts have been developed to address both vulnerabilities and the intersection between the two.[14,15] The few studies that have sought to improve health care engagement to meet the complex health and social needs related to both homelessness and SMI have focused broadly on collaborative and patient-centered medical home models tailored for this population to address social determinants of health.[15-17] Research shows that these interventions can improve continuity of care, use of primary and mental health care,[16-18] and housing outcomes.[19,20] While this research is promising, to date there have been no systematic examinations of the breadth of the literature about interventions that attempt to improve engagement in care for populations with intersecting needs related to SMI and homelessness.

For health systems to better meet the health care needs of this complex population, it is critical to learn about the types of interventions and strategies that have been evaluated to better connect patients with housing insecurity and SMI to primary care, and which outcomes they evaluated. In this evidence map, we systematically examine the literature and provide an overview of the quantity and distribution of intervention types and components that were assessed to improve engagement in primary care for individuals with housing insecurity and SMI. The overarching goal is to provide a better understanding of the breadth of intervention models that promote

primary care engagement among individuals with experiences of homelessness or who are at high risk of experiencing homelessness and who have a history of SMI.

The Key Questions (KQs) for this evidence map were:

KQ 1: What intervention strategies have been studied among adults with experiences of homelessness or who are at high risk of experiencing homelessness and who have serious mental illness (SMI) to promote engagement in primary care?

KQ 2: What measures have been used to evaluate interventions among adults with experiences of homelessness or who are at high risk of experiencing homelessness and who have SMI to promote engagement in primary care?

METHODS

We followed a standard protocol for this evidence mapping review, developed in collaboration with our operational partners and a technical expert panel. An evidence map "is a systematic search of a broad field to identify gaps in knowledge and/or future research needs that presents results in a user-friendly format, often a visual figure or graph, or a searchable database."[21] The protocol was developed prior to the conduct of the review, and was published online on the program website. There were not significant deviations after protocol publication. Each step was pilot-tested to train and calibrate study investigators. While there are no specific guidelines for reporting evidence maps, we followed the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) guidelines where applicable.[22]

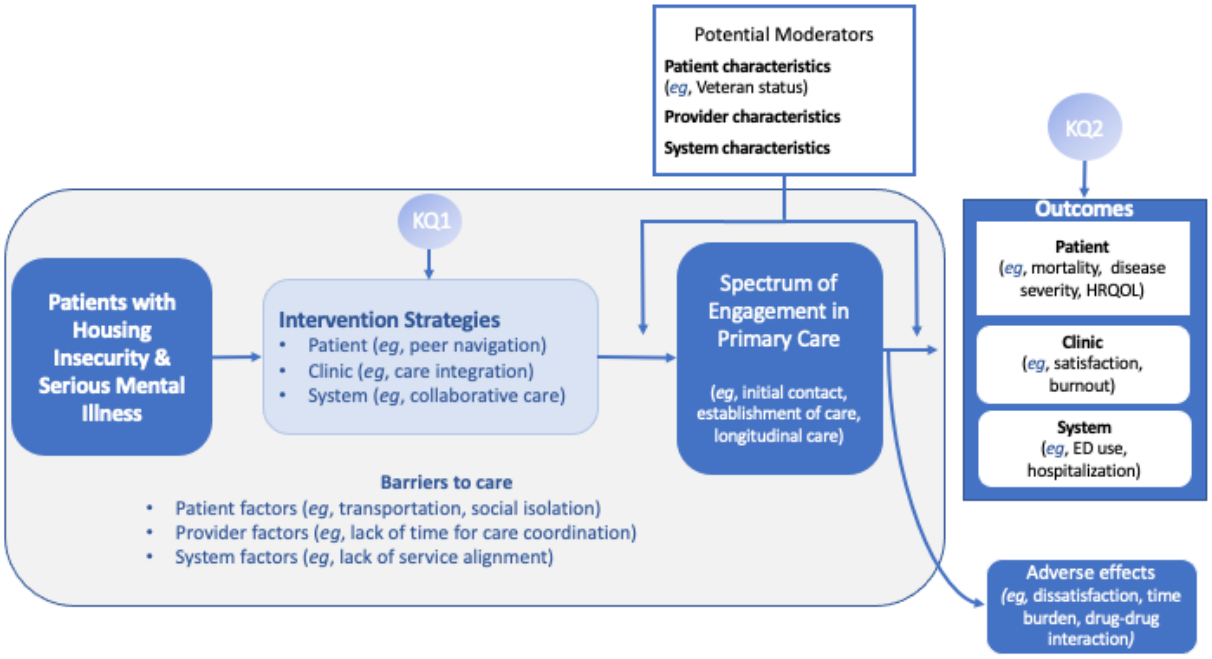
TOPIC DEVELOPMENT

This topic was requested by the National Center on Homelessness Among Veterans. Findings from this report will be relevant to the Veterans Health Administration (VHA) as it seeks to continue the provision of high-quality clinical care to the Veteran population with housing insecurity and SMI through the development of pilot programs to serve the primary care needs of this vulnerable population. The results of this project may also be relevant to individuals, health care providers, and other agencies seeking to improve the health and quality of life for individuals with housing insecurity and SMI.

Conceptual Model

To guide this evidence map, we developed the conceptual model depicted in Figure 1. Patients with housing insecurity and SMI experience numerous barriers to engaging in primary care that occur at the patient, provider, and system levels. We recognize that engaging with primary care occurs across a spectrum that includes initial contact, establishing care, and care provision over time. To overcome barriers to engaging in primary care, interventions can employ strategies at these same 3 levels (patient, clinic, and system). Patient-level strategies focused on clinical techniques and delivery models that directly targeted the patient. Clinic-level strategies related to clinic- or provider-targeted approaches, including workforce development, staffing, and capacity-building activities. System-level strategies were activities to improve system integration for multi-sector coordination. For example, peer navigators can directly connect patients with care to help overcome challenges related to lack of transportation and social isolation. Care integration improves coordination among providers to help connect patients with the care they need. Finally, models such as collaborative care address system-level barriers, including care fragmentation, by implementing structural processes that support service alignment. Patient, provider, and system characteristics modify patients' ability to engage with primary care and have an impact on the effect of primary care engagement on outcomes. When interventions effectively help patients to establish and maintain primary care, benefits are expected for patient health (*eg*, improvements in psychiatric symptoms), provider satisfaction, and the system (*eg*, reduced emergency department use). We also recognize that these interventions might lead to adverse outcomes, including patient dissatisfaction with care, oversights in medication management, and time burden for providers. The first KQ focuses on intervention strategies to improve primary care engagement of patients with housing insecurity and SMI. The second KQ explores the breadth of outcomes used to evaluate relevant interventions.

Figure 1. Conceptual Model



Definitions

To guide the evidence mapping process, we established the following definitions in conjunction with our operational partners and technical expert panel.

- **Experiences with homelessness** is lacking a fixed, regular, and adequate night-time residence, including being unhoused or living in supervised shelters, supported housing, or places not intended for human habitation. **Housing insecurity** is being at risk for losing housing and lacking resources to obtain other permanent housing or receiving housing support services. However, because the terms "homeless" and "housing insecurity" are defining in multiple ways across the literature, we accepted any definition reported in the literature.

- **Serious mental illness (SMI)** is the presence of schizophrenia, other psychotic disorders, or bipolar disorder, consistent with the VA National Psychosis Registry (NPR). We acknowledge that there are multiple ways that SMI is defined. For example, some broader definitions of SMI include major depressive disorder (MDD) and posttraumatic stress disorder (PTSD). For the purposes of this evidence mapping review, we tracked which studies used the narrower (*ie*, NPR) definition and which used a broader definition, or which self-identified their targeted patient population as having SMI but did not provide enough information to determine whether it was the broader or narrower category.

- **Primary care** is a service that "provides long-term, patient-provider relationships, coordinates care across a spectrum of health services, educates, and offers disease prevention programs" to the general population.[23]

- **Primary care engagement** is the range of structured interactions between an individual patient and a primary care provider and/or primary care clinical team that has direct linkage to a prescribing primary care provider (*eg*, MD, DO, NP, PA). Specific engagement interactions can occur across a spectrum from initial contact (including patient identification and referral to primary care), establishment of a therapeutic relationship with a primary care clinic, and longitudinal patient-centered care delivery. In this context, a key component of engagement is the establishment of a relationship with a primary care clinic with the intent for regular, proactive contact for the purpose of managing health over time.

SEARCH STRATEGY

We collaborated with an expert medical librarian to conduct a primary search of the literature from database inception to May 15, 2020, in MEDLINE® (via Ovid®), EMBASE (via Elsevier), and PsycINFO (via Ovid®). We used a combination of database-specific subject headings and keywords (*eg*, homelessness, primary care, veterans) to search titles and abstracts (Appendix A). No limits were placed on date or language. Case reports, editorials, letters, and conference abstracts were excluded from the search. We hand-searched previous systematic reviews conducted on this topic for potential inclusion.

STUDY SELECTION

Studies identified through our primary search were classified independently by 2 investigators for relevance to the KQs based on our *a priori* eligibility criteria (Table 1), which were developed with the guidance of the technical expert panel. All citations classified for inclusion by at least 1 investigator were reviewed at the full-text level. The citations designated for exclusion by 1 investigator at the title-and-abstract level underwent screening by a second investigator. If both investigators agreed on exclusion, the study was excluded. All articles meeting eligibility criteria at full-text review were included for data abstraction. All results were tracked in both DistillerSR, a web-based data synthesis software program (Evidence Partners Inc., Manotick, ON, Canada), and EndNote® reference management software (Clarivate).

Table 1. Study Eligibility Criteria

Study Characteristic	Inclusion Criteria	Exclusion Criteria
Population	Ambulatory adults (≥18 years of age) who have had experiences of homelessness or those with housing insecurity and who have serious mental illness (SMI) as determined by meeting 1 of the following 3 criteria: • Primary SMI, defined as at least a one-time diagnosis of schizophrenia, other psychotic disorder, or bipolar disorder (as per VA NPR; see expanded definition above on page 13) • Secondary SMI, defined as the above diagnoses plus major depressive disorder (MDD) or posttraumatic stress disorder (PTSD)	• Children, teens • People with substance use or depression not specified as MDD as the only diagnosed mental health condition • <75% adult population with SMI • Interventions that are not targeted toward homeless populations, or are targeted only to those with housing insecurity but who no longer need housing services

Study Characteristic	Inclusion Criteria	Exclusion Criteria
	• The population was explicitly labeled as SMI by the study authors even if the operationalized definition of SMI is different than the above 2 categories (*eg*, could be labeled as severe and persistent mental illness (SPMI))	• Mixed populations of homeless and nonhomeless without subgroup analysis
Interventions	Interventions designed to promote structured interaction with a prescribing primary care clinician or with a clinical team member who has a direct linkage, or facilitates linkage, to a prescribing primary care clinician and that meet 1 of the following 3 criteria: • Intervention is specifically targeted to patients with housing insecurity and SMI • Intervention is targeted to patients with housing insecurity, of whom at least 75% have SMI or diagnoses consistent with SMI • Intervention is targeted to patients with housing insecurity and includes a subgroup analysis with outcomes reported separately for the group of interest	• Interventions that do not include a prescribing primary care healthcare clinician (*eg*, PCP, NP, PA), which has no direct linkage, or which do not facilitate linkage to one • Interventions that involve a social worker or mental health provider without direct connection to a primary care clinical staff member
Comparators	Any comparator (*eg*, usual care, active comparator) or no comparator	Not applicable
Outcomes*	Any	Not applicable
Timing	Any	Not applicable
Setting	Any (*eg*, clinical, housing services, criminal justice system)	Not applicable
Study designs[a]	• EPOC: randomized trials, nonrandomized trials, controlled before-after studies, interrupted time series[a] • Observational: cohort, organizational case study, program evaluation • Relevant systematic reviews or patient-level meta-analyses must have search strategy, eligibility criteria, and analysis/synthesis plan • Qualitative studies must include description of intervention strategy and/or components	• Not an intervention evaluation study (*eg*, editorial, nonsystematic review, letter to the editor, conference abstract) • Clinical guidelines • Protocol only • Individual patient case study
Language	Any	Not applicable
Countries	OECD[b]	Non-OECD
Years	Any	Not applicable
Publication types	Full publication in a peer-reviewed journal	Letters, editorials, reviews, dissertations, meeting abstracts, protocols without results

[a] Cochrane EPOC criteria identify study designs optimal for evaluation of health system interventions[24]

[b] OECD = Organization for Economic Co-operation and Development includes Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.
Abbreviations: EPOC=Effective Practice and Organisation of Care; MDD=major depressive disorder; NP=nurse practitioner; PA=physician assistant; PCP=primary care physician; PTSD=posttraumatic stress disorder; SMI=serious mental illness; SPMI=severe and persistent mental illness

DATA ABSTRACTION

Data from included studies were abstracted into a customized DistillerSR database by 1 reviewer and over-read by a second reviewer. Disagreements were resolved by consensus or by obtaining a third reviewer's opinion when consensus was not reached. We treated multiple reports from a single study as a single data point, prioritizing results based on the most complete and appropriately analyzed data. We approached data abstraction in 2 phases.

First, data elements such as descriptors to assess applicability, high-level intervention details, and outcomes were abstracted. Key characteristics abstracted included patient descriptors (*eg*, age, sex, race), intervention characteristics (*eg*, entry point to care, engagement methods, provider type), comparator (if any), and outcomes. When critical data were missing or unclear in published reports, we requested supplemental data from the study authors. Key features relevant to applicability included the match between the sample and target populations (*eg*, age, Veteran status).

Second, a subgroup of the larger team (MSB, CD, JRD, KMG) abstracted specific strategies used by each intervention or program. An initial list of potential strategies was drawn from previous reviews of interventions linking primary care to patients with experiences of homelessness.[14,15] The list of potential strategies was revised collaboratively by the subgroup of investigators after abstracting an initial 2 citations. The intervention strategies for the rest of the included studies were abstracted independently by 2 investigators and then reconciled for final determination. This group met regularly during this second-level abstraction to discuss any additional changes needed for the intervention strategies list.

For details of study characteristics, see Appendix B. Appendix C presents details of the intervention characteristics. Appendix D lists outcome measures, and Appendix E shows reported findings by included study. Appendix F lists excluded studies and the reason for exclusion.

QUALITY ASSESSMENT

As this is an evidence mapping review, we did not assess the methodological quality of individual studies.[21]

DATA SYNTHESIS

We summarized the literature using relevant data abstracted from the eligible studies. Summary tables describe the key study characteristics of the primary studies: study design, patient demographics, and details of the intervention. Data were summarized narratively. Data presentations include tabular and graphical formats, as appropriate, to convey key features of the literature.

In order to systematically characterize the complexity of included interventions and programs, we used the intervention Complexity Assessment Tool for Systematic Reviews (iCAT_SR).[25] Two investigators (KMG, MSB) applied the 10 iCAT_SR dimensions and assessment criteria to an initial 4 studies to establish an approach to application in the context of this mapping project. Then, the iCAT_SR was applied to the remaining included studies by 1 investigator and over-read by a second (Appendix G).

Next, we sought to determine an intervention's degree of integration with primary care. While we are aware of existing frameworks that allow for the categorization of interventions along a continuum of integration[26] or integrated mental health, such as the Integrated Practice Assessment Tool (IPAT),[27] we were unable to apply existing tools directly because of insufficient information provided by individual studies. Therefore, we identified the following individual key elements of integration based on such tools and identified the presence or absence of each element across the included studies:

(1) **Standard referral**: nonspecific referral pathways linking patients to primary care without evidence of clear interactive communication

(2) **Enhanced referral**: established relationships with primary care providers who are not an embedded part of the intervention, but with whom there is some form of interactive communication across disciplines that can be activated when needed

(3) **Co-location**: primary care is co-located in same physical space as other disciplines working with targeted patient population (note this can occur with or without interdisciplinary care planning)

(4) **Interdisciplinary care planning:** evidence of regular interdisciplinary collaboration around the planning of care for individual patients (note that this can occur with or without co-location of disciplines)

Our analysis is presented as a broad literature map without synthesis of the results across studies or quality of individual studies, or the strength of evidence for the KQs.

RATING THE BODY OF EVIDENCE

In keeping with established methods for evidence mapping reviews, we did not grade the strength of evidence for each KQ.[21]

PEER REVIEW

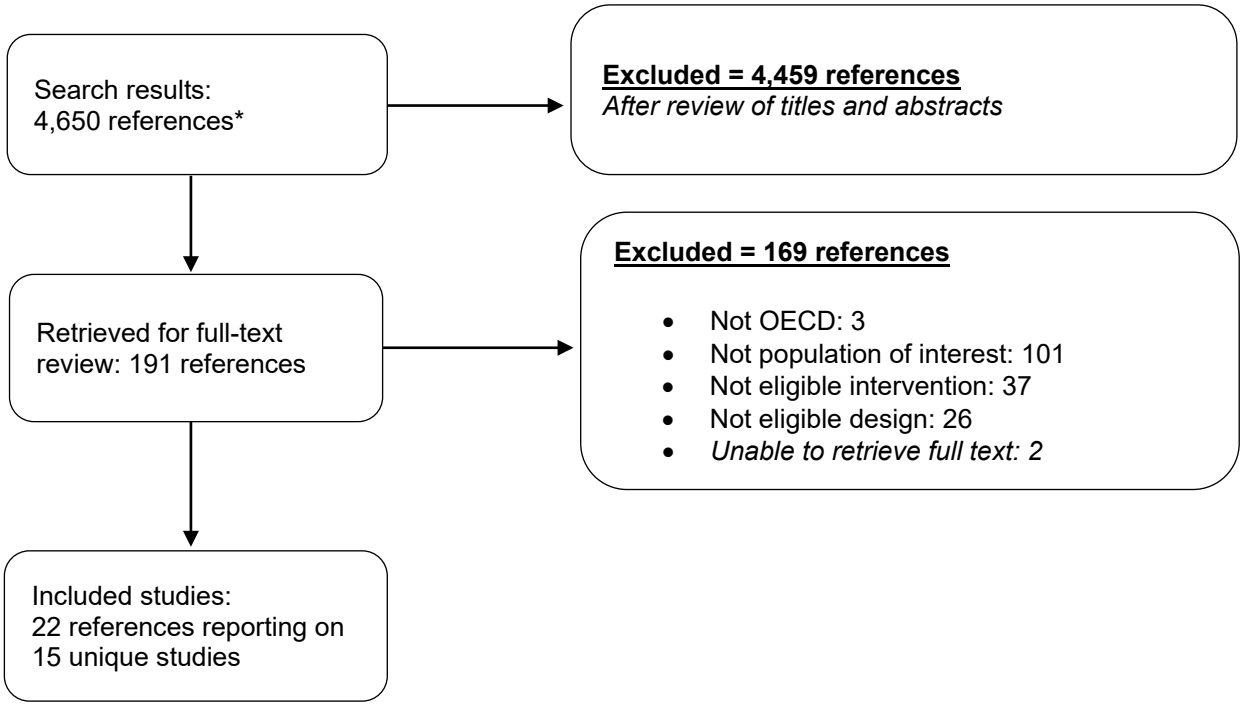
A draft version of this report was reviewed by technical experts and clinical leadership. A transcript of their comments and our responses is in Appendix H

RESULTS

LITERATURE FLOW

We identified 7,897 studies through searches of MEDLINE® (via Ovid®), EMBASE, and PsycINFO (Figure 2). An additional 7 articles were identified through reviewing bibliographies of relevant review articles for a total of 7,904 articles. After removing duplicates, there were 4,650 articles. After applying inclusion and exclusion criteria to titles and abstracts, 191 articles remained for full-text review. Included studies were conducted across Canada and the United States. Two studies were conducted within the VA.

Figure 2. Literature Flow Chart



*Search results from Ovid MEDLINE (3,358), EMBASE (942), PsycINFO (343), and identified from relevant articles (7) were combined.

KEY QUESTION 1: What intervention strategies have been studied among adults with experiences of homelessness or who are at high risk of experiencing homelessness and who have serious mental illness (SMI) to promote engagement in primary care?

Key Points

- Interventions designed to promote engagement in primary care for adults with experiences of homelessness or who are at high risk of experiencing homelessness and have SMI often employ multi-level strategies (*eg*, at the patient, clinic, and system levels).
- The most frequently described patient-level strategies include health education, service navigation, material housing support, and interdisciplinary needs assessment.
- Population-specific employee training was the most common clinic-level strategy, while psychiatry, primary care, and care management were the most frequently described disciplines delivering the intervention strategies across included studies.
- System-level strategies include shared documentation and record systems (*eg*, electronic health records and social services administrative records), standardized performance metrics, and a proactive monitoring system.
- There was a relatively even distribution of the 4 key elements of practice integration across included studies, including co-location of primary care with other disciplines, interdisciplinary care planning, a network of established referral pathways built to support interactive communication, and standard referral mechanisms.

Detailed Findings

We identified a total of 22 articles describing 15 different interventions and programs designed to support primary care engagement among patients with housing insecurity and SMI.[28-49] Seven of the 22 included articles describe the ACCESS demonstration project,[38-44] which we discuss separately from the other 14 individual interventions and programs.

ACCESS Characteristics and Demographics

The Access to Community Care and Effective Services and Support (ACCESS) was a federal demonstration program initiated in 1993. It was developed in response to recommendations from the Federal Task Force on Homelessness and Mental Illness, which sought to address the barriers generated by fragmented and isolated service delivery systems.[38-44] Endorsed and funded by the US Department of Health and Human Services, the goal of ACCESS was to test the effectiveness of systems integration strategies hypothesized to support patients with experiences of homelessness and mental illness by improving coordination across the social and medical care continuum. The ACCESS program was implemented at 18 sites in 9 pairs across major cities in the United States; all sites were provided financial resources to enhance services, but only 9 were given additional funding to support system integration.

We identified 7 publications that evaluated different aspects of the ACCESS multi-site comparative program evaluation and which included reference to primary care as a component of

system integration (see Table 2 and Appendix B).[38-44] Included ACCESS analyses were published in the 11 years spanning 1997 to 2008 and examined outcomes at the patient level (*eg*, physical and mental health status, health care utilization), clinic level (*eg*, patient referrals), and system level (*eg*, agency linkages and system coordination). One study compared the impact of gender on the outcomes of the ACCESS program.[38] Included studies examined data across ACCESS sites (all but one[41] from all 18 different sites around the country. Four studies (57%) reported the source of patient enrollment, which included locations such as homeless shelters, the streets, drop-in centers, service agencies, and soup kitchens, among others.

Individual participants at ACCESS sites were required to be homeless (had spent at least 7 of the past 14 nights in a shelter, outdoors, or in a public or abandoned building); have severe mental illness (psychiatric eligibility was determined with a 30-item screening algorithm); and not be involved in ongoing mental health treatment. Two studies reported patient-level demographics.[38,43] Both reported patient mean age as 38.5 years. One study reported the racial/ethnic make-up of patients, with 44.5% Black and 5.2% Hispanic.[43] One study reported mean monthly income of $328 (standard deviation, $449).[43] No study reported patient employment status. One study reported a 16% alcohol use disorder among patients.[38]

Table 2. Evidence Profile of ACCESS Studies (n=7)

Number of studies: 7 studies (1 intervention)
Study designs: ACCESS multisite comparative program evaluation (n=7)
Number of participants[a]: n=7,229
Enrollment setting[a,b]: homeless shelters, the streets, drop-in centers, service agencies, and soup kitchens, among others (3 studies NR)
Countries: 18 cities across USA (n=1)
Serious mental illness: ACCESS intervention designed specifically for patients with SMI
Housing insecurity: Participants had spent at least 7 of the past 14 nights in a shelter, outdoors, or in a public or abandoned building
Patient demographics: median age = 38 years old (5 studies NR); women (37%) (5 studies NR) race (44.5% Black) (6 studies NR)
Duration of intervention: 5-year demonstration project
Patient-level intervention domains: education/training (n= 0); evidence-based patient interactions (n=3); outreach (n=0); clinical/case management (n=5); structural/material supports (n=4); low-barrier clinic approaches (n=1)
Clinic-level intervention domains: program staff support (n=4); specialized team members (n=0); clinical offering domain (n=0)
System-level intervention domains: data sharing infrastructure (n=4); evaluation (n=0); coordination approaches (n=3)
Primary outcomes reported: system integration (n=3); health status (n=1); other (n=1) (2 studies NR)[c]

[a] Not all ACCESS studies analyze data from full cohort
[b] Studies recruited from multiple locations
[c] Studies reported more than one primary outcome

Non-ACCESS Study Characteristics and Demographics

We identified 14 interventions to improve access to primary care for individuals with SMI experiencing homelessness (see Table 3 and Appendix B).[28,30-37,45-49] Study designs included cohort studies (n=4[28,36,45,47]), program evaluations (n=4[32,35,48,49]), controlled before-after studies (n=2[34,37]), randomized controlled trials (n=2[31,33]), a cross-sectional study (n=1[46]), and a qualitative study (n=1[30]). Twelve studies (86%) reported participant-level enrollment.[28,30-34,36,37,45-47,49] Of 12 studies reporting, 10 studies (83%) included 500 or fewer participants,[28,30-34,36,37,46,49] 1 study had 501-1000 participants,[47] and 1 study had more than 1000 participants.[45] Eleven studies (79%) reported participant sex[28,30-37,45-49]; 10 studies enrolled mostly men in the intervention group (range 62.6% to 100% male),[28,30,33-37,45,46,49] and 1 study reported a slight minority of men in the intervention group (45% male).[31] All 5 studies with comparison groups reported majority male samples (range 56% to 100%).[28,31,34,36,37] Of the 10 studies (71%) reporting age of participants, the mean age range was 38.6 to 52.9 years.[28,31,33-37,45,46,49] Four studies (28%) were majority white, [28,31,34,45]5 studies (36%) were majority Black,[33,35,37,46,49] and 1 study reported most participants were of Hispanic ethnicity.[36] Four included studies (28%) did not report the racial/ethnic make-up of participants.[30,32,47,48]

All 14 interventions were conducted in either the United States (n=10, 71%)[30-33,35-37,45,46,48] or Canada (n=4, 28%)[28,34,47,49]. While targeting patients with housing insecurity, 9 studies (64%) did not report specific baseline housing status of participants; 1 study (7%) reported number of nights spent on streets or in shelters in past 12 months[34]; 1 study (7%) reported situational (*ie*, episodic) versus chronic homelessness[36]; 1 study (7%) reported whether or not individuals were in transitional housing[30]; and 1 study (7%) reported whether individuals lived in transitional housing (supervised or temporary shelters) or had a primary nighttime residence not meant for human habitation.[31]

Table 3. Evidence Profile of Non-ACCESS studies (n=15)

Number of studies: 15 studies (14 interventions)
Study designs: randomized controlled trial (n=2); controlled before and after (n=2); cohort (n=4); program evaluation (n=4); cross-sectional (n=1); qualitative (n=1)
Number of participants: 3,945 (2 studies NR);
Enrollment setting[a]: housing services (n=7); clinical setting or a multidisciplinary program (n=5); criminal justice (n=2); soup kitchen (n=1); drop-in service center (n=1); outreach team (n=1); setting not reported (n=4)
Countries: USA (n=10); Canada (n=4)
Serious mental illness: explicitly designed for patients with SMI (n=11); 75% or more patients meeting broad definitions of SMI (n=7)
Housing insecurity: all studies targeted patients with housing insecurity; number of nights on the street (n=1); situational vs chronic homelessness (n=1); transitional housing (n=2); specific housing status not reported (n=9)
Patient demographics: median age = 44 years old (2 studies NR); women (10%) (6 studies NR); race (51% White) (10 studies NR) (50% Black) (8 studies NR)[b]
Duration of intervention: median duration was 12 months range (6 weeks to 2 years) (6 studies NR)
Patient-level intervention domains: education/training (n= 5); evidence-based patient interactions (n=9); outreach (n=4); clinical/case management (n=13); structural/material supports (n=10); low-barrier clinic approaches (n=6)

Clinic-level intervention domains: program staff support (n=18); specialized team members (n=7); clinical offering (n=3)

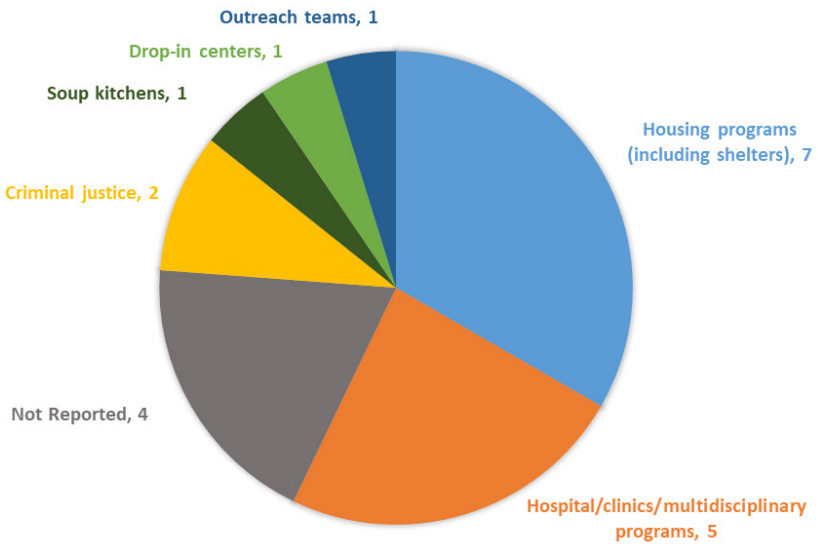
System-level intervention domains: data sharing infrastructure (n=9-4); evaluation (n=2); coordination approaches (n=0)

Primary outcomes reported: healthcare utilization (n=4); health status (n=3); other (n=3) (5 studies NR)[c]

[a] Studies recruited from multiple locations
[b] Only 2 studies report both Black and White race information
[c] Studies reported more than 1 primary outcome

The patient enrollment locations varied across the included studies (Figure 3.) Five studies reported recruiting from a clinical setting or a multidisciplinary program[28,31,33,48,49]; 3 of these reported also recruiting from a housing services location.[28,31,33] Four studies reported recruiting only from housing services.[30,34,37,45] One study recruited from the criminal justice system alone,[36] and 1 study recruited from the criminal justice system in combination with other locations.[49] In addition to other recruitment locations, 1 study recruited from a drop-in service center,[37] 1 from a soup kitchen,[45] and 1 with the help of outreach teams.[49] Four studies did not report recruitment locations.[32,35,46,47]

Figure 3. Sources of Patient Enrollment[a,b]



[a] Studies could use multiple sources for patient recruitment
[b] Does not include ACCESS studies

The included studies met our eligibility criteria for being designed for patients with SMI as follows: 11 studies were explicitly designed for patients with SMI,[30-35,45-49] and 3 studies were not specifically designed for patients with SMI but met our criteria for including 75% or greater patients meeting broad definitions of SMI (*ie*, also major depressive disorder and posttraumatic stress disorder).[28,36,37] No studies met eligibility criteria by including a subgroup analysis limited to patients with SMI or by meeting the 75% criteria with the narrower definition of SMI (*ie*, schizophrenia, bipolar disorder, and other psychotic disorders). Three studies explicitly designed for patients with SMI did not report characteristics of SMI for their sample.[32,47,48] Some studies also reported comorbid conditions, primarily other behavioral and mental health conditions. For

example, of the 7 studies reporting comorbid substance use, 9% to 74% of participants were identified to also have active drug and/or alcohol use.[28,34,36,37,45-47,49]

Intervention Strategies by Level

For KQ 1, we identified all intervention strategies described by each study and categorized each individual strategy according to its targeted level of action: patient, clinic, or system. Intervention strategies identified were not restricted to those pertaining to primary care engagement. To organize these findings, we grouped intervention strategies within level into domains (see Figure 4). Across all included studies, we identified 22 patient-level intervention strategies across 6 domains; 4 clinic-level intervention strategies across 3 domains; and 5 system-level strategies across 3 domains (see Figure 5). Four studies included strategies at all 3 levels,[31,32,34,35] and 1 study included strategies on only 1 level.[45] All studies used at least 2 patient-level strategies, and the total number of strategies described ranged from 2 to 11. Additionally, we found 6 different disciplines that compromised the core intervention staffing and 7 types of collaborating agencies typically partnered with for additional services. Next, we describe reported intervention strategies at each of the 3 levels. The median duration of these intervention was 12 months and ranged from 6 weeks to 2 years,[28,30,31,33,37,46,47,49] although 6 studies did not report this information.[32,34-36,45,48]

Figure 4. Framework of Multi-Level Intervention Strategies

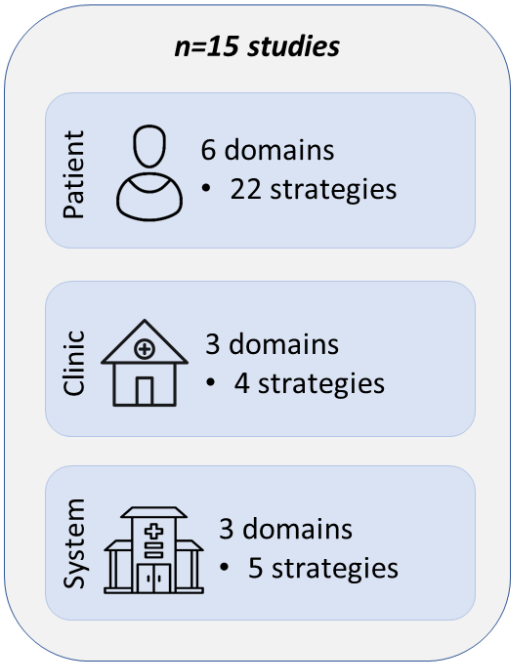
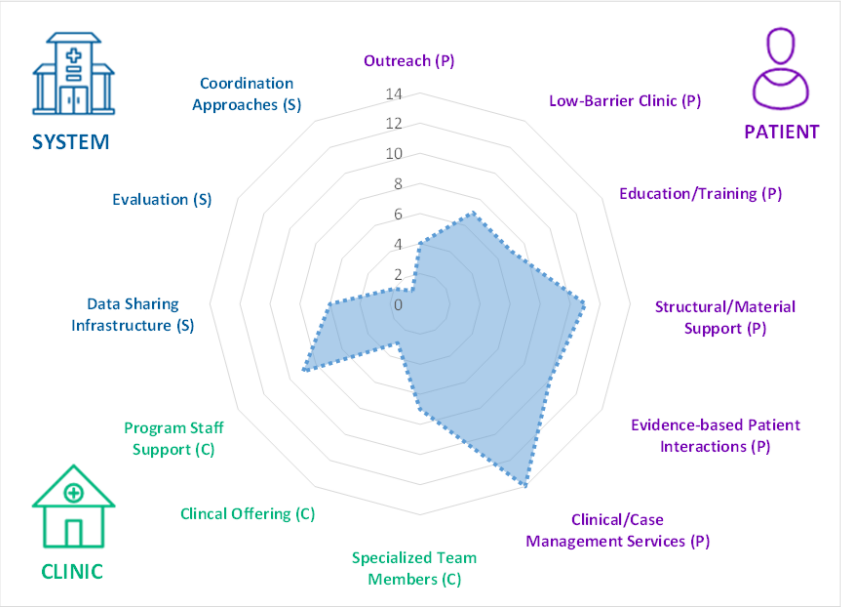


Figure 5. Studies per Domain at Patient, Clinic, and System Levels



Patient-level Intervention Strategies

Included studies employed a variety of intervention strategies which directly targeted patients, which we organized into 6 domains (*ie*, education/training, evidence-based patient interactions, outreach, clinical/case management, structural/material supports, low barrier clinic approaches). The most frequently described patient-level strategies were health education (5 studies), motivational interviewing (5 studies), interdisciplinary intake (7 studies), service navigation (6 studies), and material assistance for housing (9 studies) (Table 4). Interdisciplinary needs assessment and service navigation typically emphasized the uptake of services based on enhanced referral pathways to community-based organizations, social services, or specialized medical services. Additionally, 14 studies featured material supports by providing housing, access to technology, income assistance, and food assistance programs.[30,31,34-37,39,40,42,44-47,49] This included but was not limited to studies that incorporated the "Housing First" program model, which prioritizes permanent, stable housing with supportive services, including linkages to non-mandated health services.[50] Eleven studies incorporated evidence-based therapies or interactions to improve patient-provider collaboration as an intervention component.[28,30-33,36,39,40,44,48,49] The most frequently described of these techniques were motivational interviewing (5 studies), empathic/stigma reducing communication (4 studies). Eight studies included health education as an intervention component, often emphasizing chronic disease self-management, navigating the health care system, partnering with the care team, and social support.[30-34,36,49] For example, Stergiopoulos et al and Stanhope et al both described the role of patient education that is responsive to both social and medical drivers of health by leveraging peer and social support.[30,49] Additionally, 4 studies included crisis intervention as an available mechanism for a short-term intensive response.[32,39,48,49] Baker et al describe a nurse practitioner-driven program that offered crisis services as a strategy to avoid unnecessary hospitalizations, incarceration, or a return to homelessness.[32] Finally, 7 studies described strategies to facilitate uptake of medical services by

reducing clinic barriers.[30,32,34,35,37,44,46] These strategies included reducing eligibility requirements (*eg*, no requirements for sobriety or substance use treatment to participate), wait times, appointment prioritization, and by embedding the clinic location within the target community. Importantly, interventions often combined strategies to enhance effectiveness. For example, Kelly et al describe how health education, case management, and evidence based patient interactions can be delivered in conjunction as a multi-component self-management intervention.[31] It was delivered as a manualized, peer-led intervention using motivational interviewing, cognitive behavioral strategies, and psychoeducation about the healthcare system, benefits, health screenings, and working with medical providers.

Table 4. Patient-level Intervention Strategies by Domain

Intervention Strategy	Definition	Study
Education/Training domain		
Health education	Provide learning on health topics including navigation of the health system, ways to reduce barriers to care, health promotion/disease prevention strategies, and information about specific health conditions	Non-ACCESS[30,31,35,36,49]
Patient-provider communication techniques domain		
Motivational interviewing/ goal-setting	Building motivation for behavior change and/or engaging in realistic development of goals and plans to meet them	Non-ACCESS[30,31,33,36,49]
Trauma-informed care	A care approach that acknowledges the impact of trauma history and seeks to promote appropriate responses and avoid retraumatization	Non-ACCESS[33]
Empathic/stigma reduction	An approach that seeks to act with empathy for an individual's state and reduce shame/negative associations associated with conditions or seeking care	ACCESS[44] Non-ACCESS[36,48,49]
Supportive therapy	A form of psychotherapy that emphasizes the importance of the relationship between provider and patient in order to alleviate symptoms and address challenges	Non-ACCESS[28]
Cognitive behavioral therapy	A form of psychotherapy focused on addressing unhelpful beliefs and behaviors to improve symptoms	Non-ACCESS [31]
Other therapies	Unspecified therapeutic interventions	Non-ACCESS [32]
Assertive community treatment	A multidisciplinary team approach which provides direct psychiatric care in the community, engages in assertive outreach, and offers rehabilitation and support services	ACCESS[39,40] Non-ACCESS[30,35]
Harm reduction	A public health philosophy and accompanying set of practices and principles aimed at reducing harms associated with drug use and drug policies, as opposed to focusing on a traditional approach of abstinence promotion	Non-ACCESS[33,49]
Outreach domain		
Assertive outreach	An intensive mental health services approach for individuals with serious mental illness that aims to promote engagement in the health care system	Non-ACCESS[28,35,46]
Hospital in-reach	An outreach approach that works with hospitalized individuals to support discharge transitions, connect	Non-ACCESS[28]

Intervention Strategy	Definition	Study
	them with services, and reduce unnecessary rehospitalization	
Justice system in-reach	A case management approach that seeks to support incarcerated individuals who are being released to connect with health care services	Non-ACCESS[36]
Clinical/case management domain		
Crisis intervention	Immediate, short-term emergency response for a distressed individual	ACCESS[39] Non-ACCESS[32,48,49]
Interdisciplinary intake/needs assessment	Intake assessment/evaluation approach that engages multiple specialties (*eg*, psychiatrist, physician, case manager) with a focus on the patient's individuals needs	Non-ACCESS[28,31,32,35-37,49]
Service navigation	Linking patients and reducing barriers to essential health and community services and resources and/or coordinating these services	ACCESS[39,40,42-44] Non-ACCESS[28,30-37,45,46,49]
Transitions of care coordination	Coordination among health care providers as a patient changes providers or settings	Non-ACCESS[36]
Structural/material supports domain		
Transportation	Assistance for transportation in the form of dedicated financial support or items that support transportation (*eg*, bus pass)	Non-ACCESS[37]
Food	Money provided for the purchasing of food	Not applicable
Housing	Money provided toward temporary or permanent housing	ACCESS[40,42,44] Non-ACCESS[30,34-36,45-47,49]
Income/entitlement	Instrumental assistance in the procurement of financial or entitlement benefits	ACCESS[39,40,42,44] Non-ACCESS[47]
Access to computers/ technology	Hardware made available for the use of participants	Non-ACCESS[31]
Low-barrier clinic approaches domain		
Appointment prioritization	Ranking incoming referrals to prioritize a certain category of patients for available appointments	ACCESS[44] Non-ACCESS[37]
Flexible appointment scheduling	Offering appointment scheduling in a way that allows greater flexibility than a typical scheduling process, which can include off-hours or extended hours access and walk-in or on-demand appointment scheduling (*eg*, extended hours/24-hour access)	ACCESS[44] Non-ACCESS[32,35,37]
No waiting times	Reducing or eliminating waiting times for appointment scheduling	ACCESS[44] Non-ACCESS[37]
On-site at shelter	Services available at location of temporary housing shelter	Non-ACCESS[34]
Reasonable costs	Not defined by author	ACCESS[44]
No sobriety/ treatment requirements	Specifically notes lack of requirement of sobriety or substance use treatment engagement for program participation.	Non-ACCESS[30,46]

Clinic-level Intervention Strategies

All of the included studies contained a clinic-level intervention strategy. The most frequently described clinic-level strategy was population-specific employee training (n=9 studies). We also found that most studies leveraged a multidisciplinary team structure through interdisciplinary intervention staffing and established relationships with collaborative agencies to supplement internal resources (Tables 5-7). Nine studies (12 articles, 4 ACCESS) included training beyond what is required for discipline-specific licensure.[31-34,36-39,41,43,48,49] Training and workforce development strategies focused on skills and techniques that are tailored to the complex patient population of interest. For example, the Jefferson Department of Family and Community Medicine and a Housing First agency, Pathways to Housing-PA, formed a partnership to serve patients with experiences of homelessness and SMI and required a homeless health training rotation to develop skills specific to this population.[46] Training and workforce development strategies were often linked to intervention strategies at the system or patient/delivery level. An illustrative example is "cross training" for programs in the ACCESS study that emphasized system integration to ensure personnel were familiar with services and procedures from partnering agencies to fully leverage service agreements that facilitated coordination and collaboration.[38-44] We found significant variation in the composition of intervention staffing, with the most commonly represented disciplines being psychiatry, behavioral health, nursing, social work, primary care, and peer support/community health workers. This was in contrast to interventions that utilized referral networks to obtain support outside of core program offerings (*eg*, referrals to community-based shelters).

Table 5. Clinic-level Intervention Strategies by Domain

Intervention Strategy	Definition	Study
Program staff support domain		
Specific employee training	Training related to intervention objectives that is not necessarily part the employee's disciplinary training (*ie*, motivational interviewing, stigma reduction)	ACCESS[38,39,41,43] Non-ACCESS[31-34,36,37,48,49]
Specialized team members domain		
Medical scribes	A person or paraprofessional who specializes in charting physician-patient encounters in real time, such as during medical examinations	None
Peer support/ community health workers	An individual based in the community who promotes health and wellbeing through liaison activities between health care agencies and the community, or provides social assistance and guidance to community residents	Non-ACCESS[28,30,31,33,35,36,48]
Clinical offering domain		
Medication review/ management	Provider team assesses the combination of over-the-counter and prescription drugs used by an individual to be sure they are safe and effective	Non-ACCESS[31,32,35]

Table 6. Clinic-level Staffing by Discipline

Intervention Strategy	Definition	Study
Behavioral health	Psychologist, licensed clinical social worker (LCSW), therapist	Kelly, 2018[31] McGuire, 2009[37] Patterson, 2012[47] Rivas-Vazquez, 2009[36]
Psychiatrist	Physicians trained in psychiatry, psychiatric/mental health nurse practitioners	Baker, 2018[32] Kelly, 2018[31] McGuire, 2009[37] Patterson, 2012[47] Solomon, 1988[48] Stergiopoulos, 2012[49] Stergiopoulos, 2015[34] Weinstein, 2013[35] Weinstein, 2013[46]
Nursing	Nurses without prescribing privileges of any training level or not otherwise specified	[a]Baker, 2018[32] McGuire, 2009[37] Patterson, 2012[47] Rosenheck, 1993[45] Solomon, 1988[48] Weinstein, 2013[35] Weinstein, 2013[46]
Primary care provider	Physicians trained in primary care, primary care nurse practitioners/physician assistants	McGuire, 2009[37] Patterson, 2012[47] Rivas-Vazquez, 2009[36] Solomon, 1988[48] Stanhope, 2014[30] [b]Stergiopoulos, 2015[34] Weinstein, 2013[35] Weinstein, 2013[46]
Pharmacist		None
Case manager/ social worker (not as LCSW)	Outreach/other shelter staff	Kelly, 2108[31] McGuire, 2009[37] Rivas-Vazquez, 2009[36] Rosenheck, 1993[45] Rosenheck, 1997[43] Solomon, 1988[48] Stergiopoulos, 2012[49] Stergiopoulos, 2015[34] Weinstein, 2013[35]
Housing services	Short-term and long-term	Kelly, 2018[31]

[a]Study included nursing students
[b]Study includes 2 separate models of care: 1 involves on-site psychiatry which is embedded into an integrated, interdisciplinary team with primary care; in the second model, there is psychiatry available on-site but primary care is accessed via neighboring clinics

Table 7. Collaborative Agencies for Services Outside Core Intervention Offerings

Intervention Strategy	Study
Behavioral health/psychiatry	ACCESS[41] Non-ACCESS[28,30-32,34,45,46,49]
Medicine	ACCESS[41]

Intervention Strategy	Study
	Non-ACCESS[28,31,32,34,45,46,49]
Social work/case management	ACCESS[40,41] Non-ACCESS[28,31,32,45]
Long-term housing services	ACCESS[41] Non-ACCESS[30,32,35,36]
Temporary housing services	ACCESS[41] Non-ACCESS[32,35,36,45,48]
Pharmacy	Not applicable
Senior living center	Non-ACCESS[30]
Vocational	Non-ACCESS[49]

System-level Intervention Strategies

Intervention strategies employed at the system level sought to improve multi-sector coordination, information exchange, and evaluation. The most frequently described system-level intervention components included shared electronic health record (n=4) and proactive patient monitoring technology infrastructure (n=3) (Table 8). These systems were used to improve communication, documentation, and care management. Similarly, proactive monitoring systems were also used to anticipate patient needs and tailor the approach. Kelly et al evaluated a peer-delivered health navigator model that incorporated the use of a collaborative electronic personal health record to address challenges for this population related to paper record keeping.[31,51] This type of health record and electronic monitoring system and systems like it were used to organize care delivery, anticipate patient needs, and facilitate communication between the patient and service providers—an example of how organizations promoted interagency collaboration. We found 3 articles (all ACCESS studies) that included interagency collaboration as a system-level strategy.[39-41] Of note, this system-level strategy may have been used in other studies included in the analysis but was not explicitly referenced. Finally, we found 2 studies that reported using shared, standardized performance metrics to evaluate effectiveness across agencies and clinics.[46,47] An illustrative example of both interagency collaboration and shared performance metrics is the intervention described in Patterson et al to improve outcomes for adults with SMI who are chronically homeless in British Columbia.[47] Shared performance metrics included increased use of primary care, decreased hospital lengths of stay, decreased interactions with the criminal justice system, and increased use of income assistance. The authors also describe a common monitoring framework to ensure fidelity and standardization across sites in a system as part of an overarching interagency collaboration.

Table 8. System-level Intervention Strategies

Intervention Strategy	Definition	Study
Data sharing infrastructure		
Shared electronic health record	Collaborating agencies use common electronic health record (EHR) for care and management of patients	Non-ACCESS[31,32,34,46]
Proactive monitoring system	Collaborating agencies use common electronic database for monitoring of patient needs in order to anticipate needs	ACCESS[38,39,41] Non-ACCESS[31,35]

Intervention Strategy	Definition	Study
Shared social services administrative record	Collaborating agencies use common administrative system for documentation of case management	ACCESS[39,44]
Evaluation		
Standard performance metrics	Agencies or clinics caring for patients report use of standard quality measures to evaluate and monitor care provided	Non-ACCESS[46,47]
Coordination Approaches		
Interagency collaborative body	A multidisciplinary group established to support ongoing interactions between agencies supporting the target population	ACCESS[39-41]

Access to Community Care and Effective Services and Supports (ACCESS)

In addition to the system-level intervention strategies noted above which were reported in the included articles, the ACCESS federal demonstration program also established a set of specific system integration strategies for use across its sites. Systems integration refers to efforts to improve service system for a defined population rather than for individual patients. System integration is a continuum of combined strategies at the system, clinic, and patient/delivery levels, ranging from information sharing and communication to full-service delivery integration (Table 9).[41] As a part of ACCESS, participating sites were provided funding to facilitate adoption of a range of system integration strategies that were selected and tailored to their local context. As such, each site could have employed different combinations of strategies. While in the preceding tables, we identified individual strategies reported in included ACCESS papers. Below, we share the overarching range of potential system integration strategies used at each ACCESS site.

Table 9. ACCESS: Potential System Integration Strategies[a]

ACCESS Strategy	Definition	Intervention Level
Co-location of services	A multiservice center in a single location to facilitate access to medical services, substance abuse treatment, housing assistance, entitlement programs, or financial assistance.	Clinic
Systems integration coordinator position	A staff position focused on implementing systems integration activities. These responsibilities include engaging stakeholders, staffing interagency coalition meetings, acting as a liaison to other systems, and coordinating joint proposal or service contracts.	Clinic
Cross-training	The training of staff on procedures and services available at other agencies. This can include training staff to utilize agreements to collaborate, accept referrals, coordinate services, or share patient information.	Clinic
Interagency service delivery team	A service delivery team that is composed of interdisciplinary staff from 1 or more agencies. The team-based approach is designed to address the complex patient needs in an integrated manner.	Clinic

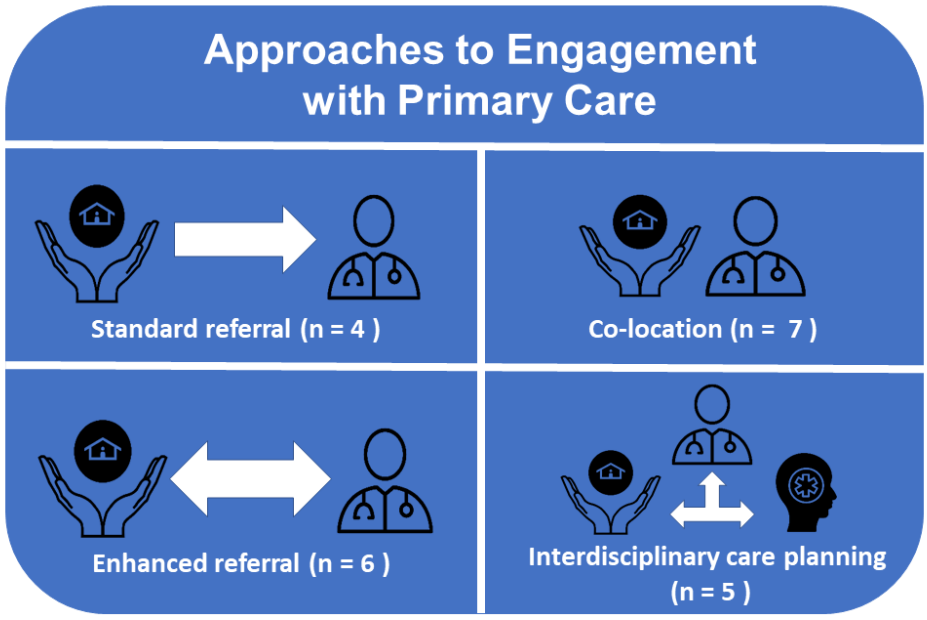
ACCESS Strategy	Definition	Intervention Level
Interagency coordinating body	An advisory group composed of representatives from multiple agencies to address common challenges including formal agreements to reduce barriers to services, eliminating duplication of services, and promoting access. An interagency coordinating body can be established at local or state level.	System
Interagency agreements	Formal or informal agreements among agencies to coordinate, collaborate, or offer combined services.	System
Joint funding	A broad array of agreements or arrangements to combine funding to offer additional resources or support interagency initiatives.	System
Flexible funding	The designation of flexible funding sources that can be used to purchase expertise, fill gaps, or coordinate the acquisition of addition resources.	System
Use of special waivers	A statutory or regulatory waiver aimed at reducing interagency barriers to services, eliminating duplication, or promoting access.	System
Consolidation of agencies	The process of combining multiple programs or agencies under a centralized administrative structure to better integrate delivery of services across previously fragmented systems.	System
Interagency management information and monitoring systems	Information tracking and management systems to facilitate transfer of patient information, simplify referral processes, reduce duplication of services or documentation, and improve access to services for patients.	System and Clinic
Uniform applications, eligibility criteria, and intake assessments	The standardization of processes used by participating agencies that potential patients must complete to apply for or receive services.	System, Clinic, and Patient

[a]Table adapted from Cocozza, 2000.[41]

Approaches to Engagement with Primary Care

We considered the elements of integration between primary care and the other services provided to patients with SMI and housing insecurity (*eg,* standard referral, enhanced referral, co-location and interdisciplinary care planning) across each included study (Figure 6 and Table 10). We considered the presence or absence of each element individually. Standard referral reflects the most basic mechanism for patient referrals to primary care largely driven by insurance networks and approvals. An enhanced referral was identified when a program had a clearly described, established relationship with a primary care clinic that supported interactive communication between the program providing housing services or mental services. Co-location was identified if primary care and other program services are in physical proximity with each other. Finally, interdisciplinary care planning indicates that multiple disciplines worked together to generate and carry out plans of care for individual patients.

Figure 6. Approaches to Engagement with Primary Care[ab]



[a]There could be overlap between approaches
[b]Does not include ACCESS studies

Overall, we found that there was a relatively even distribution of the 4 key elements of practice integration across included studies. Four studies included evidence of both co-location and regular interdisciplinary care planning,[34,36,37,46] while 1 additional study employed interdisciplinary care planning but primary care was not co-located.[30] For example, McGuire et al reported on a VA-based integrated clinic in which homeless Veterans presenting to a housing program screening clinic were seen same-day by a specially trained, co-located primary care team.[37] Three studies describe models in which primary care was co-located but there was no clear reporting that interdisciplinary care planning took place.[28,35,47] Six studies employed enhanced referral mechanisms to connect patients with primary care.[28,32,45-48] Baker et al demonstrated an enhanced referral process as part of a psychiatric/mental health NP-run, independent community health center which cared for individuals who were homeless or had housing insecurity due to SMI; they maintained a "robust referral system" and regular contact to primary care within local major health care systems.[32] Four studies used a standard referral process to connect patients with primary care based on typical consult mechanisms guided by insurance networks and without the benefit of established interactive relationships.[31,33,34,49] Note that 1 of these studies is a 2-armed study in which 1 arm features fully integrated primary care that is co-located with interdisciplinary planning and the other arm used a standard referral process.[34] Some studies used multiple routes to connect patients with primary care; for example, Weinstein and colleagues report on a Philadelphia-based program which embedded a primary care provider from a nearby academic family and community medicine department into an existing Housing First care management team as part of an integrated care program, and also supported patients who preferred to receive primary care from a non-specific local source. Of note, for some of the included studies, the description of the connection with primary care was minimal and it is possible that included programs in practice incorporated more elements of integration with primary care than were reported in the published intervention description.

Table 10. Elements of Primary Care Integration

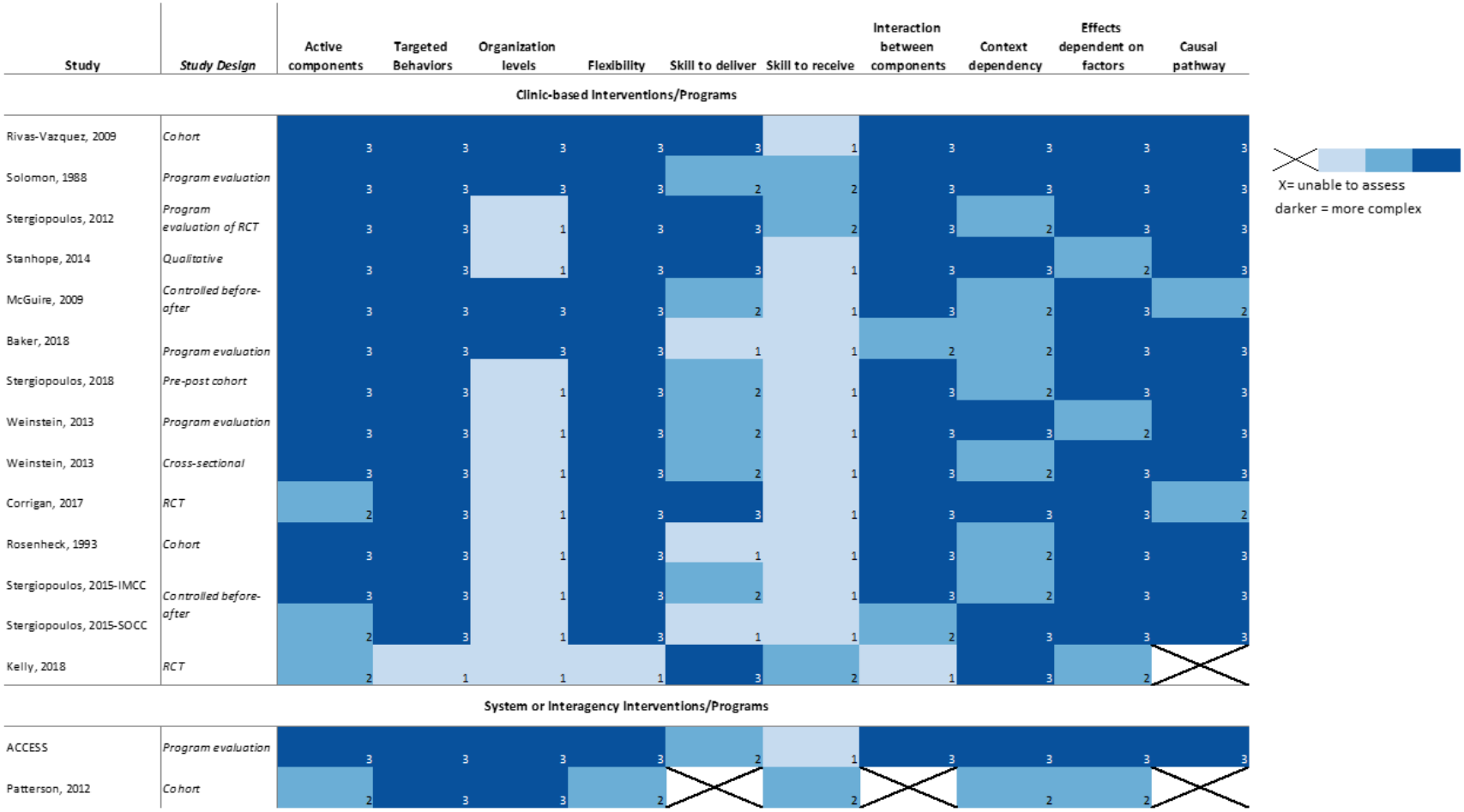
Intervention Strategy	Definition	Study
Interdisciplinary care planning	Multidisciplinary team (*eg*, medical providers, social workers, nurses) meet on a routine basis to discuss patient cases but not necessarily co-located	Non-ACCESS[30,34,36,37,46]
Co-location	Services that are located in the same physical space (eg, office, building, campus), though not necessarily fully integrated with one another (*eg*, mental health, primary health care)	Non-ACCESS[28,34-37,46,47a]
Enhanced referral	Existing relationships between the intervention site and community primary care, but which is not integrated into the intervention program	Non-ACCESS[28,32,45-48]
Standard referral	Intervention described as connecting patients to primary care but does not provide evidence of interactive communication with those services; this is akin to a case manager facilitating a referral to an external community based primary care clinic from which the patient may be eligible to receive services	Non-ACCESS[31,33,34,49]

[a] Stergiopoulos 2015[34] includes 2 separate models of care: 1 involves onsite psychiatry that is embedded into an integrated, interdisciplinary team with primary care; 1 involves psychiatry available onsite but primary care is accessed via neighboring clinics.

Intervention Complexity

We categorized the complexity of included interventions using the iCAT_SR tool grouped by clinic-based interventions versus system or interagency interventions (see Appendix G for study-specific iCAT_SR determinations). Among interventions focused on individual clinical programs, areas of high complexity common across studies included having multiple active intervention components that targeted a complex collection of behaviors (Figure 7). Interventions were typically highly flexible to allow tailoring of support provided to individual patients depending on their clinical and housing needs. In general, the nature of the causal pathway from the intervention to the intended patient outcome (*eg*, improved physical/mental health, stable housing) was often not explicitly described, but inferred to be variable and to occur over an extended period of time, adding complexity. Areas of intervention complexity that varied from study to study included the organizational levels targeted by the intervention, as some interventions focused only patients receiving care while others also included provider and clinic level components. Interactions of intervention components were found to be moderately to highly complex as most interventions involved interdisciplinary care across multiple facets of a given patient's social, mental, and physical health with an explicit expectation that these aspects of care be coordinated and intertwined. In general, we found that the effect of most interventions would be impacted by individual level factors for both patients (*eg*, degree of SMI symptom severity) and providers (*eg*, experience and comfort with caring for target population). In contrast, we found a low level of complexity related to expectations of the skills of program participants at entry, as patients could receive care at whatever baseline function they had. Similarly, the staff delivering these interventions were generally felt to require minimal skills beyond their standard disciplinary training with the exception of education on the specific health and social needs of the target population and possibly around interdisciplinary collaboration.

Figure 7. Intervention Complexity Heat Map by Core Dimension of iCAT_SR[a]



[a]1= lowest level complexity for dimension; 2 = moderate complexity; 3 = highest complexity

Reported Effects of Included studies

While in keeping with an evidence map, we did not seek to synthesize the effects of interventions described in the included articles. However, in order to facilitate contextualization of the included literature, we report the findings of included articles as reported by the authors. Appendix E includes high-level summaries of the authors reported findings by included study with note of the study design, length of follow-up, and total number of participants when relevant. Reported findings suggest possible benefit in the areas of improved health outcomes,[28,37] reduced emergency room/hospital utilization,[32,34,37] increased primary care use,[45] and reduced recidivism.[36,46] In addition, reported findings suggest that integration of care across agencies within a larger system is complex and requires intentional efforts.[41,42,44]

KEY QUESTION 2: What measures have been used to evaluate interventions among adults with experiences of homelessness or who are at high risk of experiencing homelessness and who have SMI to promote engagement in primary care?

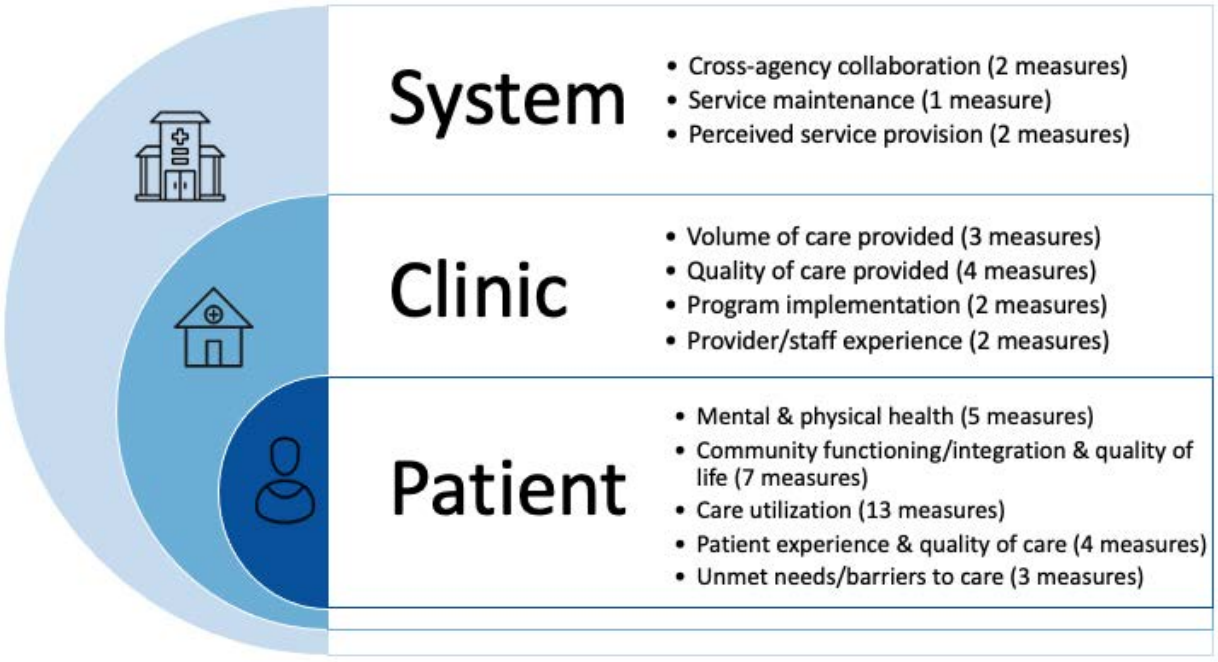
Key Points

- Included articles measured outcomes at the patient, clinic, or system level; patient level accounted for the majority of measured outcomes.
- Most common measures at the patient level were mental health status and substance use.
- Measures related to primary care integration included the number of primary care visits and the number of days between program enrollment and primary care visit.

Detailed Findings

For KQ 2, we organize findings on the approaches to measuring the effect of interventions seeking to promote primary care engagement for adults with SMI and housing insecurity at 3 levels: patient level, clinic level, and system level (Figure 8). Of the 22 included articles (evaluating 15 studies), only 1 included outcomes at all 3 levels of analysis.[40] Of the 5 articles that included outcomes at 2 levels, 4 examined both patient- and clinic-level outcomes[31,32,48,49] and 1 examined both clinic- and system-level outcomes.[44] The remaining 15 articles examined outcomes at only 1 level: 12 at the patient level[28-30,33,34,36-38,43,45-47]; 1 at the clinic level[35]; and 3 at the system level.[39,41,42] Overall, most studies (17) evaluated outcomes at the patient level, and the fewest studies (5) at the system level. Appendix D summarizes the specific outcomes measures used for the included studies.

Figure 8. Outcome Measures Mapping



Outcomes evaluated at the patient level spanned a range of potentially overlapping domains that could be loosely categorized as mental and physical health; community functioning, community integration and quality of life; care utilization; patient experience and quality of care; and unmet needs/barriers to care. At the patient level, outcomes most commonly assessed mental health (6 studies) and substance use (5 studies) outcomes. Measures used to assess mental health included validated interviews and questionnaires such as the SF-36, Diagnostic Interview Schedule, and Brief Psychiatric Rating Scale.[28,33,34,37,40,45] Substance abuse outcomes were measured using either the Addiction Severity Index or self-report.[28,32,34,37,40,45] Other patient-level outcomes commonly assessed were involvement with the justice system (*ie*, incarcerations, arrests)[32,36,37,47]; housing-related outcomes (*ie*, self-reported number of days on the street or in shelter, achievement of independent housing)[28,33,34,40]; emergency department visits or hospitalizations[28,32,34,37,45,47]; and quality of life.[28,33,40] Measures that specifically addressed primary care integration included the number of primary care visits[34,37] and the number of days between program enrollment and primary care visit.[37] Of the 11 outcomes evaluated at the clinic level, only the fidelity-to-care model was measured in more than 1 study.[40,49] Of the 5 outcomes evaluated at the system level, only integration strategies[39-41] and service linkage were measured in more than one study.[42,44]

Summary of KQ 2 Findings

Overall, few consistent outcomes or outcome measures were used across studies. The only exception to this was the use of validated measures of mental health and substance abuse outcomes such as the Addiction Severity Index. Follow-up for outcome evaluation ranged from 3 weeks to 18 months, with the majority falling between 6 and 18 months. The concentration of outcome measures was greatest in the same area in which intervention strategies were found, specifically at the patient level.

SUMMARY AND DISCUSSION

We conducted an evidence map of interventions evaluated to promote primary care engagement of individuals with SMI and experiences of homelessness or who have housing insecurity. Overall, a modest body of literature has been published in this area, largely during the last 30 years. Most of the identified literature comprised program evaluations or observational studies of existing health system- or community-based programs, primarily from outside the VA but all within the United States or Canada. Few programs were solely focused on linking the target population to primary care; rather, connecting patients to longitudinal medical care was most often 1 of multiple intervention goals. Interventions were complex, particularly due to the employment of varied combinations of intervention strategies targeting multiple patient behaviors. Outcome measures were variable across studies with most at the patient level, and few studies measured engagement of primary care.

We identified 15 unique studies evaluating interventions to promote engagement in primary care for adults with experiences of homelessness and SMI). One study, ACCESS, was a multisite comparative program evaluation of a large HHS-funded demonstration project in the United States to improve population health for persons with experiences of homelessness and mental illness. The 14 other studies evaluated community and healthcare affiliated interventions, 10 of which were published in the United States and 4 in Canada. Most evaluations were observational, and only 2 used a randomized controlled trial (RCT) design. We identified intervention strategies across patient, clinic, and systems levels—most studies employed strategies at multiple levels. The most common patient-level strategies were case management, material assistance, evidence-based interactions, and health education. The most common clinic-level strategies were multidisciplinary teams, population-specific employee training, and established referral relationships with partner agencies. The most common system-level strategies were data sharing and patient monitoring technology. Studies used a range of approaches to integrate primary care with other services for this patient population, including co-location, interdisciplinary care planning, standard referral, and enhanced referral. In particular, the ACCESS program sough to integrate social and medical care for persons with experiences of homelessness and mental illness through formalizing and growing cross-agency linkages. For some studies, the description of primary care engagement was limited and difficult to categorize. Programs that had the highest degree of complexity generally included multiple intervention components, targeted a range of behaviors, were highly flexible, required additional staff training, and intervened across multiple service sectors. Most programs did not require program participants to have a high level of skill to participate despite the complexity of the targeted behaviors.

PRIOR SYSTEMATIC REVIEWS

Prior systematic reviews evaluated interventions for patients with SMI or who had experienced homelessness, but did not explicitly address the intersection of patients with experiences of homelessness and SMI. Health Quality Ontario (2016)[14] reviewed 5 studies to identify interventions that improved access to a primary care provider for people with experiences of homelessness. Two studies included Veterans and 3 studies identified high rates of mental illness in their study populations. Intervention strategies identified included orientation to the clinic, outreach, primary care integration into homeless services, and housing and supportive services;

however, interventions were complex and included multiple components. The authors concluded that orientation to clinic services may improve access to a primary care provider, but in general evidence was of low quality. Jego and colleagues (2018) aimed to describe which primary care programs offer care to populations experiencing homelessness.[15] That review included 19 studies of any design. Only 1 of these studies was included in the Health Quality Ontario review.[52] Jego et al found that most programs were complex and included multidisciplinary team-based and integrated-care approaches. The results from both reviews about the importance of clinic orientation as a strategy to improve access to health care emerged from 1 RCT by O'Toole et al; clinic orientation was a treatment arm that comprised a personal health assessment and brief in-person introduction to the clinic. We did not find any studies that used this strategy in our evidence map. Similar to the findings of these prior reviews, we identified organizational strategies in studies with clearly defined homeless and mental illness samples. Interventions usually had multiple components and almost always relied on some level of multidisciplinary interaction among health and social service providers.

A 2011 systematic review conducted by the Durham VA ESP examined care models to improve health outcomes of individuals with serious mental illness, though primary care engagement was not the direct outcome of interest. Bradford and colleagues (2011) identified 7 papers, of which 4 were RCTs (n=3 in Veterans) that met study criteria.[53] The review found that most models were implemented in mental health specialty settings and relied on care management or care coordination strategies. Integration elements of the patient-centered medical home were not always clearly implemented. Our evidence map findings align with the findings of that systematic review in that we also identified care coordination and care management as commonly used strategies. Some of the studies we reviewed assessed strong models of integration, though in some studies models were not well described. Our evidence map advances current understanding for populations with an overlap in experiences of homelessness and mental illness. We benefitted from the organizational structures and components suggested by prior reviews, and we are able to disaggregate intervention components at multiple levels to understand patient, clinic, and organizational factors. However, none of the other reviews used a standardized approach to evaluate intervention complexity—our evidence map thus contributes to the literature in this unique way.

CLINICAL AND POLICY IMPLICATIONS

Our evidence map identified studies evaluating interventions which sought to promote primary care engagement among patients with experiences of homelessness and SMI, most of which had interventional elements occurring at 3 distinct levels (*ie*, patient, clinic, system). The included studies demonstrated heterogeneous approaches to promotion of primary care engagement, and it was clear that no single approach has been applied universally. While an evidence map is not intended to draw conclusions about which intervention approaches result in improved outcomes, our findings offer some implications for clinical and health policy groups charged with improving the care of this patient population. First, our study identifies and categorizes elements that have been employed in various combinations to improve primary care engagement among this target population. Health care systems, federal agencies, and nonprofits seeking to initiate or build similar programs could use our mapping of multi-level strategies to develop their intervention approach and ensure in-depth consideration of a variety of patient-facing clinic structure and interagency approaches. Second, our description of intervention complexity of the included studies could guide new programs in this area about the ways their intervention design

places demand on different dimensions of structural and person-level components. Moreover, existing programs could compare their program components against the examples described in this report to ensure that potential dimensions of complexity are both purposefully addressed and articulated for ideal communication. Finally, our outcome mapping can help programs for patients with SMI and housing insecurity consider the breadth of approaches to measuring program effectiveness and identify the strongest outcome.

Within the VA health care system, there are numerous rich resources both for complex mental health illnesses such as SMI and for individuals who are experiencing homelessness or housing security. For example, the VA offers a collaborative primary care model for Veterans who experience homelessness; these clinics co-locate staff with expertise in mental health, substance use, medical care, and homelessness support. Separately, the VA offers a Mental Health Intensive Care Management Program (MHICM) which helps Veterans with SMI live in the community through intensive case management; however, this program is not integrated with primary care. The VA is also testing an SMI PACT for individuals with SMI whose psychiatric symptoms can be managed in primary care with consultation from mental health and psychiatry services[54] and offers evidenced-based programs to help Veterans integrate into the community and earn an income through supported employment, which historically has focused on Veterans with SMI.[55] However, these resources often operate separately, and as a result, individuals who are part of this target population might fall through the cracks. Yet the existing resources offered by the VA could support the development of integrated population-specific programs that pool collective efforts in a patient-centered manner and that require less navigational and engagement skills from the patients themselves. Intentional program development with attention to intervention complexity and strategy choice could also inform the appropriate choice of outcome measures.

LIMITATIONS

This evidence synthesis should be interpreted in the context of several limitations, which are outlined in the following paragraphs.

Study Quality and Design

We found 1 significant limitation of the existing literature considered for this evidence map in the lack of studies designed to determine the effectiveness of care models focused on connecting patients with SMI and experiences of homelessness to primary care. While not surprising, much of the identified literature comprised non-comparative, 1-armed evaluations using varying approaches to assess outcomes. Moreover, many of the included interventions were not singularly focused on promoting primary care engagement. It is likely that there are additional programs in practice that have attempted to connect patients with SMI and experiences of homelessness to primary care but that have not been described in the peer-reviewed literature. We also found few pragmatic trials or implementation studies that would be helpful to inform future implementation of novel programs to support this patient population.

In addition, we found a wide variety of outcome measures used across studies without a consistent outcome for primary care engagement. This may have occurred because many of the studies were not focused on primary care engagement, or at least did not have this as a primary aim, as we included studies that may not have been designed for the express purpose of assessing

our outcome of interest. However, given that patient engagement with primary care occurs across a spectrum, from initial appointment scheduling to longitudinal interaction for chronic disease management, the field would benefit from clearly defined, patient-oriented, and clinically meaningful outcomes. In particular, further investigation is warranted to link programmatic elements with concrete outcomes and guide future development of programs. In addition to examining the impact of individual elements on outcomes, it is important to understand how the inclusion of elements at each level, and their interaction, are received by both patients and providers of services. For example, experience of homelessness (*ie*, street homeless vs housing instability) could moderate intervention effects, but few studies considered patient-level moderators. Given the range of outcomes evaluated, it is difficult to determine whether this length of time is sufficient to capture meaningful change in the constructs measured. From a broad perspective, there appears to be a lack of consistency in research in populations experiencing homelessness as to what constitutes "housing stability" or "tenancy sustainment", which can make it challenging to systematically evaluate what interventions are necessary, and for how long, to achieve health- and stability-related outcomes.[56] Finally, no outcome measures were clearly validated or designed for the specific patient population of those with experiences of homelessness.

Intervention Strategy Reporting

We encountered challenges with the identification and interpretation of intervention strategies. In addition, the depth and detail provided about the intervention itself was generally insufficient for determining the level of integration using validated tools or for fully facilitating replication.[27] Types of information that we might recommend other program designers and evaluators report include the extent to which behavioral and medical providers are involved in clinical decision-making. Moreover, some included studies only provided details on a few specific intervention components, and thus it is possible that additional components were employed and just not described. For example, informal interagency or multi-sector collaboration agreements to facilitate referrals or shared resources may have been leveraged but not explicitly reported. No included studies reported using a theoretical model to guide intervention or program development or described potential mechanisms of effect. Additionally, we only found studies that focused on the pathway of engaging patients with SMI and housing insecurity to primary care, and none that were developed to provide or enhance services to patients already in primary care who develop housing insecurity or destabilizing of their SMI.

It is important to note the limitations of our approach to this evidence map as well. First, we limited our eligibility criteria to those studies that were either clearly intended for patients with SMI or met our criteria for SMI through other diagnoses. It is possible that we excluded studies that did not explicitly report serving a majority of patients with SMI and thus missed some potentially relevant literature. Second, we categorized intervention strategies according to our understanding of the target of the strategy itself (patient, clinic, or system). Some strategies, such as assertive community treatment, could be considered to target multiple levels, and others might have been categorized differently. Third, we chose to use the iCAT-SR, a state-of-the-art approach to classify complex interventions. Despite using this methodologically strong approach, other ways of examining this aspect of the literature (*eg*, TIDIER [57]) may have produced dissimilar results.

Generalizability and Applicability of Findings to the VA Population

While patient populations represented in this evidence map are likely similar to Veterans with SMI and housing insecurity, the majority were not conducted in VA clinical settings (only 2 were in the VA[37,45]). Yet most of the interventions described rely heavily on local resources and collaborative agencies to supply the complex and multifaceted health and social support needed, and the VA has many similar system-level offerings that could be brought to scale to address the primary care health needs of this population. For example, the VA is an integrated health and social service system that has a common medical record, robust homeless support services, co-located behavioral and physical health care, and primary care providers with training in evidence-based patient interactions like motivational interviewing. However, coordinating across these sectors in the VA is still a challenge,[58] and as with most interventions, these services address SMI and experience of homelessness as distinct vulnerabilities. Therefore, there are opportunities to improve current services by implementing clinic- and patient-level strategies for individuals with both conditions using consistent outcome measurement to assess their effect on primary care engagement.

RESEARCH GAPS/FUTURE RESEARCH

As 1 purpose of an evidence map is to identify gaps in the literature, here we consider areas that future work might address. First, we found only 1 study that enrolled patients directly from the criminal justice system. Given that this patient population has high levels of justice involvement, focusing on connecting with patients in this area would be valuable. Second, many of the included studies focused solely on either the initial connection with primary care or providing integrated care for acute issues. Attention to the longitudinal relationship of maintaining primary care engagement for this population will be crucial for improving long-term health outcomes. Third, additional validation of outcome measures across the spectrum of primary care engagement used consistently across studies and program evaluations would support comparisons and summary of effectiveness. Fourth, while randomized controlled trials are the gold standard for efficacy intervention evaluations, they are unlikely to be appealing or feasible in this context. Well-conducted stepped wedge design pragmatic trials could offer a rigorous approach to evaluating future interventions for this population. On a brief review of clinicaltrials.gov, no studies focused on patients with SMI and experiences of homelessness were identified, though there were a small number of studies focused on chronic medical conditions among patients with SMI (*eg,* diabetes, obesity, cardiovascular risk). Given the level of complexity needed to care for the target population, adaptive studies that build in ways to test various components and outcomes would constitute another potentially useful methodological approach. Relatedly, few studies employed rigorous implementation science methods. Most interventions were localized without a demonstrated vision for scaling up the effective components. Implementation science will be essential to understanding barriers and facilitators to implementation and how these interventions need to be adapted for broader scale up and dissemination. Table 11 outlines multiple other areas for consideration for future intervention strategy testing.

Table 11. Evidence Gaps and Areas for Future Research Consideration

Population
• Patients with SMI and experiences of homelessness identified through the criminal justice system
Interventions
• Interventions designed to follow patients throughout the spectrum of primary care engagement, including longitudinal follow-up • Optimal team composition and collaboration for interdisciplinary approach (*eg*, how primary care teams should differ when engaging this population) • Embedding technologies related to proactive monitoring and care coordination) • Identifying implementation strategies to facilitate adoption of evidence-based interventions • Identification of evidence based "core components" of multicomponent interventions • Theory-based interventions
Comparators
• Various models of primary care integration approaches • Different clinical and community settings or health care systems • Across important subpopulations for which programs might be more effective than for others
Outcomes
• Validated measures of primary care engagement across the spectrum of engagement from initial visit to longitudinal care • Cost effectiveness • Patient-reported outcomes
Setting
• Long-term housing support program • Rural communities • VA-based health care systems

CONCLUSIONS

Individuals with SMI and housing insecurity often have chronic, complicated health needs. Addressing these health needs requires population-tailored interventions to promote longitudinal primary care engagement. We mapped the breadth of literature seeking to engage this patient population with primary care, including those interventions focused at the individual clinic level to national multi-site demonstration projects. In general, studies did not focus on primary care engagement as a primary outcome. We found that programs typically employ multiple intervention strategies, usually across patient, provider, and system levels. While not always well-described, the approaches used to engage patients with primary care could involve co-location with other service disciplines, interdisciplinary care planning, and enhanced and standard referral processes. Organizations seeking to optimize the health care of this vulnerable patient population can use this map to inform program strategy choices during development and reevaluation. This literature could be improved by rigorous study designs to evaluate the effectiveness of interventions, standardized descriptions of intervention components sufficient for replication and full characterization, and a uniform and validated approach to measuring primary care engagement. As one of the nation's largest integrated health care providers, the VA may be in a unique position, given its robust history of addressing the needs of Veterans experiencing homelessness, collaborative mental health care programs, and patient-centered medical home model, to consider tailoring and developing new programs for patients with SMI and housing insecurity incorporating the considerations noted above.[59]

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APPENDIX A. SEARCH STRATEGIES

Database: MEDLINE (via MEDLINE ALL, Ovid, 1946 to May 14, 2020)

Search date: 5/15/2020

Search Set	Search Strategy	Results
#1 *Housing Status Concepts*	exp Homeless Persons/ or (homeless or homelessness or "lack of housing" or squatter or squatters or "no fixed address" or roofless or "doubled up" or "doubled-up" or "rough sleep" or "rough sleeping" or "couch surfing" or "couch surf" or "couch surfer" or "couch surfers" or "supportive housing").ti,ab. or ((street or transient or transients) adj2 (population or person or persons or people or peoples or individual or individuals or adult or adults or youth or youths or men or man or women or woman or dweller or dwellers)).ti,ab. or ((temporary or unstable or unstableness or instability or insecurity or inequality or vulnerable or vulnerability or nonpermanent or non-permanent) adj2 (home or homes or house or houses or housing or accommodation or accommodations or apartment or apartments or shelter or shelters or sheltering or hostel or hostels or dwelling or dwellings)).ti,ab.	15,634
#2 *Primary Care Concepts*	exp Primary Health Care/ or Physicians, Family/ or Physicians, Primary Care/ or General Practitioners/ or Family Practice/ or Community Health Services/ or Community Health Nursing/ or exp Community Health Centers/ or Family Nursing/ or Mobile Health Units/ or Health Services Accessibility/ or "Delivery of Health Care"/ or "Delivery of Health Care, Integrated"/ or ("primary care" or "primary health care" or "primary healthcare" or "health visit" OR "health visits" OR "health visitation" OR "health visitations" OR "wellness visit" OR "wellness visits" OR "wellness visitation" OR "wellness visitations" OR "wellness exam" OR "wellness exams" OR "wellness examination" OR "wellness examinations" OR "annual exam" OR "annual exams" OR "annual examination" OR "annual examinations" or (general adj (practice or practise or practices or practises or practician or practitioner or practitioner)) or (family adj (practice or practise or medicine or physician or physicians or doctor or doctors)) or (collaborative adj2 (care or model or models or practice or practice)) or (community adj (health or healthcare or nurse or nurses or nursing or outreach)) or ((community or neighbo?rhood) adj ("health center" or "health centers" or "health centre" or "health centres" or healthcenter or healthcenters or healthcentre or healthcentres)) or ((nurse or nurses or nursing) adj (family or practitioner or practitioners or primary or advance or advanced or practice or practiced)) or ((mobile or fixed) adj ("outreach program" or "outreach programs")) or (mobile adj (hospital or hospitals or "health unit" or "health units" or "health van" or "health vans" or clinic or clinics)) or ((coordinate or coordinates or coordinated or coordinating or integrate or integrates or integrated or integrating or co-locate or co-locates or co-located or co-locating) adj3 ("health service" or "health services" or "health care" or healthcare)) or (("health service" or "health services") adj2 (accessibility or availability)) or ((healthcare or health care) adj2 (deliver or delivers or delivered or delivery)) or ("access to health care" or "access to healthcare") or (integrated adj delivery adj (system or systems)) or (("patient centered" or "patient-centered") adj2 ("medical home" or "medical homes")) or PCMH or (patient adj2 aligned adj2 ("care team" or "care teams" or "healthcare team" or "healthcare teams")) or PACT or HPACT).ti,ab.	590,937

Search Set	Search Strategy	Results
#3 *Veterans/ VA concepts*	exp Veterans/ or exp "United States Department of Veterans Affairs"/ or exp Veterans Health/ or exp Veterans Health Services/ or (veteran or veterans or "VA health" or "VA healthcare" or "VA clinic" OR "VA clinics" or "VA administration").ti,ab.	39,737
#4	2 or 3	625,193
#5	1 and 4	3,594
#6	5 not (case reports or editorial or letter or comment).pt.	3,371

EMBASE (via Elsevier)

Search date: 5/15/2020

Search Set	Search Strategy	Results
#1 *Housing Status Concepts*	'homelessness'/exp OR 'homeless person'/exp or (homeless or homelessness or 'lack of housing' or squatter or squatters or 'no fixed address' or roofless or 'doubled up' or 'doubled-up' or 'rough sleep' or 'rough sleeping' or 'couch surfing' or 'couch surf' or 'couch surfer' or 'couch surfers' or 'supportive housing'):ti,ab or ((street or transient or transients) NEAR/2 (population or person or persons or people or peoples or individual or individuals or adult or adults or youth or youths or men or man or women or woman or dweller or dwellers)):ti,ab or ((temporary or unstable or unstableness or instability or insecurity or inequality or vulnerable or vulnerability or nonpermanent or non-permanent) NEAR/2 (home or homes or house or houses or housing or accommodation or accommodations or apartment or apartments or shelter or shelters or sheltering or hostel or hostels or dwelling or dwellings)):ti,ab	19,446
#2 *Primary Care Concepts*	'primary health care'/exp OR 'general practitioner'/exp OR 'general practice'/exp OR 'community care'/de OR 'community health nursing'/exp OR 'community mental health center'/exp OR 'family nursing'/exp OR 'field hospital'/de OR 'health care access'/de OR 'health care delivery'/de OR 'integrated health care system'/exp or ('primary care' or 'primary health care' or 'primary healthcare' or 'health visit' OR 'health visits' OR 'health visitation' OR 'health visitations' OR 'wellness visit' OR 'wellness visits' OR 'wellness visitation' OR 'wellness visitations' OR 'wellness exam' OR 'wellness exams' OR 'wellness examination' OR 'wellness examinations' OR 'annual exam' OR 'annual exams' OR 'annual examination' OR 'annual examinations' or (general NEAR/1 (practice or practise or practices or practises or practician or practitioner or practitioner)) or (family NEAR/1 (practice or practise or medicine or physician or physicians or doctor or doctors)) or (collaborative NEAR/2 (care or model or models or practice or practice)) or (community NEAR/1 (health or healthcare or nurse or nurses or nursing or outreach)) or ((community or neighbo?rhood) NEAR/1 ('health center' or 'health centers' or 'health centre' or 'health centres' or healthcenter or healthcenters or healthcentre or healthcentres)) or ((nurse or nurses or nursing) NEAR/1 (family or practitioner or practitioners or primary or advance or advanced or practice or practiced)) or ((mobile or fixed) NEAR/1 ('outreach program' or 'outreach programs')) or (mobile NEAR/1 (hospital or hospitals or 'health unit' or 'health units' or 'health van' or 'health vans' or clinic or clinics)) or ((coordinate or coordinates or coordinated or coordinating or integrate or integrates or integrated or integrating or colocate or colocates or colocated or colocating) NEAR/3 ('health service' or	745,422

Search Set	Search Strategy	Results
	'health services' or 'health care' or healthcare)) or (('health service' or 'health services') NEAR/2 (accessibility or availability)) or ((healthcare or 'health care') NEAR/2 (deliver or delivers or delivered or delivery)) or ('access to health care' or 'access to healthcare') or (integrated NEAR/1 delivery NEAR/1 (system or systems)) or (('patient centered' or 'patient-centered') NEAR/2 ('medical home' or 'medical homes')) or PCMH or (patient NEAR/2 aligned NEAR/2 ('care team' or 'care teams' or 'healthcare team' or 'healthcare teams')) or PACT or HPACT):ti,ab	
#3 *Veterans/ VA concepts*	'veteran'/exp OR 'veterans health'/exp OR 'veterans health service'/exp or (veteran or veterans or 'VA health' or 'VA healthcare' or 'VA clinic' OR 'VA clinics' or 'VA administration'):ti,ab	50,259
#4	#2 OR #3	789,311
#5	#1 AND #4	4,561
#6	#5 NOT ('case report'/exp OR 'case study'/exp OR 'editorial'/exp OR [editorial]/lim OR 'letter'/exp OR [letter]/lim OR 'note'/exp OR [note]/lim OR [conference abstract]/lim OR 'conference abstract'/exp OR 'conference abstract'/it)	3,452

PsycINFO (via Ovid, 1806 to May Week 2 2020)

Search date: 5/15/2020

Search Set	Search Strategy	Results
#1 *Housing Status Concepts*	exp Homeless/ or (homeless or homelessness or "lack of housing" or squatter or squatters or "no fixed address" or roofless or "doubled up" or "doubled-up" or "rough sleep" or "rough sleeping" or "couch surfing" or "couch surf" or "couch surfer" or "couch surfers" or "supportive housing").ti,ab. or ((street or transient or transients) adj2 (population or person or persons or people or peoples or individual or individuals or adult or adults or youth or youths or men or man or women or woman or dweller or dwellers)).ti,ab. or ((temporary or unstable or unstableness or instability or insecurity or inequality or vulnerable or vulnerability or nonpermanent or non-permanent) adj2 (home or homes or house or houses or housing or accommodation or accommodations or apartment or apartments or shelter or shelters or sheltering or hostel or hostels or dwelling or dwellings)).ti,ab.	12,720
#2 *Primary Care Concepts*	exp Primary Health Care/ or Family Physicians/ or General Practitioners/ or Family Medicine/ or exp Community Mental Health Services/ or ("primary care" or "primary health care" or "primary healthcare" or "health visit" OR "health visits" OR "health visitation" OR "health visitations" OR "wellness visit" OR "wellness visits" OR "wellness visitation" OR "wellness visitations" OR "wellness exam" OR "wellness exams" OR "wellness examination" OR "wellness examinations" OR "annual exam" OR "annual exams" OR "annual examination" OR "annual examinations" or (general adj (practice or practise or practices or practises or practician or practitioner or practitioner)) or (family adj (practice or practise or medicine or physician or physicians or doctor or doctors)) or (collaborative adj2 (care or model or models or practice or practice)) or (community adj (health or healthcare or nurse or nurses or nursing or outreach)) or ((community or neighbo?rhood) adj ("health center" or "health centers" or "health centre" or "health centres" or healthcenter or healthcenters or healthcentre or healthcentres)) or ((nurse or nurses or nursing) adj	79,319

Search Set	Search Strategy	Results
	(family or practitioner or practitioners or primary or advance or advanced or practice or practiced)) or ((mobile or fixed) adj ("outreach program" or "outreach programs")) or (mobile adj (hospital or hospitals or "health unit" or "health units" or "health van" or "health vans" or clinic or clinics)) or ((coordinate or coordinates or coordinated or coordinating or integrate or integrates or integrated or integrating or co-locate or co-locates or co-located or co-locating) adj3 ("health service" or "health services" or "health care" or healthcare)) or (("health service" or "health services") adj2 (accessibility or availability)) or ((healthcare or health care) adj2 (deliver or delivers or delivered or delivery)) or ("access to health care" or "access to healthcare") or (integrated adj delivery adj (system or systems)) or (("patient centered" or "patient-centered") adj2 ("medical home" or "medical homes")) or PCMH or (patient adj2 aligned adj2 ("care team" or "care teams" or "healthcare team" or "healthcare teams")) or PACT or HPACT).ti,ab.	
#3 *Veterans/ VA concepts*	Military Veterans/ or (veteran or veterans or "VA health" or "VA healthcare" or "VA clinic" OR "VA clinics" or "VA administration").ti,ab.	22,513
#4	2 or 3	100,280
#5	1 and 4	1,346
#6	limit 5 to ("0100 journal" or "0110 peer-reviewed journal")	1,074

APPENDIX B. STUDY CHARACTERISTICS TABLES

ACCESS Studies: Federally Funded Demonstration Program

Intervention description: A federal demonstration program, Access to Community Care and Effective Strategies and Supports (ACCESS), conducted over 5 years ending in 1999, was designed to support system change through partnership development across federal, state, local, and private service agencies for people experiencing homelessness with serious mental illness and co-occurring substance disorders. A second goal of the program was to identify effective, replicable system integration strategies. Funding (average $5 million; approximately $250,000 per site) was provided at the state level to support provision of essential services to the target population, including assertive outreach, case management (100 patients per site per year), housing, mental health, and substance abuse treatment. Per communication with an author, while the intention was that primary care would be incorporated at each site; the extent to which that happened varied.

Study Design Number of Sites	Eligibility Criteria	Agencies Involved	Outcomes Examined
Calloway, 1998[42] 18 sites	Not reported	1,060 participating agencies: • 33% mental health programs • 25% homeless or housing programs • 10% substance abuse programs • 12% programs that provided primary care, dental care, testing for sexually transmitted diseases • 6% percent entitlement and social welfare programs • 14% other (*eg*, vocational or advocacy programs)	Service agency linkage (patient referrals)
Cheng, 2008[38] 18 sites	Secondary analysis of people in the full dataset who were experiencing homelessness (defined as receiving services at the homeless shelter) and had serious mental illness (based on the working clinical diagnoses of the admitting clinician for the community treatment teams) and not involved in ongoing community treatment.	The specific components of an integrated program varied based on the needs of each of the 9 individual sites	Alcohol use, drug use, social support, family relationships, victimization
Cocozza, 2000[41] 9 systems integration sites	Nine states were selected to participate in this demonstration project and then each state selected 2 sites that were similar in terms of #	Not reported	Not reported

Study Design Number of Sites	Eligibility Criteria	Agencies Involved	Outcomes Examined
	of individuals experiencing homelessness with MI, income, and available housing sites. Sites within states were randomized to receive the integrated systems intervention.		
Morrissey, 1997[44] 18 sites	Interagency networks had to provide 5 core ACCESS services including mental health, substance abuse, treatment, housing, entitlement and income, primary health care; could not provide direct/structural support only (*ie,* food, clothing); had to provide some direct patient services, no 1-2 person operations; identify 2 comparable sites	Agencies or services provided: mental health care, substance abuse treatment services, housing, entitlements and income support, primary health care	System accessibility, system coordination (Robert Wood Johnson Foundation program on chronic mental illness)
Rosenheck, 1997[43] 18 sites	1) experience of homelessness (patient had spent at least 7 of the past 14 nights in a shelter, outdoors, or in a public or abandoned building) 2) had a severe mental illness (psychiatric eligibility was determined with a 30-item screening algorithm) 3) were not involved in ongoing mental health treatment.	Mental health, general health, substance abuse, public support, housing assistance and support, dental care, and employment services	Receipt of medical services, receipt of mental health services, receipt of substance abuse services, receipt of dental services, receipt of long-term housing services, receipt of financial support, receipt of job assistance
Rosenheck, 2002[40] 18 sites Companion study: Morrissey, 2002[60] Rosenheck 1997[61]	Patients were eligible to receive case management services if they were experiencing homeless, suffered from severe mental illness, and were not involved in ongoing community treatment. Operational entry criteria for homelessness and mental illness have been described in detail elsewhere, along with validating data (companion study). Patients were considered to have experiences of homelessness if they had lived in an emergency shelter, outdoors, or in a public or abandoned building for 7 of the previous 14 days.	6 types of services: housing assistance or support from a housing agency, mental health services, substance abuse services, general health care, public income support (at least $100 a month), and vocational rehabilitation services	Mental health symptoms, alcohol problems, drug problems, use of psychiatric services in the past 30 days, service integration, identified case manager, independent housing in the past 30 days, quality of life, social support

Study Design Number of Sites	Eligibility Criteria	Agencies Involved	Outcomes Examined
Steadman, 2002[39] 18 sites	Previously funded ACCESS sites	Services included Assertive Community Treatment (ACT) teams, crisis response, mental health and substance abuse treatment, health care, housing and employment assistance, income support (not all services were provided by all sites)	Types of services offered

Non-ACCESS Studies

Study Country Design VA (Companion Article)	Intervention description	Total N Mean Age (SD) Sex % Race %	Homeless Definition	SMI Inclusion Criteria[a]	% of Population with SMI Diagnosis	Funding
Baker, 2018[32] USA Program evaluation	St. Paul's center of New York, Inc. was an independent community mental health center for adults experiencing homelessness with mental illness who were not actively using substances. Linkage to primary care was via a "robust referral system at major health care institutions."	n=212 Age: Not reported Female: Not reported Race: Not reported	"Currently homeless or at risk for homelessness"	Designed for patients with SMI	Not reported	National Institute of Nursing Research

Corrigan, 2017[33] USA Randomized controlled trial (Corrigan, 2017[29])	Community-based participatory research informed peer navigator program compared to treatment as usual for African-Americans with SMI who were experiencing homelessness. Peer navigators worked with goals including linking them with health care providers.	n=67 Age: 52.9 (8.1) Female: 39% Black: 100%	Public Health Service Act: an individual without permanent housing who may live on the streets; stay in a shelter, mission, single room occupancy facilities, abandoned building or vehicle; or in any other unstable or non-permanent situation	Designed for patients with SMI 75% SMI; broad criteria	Major depression: 85.1% Bipolar disorder: 22.4% PTSD: 6.0% Schizophrenia: 9.0%	National Institute on Minority Health and Health Disparities Grant
Kelly, 2018[31] USA Randomized controlled trial (Kelly, 2017[51])	A randomized pilot study designed to assess the feasibility of adapting an existing peer navigator intervention to work with a mentally ill population experiencing homelessness around the use of a collaborative electronic personal health record.	n=20 Age: 50.60 (10.09) Female: 50% White: 35% Biracial: 30% Black: 20%, Hispanic (comparison arm only): 33%	Currently experiencing homelessness or with a history of experiences of homelessness, supervised housing, or temporary shelters (45%); lived on the street (35%)	Designed for patients with SMI	Schizophrenia: 5% Mood disorder: 45% PTSD: 5%	Friends of the UCLA Semel Institute for Neuroscience and Human Behavior; also a CTSI grant
McGuire, 2009[37] USA Controlled before-after study VA-based	This “integrated care” intervention offered through a demonstration primary care clinic integrates homeless, primary care, and mental health services for veterans with experiences of homelessness and SMI or substance abuse offered in VA. The demonstration clinic co-locates primary care, MH care, and homeless services in a Mental Health Outpatient Treatment Center.	n=260 Age: 45.8 (7.0) Male: 99% Black: 50%	Veterans were considered to have experienced homelessness if they had spent the night prior to study enrollment in an outdoor location, in an emergency homeless shelter, in a hotel or motel, in a jail or prison, in a homeless residential care program that they had entered within the prior 30 days, or if they were temporarily doubled up with a friend or family member	75% SMI; broad definition	Schizophrenia: 13%, Bipolar disorder: 20% Depression: 42% PTSD: 17%	VA New Clinical Program Initiative
Patterson, 2012[47] Canada Cohort study	An interagency collaboration, British Columbia’s Homeless Intervention Project (HIP), provided coordinated housing	n=536 Age: Not reported	“Chronic homelessness” for longer than one year	Designed for patients with SMI	Schizophrenia: 18% Affective psychosis: 29%	British Columbia Ministry of

	and support services to adults with serious mental illness and who are chronically experiencing homelessness. The project brought a "variety of health, social and housing resources from diverse government and non-profit agencies" under a single administrative organization and service providers from multiple agencies were co-located.	Male: Not reported Black: Not reported				Social Development
Rivas-Vasquez, 2009[36] USA Retrospective cohort	This study assesses the effectiveness of a post-booking jail diversion program that ensured access to psychiatric and primary health care for a homeless program for population with experience of homelessness and mental illness. Individuals in "relationship-based care" program were compared to individuals diverted to usual care (other programs otherwise non-specified in the community).	n=229 Age: 43.0 (11.4) Male: 89% Hispanic: 50% Black: 24% White: 17% Other: 7%	Situational housing, defined as experiencing homelessness for less than 1 year or less than 4 episodes of homelessness during a 3-year period: 40% Chronic homelessness, defined as continuously experiencing homelessness for more than 1 year or 4 or more episodes of experiencing homelessness during a 3-year period: 61%	75% SMI; broad criteria	Schizophrenia: 61% Bipolar disorder: 8% Depressive disorder: 13%	Not reported
Rosenheck, 1993[45] USA Cohort study VA-based	The VA Homeless Chronically Mentally Ill (HCMI) program was designed to support access of Veterans with housing insecurity and chronic mental illness with medical and psychiatric services through 4 key services: outreach, advocacy and linkage, facilitation of access to VA and non-VA services, residential	n=1748 Age: 41.4 (1.2) Male: 98% White: 55%	Not reported	Designed for patients with SMI	Not reported	Not reported

	treatment for up to 6 months, and continuing case management.					
Solomon, 1988[48] USA Program evaluation	This demonstration project is based on an adjunctive program to an existing Health Care for the Homeless project which delivered primary health care services, service linkage, and improved access to population specific public benefits and programs. The adjunctive mental health program was intended to establish drop-in centers and provide outreach, assessment, and case management services for participants and educational, training programs and crisis back-up for non-mental health providers caring for this population.	Total: Not reported Age: Not reported Male: Not reported Black: Not reported	Not reported	Designed for patients with SMI	Not reported	Ohio Department of Mental Health and National Institute of Mental Health
Stanhope, 2014[30] USA Qualitative study	This study explored the experience of patients with axis I diagnoses of SMI and housing insecurity participating in a Housing-First program based chronic disease self-management program from the Stanford Chronic Disease Self-management program (CDSMP). The program involved the integration of an embedded primary care physician affiliated with a local academic medical center.	n=15 Age: Not reported Male: 100% Race: Not reported	Federal definition of chronic homelessness, transitional housing (100%)	Designed for patients with SMI	Not reported	Not reported
Stergiopoulos, 2012[49] Canada	This manuscript describes the evaluation of a Housing First Ethno-Racial Intensive Case	Total: 204 Age: 38.6 (12.1) Female: 34%	United Nations definition of absolute homelessness, defined as people who lack	Designed for patients with SMI	Bipolar disorder: 7%	Health Canada and Mental Health

Program evaluation[c]	Management program which was part of Canada's At Home/Chez Soi Research Demonstration Project across 5 Canadian Cities. The program involved housing support and diverse programming including services such as art therapy, computer training, and yoga.	Black: 53% Asian: 22% Mixed race: 11% Middle Eastern: 7% Latin American: 5%	a regular, fixed, physical shelter	Met broad 75% SMI criteria	Psychotic disorder: 36% Depression: 40% PTSD: 24%	Commission of Canada
Stergiopoulos, 2015[34] Canada Controlled before-after study	This study compared outcomes of 2 shelter-based collaborative mental health care models for men experiencing homelessness and mental illness. One model was an integrated multidisciplinary collaborative care model (IMCC) and the second was a less resource intensive shifted outpatient collaborative care model (SOCC).	n=140 Age: 42.1 (10.7) Male: 100% White: 56%	Defined as nights spent on streets or in shelters in past 12 months: ≤30 days 53 (38%) 31-90 days 28 (20%) >90 days 57 (42%)	Designed for patients with SMI	Mood disorders: 59% Schizophrenia or schizoaffective disorders: 49%	Canadian Institutes of Health Research; Partnerships for Health System Improvement; Ontario Career Scientist Award; Public Health Agency of Canada Applied Public Health Chair
Stergiopoulos, 2018[28] Canada Pre-post cohort (Stergiopoulos, 2017[62])	This study evaluates a brief (4-6 month) interdisciplinary intervention (Coordinated Access to Care for the Homeless or CATCH program) for adults experiencing homelessness who lack access to appropriate community supports following discharge from the hospital. CATCH is described as a "one-stop" program that includes primary and psychiatric care, peer support and case management	n=391 Age: 40.5 (12.0) Male: 74% White: 58%	All participants met criteria for current homelessness: living on the street, in crisis or emergency shelters or couch surfing	75% SMI; broad criteria	Psychotic disorder: 25% Major depressive disorder[b] or bipolar disorder: 77%	Canadian Institutes for Health Research

	for individuals discharged from the hospital.					
Weinstein, 2013[46] USA Cross-sectional	This program evaluation describes a Housing First Program affiliated with an academic medical center with a subgroup of patients who opted to receive "fully integrated care by the on-site primary care physician and team psychiatrist." A stated focus of the integrated care program was to screen and monitor chronic disease.	n=123 Age: 49.65 (9.36) Male: 62.6% Black: 72%	Federal definition of chronic homelessness	Designed for patients with SMI	Schizophrenia: 50.4% Mood disorders: 35.0%	Heath Resources and Service Administration Faculty Development in Primary Care Award
Weinstein, 2013[35] USA Program evaluation	This paper describes a preliminary evaluation of a program which created a new partnership between an academic family and community medicine department and a Housing First agency (*ie*, Pathways to Housing-PA) with an overarching goal of addressing multiple levels of health care needs for the target population. The program specifically embedded a primary care physician into the Housing First agency's Assertive Community Treatment team to provide on-site "primary care and population-based health monitoring and services".	n=Not reported Age: 51 Male: 68% Black: 71%	People with "chronic homelessness"	Designed for patients with SMI	Schizophrenia: 42% Mood disorder: 37%	Department of Health and Human Services; Health Resources and Services Administration

[a] Narrower definition of SMI includes schizophrenia, bipolar disorder, and other psychotic disorders. Broad definition of SMI additionally includes major depressive disorder and posttraumatic stress disorder.
[b] Author confirmed that mood disorder meant major depressive disorder in this study.
[c] Study design was a program evaluation of an RCT.
Abbreviations: HCMI=homeless, chronically mentally ill; PTSD=posttraumatic stress disorder; SMI=serious mental illness

APPENDIX C. INTERVENTION STRATEGIES TABLE

Study Country	Setting	Source of Participants (*eg*, Hospital, Criminal Justice)	Elements of Primary Care Integration	Core Disciplines Involved	#: Patient-level Intervention strategies	#: Clinic-level Intervention Strategies	#: System-level Intervention Strategies
492, Baker, 2018[32] USA	Mental health clinic	NR	Enhanced referral	Psychiatrist; Nursing;	6: Flexible appts; service navigation; interdisciplinary assessment; health education; crisis intervention; counseling/family therapy	2: Specific employee training; Medication review/ management;	1: Shared electronic health record
Corrigan, 2017[33] USA	Not Reported	Clinics, homeless shelters	Standard referral	Not reported	3: MI/goal setting; trauma informed care; harm reduction	2: Specific training for employees; peer navigators	Not reported
Kelly, 2018[31] USA	Mental health clinic	Multidisciplinary program (housing, MH, case management)	Standard referral	Behavioral health; Psychiatrist	6: Health education; MI/goal setting; CBT; interdisciplinary assessment; service navigation; access to computers/ technology	3: Specific employee training; Peer support/ community health workers; Medication review/ management;	2: Shared electronic health record; Proactive monitoring system
McGuire, 2009[37] USA	Primary care clinic	Housing program (homeless drop-in)	Interdisciplinary care planning; Co-location	Behavioral health; Psychiatrist; Nursing; Primary Care Provider;	6: interdisciplinary assessment, service navigation, financial income, appoint prioritization, no waiting times, flexible schedule	1: Specific employee training	Not reported
Patterson, 2012[47] Canada	Not reported	Not reported	Standard performance metrics;	Behavioral health; Psychiatrist;	2: Support for housing; income	Not reported	Not reported

Study Country	Setting	Source of Participants (*eg*, Hospital, Criminal Justice)	Elements of Primary Care Integration	Core Disciplines Involved	#: Patient-level Intervention strategies	#: Clinic-level Intervention Strategies	#: System-level Intervention Strategies
			Interagency collaborative body	Nursing; Primary Care Provider			
Rivas-Vasquez, 2009[36] USA	Interdisciplinary clinic, Citrus Health Network community health center	Criminal justice	Interdisciplinary care planning; Co-location	Behavioral health; Primary Care Provider	9: Health education; MI/goal-setting; stigma reduction; Justice system in-reach; Interdisciplinary intake; Service navigation; Transitions of care coordination; Transportation support; Housings support	2: Specific employee training; Peer support/ community health workers;	Not reported
Rosenheck, 1993[45] USA	Interdisciplinary clinic, HCMI clinics staff by 2 social workers and nurses	Community (street, soup kitchens); housing (shelters)	Enhanced referral	Nursing	2: Service navigation; Housing support	Not reported	Not reported
Solomon, 1988[48] USA	Housing services	Health clinic	Enhanced referral	Psychiatrist; Nursing; Primary Care Provider	2: Crisis intervention; Empathic/stigma reduction	2: Specific employee training; Peer support/ community health workers	Not reported
Stanhope, 2014[30] USA	Housing services, community setting	Housing program	Interdisciplinary care planning	Primary Care Provider	5: Health education; MI/goal setting; service navigation; financial housing support; no sobriety requirement	1: Peer support/ community health workers	Not reported

Study Country	Setting	Source of Participants (*eg*, Hospital, Criminal Justice)	Elements of Primary Care Integration	Core Disciplines Involved	#: Patient-level Intervention strategies	#: Clinic-level Intervention Strategies	#: System-level Intervention Strategies
Stergiopoulos, 2018 [28] Canada	Primary care clinic, mental health clinic	Hospitals discharging patients; homeless shelter sends recently discharged	Co-location, Enhanced referral	Not reported	5: Supportive therapy; assertive outreach; interdisciplinary assessment; service navigation	1: Peer support	Not reported
Stergiopoulos, 2015[34] Canada	Housing services	Housing program (shelter)	Interdisciplinary care planning; Co-location; Standard referral	Psychiatrist; Primary Care Provider	4: Health education; Service navigation; Housing support; Low barrier to care (on-site at shelter)	1: Specific employee training	1: Shared electronic health record
Stergiopoulos, 2012[49] Canada	Interdisciplinary clinic	Shelters, drop-in centers, outreach teams, mental health teams, inpatient programs, criminal justice programs	Standard referral	Psychiatrist	8: health education, crisis intervention, MI/goal setting, stigma, harm reduction, interdisciplinary assessment, service navigation, financial housing	1: Specific employee training	Not reported
Weinstein, 2013[35] USA	Primary care clinic, mental health clinic, Interdisciplinary clinic, housing services	NR	Co-location	Psychiatrist; Nursing; Primary Care Provider	6: Health education; Assertive outreach; Interdisciplinary needs assessment; Service navigation; Housing support; Flexible appointment scheduling	2: Peer support/ community health workers; Medication review/ management	1: Proactive monitoring system
Weinstein, 2013[46] USA	Interdisciplinary clinic, housing services	NR	Interdisciplinary care planning; Co-location;	Psychiatrist; Nursing; Primary Care Provider	4: Assertive outreach; Service navigation; Housing support; No	Not reported	2: Shared electronic health record;

Study Country	Setting	Source of Participants (*eg*, Hospital, Criminal Justice)	Elements of Primary Care Integration	Core Disciplines Involved	#: Patient-level Intervention strategies	#: Clinic-level Intervention Strategies	#: System-level Intervention Strategies
			Enhanced referral		sobriety/treatment requirements		Standard performance metrics

Abbreviations: MI= Motivational interviewing; CBT= Cognitive behavioral therapy

APPENDIX D. SUMMARY OF OUTCOME MEASURES

General Outcome Measure	Specific Outcome Measure	Follow-up Range	Study
Patient Level			
Mental and physical health			
Mental health, general[a]	SF 36; Diagnostic Interview Schedule; Psychiatric Epidemiology Research Interview; Psychiatric Problem Index; TCU Health Form; Recovery assessment Scale; Colorado Symptom Index, modified; Brief Psychiatric Rating Scale	Baseline to 18 months	ACCESS[40] Non-ACCESS[28,33,34,37,45]
Substance use[a]	Addiction Severity Index; self-report	Baseline to 18 months	ACCESS[38,40] Non-ACCESS[28,34,37,45]
Physical health, general[a]	SF-36	Baseline to 18 months	Non-ACCESS [28,37]
Physical health, specific	Number of chronic conditions, specific conditions diagnosed	Not reported	Non-ACCESS[46]
Pain	SF-12	Baseline to 6 months	Non-ACCESS[31]
Community functioning, community integration, and quality of life			
Quality of life	Lehman QoLI-20; single summary question	Baseline to 12 months	ACCESS[40] Non-ACCESS[28,33]
Victimization	Sum of items about frequency of physical victimization in last 2 months (Lehman quality of life)	Baseline to 18 months	ACCESS[38]
Criminal justice involvement	Number of incarcerations among “regularly followed clients”; post-diversion arrest rate; criminal justice status (parole or probation); number of offenses	12 months to 2 years	Non-ACCESS[32,36,37,47]
Community functioning	Multnomah Community Ability Scale	Baseline to 12 months	Non-ACCESS[34]
Health care self-management	Adapted Mental Health Confidence Scale	Baseline to 6 months	Non-ACCESS[31]
Housing	Residential Time Line Follow-Back Calendar; self-reported # days on street/in shelter; self-reported # of moves in past 12 months; self-reported lifetime duration of experiences of homelessness; achievement of independent housing domiciliary days	Baseline to 12 months	ACCESS[40] Non-ACCESS[28,33,34,45]
Social support[a]	Four unspecified questions about friends or professionals encouraging medical services in last 12 months;	Baseline to 18 months	ACCESS[38] Non-ACCESS[37]

General Outcome Measure	Specific Outcome Measure	Follow-up Range	Study
	# people from 9 different categories (*eg*, parent, sibling, coworker, friend) with whom the subject felt close; National Vietnam Veterans' Readjustment Study Scale		
Care utilization			
Hospitalizations	Self-report; days psychiatric inpatient stay; days medical-surgical inpatient stay	Baseline to 12 months, "*years"*	Non-ACCESS[28,32,34,45,47]
Health and social service utilization[b]	Health care and Health care utilization scale; "health and social service use" in last 60 days; Receipt of "public support payments and housing subsidies"; having a primary case manager	Baseline to 12 months	ACCESS[40] Non-ACCESS[31]
Emergency department visit	Self-report; EHR based	3 to 18 months	Non-ACCESS[28,34,37]
Primary care visits	Self-report # in last 30 days; EHR-based data collection	Baseline to 18 months	Non-ACCESS[34,37]
Psychiatric visits (outpatient)	Number per individual	12 months	Non-ACCESS[37,45]
Outpatient visits (other)	Number of medical-surgical visits per individual; # health-related appointments (scheduled/achieved)	12 months	Non-ACCESS[33,45]
Primary care access	Number of days to primary care visit following enrollment	Not applicable	Non-ACCESS[37]
Intervention engagement	Time spent in program (days); total # clinical contacts; attendance record service contact logs	12 months	Non-ACCESS[36,48]
Receipt of financial support	Shelter payments; total social assistance	12 months	Non-ACCESS[47]
Patient-level service integration	# of domains (*ie*, housing support, mental health, substance abuse, general health care, public income support, vocational rehab) in which services were received	Baseline to 12 months	ACCESS[40]
Health Care costs	Site-specific cost per service received; $ for outpatient medical services per individual per year	6 to 12 months	Non-ACCESS[45,47]
Insurance coverage	Receipt insurance coverage	12 months	Non-ACCESS[33]
Receipt of health screenings	Self-report; summary prevention services ratio based from EHR	Baseline to 12 months	Non-ACCESS[31,37]

General Outcome Measure	Specific Outcome Measure	Follow-up Range	Study
Patient experience and quality of care			
Quality of care	National Association of State Mental Health Program Directors indicators; Healthcare Effectiveness Data Information Set		Non-ACCESS[46]
Participant perspective on program	Participant perspectives on program model		Non-ACCESS[49]
Patient-provider alliance	Working Alliance Inventory-Participant	6 weeks to 6 months	Non-ACCESS[28,31]
PCP relationship	Engagement with the Health Care Provider Scale	Baseline to 6 months	Non-ACCESS[31]
Unmet needs or barriers to care			
Competing needs	5-item scale		Non-ACCESS[37]
Barriers and facilitators to addressing health needs	Semi-structured interviews	Not applicable	Non-ACCESS[30]
Perceived need	Patient-perceived need, provider assessment of patient need and differences between the two	Baseline	ACCESS[43]
Clinic Level			
Volume of care provided			
Collaborative personal health record utilization	Count of log-ins	6 months	Non-ACCESS[31]
Psychiatric evaluations by program	Visits attended	2 years	Non-ACCESS[32]
Preventive services	Percentage of patient population receiving preventive services	Not reported	Non-ACCESS[35]
Quality of clinical care provided			
Program performance	Local Public Health System Performance Assessment Instrument	Not applicable	Non-ACCESS[35]
Primary care medical home alignment	Overlap between intervention components and primary care medical home elements	Not applicable	Non-ACCESS[35]
Fidelity to care model	Measure of fidelity to assertive community treatment model; Fidelity evaluation via qualitative data collection (*eg*, observations, interviews)	12 months to 3 years	ACCESS[40] Non-ACCESS[49]
Peer support	Assessment of functioning of consumer case worker	Not applicable	Non-ACCESS[48]

General Outcome Measure	Specific Outcome Measure	Follow-up Range	Study
Program implementation			
Barriers and facilitators of program implementation	Barriers and facilitators of program implementation	Not applicable	Non-ACCESS[49]
Agency Integration	Agencies integration within existing system	Baseline	ACCESS[44]
Provider/staff experience			
Provider perspective on program	Provider perspectives on program model	Not applicable	Non-ACCESS[49]
Employee training evaluation	Employee training evaluation; post-training attitude assessment	Not applicable	Non-ACCESS[48]
System Level			
Cross-agency collaboration			
Integration strategies	Systems integration strategies selected; novel systems integration strategies introduced; changes in strategies over time; implementation status of strategies	5 years	ACCESS (Steadman, 2002[39] Cocozza, 2000[41] Rosenheck, 2002[40])
Service Linkage	Reported patient referrals between service providers at each site within a multi-site program; Questions about referrals of patients, fund transfers, information sharing (5-point Likert scale); Integration across a system	2 years	ACCESS[42,44]
Service maintenance			
Service continuation	Number of core services continued post-funding by interagency site	5 years	ACCESS[39]
Perceived service provision			
Perceived accessibility of services for persons with experiences of homelessness and SMI	Robert Wood Johnson Foundation Program on Chronic Mental Illness	Not applicable	ACCESS[44]
Perceived coordination of services for persons with experiences of homelessness and SMI	Robert Wood Johnson Foundation Program on Chronic Mental Illness	Not applicable	ACCESS[44]

[a] Measure used in a VA study
[b] Could include emergency room or urgent care providers
Abbreviations: TCU=Texas Christian University; EHR=Electronic health record

APPENDIX E. REPORTED FINDINGS BY INCLUDED STUDY

Study	Study Design Number of Patients Length of Follow Up	Number of Intervention Strategies	Primary Care Integration Approach Core Disciplines	Relevant Author-Reported Key Findings
Baker, 2018[32]	• Program evaluation • n=212 • Subgroup of patients followed for 6+ months	Patient: 6 Clinic: 2 System: 1	• Enhanced referral • Psychiatry, psychiatric/mental health nurse practitioners	Main finding from abstract: "All clients were housed and none incarcerated. From 2008 to 2010, only 3% of clients were hospitalized, compared to 7.5% of adults with SMI [population estimate]."
Corrigan, 2017[33]	• Randomized controlled trial • n=67 • 12 months	Patient: 4 Clinic: 2 System: 0	• Standard referral • Peer support	Main finding from abstract: "Findings from group by trial ANOVAs of omnibus measures of the four constructs [physical and mental health, recovery, and quality of life] showed significant impact over the one year for participants in PNP compared to control described by small to moderate effect sizes. These differences emerged even though both groups showed significant improvements in reduced homelessness and insurance coverage."
Kelly, 2018[31]	• Randomized controlled trial • study • n=20 • 6 months	Patient: 6 Clinic: 3 System: 2	• Standard referral • Peer health navigator, psychiatry, behavioral health, case management, housing support	Main finding from abstract: "Health navigator contacts and use of personal health records were associated with improvements in health care and self-management."
McGuire 2009[37]	• Single site controlled before-after study • n=260 • 18 months	Patient: 6 Clinic: 1 System: 0	• Co-located, interdisciplinary care planning • Case manager, behavioral health, psychiatrist, nursing, primary care, housing services	Main finding from abstract: "… the integrated care group was more rapidly enrolled in primary care, received more prevention services and primary care visits, and fewer emergency department visits, and was not different in inpatient utilization or in physical health status …The demonstration clinic improved access to primary care services and reduced emergency services but did not improve perceived physical health status."
Patterson, 2012[47]	• Cohort • n=536 • At least 6 months	Patient: 2 Clinic: 0 System: 1	• Co-located, enhanced referral • Behavioral health, psychiatrist, nursing, primary care	Main finding from abstract: Pre-post enrollment period comparisons "indicated significant improvements in health and social service involvement and reductions in offending."

Study	Study Design Number of Patients Length of Follow Up	Number of Intervention Strategies	Primary Care Integration Approach Core Disciplines	Relevant Author-Reported Key Findings
Rivas-Vazquez, 2009[36]	• Cohort • n=229 • Not reported	Patient: 9 Clinic: 2 System: 0	• Co-located, interdisciplinary care planning • Case manager, behavioral health provider, primary care	Main finding from abstract: "A highly significant reduction in arrest rates for individuals diverted to the relationship-based care program was observed. However, the arrest rate for the control group remained nearly identical before and after diversion. For the relationship-based care group, pre-diversion arrest rates, duration of participation in the program, and number of psychiatric contacts accounted for a significant portion of the recidivism variance."
Rosenheck, 1993[45]	• Cohort • n=1748 • 12 months	Patient: 2 Clinic: 0 System: 0	• Enhanced referral • Behavioral health, nursing	Main finding from abstract: "Although utilization of inpatient services did not increase after veterans' initial contact with the program, use of domiciliary and outpatient services increased substantially. Total annual costs to the VA also increased by 35%.... Both clinical need and participation in the program were associated with increased use of health services and increased cost."
Stanhope, 2014[30]	• Qualitative study • n=15 • Not applicable	Patient: 4 Clinic: 1 System: 0	• Integrative care planning • Primary care	All thematic findings as reported by authors <u>Consumer identified barriers to addressing health needs:</u> *Internal Barriers*: • "Postponement: Being in denial about their health was driven both by a minimization of their symptoms and a fear of what they might find if they sought care." (p 659) • "Depends on my mood: The role that mental health symptoms played in people's ability to reach out for help and take steps to improve their health was profound." (p 659) *External Barriers*: • "Now that I have a place to stay. I can start dealing with me: Participants described addressing their health needs in the context of transitioning to housing"

Study	Study Design Number of Patients Length of Follow Up	Number of Intervention Strategies	Primary Care Integration Approach Core Disciplines	Relevant Author-Reported Key Findings
				• "The system: Many participants expressed a deep distrust of the health care system which emerged both from direct experiences of discrimination due to their mental health problems and being homeless and also a general skepticism surrounding an insurance based system." (p 660) Overcoming Barriers: • "Getting out of our own heads: The most significant part of the self-management group was the peer support process that emerged from their weekly sessions." (p 661) • "Trusting my own voice: With increased knowledge and encouragement from the group, the participants felt more able to take control of their health, which often meant grappling with the internal and external barriers they had encountered."
Solomon, 1988[48]	• Program evaluation • Not applicable • Not applicable	Patient: 2 Clinic: 2 System: 0	• Enhanced referral • Behavioral health, psychiatry, nursing, primary care, case manager	Conclusion as reported by author: "A mental health project such as this needs to be flexible in its efforts to serve homeless persons who are generally suspicious of others and resistant to using traditional mental health services. Thought needs to be given to developing a non-stigmatizing identity for such a program." (p 13)
Stergiopoulos, 2012[49] Stergiopoulos, 2017[62]	• Qualitative program evaluation • n=204 • Not applicable	Patient: 8 Clinic: 1 System: 0	• Standard referral • Psychiatry, case manager	Main finding from abstract: "The target population had complex health and social needs. The [intervention] enjoyed a high degree of fidelity…. Program providers reported congruence of these philosophies of practice, and program participants valued the program and its components."
Stergiopoulos, 2018[28]	• Cohort study • n=391	Patient: 5 Clinic: 1	• Co-located, enhanced referral • Not reported	Main finding from abstract: "Participants had statistically significant improvements in mental and

Study	Study Design Number of Patients Length of Follow Up	Number of Intervention Strategies	Primary Care Integration Approach Core Disciplines	Relevant Author-Reported Key Findings
	• 6 months	System: 0		physical health status and reductions in mental health symptoms, substance misuse and the number of hospital admissions. Strength of working alliance…. associated with reduced health care use and mental health symptoms."
Stergiopoulos, 2015[34]	• Controlled before-after study • n=140 • 12 months	Agency A Patient: 4 Clinic: 1 System: 1 Agency B Patient: 4 Clinic: 1 System: 1	Agency A (Integrated multidisciplinary collaborative care model) • Co-located, interdisciplinary care planning • Psychiatry, primary care, case manager, shelter staff Agency B (shifted outpatient collaborative care model) • Standard referral • Psychiatry, case manager, shelter staff	Main finding from abstract: "We observed improvements in both programs over time on measures of community functioning, residential stability, hospitalizations, emergency department visits and community physician visits, with no significant differences between groups over time"
Weinstein, 2013[35]	• Program evaluation • n=Not reported • Not reported	Patient: 6 Clinic: 2 System: 1	• Co-located, enhanced referral • Licensed clinical social worker, psychiatrist, nursing, primary care, peer specialist	Main finding from abstract: "Preliminary program evaluation results suggest that this partnership is evolving to function as an integrated person-centered health home and an effective local public health monitoring system"
Weinstein, 2013[46]	• Cross-sectional • n=123 • Not reported	Patient: 4 Clinic: 0 System: 2	• Co-location, interdisciplinary care planning, enhanced referral, • Psychiatrist, nursing, primary care	Main finding from abstract: "Participants had high rates of comorbid chronic disease and risk behavior…The integrated care program subgroup had relatively high rates of documentation of some health care quality indicators: 62% with BMI, 73% with BP, 77% with tobacco use history, 87% with substance use history."
ACCESS: Multi-site federal demonstration project; nonrandomized cohort; strategies employed and approaches to primary care integration varied across sites				

Study	Study Design Number of Patients Length of Follow Up	Number of Intervention Strategies	Primary Care Integration Approach Core Disciplines	Relevant Author-Reported Key Findings
Calloway, 1998[42]	Main finding from abstract: "In 1994 and 1996, of the 20,801 pairs of potential service linkages, about a third were in place while the remaining two-thirds were absent. Overall, linkages showed a slight but significant increase between 1994 and 1996. More than half of the linkages changed in type, indicating a fluid service system"			
Cheng, 2008[38]	Main finding from abstract "After 18 months of follow up, women had significantly better outcomes in terms of family relationships (est. mean score increased 0.100), victimization (score decreased 0.164), and social support (score increased 0.363) than did men (all, p<0001). Being accompanied by children was significantly associated with less change in drug use among women compared to men (p<0.01)"			
Cocozza, 2000[41]	Lessons suggested by data as reported by authors: "It is possible to systematically monitor and measure the strategies used by localities in their efforts to better integrate service delivery systems." "Some strategies have a higher probability of successful implementation than others." "There are patterns in the selection of system integration strategies across sites" "when supported, communities can develop and implement a variety of strategies for integrating services" (p 405-406)			
Morrissey, 1997[44]	Main finding from abstract "Services at baseline for homeless mentally ill persons at the program sites were rates as relatively inaccessible, and the coordination of services between agencies was rates as even more problematic….On average, at baseline agencies that had received an ACCESS grant were better connected to their local service network than were other agencies"			
Rosenheck, 1997[43]	Main finding from abstract: "The greatest differences between clients' and providers perceptions of service needs were in dental and medical services, which were more frequently identified as needs by clients, and in substance abuse and mental health services which were more frequently identified by providers. Clients' and providers assessments of need were significantly, but not strongly, correlated with each other, and both were correlated with use of MH and substance use services""			
Rosenheck, 2002[40]	Main finding from abstract: "…clients at the experimental sites showed no greater improvement on measures of MH or housing…across four cohorts than those at the comparison sites. More extensive implementation of system integration strategies was unrelated to these outcomes…clients of sites that became more integrated…had progressively better housing outcomes."			
Steadman, 2002[39]	Conclusion as reported by author: "Fully 17 or the 18 ACCESS sites were continuing to provide services to homeless persons with SMI and co-occurring substance abuse by using parts or all of the ACCESS model" (p 491)			

APPENDIX F. EXCLUDED STUDIES TABLE

	Exclusion Reason			
Study	**Not OECD**	**Not population**	**Not intervention**	**Not design**
Anonymous, 2005[1]		X		
Barrow, 2019[2]		X		
Basu, 2012[3]		X		
Behl-Chadha, 2017[4]		X		
Beiser, 2019[5]			X	
Bennett, 1995[6]		X		
Biederman, 2019[7]		X		
Blue-Howells, 2008[8]		X		
Boardman, 2006[9]		X		
Booth, 2019[10]				X
Bottomley, 2001[11]		X		
Bowker, 2013[12]		X		
Bracken, 1999[13]		X		
Brown, 2013[14]		X		
Brown, 2018[15]		X		
Brush, 1999[16]				X
Buck, 2011[17]		X		
Caban-Aleman, 2020[18]		X		
Canham, 2019[19]		X		
Carriere, 2008[20]		X		
Carter, 1994[21]		X		
Center for Substance Abuse, 4734[22]				X
Chan, 2019[23]		X		
Chhabra, 2020[24]			X	
Child, 1998[25]		X		
Christensen, 2004[26]			X	
Chrystal, 2015[27]			X	
Ciaranello, 2006[28]		X		
Clark, 2003[29]			X	
Clark, 1999[30]				X
Community Psychiatry Program, 1989[31]				X
Conovkr, 1997[32]		X		
Culhane, 2002[33]			X	
Currie, 2018[34]		X		
Darbyshire, 2006[35]		X		
Dates, 2009[36]			X	
Davis, 2012[37]				X

	Exclusion Reason			
Study	**Not OECD**	**Not population**	**Not intervention**	**Not design**
Deas-Nesmith, 1992[38]				X
Dennis, 2000[39]				X
Desai, 2005[40]		X		
Dickey, 2000[41]				X
Dickins, 2019[42]		X		
Doering, 2002[43]			X	
Dorney-Smith, 2011[44]		X		
Douglass, 2018[45]		X		
Elissen, 2013[46]		X		
Ellison, 2016[47]			X	
Essendorfer, 2007[48]			X	
Fernandez, 1985[49]				X
Ferreira, 2016[50]	X			
Flores, 1998[51]			X	
Fournier, 1993[52]		X		
Fraino, 2015[53]		X		
Gabrielian, 2017[54]		X		
Gabrielian, 2016[55]		X		
Gabrielian, 2014[56]		X		
Gatewood, 2011[57]		X		
Gelberg, 1996[58]		X		
Gordon, 2007[59]		X		
Gundlapalli, 2017[60]		X		
Gundlapalli, 2005[61]		X		
Gunner, 2019[62]			X	
Hatton, 2001[63]		X		
Henwood, 2013[64]			X	
Henwood, 2011[65]				X
Hoist, 2008[66]				X
Howe, 2009[67]		X		
Jego, 2018[68]			X	
Jego, 2016[69]		X		
Johnson, 2017[70]		X		
Jones, 2017[71]			X	
Jones, 2018[72]		X		
Kaduszkiewicz, 2017[73]			X	
Kalton, 2016[74]		X		
Kaplan-Weisman, 2019[75]		X		
Keogh, 2015[76]		X		
Kerman, 2016[77]			X	
Kertesz, 2013[78]		X		

	Exclusion Reason			
Study	**Not OECD**	**Not population**	**Not intervention**	**Not design**
Kertesz, 2009[79]		X		
Kessell, 2006[80]		X		
Kirkland-Kyhn, 2020[81]				X
Koh, 2016[82]				X
Koon, 2010[83]		X		
Kuehn, 2019[84]				X
Lam, 1999[85]			X	
Lamanna, 2018[86]		X		
Lashley, 2019[87]		X		
Lee, 2013[88]		X		
Levy, 2004[89]				X
Liu, 2020[90]		X		
Luchenski, 2018[91]		X		
Madrid, 2008[92]		X		
Marshall, 1995[93]			X	
McGuire, 2007[94]			X	
McGuire, 2004[95]			X	
McGuire, 2002[96]		X		
McInnes, 2014[97]		X		
Mehta, 2017[98]		X		
Mercuel, 2013[99]			X	
Mishan, 2017[100]		X		
Montgomery, 2008[101]			X	
Moore, 2017[102]		X		
Moore, 2019[103]		X		
Morrissey, 2002[104]			X	
Morse, 1997[105]			X	
Mowbray, 1992[106]		X		
Myers, 2018[107]		X		
Nakashima, 2004[108]		X		
Nakonezny, 2005[109]		X		
Ng, 2004[110]		X		
No authorship, 1986[111]				X
O'Toole, 2013[112]		X		
O'Toole, 2010[113]		X		
O'Toole, 2016[114]		X		
O'Toole, 2015[115]		X		
O'Toole, 2018[116]		X		
O'Toole, 2011[117]		X		
Parker, 2019[118]			X	
Paudyal, 2018[119]		X		

	Exclusion Reason			
Study	**Not OECD**	**Not population**	**Not intervention**	**Not design**
Pauly, 2018[120]		X		
Pfeil, 2004[121]		X		
Pickett, 2015[122]		X		
Podymow, 2006[123]		X		
Pollio, 2000[124]			X	
Purkey, 2019[125]			X	
Putnam, 1985[126]				X
Raines, 2019[127]				X
Resnik, 2017[128]		X		
Rogers, 1993[129]				X
Rosenbaum, 2017[130]			X	
Rosenheck, 1995[131]		X		
Rosenheck, 1997[132]			X	
Rosenheck, 1998[133]			X	
Rothbard, 2004[134]			X	
Rowe, 2016[135]		X		
Salize, 2013[136]		X		
Sarango, 2017[137]		X		
Sestito, 2017[138]		X		
Shepherd, 1998[139]		X		
Shortt, 2008[140]		X		
Simmons, 2017[141]				X
Smelson, 2018[142]			X	
Snyder, 2002[143]		X		
Stein, 2000[144]		X		
Stergiopoulos, 2015[145]			X	
Strange, 2018[146]		X		
Sumalinog, 2017[147]				X
Summerside, 2013[148]		X		
Swabri, 2019[149]		X		
Timms, 2016[150]			X	
Tollett, 1995[151]		X		
Trabert, 2016[152]				X
Tsai, 2019[153]		X		
Tyner, 2014[154]				X
Upshur, 2017[155]			X	
Vargas, 2018[156]	X			
Vazquez Souza, 2011[157]			X	
Vickery, 2020[158]		X		
Weinreb, 2007[159]		X		
Wenger, 2007[160]				X

	Exclusion Reason			
Study	**Not OECD**	**Not population**	**Not intervention**	**Not design**
Wijk, 2019[161]	X			
Wilkins, 2015[162]				X
Worley, 1990[163]		X		
Wright, 2016[164]		X		
Wright, 2004[165]		X		
Zerger, 2009[166]		X		
Zlotnick, 2013[167]		X		

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APPENDIX G. INTERVENTION COMPLEXITY: ICAT SYSTEMATIC REVIEW DETERMINATIONS

1. Baker, 2018[32]

Brief Study Description		
This manuscript describes a program evaluation of St. Paul's center of New York, Inc. which was an independent community mental health center from 2003-2012 run by psychiatric/mental health nurse practitioners caring for adults experiencing homelessness and mental illness who were not actively using substances. Program was funded by non-profit grants. It was staffed by 5 full-time NPs and a full-time office manager with back-up from an off-site psychiatrist and psychiatric clinical nurse specialist. Linkage to primary care was via a "robust referral system at major health care institutions". Primary outcome = Not clearly stated, but outcomes included number of patients housed, hospitalization rate, incarceration rate Setting = New York City, U.S.		
Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component and delivered as a bundle	Program activities described to include multiple simultaneous and coordinated intervention components including, assessment and referral for comorbid illnesses related to chronic mental illness, individual supportive therapy, regular contact and follow up for medical screenings and referrals to primary care as needed.
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Program behaviors not explicitly described but can be expected to include patient level behaviors including medication adherence, engagement with therapy, attending appointments among others.
3. Organizational levels targeted by the intervention	Multi-level	Program activities describe patient level (individual treatment), staff level (continuing education, training of new psychiatric nurse practitioners), and system level work (working with state assembly on relevant policy issues)
4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	Highly/tailored	Program offerings are stable across patients, but specific care delivered by intervention is tailored to individual patient needs
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	Basic skills	Program noted to be founded on principle that psychiatric/mental health NPs "can deliver high-quality services in an efficient manner and provide a model for systemic change in caring for homeless and disenfranchised mentally ill people". No specific training described.
6. The level of skill required for targeted behavior when entering the study by those receiving the	Basic skills	Patients receiving care within this program do not need specific training or skills to receive care.

intervention, in order to meet the intervention objectives		
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	Moderate interaction	In this program, there is some interaction between professionals delivering care but no clear evidence that one would impact another.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Moderately context dependent	Programs ability to refer patients to needed services is dependent on local availability. As program is set in a large metropolitan city in the U.S., the same resources may not be available in other locations.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Highly-dependent on individual-level factors	The effect of this program would be expected to vary depending on the individual patient's severity of mental health symptoms and readiness to engagement with care provision.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Pathway variable, long	Causal pathway not clearly described but is expected to require multiple steps and behaviors for patients to remain successful housed, outside the hospital and criminal justice system.

2. Corrigan, 2017[29,33]

Brief Study Description		
A 12-month, randomized controlled trial (n=67) comparing a community-based participatory research informed peer navigator program to treatment as usual for African-Americans with SMI who were experiencing homelessness. Peer navigators worked with individuals through providing patient-centered support to achieve patient identified health goals including linking them with health care providers with the overarching objective of improving psychiatric and physical health leading to improved recovery and quality of life. Usual care was treatment through the Together for Health System which was a coordinated care system including a network of more than 30 physical and mental health providers. Primary outcome = not specified; outcome measures include physical and mental health status, recovery, quality of life, and scheduled/achieved appointments Setting = Chicago, IL, USA		
Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component	Peer navigators work with patient guided by 6 fundamental approaches (eg, proactive, broad focused, active listener, shared decision-making, and problem focused). Activities guided by patient identified goals which suggested multiple aspects of support delivered together.
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Because peer navigator support is directed by the patient, there is the potential for multi-targeted behaviors.
3. Organizational levels targeted by the intervention	Single	Intervention focused on patients alone.

4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	Highly tailored/flexible	Peer navigator accommodates needs and goals of individual patient.
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	High level skills	Peers are individuals with a history of experiences of homelessness and in recovery from SMI. Training includes seven 3-hour days initially, three 3-hour didactics during transition, one afternoon per week for 6 weeks for 3-hour didactic during start-up, and one afternoon per month every other month of in-service once started.
6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Basic skills	No specific skills required of patient receiving services.
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	High level interaction	All components delivered by the peer navigator and would depend on peer navigators experience with the individual patient needs.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Highly context dependent	Effects of navigation would depend on local resources available for individual patients.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Highly dependent on individual-level factors	Effect of navigation would depend, in part, on the physical and mental health status, circumstantial social situations, and other needs of the individual patient. In addition, effectiveness of the navigation would also depend on the navigator themselves and the connection between peers.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Pathway linear, long	While not explicitly described, it is expected that there would be multiple steps involved between peer navigation and outcomes of interest.

3. Kelly, 2018[31]

Brief Study Description		
A randomized pilot study designed to assess the feasibility of adapting an existing peer navigator intervention to work with a mentally ill population with experiences of homelessness around the use of a collaborative electronic personal health record. Primary outcome = feasibility appears to be the primary outcome, other measures include intervention engagement quality measures (*eg,* working alliance inventory short form), health service utilization, primary care provider relationship, health screening, pain, health care self-management, # log-ins into collaborative electronic personal health record. Setting = Los Angeles, CA		
Core Dimension	Judgment	Support for Judgment

1. Active components included in the intervention, in relation to comparison	Multi-component	Participants received coaching and instruction from health navigators around use of a collaborative electronic health record.
2. Behavior or actions of interventions recipients to which intervention is directed	Single target	Participant behavior targeted was use of the collaborative electronic health record with and without the health navigator.
3. Organizational levels targeted by the intervention	Single category	Participants were the only target of the intervention.
4. The degree of tailoring intended or flexibility permitted across individuals or sites in applying or implementing the intervention	Inflexible	All participants were expected to use the collaborative electronic health record.
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	High level skills	Health navigators had previously completed a 4-day manualized training, biweekly group supervision, and coaching around first consumer interaction. Previous training culminated in certification as health navigator. Navigators also completed 1-4 additional training sessions with the study principal investigator around tablet use and the electronic medical record.
6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Intermediate level skills	Individuals participating in study were required to have used the internet in the prior year “to ensure that they had some familiarity with technology”.
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	Independent	Intervention has only one component.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Highly context dependent	Intervention requires access to a unique collaborative electronic health record system which leverages existing technology to make it patient accessible and which is not universally available.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Moderately dependent on individual level factors	A participant’s ability to engage with collaborative health record is likely dependent on their current symptom status of their serious mental illness and other comorbidities.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Unable to assess	Insufficient information provided.

4. McGuire, 2009[37]

Brief Study Description		
This is a pre-post study of an intervention ("integrated care") offered through a demonstration primary care clinic that integrates homeless, primary care, and mental health services for homeless veterans with SMI or substance abuse offered in VA. The demonstration clinic co-locates primary care, MH care, and homeless services in a Mental Health Outpatient Treatment Center (MHOTC funded by VA Central Office). Veterans with usual care primary care services (received before demonstration clinic opened) are compared to those who received care in the demonstration clinic (post-integration group) Primary outcome = use of emergency services, physical health status, use of primary care services Setting = LA VA		
Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component and provided as a bundle	Veterans were evaluated in a screening clinic and referred to all needed services within the MHOTC building. Goal was for Veteran to have a primary care visit on the same day as the screening visit. Team used weekly case conferences, building operation meetings, SOPs, and policies to facilitate interclinic coordination and communication.
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Intervention sought to address mental health, primary health, housing needs and other support (*ie*, transportation) needs.
3. Organizational levels targeted by the intervention	Multi-level	Intervention targets mentally ill Veterans with experiences of homelessness and how these services are offered within the LA VA system in an integrated way. While primary care model was similar, services were co-located and additional standard operating procedures were put in place to facilitate communication between MH, primary care, and homeless service teams.
4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	Highly tailored/flexible	Model of care is stable across patients, but specific care delivered by intervention is tailored to individual patient needs
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	Intermediate level skills	Primary care providers received training on Healthcare for the Homeless including infectious disease screening and treatment, chronic pain, and hypertension management.
6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Basic skills	Patients receiving care within this model do not need specific training or skills to receive care.
7. The degree of interaction between intervention components, including the	High level of interaction	This model of care is designed to be highly interactive and service needs are determined through an initial

independence/interdependence of intervention components		comprehensive assessment and immediate referral to primary care. Case managers are involved and teams meet regularly to discuss cases.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Moderately context dependent	The approach could be generalized across VAs particularly if VA central office provided funded for other similar clinics. All VAs offer homeless services and have provide similar levels of primary and mental health care and VA has been a pioneer in thinking about integrated care.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Highly dependent on individual-level factors	The effect of this care model would be expected to vary depending on the individual patient's severity of mental health symptoms and readiness to engage with care provision.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Pathway linear, long	One of the outcomes is improved access to primary care which could be achieved through the immediate primary care visit that is scheduled on the same day as the screening. However, other outcomes, including use of ED services and improved health would likely require additional primary care and MH visits and housing support to achieve though the immediate link with primary care makes that link more straight forward.

5. Patterson, 2012[47]

Brief Study Description		
An interagency collaboration, British Columbia's Homeless Intervention Project (HIP), provided coordinated housing and support services to adults with serious mental illness and who chronically experience homelessness. The project brought a "variety of health, social and housing resources from diverse government and non-profit agencies" under a single administrative organization and service providers from multiple agencies were co-located. This analysis collected data from the HIP program at 3 provincial ministries. Primary outcome = primary goals of program stated as increasing use of primary care, decreasing the number of hospitalizations and length of stay, decreasing justice system involvement, and increasing the use of income assistance. Setting = British Columbia, Canada		
Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component	Multiple agencies involved in project; however, limited detail is provided with which to determine *if* components are delivered as a bundle.
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Behaviors/actions of this project are directed at the agency and clinician levels. Though not explicitly described, since the provision of care to the target population is expected to be complex, the behaviors targeted in

		delivering such care are expected to be multi-targeted.
3. Organizational levels targeted by the intervention	Multi-level	Project appears to impact agencies and individual clinicians that deliver care to this population.
4. The degree of tailoring intended or flexibility permitted across individuals or sites in applying or implementing the intervention	Moderately tailored/flexible	Project noted to include a "common monitoring framework to ensure fidelity and standardization of activities across sites."
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	Unable to assess	Insufficient information provided.
6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Intermediate skills	Skills of clinicians and agencies appear to be standard for given profession.
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	Unable to assess	Insufficient information provided.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Moderately context dependent	While this intervention was implemented at multiple sites within British Columbia, there is little information provided about differences across sites. However, it can be expected that while this intervention would depend on locally available personnel and resource availability and the specific health policy and financial resources found in British Columbia.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Moderately dependent on individual level factors	Differences in resources and personnel across agencies could be expected to impact effect of interagency collaboration.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Unable to assess	Insufficient information provided.

6. Rivas-Vazquez, 2009[36]

Brief Study Description
This study uses a non-randomized control pre/post comparison to assess the effectiveness of a post-booking jail diversion program that ensured access to psychiatric and primary health care for a homeless program for a population experiencing homelessness with mental illness. Individuals in "relationship-based care" program were compared to individuals diverted to usual care (other programs otherwise non-specified in the community). Primary outcome = rate of arrests after admission to program

Setting = South Florida		
Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component and provided as a bundle	Intervention included outreach team, comprehensive assessment, advocate at hearing, and primary and psychiatric care and housing support. Also provided with health education and other support as needed.
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Intervention sought to address material, health, and legal needs in order to reduce criminal recidivism.
3. Organizational levels targeted by the intervention	Multi-level	Intervention targets populations who experience homelessness and mental illness in need of a jail diversion program. Sought to turn CHC services into jail diversion program, trained outreach team.
4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	Highly tailored/flexible	Model of care is stable across patients, but specific care delivered by intervention is tailored to individual patient needs
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	High level skills	Paper did not talk much about steps taken to ensure coordinated care within CHC, but there was a specialized outreach team and inclusion of legal support.
6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Basic skills	Patients receiving care within this model do not need specific training or skills to receive care.
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	High level of interaction	This model of care is designed to be highly interactive along a continuum from release from jail to integration in the community. A trained outreach team engages individuals who will be released from jail, they conduct a comprehensive assessment and services from various sectors come together to meet the patient's health, legal, case management, housing, and other support needs.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Highly context dependent	The underlying approach could be generalized, but in this case, the CHC received external funding to implement this intervention and there were clear champions within the judicial system that facilitated the environment within which this intervention could occur.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Highly dependent on individual-level factors	The effect of this care model would be expected to vary depending on the individual patient's severity of mental health symptoms and readiness to engagement with care provision.

10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Pathway variable, long	While no clear causal pathway is outlined or theory provided to understand potential causal pathway, the intervention involves so many factors that it is likely that the intervention could operate through multiple pathways and interactions between services and the patients' mental health function and willingness to engage.

7. Rosenheck, 1993[45]

Brief Study Description		
A VA-based program started in 1987 called the VA Homeless Chronically Mentally Ill (HCMI) designed to support access of Veterans with housing insecurity and chronic mental illness with medical and psychiatric services through four key services: outreach, advocacy and linkage, facilitation of access to VA and non-VA services, residential treatment for up to 6 months, and continuing case management. Sites are each staffed by two clinicians (mostly social workers and nurses). Primary outcome = utilization and cost of VA health services Setting = nine program sites within the larger national Veterans Affairs Health Care System program; n=1,748 patients		
Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component and delivered as a bundle	Limited description, however, four key services outlined would require multiple components to be delivered together
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Limited description, however, would anticipate that patients would need to exhibit multiple behaviors to engage with each of the four key services.
3. Organizational levels targeted by the intervention	Single category	This intervention is directed at the patient recipients.
4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	Highly tailored	The extent to which each patient receives the key services would be tailored to their need.
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	Basic skills	No evidence that administrators of the program would need additional training.
6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Basic skills	No evidence that recipients of the program would need additional training beyond standard professional training though primarily delivered by master's level social workers and nurses.
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	High level interaction	Integration of multiple key services are expected to require a high level of complex interdependence.

8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Moderately context dependent	Specific program offerings likely somewhat variable across 43 VA sites, however, functioning within a national health care system.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Highly dependent on individual level factors	A participant's ability to engage with the care offered is likely dependent on their current symptom status of their serious mental illness and other comorbidities.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Pathway variable, long	While not specifically articulated, the causal pathway is expected to be complex with multiple steps required for an individual patient to engage with programmatic offerings to have improved health, and stable housing.

8. Solomon, 1988[48]

Brief Study Description
This program evaluation of a demonstration project is based on an adjunctive program to an existing Health Care for the Homeless project which delivered primary health care services, service linkage, and improved access to population specific public benefits and programs. The adjunctive mental health program was intended to establish drop-in centers and provide outreach, assessment, and case management services for participants and educational, training programs and crisis back-up for non-mental health providers caring for this population. n=NR Primary outcome=not identified; included both process and summative evaluation Setting=Cleveland, OH

Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component and delivered as a bundle	Multiple components delivered as bundles to patients and non-mental health staff.
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Limited description, however engaging in care with both medical and mental health care would require multiple behaviors; in addition, caring for patients with both serious mental illness and a history of housing insecurity would require multiple actions.
3. Organizational levels targeted by the intervention	Multi-category	Program is directed at both patient participants and non-mental health providers.
4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	Highly tailored	Limited description, however, the extent to which each patient receives the key services is assumed to be tailored to individual need; similarly, educational training likely was designed to meet the needs of providers across settings (*eg,* shelters vs meal-site).
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	Intermediate level skills	Some skills around collaboration and integration in a specialized clinical team are expected, as well as expertise to provide educational training.

6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Intermediate skills	No specific skills required for patient participants; however, providers would be required to have their basic professional training.
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	High level interaction	It is expected that the various intervention components provided to patients are internally interdependent and interact with the training provided to non-mental health providers.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Highly context dependent	The described program was initiated as an adjunct to an existing program to provide health care for individuals experiencing homelessness.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Highly dependent on individual level factors	A patient participant's ability to engage with integrated care is likely dependent on their current symptom status of their serious mental illness and other comorbidities. Provider factors are expected to be less dependent on individual factors.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Pathway variable, long	While not specifically articulated, the causal pathway is expected to be complex with multiple steps required for an individual patient to engage with programmatic offerings to have improved health, and stable housing.

9. Stanhope, 2014[30]

Brief Study Description		
This is a qualitative study exploring the experience of patients with axis I diagnoses of SMI and housing insecurity participating in a Housing-First program based chronic disease self-management program from the Stanford Chronic Disease Self-management program (CDSMP). The program involved the integration of an embedded primary care physician affiliated with a local academic medical center. Primary outcome = "barriers and facilitators to addressing health care needs of people enrolled in a chronic disease self-management program within a supported housing program" Setting = US (city not reported)		
Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component and delivered as a bundle	Minimal information available, however, participants received integrated primary care and an established multi-component chronic disease self-management program in conjunction with other supports inherent in the interdisciplinary housing first program.
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Behaviors expected of program participants are not explicitly described but can be expected to include patient level behaviors including medication adherence, engagement with therapy, self-management behaviors which are almost always multi-

		faceted, and attending appointments among others.
3. Organizational levels targeted by the intervention	Single category	This intervention is directed at the patient recipients.
4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	Highly tailored/flexible	While program components are universally available to participants who opt into the chronic self-management program, the combination and intensity of individual components will be uniquely customized to the needs of the individual participant.
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	High skill level	Individuals (peer educators/facilitators) delivering the chronic self-management program were brought in specifically to deliver the 6-week program as they had previously conducted the program at a similar location.
6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Basic skills	No special experience required for participants of the program.
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	High level interaction	It can be expected that acquisition of self-management skills would have a synergistic effect on primary care provision in an interdisciplinary context.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Highly context dependent	Ability to recreate the interdisciplinary team would require access to similar personnel through local academic medical centers. In addition, conducting the described program would require local expertise for delivery.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Moderately dependent on individual level factors	A participant's ability to engage with the care offered is likely dependent on their current symptom status of their serious mental illness and other comorbidities.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Pathway variable, long	While not specifically articulated, the causal pathway is expected to be complex with multiple steps required for an individual participant and that one participant's path towards improved health, disease self-management, and stable housing could look different from another participant.

10. Stergiopoulos, 2012[49]

Brief Study Description
This manuscript describes the evaluation of a novel Housing First Ethno-Racial Intensive Case Management program which was funded as part of the Mental health Commission of Canada's At Home/Chez Soi Research Demonstration Project across 5 Canadian Cities (Moncton, Montreal, Toronto, Winnipeg, and Vancouver). The program involved housing support and diverse programming including services such as art therapy, computer training and yoga.

n=204 (intervention=102; control=102)

Primary outcome=not stated as such but included recruitment, fidelity, program provider and participants perspectives, implementation challenges and facilitators

Setting=Toronto, Canada

Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component and delivered as a bundle	Multiple components of care including case management and other support services delivered together to patients.
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Limited description, however engaging in care with both medical and mental health care would require multiple behaviors.
3. Organizational levels targeted by the intervention	Single category	Services provided by program are directed at patient participants.
4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	Highly tailored	Limited description, however, the extent to which each patient receives the key services is assumed to be tailored to individual need.
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	High level skills	To achieve stated goals of focus on anti-racism and anti-oppression care delivery, the program partnered with a skilled and experienced agency to lead and implement the service model (*ie*, Across Boundaries).
6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Intermediate skills	Patient participants were not required to have specific skills per se, however, had to agree to weekly face-to-face meetings with their case manager and a limit was placed on proportion of income used for rent.
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	High level interaction	Given that care is integrated, it is expected that components of program are interdependent.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Moderately context dependent	Larger program of which this was a component took place in multiple cities across Canada, though this one was only in Toronto and appears to rely on local expertise and is tailored to a specific multi-racial/cultural population.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Highly dependent on individual level factors	A patient participant's ability to engage with integrated care is likely dependent on their current symptom status of their serious mental illness and other comorbidities.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Pathway variable, long	While not specifically articulated, the causal pathway is expected to be complex with multiple steps required for an individual patient to engage with programmatic offerings to have improved health, and stable housing.

11. Stergiopoulos, 2015[34]

Brief Study Description		
A quasi-experimental study comparing outcomes of two shelter-based collaborative mental health care models for men experiencing homelessness and mental illness. One model was an integrated multidisciplinary collaborative care model (IMCC) and the second was a less resource intensive shifted outpatient collaborative care model (SOCC). IMCC is a 780-bed shelter that partners with local teaching hospital to provide onsite psychiatrist or mental health worker 4 half days per week as an integrated member of primary care team. SOCC is a 480-bed shelter has a psychiatric consultant who is not administratively linked to primary care but who provides outpatient treatment one half day per week in shelter. SOCC does not provide on-site primary care, but patients are referred to neighboring primary care clinics. Primary outcome = patient's level of community functioning 12 months after study enrollment Setting = Toronto, Ontario		
Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	IMCC: more than one component and delivered as a bundle SOCC: more than one component	IMCC: This model of care offers interdisciplinary stepped care with intentional communication among professionals of diverse backgrounds with an emphasis on coordinated care and integrated shelter-based care and case management. A common electronic medical record is used. SOCC: In this model of care, primary care and nursing is not offered on site and communication is limited to the psychiatrist and "select shelter staff." There is no integration between primary care and mental health and primary care is accessed via referral to near-by primary care clinics.
2. Behavior or actions of interventions recipients to which intervention is directed	IMCC: Multi-target SOCC: Multi-target	IMCC: Intervention (model of care) is delivered to men with mental health disorders and who are experiencing homelessness. While not explicitly described, patients are interacting with staff members of multiple disciplines (medicine, housing services, mental health) which will be addressing separate patient-level behaviors SOCC: same as above
3. Organizational levels targeted by the intervention	IMCC: Single category SOCC: Single category	IMCC: Intervention (model of care) targets men experiencing homelessness with mental illness who are accessing shelter. SOCC: Intervention (model of care) targets men experiencing homelessness with mental illness who are accessing shelter.

4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	IMCC: Highly tailored/flexible SOCC: Highly tailored/flexible	IMCC: Model of care is stable across patients, but specific care delivered by intervention is tailored to individual patient needs. Flexible entry into program and accessing needed services. SOCC: same as above
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	IMCC: Intermediate level skills SOCC: Basic skills	IMCC: In addition to professional training, members of integrated model must demonstrate purposeful, integrated collaboration. SOCC: In this model, professionals are delivering care in manner standard to their professional training.
6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	IMCC: Basic skills SOCC: Basic skills	IMCC: Patients receiving care within this model do not need specific training or skills to receive care. SOCC: same as above
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	IMCC: High level of interaction SOCC: Moderate interaction	IMCC: As this model of care is designed to be integrative and collaborative, the actions of each team member impact the actions of others; successful care delivery of individual team members can be expected to increase the likelihood of successful care delivered by others. SOCC: In this model of care, there is some interaction between professionals delivering care but no clear evidence that one would impact another.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	IMCC: Moderately context dependent SOCC: Highly context dependent	IMCC: Care delivered by this model of care is largely internally contained and thus less dependent on availability of clinical resources outside the specific shelter. However, healthcare policies and structures may differ significantly outside of Canada which would impact implementation. SOCC: As care delivered by this alternate model depends on referrals to neighboring clinics to provide core services (*ie*, primary care), implementation of this program would be highly dependent on the context. Geographic context principles apply to this model as well.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	IMCC: Highly-dependent on individual-level factors SOCC: Highly-dependent on individual-level factors	IMCC: The effect of this care model would be expected to vary depending on the individual patient's severity of mental health symptoms and readiness to engagement with care provision. SOCC: same as above

10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	IMCC: Pathway variable, long SOCC: Pathway variable, long	IMCC: While no clear causal pathway is outlined, the course from entry into care to primary outcome (*ie*, level of community functioning at 12 month) is expected to be variable with multiple steps required. SOCC: same as above

12. Stergiopoulos, 2018[28]

Brief Study Description		
This manuscript and its associated protocol paper (Stergiopoulos et al, 2017) describe a pre-post mixed method study to evaluate a brief (4-6 month) interdisciplinary intervention (Coordinated Access to Care for the Homeless or CATCH program) for adults experiencing homelessness who lack access to appropriate community supports following discharge from the hospital. CATCH is described as a "one-stop" program that includes primary and psychiatric care, peer support and case management for individuals discharged from the hospital. The program features a weekly "low barriers" clinic staffed with a nurse, a primary care physician and two psychiatrists. Clinic staff work "seamlessly" with case managers on multidisciplinary assessments and comprehensive plans. Other features include outreach, crisis intervention, assistance with material supports, and interagency partnerships with local hospitals. Primary outcome = change in participant health status from baseline to 6 months as evaluated by the physical and mental health component scores of the Short-Form 36 (SFS-36) Setting = Toronto, Canada		
Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component and delivered as a bundle	Intervention activities include multiple simultaneous and coordinated intervention components including, assertive outreach, crisis intervention, assistance with material supports, and primary and mental health care provision.
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Behaviors targeted by the intervention are not explicitly described but can be expected to include patient level behaviors including medication adherence, engagement with therapy and medical care, and executive tasks such as applying for financial and housing resources.
3. Organizational levels targeted by the intervention	Single category	Intervention is directed at adults experiencing homelessness with unmet physical or mental needs as identified by clinicians and unmet support needs as identified by patient.
4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	Highly/tailored	Intervention offerings are stable across patients, but specific care delivered by intervention is tailored to individual patient needs.
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	Intermediate level skills	Training of intervention staff not explicitly described but could expect some skill needed to achieve level of described multidisciplinary coordination.

6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Basic skills	Participants receiving care within this program do not need specific training or skills to receive care.
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	High level interaction	The design of this intervention is described as interdisciplinary and includes multiple opportunities for care delivery interaction in a manner that is expected to be synergistic.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Moderately context dependent	It can be expected that while this intervention as described is largely self-contained, the ability to implement it would depend on locally available personnel and resource availability and the limitations of health policy and financial resources.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Highly-dependent on individual-level factors	The effect of this intervention would be expected to vary depending on the individual patient's severity of mental health symptoms and readiness to engagement with care provision.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Pathway variable, long	Causal pathway not clearly described but is expected to require multiple steps and behaviors for patients to achieve better physical and mental health status.

13. Weinstein, 2013[46]

Brief Study Description		
This program evaluation describes a Housing First Program started in 2008 and affiliated with an academic medical center with a subgroup of patients who opted to receive "fully integrated care by the on-site primary care physician and team psychiatrist". Primary care was available 2 half-days per week. All program participants received on-site psychiatry and nursing care. A stated focus of the integrated care program was to screen and monitor chronic disease. n=123 participants; 43 integrated care subgroup Primary outcome=healthcare quality indicators from National Association of State Mental health Program Directors (NASMHPD) and Healthcare Effectiveness Data Information Set (HEDIS) Setting=Philadelphia, PA		
Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component and delivered as a bundle	Limited description, however, fully integrated care from at least three disciplines (medicine, psychiatry, nursing) implies multiple components administered together.
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Limited description, however engaging in care with both chronic disease and mental health care would require multiple behaviors
3. Organizational levels targeted by the intervention	Single category	Services of program are provided to patients.

4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	Highly tailored	Limited description, however, the extent to which each patient receives the key services is assumed to be tailored to individual need.
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	Intermediate level skills	Limited description, however, some skills around collaboration and integration in a specialized clinical team are expected.
6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Basic skills	No special skills are noted for patients receiving care through this program.
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	High level interaction	Given that care is integrated, it is expected that components of program are interdependent.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Moderately context dependent	It is expected that program offerings and available collaborations could vary by location (*eg,* access to academic affiliate).
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Highly dependent on individual level factors	A participant's ability to engage with integrated care is likely dependent on their current symptom status of their serious mental illness and other comorbidities.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Pathway variable, long	While not specifically articulated, the causal pathway is expected to be complex with multiple steps required for an individual patient to engage with programmatic offerings to have improved health, and stable housing.

14. Weinstein, 2013[35]

Brief Study Description		
This paper describes a preliminary formative evaluation of a program which created a new partnership between an academic family and community medicine department and a Housing First agency (*ie,* Pathways to Housing-PA) with an overarching goal of addressing multiple levels of health care needs for the target population. The program specifically embedded a primary care physician into the Housing First agency's Assertive Community Treatment team to provide on-site "primary care and population-based health monitoring and services." Primary outcome = the overlap between program components and primary care medical home elements Setting = Philadelphia, PA, US		
Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component and delivered as a bundle	Participants receive "fully integrated" primary and behavioral health care as a part of the program, in addition to care

		transitions and other supports inherent in the interdisciplinary housing first program.
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Behaviors expected of program participants are not explicitly described but can be expected to include patient level behaviors including medication adherence, engagement with therapy, attending appointments among others.
3. Organizational levels targeted by the intervention	Single category	Program is directed at patient participants.
4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	Highly tailored/flexible	While program components are universally available to participants, the combination and intensity of individual component will be uniquely customized to the needs of the individual participant.
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	Intermediate level skills	Interdisciplinary team members are practicing within their established scope of practice, however, requires training for providers in “population-centric models of care.”
6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Basic skills	There is not expectation that participants enter the program with previously existing skill sets.
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	High level interaction	Program components are derived from care provided by interdisciplinary team which is intentionally coordinated and interdependent.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Highly context dependent	Program components are presumed to be unique to the offerings of the existing programs which were co-located and integrated. Other implementation sites may not have access to the same offerings.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Moderately dependent on individual level factors	A participant’s ability to engage with the care offered is likely dependent on their current symptom status of their serious mental illness and other comorbidities.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Pathway variable, long	While not specifically articulated, the causal pathway is expected to be complex with multiple steps required for an individual participant and that one participants path towards improved health and stable housing could look different from another participant.

15. ACCESS Studies

Calloway, 1998[42]
Cheng, 2008[38]
Cocozza, 2000[41]
Morrissey, 1997[44]
Rosenheck, 1997[43]
Rosenheck, 2002[40]
Steadman, 2002[39]

Brief Study Description		
A quasi-experimental federal demonstration program, Access to Community Care and Effective Strategies and Supports (ACCESS), conducted over 5 years ending in 1999 which was designed to support system change through partnership development across federal, state, local, and private service agencies for people experiencing homelessness with serious mental illness and co-occurring substance disorders. A second goal of the program was to identify effective, replicable system integration strategies. Funding (average $5 million; approximately $250,000 per site) was provided at the state level to support provision of essential services to the target population, including assertive outreach, case management (100 patients per site per year), housing, mental health, and substance abuse treatment. Per communication with an author, while the intention was that primary care would be incorporated at each site; the extent to which that happened varied. Primary outcome = varied by article, but outcomes included continuation of services after funding ended, size of caseload, integration strategies chosen, quantification of level of implementation; extent of agency linkages; treatment outcomes; perceived needs by patient and service provider; gender-specific response to initiative Setting = 18 US sites in 9 states (*ie*, Connecticut, Illinois, Kansas, Missouri, North Carolina, Pennsylvania, Texas, Virginia, and Washington); in each state identified one systems integration site and one control site (matched on demographic and economic variables)		
Core Dimension	Judgment	Support for Judgment
1. Active components included in the intervention, in relation to comparison	More than one component and delivered as a bundle	The stated requirements for ACCESS participation sites were broad and did not dictate how all components of interdisciplinary and interagency care for patients experiencing homelessness with SMI were delivered. However, involvement of multiple agencies and multiple types of care delivery were expected to be provided to individual patients.
2. Behavior or actions of interventions recipients to which intervention is directed	Multi-target	Target behaviors of ACCESS program were largely directed at the providers or agencies serving the target population. Developing linkages and integration services across multiple organizations is expected to be complex and require multiple behaviors (*eg,* interagency communication, alignment of efforts, *etc*)
3. Organizational levels targeted by the intervention	Multi-level	ACCESS was designed to impact at the community level (*eg*, increase interagency linkages), agency/clinic level (*eg*, develop new clinic level resources), and patient level (*eg*, direct case management and outreach).

4. The degree of tailoring intended or flexibility permitted across individuals in applying or implementing the intervention	Highly tailored	Each ACCESS site developed its own approach to implemented intended domains.
5. The level of skill required by those delivering the intervention in order to meet the intervention objectives.	Intermediate level skills	ACCESS intended for existing agencies to combine efforts, so were presumably using existing skill sets though likely had to work on new skills around system integration.
6. The level of skill required for targeted behavior when entering the study by those receiving the intervention, in order to meet the intervention objectives	Basic skills	No special experience required for participants of the program.
7. The degree of interaction between intervention components, including the independence/interdependence of intervention components	High level interaction	While variable across sites, integration strategies and degree of linkages suggest that intervention components delivered by cooperating agencies would impact those delivered by another agency.
8. The degree to which the effects of the intervention are dependent on the context or setting in which it is implemented	Highly context dependent	State and city level resources and regulations as well as interests and priorities are expected to have contributed significantly to effect of the intervention.
9. The degree to which the effects of the intervention are changed by recipient or provider factors.	Highly dependent on individual level factors	A participant's ability to engage with the care offered is likely dependent on their current symptom status of their serious mental illness and other comorbidities. Similarly, since much of the ACCESS intervention occurred at the agency level, the degree to which agencies were integrated likely depended on their ability and willingness to collaborate.
10. The nature of the causal pathway between the intervention and the outcome it is intended to effect.	Pathway variable, long	While not specifically articulated, the causal pathway is expected to be complex with multiple steps required for an individual agency to create new linkages and for participants to have improved health, and stable housing.

APPENDIX H. PEER REVIEW COMMENTS AND RESPONSE TABLE

Question Text	Reviewer Number	Comment	Response
Are the objectives, scope, and methods for this review clearly described?	1	Yes	
	2	Yes	
	3	Yes	
	4	Yes	
	5	Yes	
	6	Yes	
	7	Yes	
Is there any indication of bias in our synthesis of the evidence?	1	No	
	2	No	
	3	No	
	4	No	
	5	No	
	6	No	
	7	No	
Are there any published or unpublished studies that we may have overlooked?	1	No	
	2	No	
	3	No	
	4	No	
	5	No	
	6	No	
	7	No	
Additional suggestions or comments can be provided below. If applicable, please indicate the	1	I think the report clearly demonstrates that this is not a well studied area despite the high morbidity and mortality in this population. I think these are two populations that commonly suffer from healthcare inequities for many reasons. The meager evidence base suggests that similar gaps may also exist in research. People with serious mental illness are disproportionately represented in the homeless population and more effort should be devoted to this type of research.	

page and line numbers from the draft report.	2	General feedback: the presentation of results, switching between categories of findings and "most common" strategies, was confusing and make it a bit difficult to know what to value in terms of findings.	We appreciate this source of confusion and have addressed as described below.
		Presentation of characteristics of studies in narrative form was a bit difficult to follow and would be better done via a Table.	We agree and have added an evidence profile table.
		The Executive Summary Methods left out key information related to the process of selecting studies for inclusion. More specific feedback: p.8 - Can you include a sentence to explain the process by which 4,000+ articles were excluded? This was not clear based on your previous Methods section.	We have clarified in executive summary method that a standard dual-screener approach was used to exclude ineligible citations. In keeping with current standards, we have left additional detail in the main body of the report.
		p.8 – 22 studies were included in your review sample yet the total number of strategies here is more than 22. Similarly, your previous section mentions that there are 15 unique interventions but this mentions 22 intervention strategies. Can you mention that some studies had more than one level of focus or otherwise clarify this seeming lack of continuity?	We understand this confusion. We have added detail to clarify that each individual study could have used multiple intervention strategies at multiple levels.
		p.8 - Another point of clarification - did you approach focus only on the primary strategy within each study, or the primary strategy at each level within a study (if one study could be counted multiply at patient/clinic/system levels), or could a single study have multiple strategies which were recorded? Tis would be useful to clarify, as these sentences about the "most common" strategies at the clinic and systems level are not clear to the extent that they are a comprehensive list of ALL mentioned strategies or only the most commonly-mentioned strategies, given the relatively small number of studies in each of these groups.	We appreciate this confusion and have removed the phrase “most common” from the report. Indeed, we identified all mentioned strategies across all included studies. We now use the phrase “most frequently described” to indicate that the relevant strategy was one that was reported the most across all included studies.
		p. 9 – you mention one outcome of “reduced recidivism” as outcome of interest, but do not mention what action is being reduced – use of high-intensity MH services? Use of ED services? Inpatient care? It would be good to clarify.	We have revised this to read: “Reduced criminal recidivism”

p.21-22: can a table be created to summarize the characteristics of the studies included in this review. The narrative provides a lot of numbers describing different characteristics of included studies which tend to blend together and would be better presented as a table.	We agree. As noted above, we have added an evidence profile table for clarity.
p.23 – you state that you "identified 22 patient-level strategies across 6 groups; 4 clinic-level intervention strategies across 3 groups… " etc. The term "group" here is a bit confusing, as I was not clear if you meant this to reflect different studies, subpopulations which might be represented across different studies, or populations within the same study which were compared. Is there a better term to use here instead of "group"?	We agree and have relabeled this section. We now refer to intervention *strategies* as those activities conducted as part of a study to effect a benefit for the target population. Strategies were grouped by *domain*, and domains were categorized by patient/clinic/system *levels*.
p.23 – you mention the "most common patient-level strategies…" this phrasing is a bit imprecise and makes interpretation of this section a bit confusing. Does this mean that less-common strategies are not reported in this analysis? Also, the presentation approach which mentions the 5 categories into which all patient-level strategies will be classified, followed by a presentation of the "most common" strategies which span multiple categories, is further confusing. This section could be improved by clarifying that the 5 "groups" reflect the categories which patient-level intervention strategies were organized into and by dropping any mention of "most common" strategies unless this can be more clearly quantified (by number of studies?). This shift from the categories of interventions to types of interventions in a manner that does not go through the categories of interventions is very confusing. Perhaps some sub-headings would improve this section, by dividing the discussion into categories of strategies rather than jumping between them?	As noted above, we have removed the phrase "most common" to categorize strategies and are using "most frequently described". We have also added the # of studies using listed strategies within the text for clarity
p.27 – similar to the section on patient-level strategies, the section on clinic-level strategies would benefit from more organization/structure. I recommend either creating subheadings which reflect the categories of strategies or moving in a more structured way through a presentation of the categories and the strategies which fall in each category. A presentation of "most common strategies" is confusing given the current lack of clear structure in this narrative section.	We have also restructured the clinic and system-level strategy sections as described above for clarity and consistency.

		p.30 – similar feedback to that related to p. 23 and p. 30 – more clear structure in this narrative section will help avoid confusion related to strategies, categories, and "most common" strategies.	We have also restructured the clinic and system-level strategy sections as described above for clarity and consistency.
		p.38 – this presentation of detailed findings was very clear and well-written.	Thank you.
		P.39 – Figure 7: this provided more clear information on findings, using numbers to reflect measures at different levels.	Thank you.
		p.41 – the presentation focusing on "most common" strategies without any mention of the categories of strategies from earlier in the report makes me think that it may be more useful to focus on a count of the number of studies that used each strategy as well as a presentation which reflects % of studies that reflected each strategy –this could provide more concrete framing of how wide-spread the "common" studies are within the	We appreciate this suggestion and have added quantitative data to support and clarify these assertions.
	3	Page 6 line 20- the adjective "knowledgeable" appears to be applied to "clinical setting", which seems off. "context of a knowledgeable and familiar clinical setting"	We have reworded this sentence to read "in the context of a population-tailored clinical setting".
		Page 6 line27 "Thoughtful interventions exist which focus on collaborations with either SMI or homelessness.." Are words missing? This appears to refer to collaborations between health/ social conditions, when it is assumed to be intended to refer to professionals collaborating.	We have reworded this sentence to read: "Previously developed interventions have focused on collaborations between primary care and either persons with SMI or persons experiencing homelessness, but few have targeted both populations simultaneously."
		Page 11 line 22 "Disorientation" is not a common symptom among those with most types of SMI. Disorientation would be more common in dementia or delirium. The phrase "disorientation due to SMI symptoms" would itself perpetuate the next issue in the list - "stigma in the health system".	We appreciate this point and have removed this phrase from the text.
		Page 12 line 27 The concept of protocol registration is introduced without being defined. It is not entirely clear whether	We have removed the term 'registration' and clarified that the protocol was published the program website.

publishing the protocol online is the registration process or something else. Page 13 lines 54-56- Most VA readers will lack a minimal understanding of what is included in the National Psychosis Registry (NPR) . Probably zero non-VA readers will know this. The acknowledgement of variation in SMI definitions is noted and appreciated. Clarification is on whether NPR includes some non-psychotic psychiatric diagnoses. I believe that it does, but a leader is likely to assume from the name of the registry that it only includes psychotic disorder. There is no definition of SMI known to me that includes only psychotic disorders. Non-psychotic bipolar disorder would be a good example of an SMI that would be included in nearly every SMI definition.	We have added that The VA National Psychosis Registry defines SMI as the presence of schizophrenia, other psychotic disorders, or bipolar disorder to the Introduction section of the executive summary, the Introduction section of the full report, and the Definitions section of the Methods.
Page 13 Conceptual model is very clear and well-done generally.	Thank you.
Page 15 The definition of SMI here makes no mention of National Psychosis Registry, so it is unclear if there is a different definition than on page 13.	We have added language to Table 1 to indicate that we used the same definitions as outlined on page 13.
Page 16 EPOC is defined in terms of what the letters stand for, but the association with these letters and types of studies has not been explained.	We have clarified in a foot note for Table 1: “Cochrane EPOC criteria identify study designs optimal for evaluation of health system interventions” and have provided a citation for addition reference.
Page 21 line 28-29 “mental health comorbidities” - comorbid to what? It seems SMI is your primary condition, so it is not clear to what comorbidities refers	We agree that this is confusing and have removed this phrase.
Page 23 the graphic is very nice. Could it possibly be expanded to include names of strategies and possibly sub strategies?	Thank you. Figure 4 is intended to provide a high-level overview of the way the subsequent section is organized. Additional details about the names of the strategies and domain are listed in subsequent tables. Thus, we have relabeled Figure 4 as a “Framework of Multi-Level Intervention Strategies” to clarify the figure intent.
Page 24 Assertive community treatment is also a clinic and possibly system level intervention. I am making a note here in case ACT is not also classified this way later in the paper.	We agree that Assertive community treatment could have been classified in multiple ways. Because we were identifying strategy levels based on the targeted effect, we elected to categorize as patient-level. We have added a statement in the limitations that these could have been categorized differently.

		Page 32 I am sorry if I missed it, but have you all talked about the relationship of having housing with engagement with primary care. The relationship was discussed in the intro, and I understand the paper is on homeless people. Still, one would expect homelessness to be dynamic. Getting folks housing surely increases engagement with healthcare, right? Housing First is a big intervention in this field. I wonder if you all might want to look at healthcare engagement in these trials. Apologize if I missed this.	We agree that the experience of homelessness is a dynamic process and has the potential to impact an individual's ability to engage with healthcare. In particular, we explored an individual's ability to engage with primary health care. See Figure 5 for how we considered intervention approaches to engage with primary care. (See also Whisler A, Dosani N, To MJ, O'Brien K, Young S, and Hwang SW. The effect of a Housing First intervention on primary care retention among homeless individuals with mental illness. *PLoS One*. 2021;16:e0246859.)
		The paper would generally benefit from further review by a medical editor. There are some places where the writing could be made more clear.	We have worked with our medical editor to improve the clarity of the writing.
	4	I will upload the ESP with comments embedded in the PDF.	
		Figure 4. Multi-level Intervention Strategies Not sure of point of this figure. Maybe would be easier to interpret if the strategies were listed and the corresponding table number were embedded into the three levels	Thank you for this suggestion. As noted above, we have reworked this figure for clarity and to optimize added value.
		Patient-Level Intervention Strategies 5 groups, but 6 patient-level strategies.... is there one missing? Might be helpful to use the same language.	We have corrected this typo.
		Pg 23 Row 56 Are these now describing sub-strategies?	As noted above, we have relabeled each level for clarity. This line is referring to strategies.
		Pg 24 row 22 By "strategies" here, does this mean sub-strategies?	As noted above, we have relabeled each level for clarity. This line is referring to strategies.
		Table 2. Patient-Level Intervention Strategies; Evidence-based patient interactions Can call this provider-patient communication techniques? wonder if CBT, ACT, counseling and family therapy should be in the left column preceded by "Other: xxx" with the definition in this column.	Thank you, we have renamed this category "Patient-provider communication techniques"

Table 2. Patient-Level Intervention Strategies; Assertive outreach IS this the same as ACT above?	Thank you for this suggestion. We agree that it would generally be assumed that Assertive community treatment (ACT) would include assertive outreach. Although a study could potentially have assertive outreach without including other tenets of ACT so we have left as separate.
Table 2. Patient-Level Intervention Strategies Wonder if middle column can be moved to left preceded by "Other: xxx" so it can be defined in the middle column, as column heading specifies. What is, for example, "reasonable"?	We have shifted those strategies previously in the middle column to the left column and added appropriate definitions as requested. The term “reasonable costs” came directly from the cited study which used the full phrase “provides services at reasonable costs.”
Table 3. Clinic-Level Intervention Strategies; Medical scribes Not sure why this is here? Not mentioned in text as part of logic model and not in any study	We identified an initial collection of strategies based on existing systematic reviews of similar types of interventions. Though we did not find each a priori identified strategy in the included studies, we kept them in our report so as to describe the breadth of potential strategies as fitting an evidence map.
Table 4. Clinic Level Staffing by Discipline; Pharmacist Does this mean "none"?	Yes. We have reworded this row to “none” from “not applicable”
Intervention Complexity (Pg 35) also interesting that organization level expected to be quite low, maybe in terms of shared EHR, data, outcomes, etc?	This core dimension refers to the number of organizational categories to which the study intervention was directed (*ie*, individuals, groups or teams of individuals, systems). So the lack of complexity across studies in this dimension reflects that most interventions targeted individuals vs across all levels.
Summary of KQ 2 Findings (pg 39) I could see MH and SUD outcomes obtained at baseline. Was the goal for these studies to improve MH/SUD outcomes as a byproduct of PC engagement?	The primary outcome or objective of included studies varied. Most were not primarily aiming to improve primary care engagement.

		Limitations; Study Quality and Design (pg 43) This limitation is important. would include this in the executive summary. I think I only saw that PC engagement was not endpoint for many studies.	We agree and have added this point to the executive summary.
	5	This evidence synthesis compiles the literature on primary care utilization and engagement among adults with homeless experiences and serious mental illness. The authors are to be commended for the tremendous effort put into this report; they thoroughly synthesized the literature and aimed to use key findings to inform VA's efforts to develop programs to enhance primary care use among Veterans with homeless experiences and serious mental illness. The report is clear and well-written. I have a variety of comments below. Some overarching feedback, buried in these comments, includes the following:	Thank you.
		a) The report could benefit from more clarity about the definition of homelessness / housing insecurity. I would recommend using the term adults with homeless experiences, and defining up front that this includes individuals who have experienced homelessness and those with housing insecurity	We have changed the first sentence of the introduction in the executive summary and main report to use this language and stated this definition. In addition, we have changed the patient to be person-first throughout. We have also changed the title accordingly.
		b) It would help to define this population as a population with "two vulnerabilities;" this would clarify some key points made in the report – that perhaps could be highlighted – that systems of care tailored to this population with two vulnerabilities currently focus on homelessness or serious mental illness, and few efforts have been made to address both vulnerabilities and the intersection between them	Thank you for this point. We appreciate this framing and have added language to the Introduction in Executive Summary and the main Introduction.
		c) In thinking about evaluation measures for interventions (KQ2), a key problem in evaluating in the literature is the dearth of measures that are validated for persons with homelessness, much less persons with homeless experiences and SMI.	This is an important point which we have added to the discussion of the limitations of the current literature (see page X).
		• Acknowledgments o The National Center on Homelessness among Veterans typically does not capitalize the "A" in among	Thank you. We have corrected this typo.
		•Technical Expert Panel o Corrections to my name	Thank you, we have made these changes.

○ My degrees are MD, MPH (VA was accidentally included) ○ My title can be Physician and Health Services Researcher	
•Executive summary ○ I would define SMI the first time it is mentioned in the executive summary. Can be interpreted in many ways as a diagnostic group. ○ Minor typos: ▪ Page 9, line 38, remove comma between assessed and included ▪ Page 9, line 56, there needs to be a space between over and time ▪ Page 9, line 56 missing word – Third, there IS a need to…	We have added the VPR definition of SMI to the executive summary introduction. The noted typos have been corrected.
• Introduction ○ I would like to see clear definitions of homelessness and SMI up front – these are presented later (in the methods), but anyway to move them up to the introduction would improve the document	We have added greater definition for each these terms at the beginning of the introduction.
○ Page 11, line 22 uses the word “disorientation” due to SMI symptoms – I’m not sure what that means. Persons with psychotic disorders are not disoriented. They may be conceptually disorganized.	We have removed this word.
○ Another key point for the introduction is that stigma often results in patients with SMI’s medical complaints being dismissed or thought of as psychiatric in nature	We agree with this point and have added a few citations to substantiate the importance of stigma for individuals with SMI and homelessness. If the reviewer has a specific reference regarding the dismissal of medical complaints, we would be happy to review and add it.
• Methods ○ The conceptual framework might benefit from more population-specific examples of moderators and outcomes. For example, an important patient characteristic might be housing status. Important patient outcomes might be housing outcomes, psychiatric symptoms.	We agree with this suggestion and have provided more population specific examples of moderators and outcomes. We have modified the wording in the description of the conceptual model and better defined the 3 levels.

○ I am struggling with the inclusion criteria of currently homeless – in the literature this generally includes persons who are engaged in housing services, particularly within VA. Homelessness is a transient state that individuals vacillate in and out of. We generally talk about persons with homeless experiences to use person centered language.	We have reworded this criteria to "Ambulatory adults (≥18 years of age) who have had experiences of homelessness or those with housing insecurity"
• KQ1 ○ Housing First is mentioned for the first time on p.24, line 8. I would define this as "permanent housing with supportive services, including linkages to non-mandated health services."	We have reworded this sentence to the following: "This included, but was not limited, to studies that incorporated the "Housing First" program model, which prioritizes permanent, stable housing with supportive services, including linkages to non-mandated health services"
○ It's hard to conceptualize what "crisis intervention" looks like in terms of primary care engagement (p. 24, lin3 19) → this term generally does not describe a response to acute concerns that can be managed in primary care settings	We appreciate this question. It is important to note that we identified all intervention strategies regardless of whether or not they were specifically relevant to primary care as they were part of an intervention that included primary care engagement. We have added the following sentence to the beginning of the intervention strategies results section:" Intervention strategies identified were not restricted to those pertaining to primary care engagement."
○ Table 4: ▪ The definition of psychiatrist probably should not say "psychiatrist." Perhaps - Physicians trained in psychiatry; psychiatric/menta health nurse practitioners. Note that psychiatrists do fall under behavioral health as well.	We have reworded as suggested.
▪ Is there a reason not to define nursing? Is this RN level care? NPs?	We have added the following definition: "Nurses without prescribing privileges of any training level or not otherwise specified"
▪ Primary care provider should parallel the psychiatrist definition. Perhaps Physicians trained in primary care, primary care nurse practitioners/physician assistants	We have reworded this definition as suggested.
▪ I am not sure what social work (non-specified as LCSW) means. Is this referring	LCSW refers to a specific licensure for individuals with a masters of social work who have also

to social workers but you don't know whether or not they are licensed?	undergone extensive training and certification to diagnose and treat mental health disorders using psychotherapy approaches.
• Clinical and policy implications o Page 43 – line 17: rename the Center the National Center on Homelessness among Veterans	We have renamed as recommended.
o The VA has tested PCMH models for Veterans with homelessness (HPACT) and Veterans with SMI (SMI-PACT)	
▪ There are two contrasting approaches in thinking about PC engagement for persons with SMI in these two models. The HPACT model tailors care for people with homelessness, many of whom have mental health problems (including SMI), but it is ultimately a primary care setting. SMI PACT actually is distinct model, a PACT for people with SMI, but it is intentionally a model for people with SMI who have relatively stable mental illness that can be managed in primary care settings, with psychiatric/mental health consultation only	Thank you for this point—we have expanded our discussion of these services and added information about supported employment and the MHICM in the clinical implications section.
▪ There is a larger notion in terms of clinical implications that I would love to see mentioned somewhere. For homeless people with SMI, there is the idea that primary care services can be embedded in mental health settings (people with SMI may be most engaged in MH) or there is the distinct idea that PC and MH should be integrated in a PC setting (though at VA and in many other settings, PCMHI is not well-suited for persons with SMI, so this would require further tailoring).	While we agree with the reviewer's recognition of the important clinical implications here, because this is an evidence map and not a systematic review – we are unable to draw specific conclusions to support specific recommendations for clinical care delivery.
▪ Relevant in the VA context are programs like MHICM, which serve patients with SMI	We mentioned this point in the Clinical Implications section

exclusively, but often do not have embedded PC services	
• Limitations ○ Page 43, line 39 – the authors describe "connecting patients with SMI to primary care" – did they intend to use homelessness somewhere in this sentence also?	Yes, we have added this language.
○ Page 43, line 44 – the word housing insecurity is used, not homelessness. I mentioned this earlier but I think I would use an all-encompassing definition up front of homeless experiences that includes persons at risk for becoming homeless to clean up the nomenclature throughout	We agree and have changed this language throughout.
○ The discussion about outcome measures is interesting – to me, a clear limitation of the body of literature being synthesized is that use of measures that are not validated or even intended to be used by this population with two core vulnerabilities	We agree with this point and have added this to the limitation section as follows: "Finally, no outcome measures were clearly validated or designed for the specific patient population of those with experiences of homelessness."
○ Page 44, line 51 – consider changing to …clinical setting (two were in VA)…	This has been corrected as recommended.
○ Though the VA is an integrated health and social service system, the challenge would be integrate across its health and social service sectors, which can be challenging	We agree with this point and have added language and a citation to support fragmented service delivery across the health and social sectors in VA in the Generalizability to VA section of the report
• Table 9 ○ See earlier comments about concerns using the words housing insecurity instead of homelessness	This language has been corrected throughout.
○ Not sure what is meant by Patients with SMI and housing insecurity with additional co-occurring chronic health conditions – does this refer to strategies to address specific chronic health conditions, e.g., diabetes? Chronic medical illness is highly prevalent – and the norm – in this population of adults with two vulnerabilities	This sentence has been removed.
○ Page 46, line 16 – primary care teamS differ ○	Typo corrected

		What spectrum is being referred to in line 27 of page 46?	We have clarified this sentence to read: "….across the spectrum of engagement from initial visit to longitudinal care"
		• Conclusions o See earlier comments about use of housing insecurity	This language has been changed throughout.
		o When commenting on the unique position of VA, I would also note that the VA is the nation's largest provider of SMI services	Thank you, we have added "As one of the nation's largest integrated heath care providers…" to the Conclusions of the report and cited Zeiss AM and Karlin BE. Integrating Mental Health and Primary Care Services in the Department of Veterans Affairs Health Care System. *J. Clin. Psychol. Med. Settings*. 2008;15:73-78.
	6	Overall a very well constructed and helpful summary. There is clearly a need for more research and better identification/measurement of primary care engagement and an understanding of longer term impacts. An additional need is exploration of engagement strategies for individuals with experiences of homelessness. The majority of studies examined did not appear to include individuals with a history of homelessness. VA tracks Veterans in homeless programs after they have been successfully housed recognizing that there are persisting risks and barriers to care and elevated morbidity and mortality. There may be differences in approach needed for "street homeless" vs. those with housing instability vs. those with experiences of homelessness but all likely require targeted enhancement strategies.	Thank you. The recognition of different populations of persons with experiences of homelessness is an important one. We did not identify any studies focused on individuals with a history of homelessness only or studies that examined how experience of homelessness (*ie*, street homelessness vs. housing instability) moderated the intervention effect. We have cited this as a limitation of the current literature and a need for future research. "For example, experience of homelessness (*ie*, street homeless vs. housing instability) could moderate intervention effects, but few studies considered patient-level moderators."
		On page 43, line 17 the sentence reads: "For example, VA offers services through the National Center on Homelessness, has tested a patient-centered medical home model for Veterans with SMI, . . . " This didn't read correctly/make sense to me and I wasn't sure if what was being referenced was SMI-PACTs or H-PACTs. Also, technically,, the NCHAV doesn't offer services directly. Services may be developed/piloted/tested via the NCHAV but core offerings such as Homeless Patient Aligned Care Teams (HPACTs) are not under the NCHAV.	Thank you for this clarification. We have revised this sentence to read: "For example, the VA Homeless Programs Office has developed and implemented designed primary care teams to provide care specifically for patients with experiences of homelessness(H-PACT), the VA and has also tested a patient-centered medical home model for Veterans with SMI (SMI-PACT),..."

	7	Page 9 line 14 - about 20% of people who experience homelessness in the United States also have diagnosed serious mental illness (SMI) - 20% seems low unless it is "diagnosed" and general population including youth/children	We identified several sources that provided prevalence estimates within this range. Our original reference was from the National Alliance on Mental Illness (2019) and we added two other references: National Coalition for the Homeless. Mental Illness and Homelessness. Available at: www.nationalhomeless.org/factsheets/Mental_Illness.pdf. Accessed March 22, 2021. 2009. and Tsai J, Mares AS, and Rosenheck RA. Do homeless veterans have the same needs and outcomes as non-veterans? *Mil. Med.* 2012;177:27-31.
		Page 46 Line 17 - VA offers services through the National Center on Homelessness - what services are you referring to? We at the Center don't offer direct Veteran care services rather we engage in research, education, model development, and being a resource center. The Homeless Programs Office oversees homeless programming. If this service is what this sentence is referring to, then would recommend replacing NCHAV with HPO. NCHAV is under HPO.	We have reworded this section as noted above.