Engaging Veterans Experiencing Homelessness in Primary Care

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PREFACE

The VA Evidence Synthesis Program (ESP) was established in 2007 to conduct timely, rigorous, and independent systematic reviews to support VA clinicians, program leadership, and policymakers to improve the health of Veterans. ESP reviews have been used to develop evidence-informed clinical policies, practice guidelines, and performance measures; to guide implementation of programs and services that improve Veterans' health and wellbeing; and to set the direction of research to close important evidence gaps. Four ESP Centers are located across the US. Centers are led by recognized experts in evidence synthesis, often with roles as practicing VA clinicians. The Coordinating Center, located in Portland, Oregon, manages program operations, ensures methodological consistency and quality of products, engages with stakeholders, and addresses urgent evidence synthesis needs.

Nominations of review topics are solicited several times each year and submitted via the ESP website. Topics are selected based on the availability of relevant evidence and the likelihood that a review on the topic would be feasible and have broad utility across the VA system. If selected, topics are refined with input from Operational Partners (below), ESP staff, and additional subject matter experts. Draft ESP reviews undergo external peer review to ensure they are methodologically sound, unbiased, and include all important evidence on the topic. Peer reviewers must disclose any relevant financial or non-financial conflicts of interest. In seeking broad expertise and perspectives during review development, conflicting viewpoints are common and often result in productive scientific discourse that improves the relevance and rigor of the review. The ESP works to balance divergent views and to manage or mitigate potential conflicts of interest.

ACKNOWLEDGMENTS

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Operational Partners

Operational partners are system-level stakeholders who help ensure relevance of the review topic to the VA, contribute to the development of and approve final project scope and timeframe for completion, provide feedback on the draft report, and provide consultation on strategies for dissemination of the report to the field and relevant groups.

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Technical Expert Panel

To ensure robust, scientifically relevant work, the technical expert panel (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 included:

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Disclosures

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The findings and conclusions in this document are those of the author(s) who are responsible for its contents and do not necessarily represent the views of the Department of Veterans Affairs or the United States government. Therefore, no statement in this article should be construed as an official position of the Department of Veterans Affairs. The final research questions, methodology, and/or conclusions may not necessarily represent the views of contributing operational and content experts. No investigators have affiliations or financial involvement (*eg*, employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties) that conflict with material presented in the report.

Executive Summary

KEY FINDINGS

Engaging Veterans Experiencing Housing Insecurity in Primary Care

- Engaging Veterans experiencing housing insecurity in any primary care may significantly reduce hospitalizations and emergency department visits (moderate confidence).
- Among Veterans experiencing housing insecurity, primary care visits may be high after initial engagement in primary care and then decrease over time (low confidence).
- Studies provided insufficient evidence (no conclusion) for housing or community integration outcomes for Veterans experiencing housing insecurity who are versus are not established in primary care.
- The studies did not evaluate specialty care utilization, cost and return on investment, Veteran experience or satisfaction, or disease-specific outcomes.

Effect of Homeless-Tailored Primary Care versus Usual Primary Care

- Homeless-tailored primary care may reduce inpatient hospitalizations and emergency department visits and increase appropriate use of emergency care (low confidence).
- Studies provided insufficient evidence (no conclusion) on the effect of homeless-tailored compared to usual primary care on primary care utilization or overall specialty care utilization.
- Homeless-tailored primary care may reduce mental health and substance use visits (low confidence).
- Patient experiences may be better for Veterans experiencing housing insecurity in homeless-tailored primary care compared to usual primary care (low confidence).
- Homeless-tailored primary care may increase primary care costs and reduce emergency department and overall health care costs (low confidence).
- There is no evidence for a difference in disease-specific outcomes for Veterans in homeless-tailored primary care compared to usual care (low confidence).
- The studies did not evaluate housing and community integration outcomes.

Veterans experiencing housing insecurity are a vulnerable population, and the US Department of Veteran Affairs (VA) has made addressing homelessness a priority. Although placing Veterans experiencing housing insecurity in permanent housing is important, these Veterans still have a need for health care. Physical illness, mental illness, and substance use diagnoses are all more common among Veterans experiencing housing insecurity than matched stably housed people. Medical and social needs of Veterans experiencing housing insecurity can be managed with outpatient care.

CURRENT REVIEW

Given that Veterans experiencing housing insecurity have a high prevalence of a variety of physical and behavioral health diagnoses, it is important to understand the effect of establishing primary care on these individuals. Therefore, the Veterans Health Administration (VHA) Office of the Assistant

Undersecretary for Health - Clinical Services requested the following systematic review to examine the impact of accessing primary care services, including Patient Aligned Care Teams (PACT) and Homeless Patient Aligned Care Teams (HPACT), on health care utilization and other outcomes in Veterans experiencing housing insecurity. The following key questions (KQ) were developed in collaboration with VA partners:

1. Among Veterans enrolled in VA programs for those experiencing housing insecurity[i], what is the effect of receiving primary care through PACT and/or HPACT on Veteran-reported clinical, health service use, and housing outcomes?
2. Among Veterans experiencing homelessness or at risk for homelessness, what is the effect of PACT and/or HPACT on Veteran-reported, clinical, health service use and housing outcomes?

We searched for peer-reviewed articles in Ovid Medline, Cochrane, PsycINFO, CINAHL, Scopus, and ClinicalTrials.gov from inception until March 26, 2024. Eligible studies included US Veterans ≥18 years of age with a history of experiencing housing insecurity. For KQ 1, we focused on studies of Veterans enrolled in a named VA homeless program. For KQ 2, we focused on studies of Veterans experiencing housing insecurity regardless of enrollment in any specific VA homeless program. Studies were excluded if they consisted of home-based primary care, Geriatric PACT (GERIPACT), community primary care (*ie,* primary care outside the VA), or TriCare. Comparators of interest included Veterans experiencing housing insecurity not receiving primary care or not enrolled in PACT or HPACT, usual primary care, or no comparator. We included randomized controlled trials (RCT), nonrandomized comparative studies (NRCS), and single group studies. We analyzed Veteran-reported outcomes such as unmet medical needs, unmet supportive care needs, or satisfaction with VA; disease-specific outcomes, including binary indicators of chronic disease management and referrals to specialty services (present or absent); food insecurity outcomes; health care utilization outcomes; and housing outcomes. We assessed certainty of evidence following the GRADE (Grading of Recommendations Assessment, Development and Evaluation) approach. Single group studies without pre and post data were excluded from our GRADE assessments.

RESULTS

Four studies evaluated the effect of engaging Veterans experiencing housing insecurity in primary care (*ie,* yes or no primary care), and 16 studies compared outcomes for Veterans experiencing housing insecurity in homeless-tailored primary care to standard or usual primary care (*eg,* HPACT vs PACT). The studies span from 2006 to 2021 and involved 115,844 participants (range = 123 to 51,886). Three studies used data from the Patient-Centered Medical Home-Survey of Healthcare Experiences of

[i] VA homeless programs include US Department of Housing and Urban Development-VA Supportive Housing (HUD-VASH), Health Care for Homeless Veterans (HCHV), Grant and Per Diem (GPD), Supportive Services for Veteran Families (SSVF), Domiciliary Care for Homeless Veterans (DCHV), Homeless Veteran Community Employment Services (HVCES), Compensated Work Therapy (CWT), Health Care for Re-entry Veterans (HCRV), or Veteran Justice Outreach (VJO).

Patients and the remaining studies used data from VA electronic medical records. Only 1 study exclusively included Veterans enrolled in a named VA homeless support program (HUD-VASH), and 18 studies included Veterans experiencing housing insecurity regardless of enrollment in a named VA homeless program.

Engaging Veterans Experiencing Housing Insecurity in Primary Care

Four studies (2 nonrandomized comparisons and 2 single group analyses) conducted in the VA between 2006 and 2017 included 14,967 analyzed participants and evaluated outcomes for Veterans experiencing housing insecurity engaged in primary care (*ie,* yes or no primary care). Two studies evaluated Veterans experiencing housing insecurity new to primary care. Only a single study exclusively analyzed participants in a named VA homeless program (HUD-VASH). The studies had different follow-up periods and comparisons: 1 study compared outcomes 7 to 12 months after enrollment in homeless-tailored primary care to outcomes during the first 6 months after enrollment, 1 study compared outcomes 6 months before and after enrollment in HPACT, 1 study compared Veterans who accessed primary care within 1 month of study enrollment to those who did not, and 1 study compared Veterans who accessed primary care over a 1 year period to those who did not. In 2 studies, most participants were White (62% and 81%), 1 study reported that most participants were Black (57%), and 1 study did not report information about race. Mean age in the 4 studies ranged from 48.4 to 52.9 years old. The 4 studies reported multiple comorbidities including depression (approximately 55% in 2 studies), anxiety (33% and 47% in 2 studies), posttraumatic stress disorder (31% in 1 study), and bipolar disorder (19.2% in 1 study).

One NRCS only reported results from an unadjusted analysis (therefore, moderate risk of bias). Three studies had no methodological concerns (*ie,* low risk of bias).

The studies found that establishing Veterans experiencing housing insecurity in primary care may reduce emergency department visits (2 studies) and hospitalizations (2 studies; moderate confidence for both). Primary care visits for Veterans experiencing housing insecurity newly established in primary care may be high after initial engagement and then decrease over time (1 study, low confidence). Evidence is insufficient (no conclusion) for the impact of establishing Veterans experiencing housing insecurity in primary care on housing and community integration outcomes (inconsistent estimates and methodological limitations). No study reported data on specialty/other care, patient experiences, satisfaction, cost or return on investment, or disease-specific outcomes at different time points.

The Effect of Homeless-Tailored Primary Care versus Usual Primary Care

Sixteen studies (10 nonrandomized comparisons and 6 single group analyses) conducted between 2011 and 2021 included 114,965 analyzed participants and compared homeless-tailored primary care to usual primary care. All but 1 study explicitly included Veterans with a history of being established or engaged in primary care prior to enrolling in the homeless-tailored primary care. In 13 studies, most participants were White (range of 38% to 81%), in 2 studies most participants were Black (52% and 67%), and 1 study did not report data on race. In 9 studies, the mean age was between 49.1 to 59.5 years, in 5 studies most participants were between 45 and 64 years of age (range 18 to 65+), and 2 studies did not report data on age. Thirteen studies reported a range of mental health diagnoses or use of psychiatric medication at baseline (range = 8% to 97%) and substance use disorder (2% to 75%). The studies called homeless-tailored primary care by different names (*eg,* HPACT, homeless-

orientated primary care, integrated primary care), but services offered in this model of care generally consisted of high staff-to-patient ratios, primary care, non-medical social services and outreach.

Four single group studies only reported follow up data without baseline data and were excluded from our certainty of evidence assessment. One NRCS had concerns about the comparator representativeness and unclear reporting or discrepancies in the study (therefore, high risk of bias). Eight NRCS had moderate risk of bias. Five of these NRCS used self-reported outcomes where participants were not blinded to the intervention, 1 study had unclear reporting, incomplete outcome data, and concerns about the comparator representativeness, 1 used a crude unadjusted analysis, and 1 study had concerns about the comparator representativeness. Three NRCS had no concerns (therefore, low risk of bias).

The studies provided insufficient evidence (no conclusion) for primary care utilization (4 studies) or overall specialty care utilization (3 studies) for homeless-tailored primary care compared to usual primary care (methodological limitations and inconsistent estimates). There is no evidence for a difference in disease-specific outcomes for Veterans in homeless-tailored primary care compared to usual care (2 studies; low confidence). Homeless-tailored primary care may reduce inpatient hospitalizations (4 studies) and emergency department visits (5 studies) and increase appropriate use of emergency care (4 studies; low confidence for all). Homeless-tailored primary care may reduce mental health care visits (5 studies) and substance use care visits (3 studies; low confidence). Homeless-tailored primary care may increase primary care costs and reduce emergency department and overall health care costs (1 study; low confidence). Further, patient experiences may be better for housing-insecure Veterans in homeless-tailored primary care compared to usual primary care (6 studies; low confidence). No study reported data on housing and community integration outcomes.

DISCUSSION

Four studies evaluated the effect (or association) of establishing Veterans experiencing housing insecurity with primary care (*ie,* yes or no primary care). These studies identified fewer emergency department visits, including judicious use of emergency departments, as well as fewer inpatient admissions for Veterans experiencing housing insecurity engaged in primary care compared to those without primary care engagement. This finding is consistent with the broader literature that shows improved access to primary care is generally associated with less use of acute care. Although the 4 studies did not evaluate cost, the findings of reduced acute care may translate into cost savings for Veterans engaged in primary care. There was insufficient evidence to determine the effect of engaging in primary care on primary care utilization or chronic disease management for Veterans experiencing housing insecurity.

More studies compared homeless-tailored primary care to general or usual primary care. This comparison was more frequently reported because VA providers (at the national and medical center levels) have implemented multiple models of homeless-tailored primary care. Homeless-tailored primary care may reduce inpatient hospitalizations and emergency department visits and increase appropriate use of emergency care. In addition, homeless-tailored primary care may reduce overall cost of care. These findings occurred despite insufficient evidence for primary care or specialty care utilization for Veterans in homeless-tailored primary care compared to usual primary care. Importantly, Veterans in homeless-tailored primary care reported better experience and satisfaction, indicating that they rated the services or attitudes typically provided with tailored primary care higher than usual care. Further, overall, homeless-tailored primary care reduced mental health and substance use services. One

explanation for the reduction in mental health and substance use care is that homeless-tailored primary care includes these services as part of their model of care. However, an alternative explanation is that those in HPACT may not receive the same referrals for services as non-HPACT Veterans.

Implications for VA Policy

There is a VHA priority to support Veterans' whole health. For Veterans experiencing housing insecurity, this includes primary care, housing, and treatment of medical and mental health conditions. This review found that establishing or engaging in primary care was associated with lower emergency department use and fewer hospitalizations. In addition, enrollment in homeless-tailored primary care was associated with lower emergency department use, including inappropriate emergency department use, fewer hospitalizations, and Veterans in these programs felt more "engaged" in care. Because of the reduction in emergency and inpatient visits and efficient use of outpatient care, there is clear value in establishing Veterans experiencing housing insecurity in primary care. Although homeless-tailored primary care has additional benefits over usual primary care, any primary care may be beneficial for Veterans.

Engaging and retaining Veterans experiencing housing insecurity in VA care is important because this population has housing, social, and medical needs that may be difficult to address outside the VA in a community setting. The VA is positioned to enroll Veterans experiencing housing insecurity in primary care. VA programs to end Veteran homelessness (*eg,* HUD-VASH or GPD) typically have formal intake assessments, enrollments, and multiple contacts with staff. During the intake or initial contact with homeless program staff, there is an opportunity to refer Veterans to primary care. VA decision-makers should consider developing a formal protocol that facilitates transitions between homeless program staff and primary care staff. Any formal protocol should be evaluated using rigorous implementation science methods. There should also be an eye towards reproducibility and evaluation of any protocol. Evaluating efforts to strengthen connections between programs may require adding some questions or items to homeless program intake assessments.

Research Gaps/Future Research

Although it is challenging to determine the causal effect of establishing Veterans experiencing housing insecurity in primary care on outcomes, there are opportunities for qualitative research to understand barriers and facilitators to accessing care and the perceived benefits of primary care. There may also be opportunities to evaluate the effect of VA programs that seek to support access to primary care rather than the direct effect of primary care on outcomes.

Investigating homeless-tailored primary care compared to usual primary care may be an ideal scenario for a site-level randomized trial (*ie,* randomization at the Medical Center level). Cluster or site-level randomized trials may allow for higher quality studies while reducing the ethical considerations surrounding randomizing Veterans to homeless-tailored primary care or usual primary care. Future studies evaluating homeless-tailored primary care should also focus on describing the specific features of tailored primary care and understanding the aspects of tailored primary care that affect outcomes. Further, there was limited information for several outcomes of interest, including data on cost and disease-specific outcomes. Additional data on cost and cost-effectiveness would be particularly powerful in helping to understand the additional resources required to deliver homeless-tailored primary care. For studies conducted in the VA, cost data may be relatively easy to evaluate (obtained from routinely captured VA data) and would not increase participant burden with surveys. There is also a need for future studies to consider the contextual factors that influence care, such as

neighborhood factors and transportation access. Finally, identified studies were too dissimilar to permit meta-analyses. Therefore, there is a need for VA researchers and staff to prospectively plan studies together or develop consensus about the best study designs to use and most actionable outcomes to assess.

Limitations

This evidence review has several limitations. First, we were unable to differentiate between the types of homeless-tailored primary care described in the literature (*eg,* HPACT or homeless-oriented primary care) and instead treated these programs as a single intervention. Nor were we able to understand the features of homeless-tailored primary care that affect outcomes. Second, many of the studies used the same VA data, and it is possible that the same Veterans are included in multiple included studies. Third, many of the studies were not designed to directly investigate the effect of primary care on outcomes. This resulted in the review excluding comparator information from studies that compared Veterans experiencing housing insecurity to stably housed Veterans and evaluating studies originally designed as an NRCS as a single group.

CONCLUSIONS

Findings from this review highlight the potential value of establishing and engaging Veterans experiencing housing insecurity in primary care and more specifically homeless-tailored primary care. Benefits of primary care for Veterans experiencing housing insecurity include reducing hospitalizations and emergency department visits. Although these studies did not evaluate cost, the reductions in acute care may translate to cost savings and a return on investment. In addition, homeless-tailored primary care may provide some additional benefits over usual primary care for Veterans experiencing housing insecurity, including reduced inpatient hospitalizations and emergency department visits and increased appropriate use of emergency care, overall cost savings, and better experiences with care. Homeless-tailored primary care may reduce the use of mental health and substance treatment, which could be because homeless-tailored primary care includes these services in its model of care or because referral practices differ for Veterans who are versus are not enrolled in HPACT. Additional data are needed on engagement in primary care on disease and community integration outcomes, and on cost and return on investment of homeless-tailored primary care. Future studies should also aim to understand the specific features of homeless-tailored primary care and how they affect outcomes.

Main Report

Evidence Synthesis Program

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ABBREVIATIONS TABLE

Abbreviation	Definition
aOR	Adjusted odds ratio
aRD	Adjusted risk difference
CWT	Compensated Work Therapy
DCHV	Domiciliary Care for Homeless Veterans
GERIPACT	Geriatric PACT
GPD	Grant and Per Diem
GRADE	Grading of Recommendations Assessment, Development and Evaluation
HCHV	Health Care for Homeless Veterans
HCRV	Health Care for Re-entry Veterans
HPACT	Homeless Patient Aligned Care Team
HUD-VASH	US Department of Housing and Urban Development-VA Supportive Housing
HVCES	Homeless Veteran Community Employment Services
ICD	International classification of disease
KQ	Key question
MD	Mean difference
MeSH	Medical subject headings
MOST	Multiphase optimization strategy
NR	Not reported
NRCS	Nonrandomized comparative studies
OR	Odds ratio
PACT	Patient Aligned Care Team
PCMH-SHEP	Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients
PCQ-H	Primary Care Quality-Homeless survey
RCT	Randomized controlled trial
RD	Risk difference
SD	Standard deviation
SRDR+	Systematic Review Data Repository
SSVF	Supportive Services for Veteran Families
TEP	Technical expert panel
VA	Department of Veteran Affairs
VHA	Veterans Health Administration
VJO	Veteran Justice Outreach

BACKGROUND

Veterans experiencing housing insecurity (collectively Veterans with a history of homelessness, currently experiencing homelessness, or at risk for homelessness) are a vulnerable population in which racial and ethnic minorities are disproportionately represented.[i] [1,2] Most Veterans experiencing housing insecurity are male, but female Veterans may be more likely to experience housing insecurity and have more unmet health and social needs.[3,4] Although placing Veterans experiencing housing insecurity in permanent housing is the priority, these Veterans still have a need for health care. Conceptually, housing security and health are interrelated.[5] Housing insecurity may lead to increased risk of poor social and health outcomes due to stress, poor access to clean water and proper hygiene, and exposure to the elements.[5] Simultaneously, poor health, financial difficulties, and untreated substance misuse can lead to housing insecurity.[6]

Physical illness, mental illness, and substance use diagnoses are all more common among Veterans experiencing housing insecurity than matched stably housed people.[7-10] Medical and social needs of Veterans experiencing housing insecurity can be managed with outpatient care.[11-13] In addition, several studies have found that connecting Veterans experiencing housing insecurity with primary care may result in more appropriate (and less costly) health service utilization.[14, 15] However, Veterans experiencing housing insecurity may be hesitant to seek primary care services due to factors such as lack of trust of the health care system or concerns about stigma.[16] Hesitancy to seek primary care may also contribute to Veterans experiencing housing insecurity using acute care more than stably housed Veterans.[11-13]

Ending Veteran homelessness is a priority of the US Department of Veteran Affairs (VA).[17, 18] To end Veteran homelessness, the VA has invested billions of dollars in specialized homeless services including the US Department of Housing and Urban Development-VA Supportive Housing (HUD-VASH), Health Care for Homeless Veterans (HCHV), Grant and Per Diem (GPD), Supportive Services for Veteran Families (SSVF), Domiciliary Care for Homeless Veterans (DCHV), Homeless Veteran Community Employment Services (HVCES), Compensated Work Therapy (CWT), Health Care for Re-entry Veterans (HCRV), and Veteran Justice Outreach (VJO).[19-23] These investments may have contributed to the 47% decrease in the number of homeless Veterans seen between 2010 to 2017.[19] However, recent data suggest a reversal in this trend. Between 2022 and 2023, there was a 7.4% increase in homelessness among Veterans.[24]

To improve Veteran care, the VA implemented the Patient Aligned Care Team (PACT) initiative in 2010. PACT is a team-based method of care that encourages collaboration and coordination between health care providers while building a partnership with Veterans.[25-27] Teams of health care professionals work with Veterans to provide needed health care services.[25] Since the implementation of

[i] Studies used inconsistent terminology to describe the population of Veterans experiencing homelessness or at risk of homelessness. Throughout the report we chose to use the term "Veterans experiencing housing insecurity."

the PACT initiative, several programs have been developed for specialized populations, including Homeless Patient Aligned Care Teams (HPACT). HPACT functions in a similar way to traditional PACT but incorporate additional team members such as social workers, substance use counselors, and homeless program staff, who offer services that can help lead to permanent supportive housing.[27,28] In addition, HPACT may also include walk-in clinics or extended hours, integrated services such mental health services, continuity of care across the VA and community agencies through team-based care, and staff with specialized training in homeless care.[29]

Given that Veterans experiencing housing insecurity have a high prevalence of a variety of physical and behavioral health diagnoses, it is important to understand the effect of establishing primary care on these individuals' health and housing stability. Therefore, the Veterans Health Administration (VHA) Office of the Assistant Undersecretary for Health - Clinical Services requested the following systematic review to examine the impact of primary care services, including PACT and HPACT, on health care utilization and other outcomes in Veterans experiencing housing insecurity.

METHODS

TOPIC DEVELOPMENT

We worked with representatives from the VHA Office of the Assistant Undersecretary for Health - Clinical Services and our technical expert panel (TEP) to refine the key questions (KQ). We focused on studies that included Veterans experiencing housing insecurity (literal homelessness, history of homelessness or at risk for homelessness) and examined the effect of receiving primary care on Veteran-reported outcomes (*eg*, satisfaction), clinical outcomes (*eg*, binary indicators for chronic disease management), health service use outcomes (*eg,* emergency department use), and housing outcomes (*eg,* loss of housing). We evaluated these outcomes separately for Veterans enrolled in VA homeless programs (HUD-VASH, HCHV, GPD, SSVF, DCHV, HVCES, CWT, HCRV, or VJO) that provide housing or social support. In addition, we evaluated the effect of receiving primary care on outcomes for all Veterans experiencing housing insecurity regardless of enrollment in any VA homeless program.

KEY QUESTIONS AND PROTOCOL

The following KQs were the focus of this review:

Key Question 1	Among Veterans enrolled in VA programs for those experiencing housing insecurity[a], what is the effect of receiving primary care through PACT and/or HPACT on Veteran-reported, clinical, health service use, and housing outcomes?
Key Question 2	Among Veterans experiencing homelessness or at risk for homelessness, what is the effect of PACT and/or HPACT on Veteran-reported clinical, health service use and housing outcomes?

Notes. [a] VA homeless programs include US Department of Housing and Urban Development-VA Supportive Housing (HUD-VASH), Health Care for Homeless Veterans (HCHV), Grant and Per Diem (GPD), Supportive Services for Veteran Families (SSVF), Domiciliary Care for Homeless Veterans (DCHV), Homeless Veteran Community Employment Services (HVCES), Compensated Work Therapy (CWT), Health Care for Re-entry Veterans (HCRV), or Veteran Justice Outreach (VJO).

A protocol for this review was registered on the PROSPERO international prospective register of systematic reviews (CRD42024537730). The review followed the PRISMA guidelines. A draft version of this report was reviewed by external peer reviewers; their comments and author responses are located in the Appendix.

SEARCHING AND STUDY SELECTION

We searched Ovid Medline, Cochrane, PsycINFO, CINAHL, Scopus, and ClinicalTrials.gov from inception until March 26, 2024. We used Medical Subject Headings (MeSH) and free text terms relevant to *homelessness*, *VA supportive housing programs*, *primary care*, *patient aligned care teams*, and *Veterans* (see Appendix A for complete search strategies). We ensured that known relevant publications were captured by our searches. Additional citations were sought from hand-searching reference lists of relevant systematic reviews and consultation with content experts.

Citations were uploaded into EndNote and deduplicated. We screened citations in Systematic Review Data Repository (SRDR+) (https://srdrplus.ahrq.gov/). To ensure a common understanding of the eligibility criteria, we ran a pilot round of 100 citations, where all team members screened the title and abstract of the same citations, and conflicts were resolved as a group. After this, citations were

screened in duplicate, and conflicts were resolved by group discussion or by the lead researcher. Abstracts accepted at the screening phase underwent full-text review by 2 independent reviewers, with conflicts resolved by an additional team member. Appendix B lists the studies excluded at full-text review phase, along with the reason for their exclusion.

Study eligibility criteria are shown in Table 1. In brief, eligible studies included US Veterans experiencing housing insecurity. For KQ 1, we focused on studies of Veterans enrolled in HUD-VASH, HCHV, GPD, SSVF, DCHV, HVCES, CWT, HCRV, or VJO (VA programs that provide Veterans experiencing housing insecurity with various services and supports; *eg,* HUD-VASH provides Veterans with a housing voucher and wrap-around clinical support; CWT provides Veterans with vocational rehabilitation). For KQ 2, we focused on studies of Veterans experiencing housing insecurity regardless of enrollment in any specific VA homeless program. Both KQs focused on Veterans aged 18 and older.

Eligible studies evaluated the effect of VA primary care including PACT or HPACT on prioritized outcomes (described below). Studies were excluded if they consisted of home-based primary care, Geriatric PACT (GERIPACT), community primary care (*ie,* primary care outside the VA), or TriCare. Comparators of interest included Veterans experiencing housing insecurity not receiving primary care or not enrolled in PACT or HPACT, usual primary care (*eg,* standard VA primary care or PACT), or no comparator. We analyzed Veteran-reported outcomes such as unmet medical needs, unmet supportive care needs, or satisfaction with VA; disease-specific outcomes, including binary indicators of chronic disease management and referrals to specialty services (present or absent); food insecurity outcomes; health care utilization outcomes; and housing outcomes. Based on consultation with the nominator and technical expert panel, continuous measures of chronic disease management were excluded (*eg,* change in hemoglobin A1C). We included randomized controlled trials (RCT), non-randomized comparative studies (NRCS), and non-comparative (single group) studies of any design except case reports/series and qualitative research. We required at least 10 participants per intervention (*eg,* PACT or HPACT). If an RCT reported a comparison of interest (*eg,* PACT vs usual primary care) that was not randomized, we evaluated the study as a NRCS. If a RCT or NRCS included 1 eligible arm and 1 noneligible arm (*eg,* non-Veterans), we included the eligible arm as a "single group" study.

Table 1. Eligibility Criteria

	Inclusion Criteria	Exclusion Criteria
Population	KQ 1: US Veterans enrolled in HUD-VASH, HCHV, GPD, SSVF, DCHV, HVCES, CWT, HCRV or VJO KQ 2: US Veterans experiencing housing insecurity (homelessness, history of homelessness or at risk for experiencing homelessness)	<18 years of age
Intervention	Receipt of primary care including PACT or HPACT, or usual primary care in the VA	Enrollment in home-based primary care, GERIPACT, community primary care, or TriCare
Comparator	KQ 1: Veterans not receiving primary care or not enrolled in PACT or HPACT, or no comparator KQ 2: Alternative program (*ie,* HPACT vs. PACT), other or no health care (*ie,* neither HPACT nor PACT), or no comparator	• Non-Veteran comparison groups • Health care exclusively outside the VA • Stably housed Veterans

	Inclusion Criteria	Exclusion Criteria
Outcomes	Veteran-reported outcomes • Unmet medical or supportive care needs • Experience/satisfaction with VA Disease-specific outcomes • Binary indicators for chronic disease quality measures (*eg,* proportion of Veterans with diabetes meeting care management goals) • Referrals to specialty care and receipt of mental health and substance use treatment Food insecurity Health service use and housing • Emergency department, inpatient care, or acute psychiatric hospitalization • Housing outcomes (*eg*, loss of supportive housing or positive transition out of supportive housing) • Utilization of homeless service programs • Return on investment or cost effectiveness	• Continuous measures of chronic disease management
Timing	Any	
Setting	Any	
Study Design	RCTs NRCS Single group (including baseline and follow-up, and noncomparative) studies	• Case report/case series • Qualitative research studies • Protocols
Other	>10 people meeting inclusion criteria	

Abbreviations. CWT=Compensated Work Therapy; DCHV=Domiciliary Care for Homeless Veterans; GERIPACT=Geriatric Patient Aligned Care Teams; GPC=Grant and Per Diem; HCHV=Health Care for Homeless Veterans; HCRV=Health Care for Re-entry Veterans; HUD-VASH=US Department of Housing and Urban Development-VA Supportive Housing; HVCES=Homeless Veteran Community Employment Services; KQ=key question; NRCS=non-randomized comparative study; PACT=Patient Aligned Care Teams; SSVF=Supportive Services for Veteran Families; VJO=Veteran Justice Outreach.

DATA EXTRACTION, ASSESSMENT, AND SYNTHESIS

We created a data extraction form in SRDR+. We extracted the following data from eligible studies: study design, sample size, and study participant characteristics at baseline, primary care program type, and outcomes of interest. All data was extracted by 1 reviewer and then confirmed by a second reviewer, with consultation from other team members as needed.

Study risk of bias was independently assessed by 1 reviewer and confirmed by a second using questions derived from the Cochrane Risk of Bias tool for RCTs and Risk of Bias In Non-randomized Studies – of Intervention tool for other study design (Appendix C). For all study designs, we also evaluated whether the article was free of discrepancies and whether patient eligibility criteria, protocols, setting, and outcome assessment were reported clearly. For RCTs, we considered the methods of randomization and allocation concealment and whether intention-to-treat analysis was used. For NRCSs, we evaluated the similarity of patients in the treated and comparison groups and the strategies used to deal with potential confounders. Studies with low overall risk of bias had no concerns in all domains or unclear risk of bias in 1 domain. Studies with moderate overall risk of bias

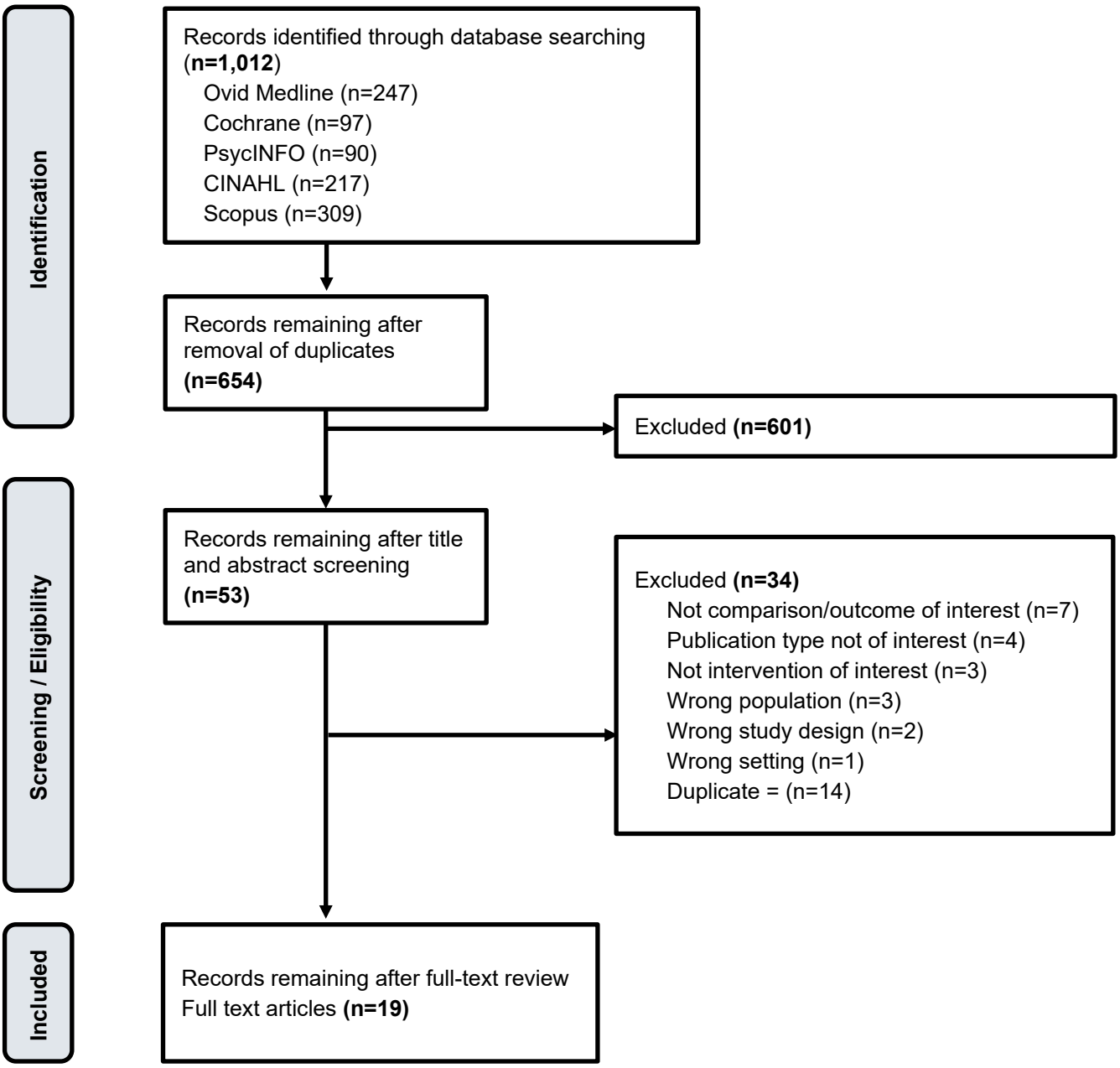
had unclear risk of bias for ≥2 domains and high risk of bias for only 1 domain. Studies with high overall risk of bias had concerns in ≥2 domains. In general, single group studies that do not explore within-group changes from before to after an exposure are vulnerable to biases and provide limited information on treatment effects (*eg*, of primary care on outcomes for Veterans experiencing housing insecurity). Therefore, results of single group studies that did not include within-group comparisons were considered at high risk of bias.

We conducted a narrative synthesis of the evidence. We aimed to meta-analyze quantitative data, but this was not feasible. We compared results in study groups using odds ratios (OR) for dichotomous outcomes. When a study had 0 events in 1 group, we calculated risk differences (RD). We compared continuous data using mean differences (MD) between interventions. Adjusted analyses were preferentially extracted over unadjusted (crude) comparisons. We assessed the certainty of evidence following the GRADE (Grading of Recommendations Assessment, Development and Evaluation) approach.[30] We compiled key study findings in evidence profiles, which provide the basis for determination of certainty of evidence and summarize conclusions for outcomes. Within each outcome, we considered the study design, the number of studies and participants, methodological limitations, directness of the evidence, precision of the findings, consistency across studies, and other issues. Single group studies without pre and post data were excluded from our GRADE assessments. For outcomes with insufficient evidence, the summary finding for that outcome is "no conclusion."

RESULTS

LITERATURE FLOW DIAGRAM

The literature flow diagram summarizes the results of the study selection process. Of 654 records screened, 52 were accepted for full-text review, of which 19 primary studies were eligible and included. Reasons for exclusion included not reporting comparison or outcomes of interest ($N = 7$), publication type not of interest ($N = 4$), no intervention of interest ($N = 3$), wrong population ($N = 3$), ineligible study design ($N = 2$), wrong setting ($N = 1$), or duplicate citations ($N = 14$). A full list of excluded studies is provided in Appendix B.



OVERVIEW OF INCLUDED STUDIES

Four studies evaluated the effect or association of engaging Veterans experiencing housing insecurity in primary care (*ie,* yes or no primary care), and 15 studies compared outcomes for Veterans experiencing housing insecurity in homeless-tailored primary care to standard or usual primary care (*eg,* HPACT vs PACT). Table 2 shows the study design and summary characteristics of the eligible studies. Appendix D presents study design details, and Appendix E presents baseline characteristics. The studies were published between 2006 and 2021; they included 115,844 participants (range = 123 to 51,886). There were 12 NRCSs and 7 studies evaluated as a single group design; no RCTs compared interventions of interest. Across the 19 studies, most participants were men (85% to 97%), and most participants were on average between 45 and 64 years of age.

Homeless-tailored primary care was labeled differently in the literature (*eg,* HPACT, homeless oriented primary care, and integrated primary care) but typically consisted of a combination of physical health care, mental health care, substance use treatment, and social services for Veterans experiencing housing insecurity. When studies did not specifically use the term HPACT, we used the term homeless-tailored primary care for consistency and clarity. Three studies used data from the Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP), which is an ongoing survey of Veteran primary care experiences conducted by the VHA.[31] Two of these studies used data from the 2014-2015 survey, though they included different comparison groups.[32,33] The remaining studies used data from VA electronic medical records. One study exclusively included Veterans enrolled in a named VA homeless program (HUD-VASH),[34] and 18 studies included Veterans experiencing housing insecurity regardless of enrollment in a named VA homeless program. The 19 studies used different methods to identify Veterans experiencing housing insecurity. This included identifying Veterans experiencing housing insecurity through a combination of ICD codes and VA homeless service use ($N = 8$), enrollment in HPACT or specialized primary care ($N = 5$), though the McKinney–Vento Act or Stewart B. McKinney Homeless Assistance Act criteria ($N = 3$), ICD codes only ($N = 1$), several of these definitions ($N = 1$), and enrollment in a named VA homeless program only ($N = 1$) (Appendix F).

Table 2. Summary Characteristics of Eligible Studies (*N* = 19)[a]

Characteristics	
Design	*Number of Studies*
NRCS[b,c]	12
Single group[d]	7
Sample Source	*Number of Studies*
Medical center	7
National	9
VISN	1
Other	2
Method of Homelessness Identification	
Combination of ICD codes and VA homeless service use	8
Enrollment in HPACT or specialized primary care	5
McKinney–Vento Act or Stewart B. McKinney Homeless Assistance Act criteria	3
ICD codes only	1

Characteristics	
Enrollment in a named VA homeless program	1
Multi-criteria definition	1
Risk of Bias	
Low	5
Moderate	8
High	6
Baseline Details	
Sample size range (*N* = 19)	123 to 51,886
Male % range (*N* = 18)	84.6 to 97%
Age	
Mean age range (*N* = 12)	48.4 to 59.5
Age range (*N* = 5)	18-65+ (Majority aged 45-64)
Age not reported (*N* = 2)	-
Race (% range)	
Studies reporting majority of patients White (*N* = 14)	37.7 to 80.8%
Studies reporting majority of patients Black (*N* = 3)	51.6 to 66.7%
Studies not reporting race information (*N* = 2)	-

Notes. [a]Data only includes homeless group study arms; [b]One post hoc analysis of an RCT was analyzed as an NRCS; [c]One NRCS was evaluated as a single group study and as an NRCS for different questions of interest; [d] Four NRCS were evaluated as single group studies since the comparator groups were not of interest (Chang, 2020; Jones, 2017; O'Toole, 2013; Trivedi, 2018).

Abbreviations. NRCS=nonrandomized comparative study; HPACT=homeless patient aligned care teams; ICD=international classification of disease; VISN=Veterans Integrated Service Networks.

EFFECT OF ENGAGING VETERANS EXPERIENCING HOUSING INSECURITY IN PRIMARY CARE

Four studies (2 NRCSs with 1 RCT evaluated as an NRCS, 2 single group with 1 NRCS evaluated as a single group) that were conducted in the VA between 2006 and 2017 involved 14,967 participants and evaluated outcomes for Veterans experiencing housing insecurity engaged in primary care (*ie,* yes or no primary care).[29,34-36] Two studies evaluated care in Veterans experiencing housing insecurity new to primary care. That is, Veterans who were not established or engaged in primary care prior to enrolling in specialized homeless primary care. Specifically, 1 study compared Veterans before and after enrollment in homeless-oriented primary care, and also compared these individuals to a historic sample of Veterans experiencing housing insecurity that received care from a general VA internal medicine clinic.[36] Of note, in this section we only report results from this study for the within-group changes for Veterans before and after enrollment in homeless-oriented primary care (*ie,* evaluated as a single group study). In the next section (homeless-tailored primary care versus usual primary care), we report this study as an NRCS.

Another study compared Veterans across 33 VHA medical centers before and after HPACT enrollment.[29] The remaining 2 studies compared Veterans experiencing housing insecurity that did and did not access primary care during the period of observation.[34, 35] One of these 2 studies was a post-hoc

analysis of individuals in an RCT (randomized to receive a brief personalized health assessment, a clinic/health system orientation, or a combination of the 2 versus usual care),[37] which we evaluated as an NRCS (*ie,* yes or no primary care). Only 1 study exclusively analyzed participants in a named VA homeless program (HUD-VASH).[34] The studies evaluated outcomes over different time periods. One study compared outcomes 7 to 12 months after enrollment in homeless-tailored primary care to outcomes during the first 6 months of enrollment,[36] 1 study compared outcomes 6 months before and after enrollment in HPACT,[29] 1 study compared Veterans who accessed primary care within 1 month of study enrollment compared to those who did not,[35] and 1 study compared Veterans who accessed primary care over a 1 year period to those who did not.[34]

In 2 studies, the majority of participants were White (62.0% and 80.8%),[19, 35, 36] 1 study reported that the majority of participants were Black (57.2%),[34] and 1 study did not report information about race. Mean age in the 4 studies ranged from 48.4 to 52.9 years old, and most participants were male (93.6% to 95.9%). The 4 studies reported multiple comorbidities. In 1 study, 15.2% of Veteran had ≥1 mental health diagnosis.[34] In 2 studies, approximately 55% had depression, and 33.3% and 46.5% had anxiety.[35, 36] One study reported that 31.0% of participants had posttraumatic stress disorder,[35] and 1 study reported that 19.2% had bipolar disorder and 7.3% had schizophrenia.[36] In 1 study, 6.3% had at least 1 substance use disorder,[34] and 2 studies reported alcohol use (67.6% and 64.4%), marijuana (33.1% and 12.9%), cocaine (13.4% and 28.8%) and heroin (7.9%) use disorders. The single group study did not report information on mental health or substance use services at baseline. One study also reported that 11.8% of Veterans had diabetes, 44.1% had hypertension, and 42.4% had hyperlipidemia.[36] The other 3 studies did not report data on these chronic conditions.

One NRCS reported results from an unadjusted analysis (therefore, moderate risk of bias).[35, 36] Three studies had no methodological concerns (therefore, low risk of bias).[29, 34, 36] Appendix C shows the full risk of bias assessments.

In summary (Table 3), available studies found that engaging Veterans experiencing housing insecurity in primary care may reduce emergency department visits and hospitalizations (moderate confidence). Primary care visits of those newly established in primary care may be high at first and then decrease over time (low confidence). Studies provided insufficient evidence for the impact of establishing Veterans experiencing housing insecurity in primary care on housing and community integration outcomes (no conclusion). No study reported data on specialty/other care, patient experiences, satisfaction, cost or return on investment, or disease-specific outcomes at different time points.

Table 3. Summary of Findings for the Effect of Engaging Veterans Experiencing Housing Insecurity in Primary Care

Outcome	Studies (Patients); Design	Methodological Limitations	Indirectness	Imprecision	Inconsistency	Other Issues	Summary	Overall Confidence
Primary Care[36]	1 (177); NRCS[a]	Low[c]	Direct	Precise	NA[b]	Single study	Primary care use may be high at first and then decrease over time.	Low
Emergency Care[29, 36]	2 (14265); 1 NRCS[a] 1 Single group	Low[c]	Direct	Precise	Inconsistent[d]	None	Establishing primary care may reduce emergency department visits.	Moderate
Inpatient Care[29, 36]	2 (14265); 1 NRCS[a] 1 Single group	Low[c]	Direct	Precise	Inconsistent[e]	None	Establishing primary care may reduce hospitalizations	Moderate
Specialty/Other Care	NR	NR	NR	NR	NR	NR	NA	No evidence
Cost and Return on Investment	NR	NR	NR	NR	NR	NR	NA	No evidence
Housing and Community Integration and Food Insecurity[34,35]	2 (702); 2 NRCSs	Moderate[f]	Direct	Precise	Inconsistent[e]	NR	No conclusion[g]	Insufficient
Patient Experience/ Satisfaction	NR	NR	NR	NR	NR	NR	NA	No evidence
Disease-Specific Outcomes	NR	NR	NR	NR	NR	NR	NA	No evidence

Notes. [a]NRCS evaluated as a single group study for this question; [b]Single study; [c]As a single group, this study was rated as low risk of bias; [d]One study reported a reduction in overall visits from before to after enrollment, and another study reported mixed results for change in visits from the first 6 months of enrollment to 7-12 months after enrollment for both overall emergency department visits and appropriateness of visits; [e]Assessment of different outcome definitions; [f]One study was rated as moderate risk of bias for using a crude analysis; [g]One study reported no difference in all outcomes between groups, and 1 study reported no difference in most outcomes but favored primary care group for 1 outcome.

Abbreviations. N/A=not applicable; NR=not reported; NRCS=non-randomized comparative study.

Primary Care

Two single group studies reported the number of primary care visits for housing-insecure Veterans who received primary care. One NRCS evaluated as a single group study found significantly fewer primary care visits per Veteran 7 to 12 months after enrollment homeless-tailored primary care compared to the first 6 months of enrollment (MD = -3.95, 95% CI [-2.73, -5.17], $p < 0.01$).[36] The study did not report the change in primary care encounters for Veterans before and after enrolling in homeless-oriented primary care. A second single group study did not report baseline data but observed an average of 3.4 primary care visits over 12 months for Veterans enrolled in HPACT.[29]

Emergency Department Utilization

All-Cause Emergency Department Utilization

Two single group studies reported emergency department utilization for Veterans experiencing housing insecurity who received primary care.[29, 36] One single group analysis (of a larger NRCS) of Veterans enrolled in homeless-tailored primary care found a significant decrease in the proportion of Veterans with an emergency department visit for any cause from 0 to 6 months after enrollment to 7 to 12 months after enrollment (55.3% to 36.8%, $p < 0.01$). The average number of emergency department visits per Veteran did not significantly decrease between periods (MD = -0.55, 95% CI [-1.32, 0.22]). The study did not report data on emergency department utilization before enrollment in homeless-tailored primary care.

Another single group study reported a 19% reduction in emergency department visits in the 6 months after compared to before HPACT enrollment (significance not reported).[29]

Appropriate Emergency Department Utilization and Cause-Specific Emergency Department Utilization

One single group of Veterans enrolled in homeless-tailored primary care found a significant decrease in the proportion of Veterans using emergency department care for non-emergencies from 0 to 6 months after enrollment to 7 to 12 months after enrollment (22.4% to 13.2%, $p < 0.02$).[36] However, the proportion of all emergency department visits that were for non-emergency care did not significantly decrease between periods (23.6% of visits to 18.5%, $p = 0.39$). The average number of non-emergency emergency department visits per Veteran also did not significantly decrease between periods (MD = -0.18, 95% CI [-0.46, 0.10]), nor did the average number of substance abuse-related emergency department visits per Veteran (MD = -0.03, 95% CI [-0.49, 0.43]).[36]

Inpatient Hospitalizations

Two studies reported hospitalization outcomes.[29, 36] A single group found no significant difference in the mean number of all-cause hospitalizations 7 to 12 months after enrollment in homeless-tailored primary care compared to 0 to 6 months after enrollment (MD = 0.01, 95% CI [0.32, 0.34]). In contrast, the proportion of hospitalizations not related to drug or alcohol use or mental health significantly decreased between periods (28.6% to 10.8%, $p < 0.01$).[36]

A single group study found a 34.7% decrease in hospitalizations in the 6 months after compared to before HPACT enrollment (significance not reported).[29]

Specialty/Other Care Utilization

One single group study reported Veterans had an average of 1.5 specialty care clinic visits over 12 months of enrollment in HPACT (standard deviation and significance not reported). This study did not report specialty care utilization prior to enrollment in HPACT.[29]

Cost, Return on Investment, and Satisfaction

No study reported cost, return on investment, or Veteran satisfaction with care.

Housing and Community Integration and Food Insecurity

Two NRCSs reported housing or community integration outcomes for Veterans who received primary care. One NRCS that analyzed Veterans enrolled in HUD-VASH reported no significant differences in community adjustment (aOR = 1.01, 95% CI [0.98, 1.04]), housing stability (aOR = 1.00, 95% CI [0.95, 1.05]), or employment (aOR = 0.96, 95% CI [0.88, 1.06]) between Veterans who did and did not access primary care.[34] One NRCS (which was a post hoc analysis of individuals included in an RCT) found a significantly lower odds of living in unstable housing or moving into unstable housing for Veterans experiencing housing insecurity who accessed primary care within 1 month of study enrollment compared to those who did not access primary care (OR = 0.38, 95% CI [0.16, 0.95]).[35] Veterans who accessed primary care appeared to have higher odds of moving to stable housing, but this difference was nonsignificant (OR = 2.03, 95% CI [0.91, 4.54]). The odds of remaining in stable housing were similar between groups (OR = 1.03, 95% CI [0.52, 2.01]).

Disease-Specific Outcomes

One single group study evaluated as a single group study found that most Veterans achieved their target blood pressure goal (78.8%), diabetes care goal (57.1%) and lipid management goal (65.4%) 6 months after enrolling in homeless-oriented primary care.[36]

EFFECT OF HOMELESS-TAILORED PRIMARY CARE VERSUS USUAL PRIMARY CARE

Sixteen studies (10 NRCSs and 6 single group studies) compared homeless-tailored primary care to usual primary care.[14,15,31-33,36,38-47] Studies were conducted between 2011 and 2021 and involved 114,965 participants. All but 1 study explicitly included Veterans with a history of being established or engaged in primary care prior to enrolling in the homeless-tailored primary care.[14,15,31-33,36,38-40,42-47] Comparisons varied across the 10 NRCSs. Six compared Veterans in homeless-tailored primary care to standard primary care.[15,39,40,43,44,47] One NRCS compared Veterans from the first 6 months of enrollment in homeless-tailored primary care to 7 to 12 months after enrollment in primary care and to a historical sample of seasonally matching Veterans experiencing housing insecurity that received care from a general VA internal medicine clinic.[36] Two NRCS compared Veterans in HPACT to similar Veterans in the same medical center but not enrolled in HPACT (but assumed to be participating in primary care), and also to similar Veterans enrolled in standard primary care at medical centers without HPACT.[14, 32] Finally, 1 NRCS compared Veterans in medical centers with HPACT to medical centers without HPACT. In this study, it was unclear whether the Veterans in medical centers with HPACT were enrolled in HPACT.[41]

Six studies were evaluated as a single group design.[31,33,38, 42,45,46] Of these, 4 included a comparison group that did not meet the review criteria.[35,38,45,46] Two single group studies included Veterans before

and after enrollment in HPACT[42] or other homeless-tailored primary care.[33] In these 2 studies, Veterans were enrolled or participated in usual primary care prior to enrollment in homeless-tailored primary care.

In 13 studies, most participants were White (range =38%–80.8%),[15,26,31-33,36,39-43,45-47] while 2 studies reported that most participants were Black (range = 52%–67%),[14, 44] and 1 study did not report information on race.[38] In 9 studies, the mean age was between 49.1 to 59.5 years,[14,15,36,40,43-47] and in 5 studies most participants were between 45 and 64 years of age (range = 18–65+).[31-33,39,41] Two studies did not report the age of participants.[38, 42]

Thirteen studies reported a wide range of mental health diagnoses or use of psychiatric medication at baseline (range = 8%–97%). [15,31-33,36,39-43,45-47] The same 13 studies reported substance use disorder from a low of 2% for sedative/hypnotic use or treatment[42] to a high of 74.8% for any reported substance use disorder.[33] Five studies reported hypertension ranged from 19% to 51%[15,36,39,45,46] and 4 studies reported diabetes ranged from 8% to 25%.[36,39,45,46]

Five studies comparing homeless-tailored primary care to usual care had high risk of bias. Four of these were single group studies that only reported follow-up data without baseline data [31,38,45,46] One NRCS was considered at high risk of bias due to concerns about the comparator representativeness and unclear reporting or discrepancies in the study.[14] Eight studies (all NRCS) had moderate risk of bias. Five of these studies used self-reported outcomes where participants were not blinded to the intervention[15,32,39,41,43]; 1 study had unclear reporting, incomplete outcome data, and concerns about the comparator representativeness[47]; 1 conducted unadjusted analyses[44]; and 1 study had concerns about the comparator representativeness.[36] Three studies had no concerns and were judged to be at low risk of bias.[33,40,42]

In summary (Table 4), available studies provided insufficient evidence (no conclusion) on the effect of homeless-tailored primary care on primary care utilization or overall specialty care utilization compared with usual primary care. Homeless-tailored primary care may reduce inpatient hospitalizations and emergency department visits and increase appropriate use of emergency care (low confidence). Homeless-tailored primary care may reduce mental health and substance use visits (low confidence). Homeless-tailored primary care may increase primary care costs and reduce emergency department and overall costs (low confidence). There is no evidence for a difference in disease-specific outcomes for patients in homeless-tailored primary care compared to usual care (low confidence). Veterans experiencing housing insecurity in tailored primary care rate their experience better than those in usual care (low confidence). Available studies did not evaluate housing and community integration outcomes.

Table 4. Summary of Findings for the Effect of Homeless-Tailored Primary Care versus Usual Primary Care[a]

Outcome	Studies (Patients); Design	Methodological Limitations	Indirectness	Imprecision	Inconsistency	Other Issues	Summary	Overall Confidence
Primary Care[14,15,36,42]	4 (52508); 3 NRCS and 1 single group	Moderate[b]	Direct	Precise	Inconsistent[c]	None	No conclusion	Insufficient
Emergency Care[14,15,33,36, 2]	5 (52631); 3 NRCS and 2 single group	Moderate[d]	Direct	Precise	Inconsistent[e]	None	Homeless-tailored primary care may reduce emergency department use and lead to more appropriate emergency department use.	Low
Inpatient Care[15,33,36,42]	4 (745); 2 NRCS and 2 single group	Moderate[f]	Direct	Precise	Inconsistent[g]	None	Homeless-tailored primary care may reduce hospitalizations.	Low
Specialty/ Other Care[14,15,33,40,42]	5 (55297); 3 NRCS and 2 single group	Moderate[h]	Direct	Precise	Inconsistent[i]	None	No conclusion for effect of homeless-tailored primary care on specialty visits, but homeless-tailored primacy care may reduce mental health and substance care (potentially because these services are embedded in tailored primary care).	Low
Cost and Return on Investment[15]	1 (266); NRCS	Moderate	Direct	Precise	N/A[j]	Single Study	Homeless-tailored primary care may increase primary care costs and reduce emergency department and overall costs.	Low
Housing and Community Integration and Food Insecurity	NR	NR	NR	NR	NR	NR	NA	No evidence
Patient Experience/Satisfaction[15,32,39,41,43,44]	6 (31434); NRCS	Moderate[k]	Direct	Precise	Inconsistent[l]	None	Higher patient experience for homeless-tailored primary care.	Low
Disease-Specific Outcomes[36,47]	2 (19782); NRCS	Moderate[m]	Direct	Precise	Inconsistent[n]	None	No evidence of a difference.	Low

Notes. [a]We did not GRADE data from 4 single group studies without baseline and follow-up data; [b]One study was high risk of bias due to unclear reporting and concerns about comparator representativeness, 2 studies had moderate risk of bias due to concerns about comparator representativeness and blinding, and 1 study was low risk of bias; [c]Mixed findings: 1 study reported more visits in HPACT versus PACT to primary care providers but not primary care teams, another study reported more visits in the last 6 months compared to a general internal medicine clinic, 1 study reported an increase in primary care visits after PHACT enrollment, and 1 study reported a decrease in visits from before to after enrollment, but that change was smaller than those not enrolled in HPACT at HPACT sites and not different from those in usual care, and the time points of these outcomes differed; [d]One study was high risk of bias due to unclear reporting and concerns about comparator representativeness, 2 studies were moderate risk of bias due to concerns about comparator representativeness and blinding, and 2 were low risk of bias; [e]Mixed results for both within- and between-group changes (either a decrease or no difference in emergency department visits), and outcomes included all-cause visits and appropriateness of visits; [f]Two studies were moderate risk of bias due to concerns about comparator representativeness and blinding, and 2 were low risk of bias; [g]Two studies reported a reduction in hospitalization from before to after enrollment. Two studies reported mixed results; [h]One study was high risk of bias due to unclear reporting and concerns about comparator representativeness, 1 had moderate risk of bias due to concerns about blinding, and 3 were low risk of bias; [i]The definition for specialty care varies across studies, and outcomes across these were mixed; [j]Single study; [k]Five studies were moderate risk of bias due to concerns about blinding and 1 study had moderate risk for conducting a crude analysis; [l]Four of 6 studies reported more positive patient experiences in at least 1 assessed domain related to care, and 2 other studies reported no differences

between groups; [m]Both studies rated as moderate risk of bias due to concerns about comparison group or unclear blinding of outcome assessor and incomplete outcome data; [n]One study reported no difference in overdose outcomes in homeless-tailored primary care versus other primary care and another study found no difference in the proportion of patients meeting blood pressure, diabetes, or lipid management goals, and time points of these comparisons differed.

Abbreviations. N/A=not applicable; NRCS=non-randomized comparative study.

Primary Care

Six studies (3 NRCS and 3 single group) reported on primary care use among Veterans experiencing housing insecurity participating in homeless-tailored primary care compared to similar Veterans in usual primary care. One NRCS found significantly more primary care physician encounters over 2 years among Veterans enrolled in HPACT compared to PACT (MD = 1.5, 95% CI [0.5, 2.5], p = 0.001).[15] The overall number of combined primary care physician and nursing visits also appeared to differ between groups, but this difference was not statistically significant (MD = 1.7, 95% CI [-0.10, 3.50], p = 0.06).[15]

One NRCS found more primary care visits 7 to 12 months after enrollment in HPACT compared to a historical group of similar Veterans enrolled in non-tailored general internal medicine.[36] The study reported this difference to be significant (p = 0.05) but the calculated confidence interval did not show significance (MD = 0.7, 95% CI [-0.01, 1.46]).

The third NRCS reported the change in primary care visits 6 months before and after enrollment in HPACT among Veterans experiencing housing insecurity with 2 or more emergency department visits during the baseline period.[14] The study also compared the change in primary care visits from the 6 months to the second 6 months of 2012 in 2 other groups. The first was Veterans at the same medical center who were not enrolled in HPACT. The second comparison group was Veterans in medical centers that did not have HPACT. [14] There was a significant reduction in the number of primary care visits 6 months after compared to before HPACT enrollment (MD = -0.012, p = 0.015). This change was significantly different than the change in the number of primary care visits for Veterans in medical centers with HPACT but not enrolled in HPACT (difference-in-differences = -0.012, p < 0.001) but not significantly different than change in visits for Veterans in medical centers without HPACT (difference-in-differences = -0.02, p = 0.23).[14]

One single group study found a large significant increase in the odds of having a primary care encounter both 0 to 6 months and 7 to 12 months after HPACT enrollment compared to the 6 months prior to enrollment, with greater odds during the 0 to 6 month period (0 to 6 months aOR = 4.91, 95% CI [2.94, 8.20]; 7 to 12 months aOR = 2.30, 95% CI [1.42, 3.72]).[42] The same study found a significant increase in the number of primary care visits 12 months after HPACT enrollment compared to 12 months before enrollment (MD = 1.13, 95% CI [0.57, 1.69], p < 0.001).[42]

Two single group studies reported Veteran primary care utilization after enrollment in HPACT or homeless-tailored primary care without data on utilization prior to enrollment.[38, 45] On average, Veterans in HPACT or homeless-tailored primary care had between 7.7 and 8.4 primary care visits (12 months follow-up in 1 study and 6 months follow-up in 1 study).

Emergency Department Utilization

All-Cause Emergency Department Utilization

Three NRCSs and 4 single group studies reported all-cause emergency department utilization. One NRCS found no significant difference in the odds of having an all-cause emergency department visit between Veterans in HPACT and PACT from June 2012 to January 2014 (OR = 0.83, 95% CI [0.48, 1.42]).[15] This study also found no significant difference in the mean number of emergency department visits between Veterans in HPACT and PACT (MD = -0.3, 95% CI [-1.4, 0.8], p = 0.57).

One NRCS compared the change in emergency and urgent care visits 6 months before and after enrollment in HPACT among Veterans experiencing housing insecurity with 2 or more emergency department visits during the baseline period.[14] The study also compared this change to the change in emergency and urgent care from the first 6 months to the second 6 months of 2012 in similar Veterans at the same medical center who were not enrolled in HPACT, and also to a group of similar Veterans in medical centers that did not have HPACT. There were significantly fewer emergency department visits per Veteran per month in the 6 months after HPACT enrollment compared to the 6 months before enrollment (MD = -0.061, $p < 0.001$). However, this change was not significantly different from the change in emergency department visits for similar Veterans at HPACT sites who were not enrolled in HPACT (difference-in-differences = -0.02, $p = 0.27$) or similar Veterans at medical centers without HPACT (difference-in-differences = -0.09, $p = 0.89$).

One NRCS found no significant difference in the proportion of Veterans with an emergency department visit 7 to 12 months after enrollment in homeless-tailored primary care compared to a historical comparison of homeless Veterans who used non-tailored general internal medicine during the last 6 months of 2012 (OR = 0.84, 95% CI [0.46, 1.55]).[36] The same study found no significant difference in the number of emergency department visits per Veteran 7 to 12 months after enrollment in homeless-tailored primary care compared to a historical comparison of homeless Veterans who used general internal medicine (MD = 0.32, 95% CI [-0.22, 0.86]).

One single group study reported significantly lower adjusted odds of emergency department visits in Veterans 0 to 6 months and 7 to 12 months after HPACT enrollment compared to the 0 to 6 months before HPACT enrollment (0 to 6 months aOR = 0.57, 95% CI [0.34, 0.94] and 7 to 12 months aOR = 0.55, 95% CI [0.33, 0.91]).[42] In an unadjusted analysis, the study found no significant difference in the mean number of emergency department visits in the 12 months after HPACT enrollment compared to 12 months before enrollment (MD = 0.15, 95% CI [-0.28, 0.58]).

Another single group study compared emergency department utilization in the 4 quarters before and after enrollment in an integrated primary care clinic, which addressed factors related to social determinants of health and substance use prevention, assessment, and treatment.[33] In a subgroup of Veterans with homeless experiences, there was a significant decrease in emergency department use after enrollment in integrated primary care (31% decrease in emergency department visits from the pre- to post-enrollment periods, $p < 0.001$).

Two single group studies reported emergency department utilization after enrollment in homeless-tailored primary care without data on utilization prior to enrollment. One single group study found that, on average, Veterans had 1 emergency department visit during the first 6 months of HPACT.[45] During this same period, 48% of the study population had an emergency department visit. Another single group study reported an average of 2.2 emergency department visits over 12 months for Veterans experiencing housing insecurity enrolled in homeless-tailored primary care.[38]

Appropriate Emergency Department Utilization

Three NRCSs and 1 single group studies reported a measure of appropriate emergency department use. One NRCS found a small but significant difference in ambulatory-care-sensitive condition emergency department visits from June 2012 to January 2014, with Veterans enrolled in HPACT having fewer visits compared to PACT (MD = -0.2, 95% CI [-0.3, -0.1], $p = 0.04$).[15] This same study reported fewer acute care visits, which included all-cause and ambulatory-care-sensitive emergency department visits and hospitalizations, for those in the HPACT group (aOR= 0.41, 95% CI [0.21, 0.80]).

One NRCS reported whether Veterans accessed the emergency department for non-emergency care, which was defined as "conditions that could have been treated in a primary care clinic."[36] The study found a lower odds of non-emergency emergency department utilization 7 to 12 months after enrollment in homeless-tailored primary care, but this was not significantly different from a historical group of similar Veterans in non-tailored general internal medicine (OR = 0.50, 95% CI [0.22, 1.13]).[36] However, when examining the distribution of emergency department visits (unit of observation emergency department visits), there were significantly fewer non-emergency emergency department visits in the homeless-tailored primary care group compared to the general internal medicine group during the last 6 months of the study period (OR = 0.46, 95% CI [0.22, 0.93]). There was also no difference in number of non-emergency emergency department visits per Veteran 7 to 12 months after enrollment in homeless-tailored primary care to Veterans in a general internal medicine groups (MD = -0.09, 95% CI [-0.27, 0.09]). The study also reported significantly lower odds of emergency department visits for non-acute conditions over 12 months in the homeless-tailored primary care group compared to Veterans enrolled in general internal medicine (aOR = 0.4, 95% CI [0.2, 0.80]).

One NRCS used the New York University algorithm to determine the appropriateness of emergency department visits.[14] The NRCS compared the proportion of emergency department and urgent care visits that were "appropriate" 6 months before and after enrollment in HPACT among Veterans experiencing housing insecurity.[14] The study also reported the change in the proportion of appropriate emergency department and urgent care visits from the first 6 months to the second 6 months of 2012 in 2 other groups. The first was Veterans experiencing housing insecurity in the same medical center but not enrolled in HPACT. The second comparison group was Veterans experiencing housing insecurity in medical centers that did not have HPACT. This study did not compare the change in the proportion of emergency department visits that were appropriate between groups. Significantly more emergency and urgent care visits were classified as not preventable/avoidable in the 6 months after HPACT enrollment compared to 6 months before enrollment (8.7% vs 10.0%, $p = 0.01$). There was a small but significant increase in not preventable or avoidable emergency department visits for Veterans experiencing housing insecurity at sites without HPACT (8.4% vs 9.1%, $p = 0.01$) but not in Veterans at sites where HPACT was available but who were not enrolled in HPACT (5.6% vs 5.8%, $p = 0.39$). More visits classified as non-emergent were found in the 6 months after HPACT enrollment compared to the 6 months prior to enrollment (22.3% vs 24.4%, $p = 0.004$). Slight increases in non-emergent visits were also observed for Veterans at medical centers with HPACT but not enrolled (24% vs 25.9%, $p < 0.001$) but not for Veterans at medical centers without HPACT (26.5% vs 26.5%, $p = 1.00$). There was a significant decrease in the number of unclassified emergency and urgent care visits before and after HPACT enrollment (51.1% vs 47.5%, $p < 0.001$) and for Veterans at medical centers with HPACT but not enrolled in HPACT (54.8% vs 51.6%, $p < 0.001$) and Veterans at medical centers with usual primary care (47.7% vs 46.3%, $p = 0.01$). There was no difference in the proportion of emergent/primary care treatable visits before and after enrollment in HPACT (12.9% vs 12.8%, $p = 0.92$). However, there was a small but significant increase from the first 6 months to the second 6 months of 2012 for Veterans at medical centers with HPACT but not enrolled in HPACT (12% vs 12.9%, $p = 0.002$) and in those who received usual care at non-HPACT sites (13.4% vs 14.1%, $p = 0.04$). There was no significant difference in any group for changes in emergency and urgent care visits that were preventable/avoidable.

The same NRCS conducted an analysis in a subgroup of high emergency department utilizers, which was defined as those with ≥2 emergency department visits in a 6-month period.[14] This study only reported within-group differences. There were no differences in visits that were categorized as not preventable or avoidable for Veterans before and after HPACT enrollment (9.0% vs 8.9%, $p = 0.91$) or

at HPACT sites for individuals not enrolled in HPACT when comparing the first and second 6 months of data in the 2012 calendar year (5.0% vs 5.5%, $p = 0.60$). However, there were significant increases in emergency department visits classified as not preventable or avoidable at non-HPACT sites when comparing the first and second 6 months of data in the 2012 calendar year (8.5% vs 9.5%, $p = 0.03$). Similarly, there was no significant difference in unclassified emergency department visits from before to after HPACT enrollment (51.7% vs 49.8%, $p = 0.13$) or at HPACT sites for individuals not enrolled in HPACT when comparing the first and second 6 months of data in the 2012 calendar year (59.6% vs 58.3%, $p = 0.46$). There was a significant increase in unclassified emergency department visits in usual care at non-HPACT sites when comparing the first and second 6 months of data in the 2012 calendar year (46.3% vs 44.2%, $p = 0.02$). There was a significant increase in non-emergency visits in the HPACT group (20.6% vs 24.4%, $p < 0.001$) but not for Veterans in the HPACT non-enrolled group (21.2% vs 21.6%, $p = 0.80$) or at medical centers without HPACT (26.8% vs 26.3%, $p = 0.48$). No differences were seen in any group for changes in emergency and urgent care visits that were preventable or avoidable or emergent but treatable in primary care.

Additionally, the same study reported changes in mean emergency and urgent care visits for patients based on emergency department utilization during the baseline period (the pre-enrollment period for the HPACT group and the first 6 months of study data for those non-enrolled or in usual care). There was a significant increase in emergency department visits after HPACT enrollment for Veterans with 0 emergency department visits before HPACT compared to Veterans at medical centers without HPACT (adjusted difference-in-differences = 0.44, $p < 0.05$). However, those enrolled in HPACT had a significant decrease in visits compared to those receiving usual care at non-PACT sites for those with 1 emergency department visit (adjusted difference-in-differences = -1.13, $p < 0.05$) or 2+ emergency department visits during the baseline period (adjusted difference-in-differences= -4.43, $p < 0.05$). Similar patterns were seen when comparing those enrolled in HPACT to those at HPACT sites who were not enrolled, with increases in those with 0 emergency department visits during the baseline period (adjusted difference-in-differences= 0.29 , $p < 0.05$), but significant decreases in those with 1 emergency department visit (adjusted difference-in-differences= -0.20, $p < 0.05$) and 2+ emergency department visits during the baseline period (adjusted difference-in-differences= -0.29, $p < 0.05$). Overall, there were significantly fewer mean emergency and urgent care visits per Veteran per month from before to after enrollment for those enrolled in HPACT (mean = 0.12 [NR)] vs 0.059 [NR], $p < 0.001$) but this change did not differ significantly when compared to changes in the HPACT non-enrolled group (difference-in-differences = -0.02 [-0.05, 0.02], $p = 0.27$) or those in usual care at sites without HPACT (difference-in-differences = -0.09 [-1.37, 1.19], $p = 0.89$).[14]

One single group study reported no difference in the mean number of inappropriate emergency department visits in the 12 months after compared to 12 months before HPACT enrollment (MD = -0.08, 95% CI [-0.32, 0.16]).[42]

Cause-Specific Emergency Department Utilization

Two NRCSs reported cause-specific emergency department use. One NRCS found no significant difference in the number of substance abuse-related emergency department visits per Veteran 7 to 12 months after enrollment in homeless-tailored primary care compared to similar a historical comparison of homeless Veterans who used non-tailored general internal medicine (MD = 0.32, 95% CI [-0.04, 0.68]).[36] Another NRCS reported significantly lower odds of having mental health-related emergency department visits from June 2012 to January 2014 for Veterans in HPACT compared to PACT (OR = 0.58, 95% CI [0.34, 0.98]).[15]

Inpatient Hospitalizations

Five studies (2 NRCSs and 3 single group) reported inpatient hospitalizations for Veterans experiencing housing insecurity enrolled in primary care. The studies did not consistently indicate the reason for hospitalization. One NRCS found no significant difference in the mean number of hospitalizations (unclear whether VA only or VA and community combined) or community hospitalizations from June 2012 to January 2014 between Veterans enrolled in HPACT compared to PACT (MD = -0.2, 95% CI [-0.5, 0.1] and MD = -0.1, 95% CI [-1.5, 1.3]).[15] This same study reported a significantly lower odds of having a hospitalization for Veterans in HPACT compared to PACT (OR = 0.55, 95% CI [0.31, 0.98]).

Another NRCS reported significantly more all-cause hospitalizations 7 to 12 months after enrollment in the homeless-tailored primary care group compared to the historic non-tailored general internal medicine group (MD = 0.32, 95% CI [0.04, 0.60], $p = 0.02$).[36] The study reported more hospitalizations over a 12 month period in the homeless-tailored primary care group compared to the general internal medicine group (72% vs 47%, $p = 0.02$). The study also found a significantly lower odds of being hospitalized for non-drug or non-alcohol use or mental health 7 to 12 months after enrollment in homeless-tailored primary care compared to similar Veterans in a historic general internal medicine group (OR = 0.15, 95% CI [0.04, 0.61]).[36]

One single group study reported a significantly lower odds of having an inpatient hospitalization 0 to 6 months and 7 to 12 months after HPACT enrollment compared to 6 months prior to enrollment (0 to 6 months aOR = 0.43, 95% CI [0.25, 0.76] and 7 to 12 months aOR = 0.45, 95% CI [0.26, 0.80]).[42] The same study also observed no differences in inpatient hospitalizations in the 12 months after compared to 12 months before HPACT enrollment in an unadjusted analysis (MD = -0.04, 95% CI [-0.35, 0.28]).

A subgroup analysis of Veterans with homeless experiences in integrated primary care found a 34% reduction in the rate of hospitalizations in the 4 quarters after compared to the 4 quarters before enrollment in integrated primary care ($p = 0.04$).[33]

A third single group study of Veterans enrolled in HPACT who received >90% of their care in the VA reported the adjusted mean number of Medicare acute hospitalizations and VA acute hospitalizations over 12 months (0.71, 95% CI [0.60, 0.82] and 0.55, 95% CI [0.39, 0.71]). This study did not report data on utilization prior to enrollment in HPACT. In a subanalysis, the adjusted mean number of Medicare acute hospitalizations over 12 months increased by the annual number of outpatient visits (0 to 22 outpatient visits annually = 0.21 hospitalizations, 95% CI [0.12, 0.31], 23 to 55 outpatient visits annually = 0.64 hospitalizations, 95% CI [0.51, 0.78] and >55 visits outpatient visits = 1.31 hospitalizations, 95% CI [1.04, 1.58]). Similarly, the adjusted mean number of VA acute hospitalization increased by intensity (0 to 22 outpatient visits = 0.27 hospitalizations , 95% CI [0.11, 0.43]; 23 to 55 outpatient visits = 0.50, 95% CI [0.26, 0.73]; >55 outpatient visits = 1.17 hospitalizations, 95% CI [(0.70, 1.63]).[46] The study also reported the total VA- and Medicare-financed acute care hospitalizations (adjusted mean = 1.49, 95% CI [1.26, 1.71]), VA-financed acute care hospitalizations (adjusted mean = 0.63, 95% CI [0.48, 0.78]), and Medicare-financed acute care hospitalizations (adjusted mean= 0.85, 95% CI [0.72, 0.98]) over the 12-month period.

Specialty/Other Care Utilization

Specialty Care (General)

Five studies (2 NRCSs and 3 single group) reported specialty care utilization without specifying the specialties.[14,15,38,42,45] One NRCS compared the change in specialty care utilization 6 months before and after enrollment in HPACT among Veterans experiencing housing insecurity with 2 or more emergency department visits during the baseline period. The study also compared this change to the change in specialty care from the first 6 months to the second 6 months of 2012 in 2 other groups. The first was Veterans experiencing housing insecurity in the same medical center but not enrolled in HPACT. The second comparison group was Veterans experiencing housing insecurity in medical centers that did not have HPACT.

There was no significant change in the number of medical specialty visits per month before and after HPACT enrollment (MD = -0.007, 95% CI [-0.019, 0.005], $p = 0.24$). Nor was there a significant difference in change in specialty visits per month between Veterans in HPACT and similar Veterans receiving primary care at medical centers without HPACT (difference-in-differences = -0.016, $p = 0.42$). However, there was a significant difference in the change in specialty care visits between Veterans at medical centers with HPACT but not enrolled in HPACT and Veterans enrolled in HPACT (difference-in-differences = 0.002, $p = 0.0022$).[14]

One NRCS reported no significant difference in the mean number of specialty care visits over 2 years for Veterans enrolled in HPACT compared to PACT (MD = -0.5, 95% CI [-1.8, 0.8], $p = 0.41$).[15]

One single group study found significantly more medical specialist visits 12-months after compared to 12-months before HPACT enrollment (MD = 1.44, 95% CI [0.31, 2.56], $p = 0.012$).[42]

One single group study reported 12-month specialty care utilization for Veterans in homeless-tailored primary care (mean = 2.6 [SD 4.0]).[38] This study did not report data on utilization prior to enrollment in homeless specialized primary care.

One single group study without baseline utilization data reported that 86.6% of Veterans in HPACT used specialty care during the first 6 months of primary care enrollment.[45]

Mental Health

Seven studies (3 NRCSs and 4 single group) reported mental health care utilization.[14,15,33,38,40,42,45] One NRCS compared the change in mental health visits among Veterans experiencing housing insecurity with 2 or more emergency department visits during the baseline period. This study compared the change in visits 6 months before and after enrollment in HPACT to the change in mental health visits during the first 6 months of 2012 compared to the second 6 months of 2012 for Veterans experiencing housing insecurity in the same medical center but not enrolled in HPACT and Veterans experiencing housing insecurity in medical centers that did not have HPACT.[14] The NRCS reported a significant reduction in the number of mental health care visits in 6 months after compared to the 6 months before HPACT enrollment (MD = -0.04, $p = 0.0031$). This change was not significantly different than the change in the number of mental health care visits for Veterans in HPACT sites but not enrolled in HPACT from the first 6 months to the second 6 months of 2012 (difference-in-differences = 0, $p = 0.22$), or the change for Veterans in medical centers without HPACT (difference-in-differences = -0.066, $p = 0.88$).

One NRCS reported significantly fewer mental health care visits over 2 years for Veterans enrolled in HPACT compared to PACT (MD = -4.6, 95% CI [-7.9, -1.3], $p = 0.01$).[15] Additionally, there was a significantly lower odds of accessing group therapy over 2 years for Veterans in the HPACT compared to PACT (OR = 0.59, 95% CI [0.35, 0.99]). There was no significant difference in the odds of Veterans accessing psychiatry or psychology care between Veterans in HPACT and PACT (OR = 0.75, 95% CI [0.44, 1.28] and OR = 0.76, 95% CI [0.44, 1.30]).

Another NRCS found significantly greater odds of receiving treatment for depression within 84 and 180 days following a positive Patient Health Questionnaire (PHQ-2) screen between those in HPACT compared to PACT (aOR = 1.61, 95% CI [1.21, 2.15] and aOR = 1.51, 95% CI [1.15, 1.99]).[40] The NRCS also found Veterans in HPACT compared to PACT had significantly greater odds for a composite measure of receiving ≥60 day supply of antidepressant prescriptions, ≥4 mental health specialist visits, or ≥3 psychotherapy visits for Veterans in HPACT compared to PACT(aOR = 1.58, 95% CI [1.15, 2.16]).

One single group study found no significant differences in the mean number of mental health encounters in the 12 months after compared to the 12 months before HPACT enrollment (MD = 0.14, 95% CI [-0.98, 1.25], $p = 0.805$).[42] This study also found no significant difference in the odds of a mental health visit 0 to 6 months after HPACT enrollment compared to 6 months before enrollment (aOR= 0.90, 95% CI [0.53, 1.51]). However, there were significantly lower odds of mental health specialist visits 7 to 12 months after HPACT enrollment compared to 6 months before enrollment (aOR = 0.35, 95% CI [0.20, 0.60]).

Another single group study reported a non-significant reduction in mental health clinic utilization in the 4 quarters after compared to the 4 quarters before enrollment in integrated primary care (-30%, $p = 0.10$).[33]

Two single group studies did not report data on utilization prior to enrollment in homeless-oriented primary care. A single group study reported the 12-month average number of mental health care encounters for Veterans in homeless specialized primary care (mean = 34.9 [SD 39.1]).[38] This study also reported that 2.8% of Veterans in homeless-specialized primary care received intensive mental health case management over 12 months. Another single group study found that 88.2% of Veterans had a mental health care visit during the first 6 months of HPACT enrollment.[45]

Substance Use

One NRCS and 3 single group studies reported treatment of substance use for Veterans enrolled in homeless-tailored primary care. One NRCS reported no significant change in substance abuse visits from before to after HPACT enrollment (MD = -0.05, $p = 0.72$) among Veterans experiencing housing insecurity with 2 or more emergency department visits during the baseline period. This change was not significantly different than the change in substance abuse visits over a similar period for Veterans experiencing housing insecurity at the same medical center not enrolled in HPACT (difference-in-differences = 0, $p = 0.47$) or Veterans in medical centers without HPACT (difference-in-differences = -0.068, $p = 0.14$).[14]

One single group study reported no significant differences in the number of addiction specialist visits in the 12 months after HPACT enrollment compared to the 12 months before (MD = -0.07, 95% CI [-0.22, 0.08], $p = 0.35$). Nor were there significant differences in the odds of an addiction specialist visit 0 to 6 months after HPACT enrollment compared to 0 to 6 months prior (aOR = 0.51, 95% CI

[0.24, 1.06]). However, there were significantly lower odds of an addiction specialist visit 7 to 12 months after HPACT enrollment compared to the 6 months before enrollment (aOR = 0.39, 95% CI [0.18, 0.84]).[42]

Another single group study reported a significant reduction in specialty substance disorder clinic visits from the 4 quarters before and after enrollment in integrated primary care (-40%, $p < 0.001$).[33]

A single group study without baseline utilization data reported that 37.8% of Veterans utilized substance abuse treatment services during the first 6 months of HPACT enrollment.[45]

Other Specialty Care

One NRCS compared the change in specialty care among Veterans experiencing housing insecurity with 2 or more emergency department visits during the baseline period. This study compared visits 6 months before and after enrollment in HPACT to the change in primary care visits during the first 6 months of 2012 compared to the second 6 months of 2012 for Veterans experiencing housing insecurity in the same medical center but not enrolled in HPACT and Veterans experiencing housing insecurity in medical centers that did not have HPACT. This study reported small but significant reductions in the mean number of monthly visits for laboratory and imaging (MD = -0.05, $p = 0.039$), rehabilitation (MD = -0.014, $p = 0.0068$), social work (MD = -0.012, $p = 0.008$), and surgery (MD = -0.0032, $p = 0.019$) in the 6 months after HPACT enrollment compared to the 6 months before enrollment.[14] There was no significant difference in social work visits for Veterans in HPACT compared to similar Veterans at medical centers with HPACT but not enrolled in HPACT, or Veterans in medical centers without HPACT. There was a small increase in homeless care visits from before to after enrollment in HPACT (MD = 0.02, $p < 0.001$). This change was significantly different from the change for Veterans at medical centers with HPACT but not enrolled in HPACT (difference-in-differences = 0.03, $p < 0.001$) and Veterans at medical centers without HPACT (difference-in-differences = -0.004, $p < 0.001$).[14] There was a significant difference in rehabilitation and diagnostic (laboratory and imaging) visits for Veterans in enrolled in HPACT compared to similar Veterans at medical centers with HPACT but not enrolled in HPACT, but the direction of this relationship was unclear based on the reported data. There was no significant difference in rehabilitation visits and diagnostic (laboratory and imaging) visits for Veterans enrolled in HPACT compared to similar Veterans at medical centers without HPACT.

The same study reported no change in dental visits before to after enrollment in HPACT (MD = 0.001, $p = 0.97$), but this change was significantly different from the change in Veterans at sites with HPACT who were not enrolled ($p = 0.0059$). There was no significant difference in change in dental visits for Veterans in the HPACT group compared to similar Veterans in medical centers without HPACT ($p = 0.056$). There was no change in surgical specialty visits before to after enrollment in HPACT (MD = -0.009, $p = 0.76$), nor were there significant differences in change when compared to Veterans at medical centers with HPACT but not enrolled or Veterans at medical centers without HPACT.[14]

One NRCS reported significantly more social work visits over a 2-year period for Veterans enrolled in HPACT compared to PACT (MD = 1.9, 95% CI [1.0, 2.8], $p = 0.001$). The same study found a large difference in 30-day prescription drug fills, with Veterans enrolled in HPACT having significantly fewer drug fills compared to PACT (MD = -18.3, 95% CI [-29.9, -6.7], $p = 0.001$).[15]

One single group study without data on utilization prior to enrollment in homeless specialized primary care reported the 12-month average number of encounters for other care (15.4, SD [18.9]).[38] This study

also found that 4.5% of Veterans received telehealth services and 1.7% received palliative care or hospice services.

Cost and Return on Investment

One NRCS found significantly lower total VA annual cost for Veterans enrolled in HPACT compared to similar Veterans in PACT (MD = -$9,352, 95% CI [-$17,281, -$1,422]).[15] The study analyzed Veterans between 2012 to 2014, and it was unclear whether dollars were indexed to a common year. The same study reported lower mental health-related substance abuse treatment costs and slightly higher primary care costs for those in HPACT compared to similar Veterans in PACT (MD = -$1,392, 95% CI [-$2,658, -$125] and MD = $681, 95% CI [$45, $1,316]). The study reported no significant difference in costs for specialty care, emergency department care, emergency department care for ambulatory care-sensitive conditions, VA sponsored community-based care, hospitalizations, or prescription drugs between groups.

No study reported return on investment or cost-effectiveness.

Satisfaction

Seven studies (6 NRCSs and 1 single group) reported on Veteran satisfaction. Five NRCSs compared HPACT to PACT and 1 NRCS compared homeless-tailored care to mainstream care. One NRCS used the Primary Care Quality-Homeless (PCQ-H) questionnaire and found a greater odds of reporting favorable outcomes on multiple domains for Veterans in HPACT compared to PACT: accessibility and coordination (aOR = 2.2, 95% CI [1.6, 3.1]), patient-clinician relationship (aOR = 1.9, 95% CI [1.4, 2.6]), perceived cooperation among clinician (aOR = 1.9, 95% CI [1.4, 2.6]), and homeless-specific needs (aOR = 2.1, 95% CI [1.5, 2.9]).[39]

Two NRCSs by the same researchers used the 2014–2015 PCMH-SHEP. One of these NRCSs found significantly higher positive experiences for Veterans at medical centers with HPACT compared to medical centers without HPACT for outcomes related to access (adjusted % = 45.5 vs 42.2, p = NR), communication (adjusted % = 65.8 vs 58.9, p = NR), office staff helpfulness/courtesy (adjusted % = 60.0 vs 58.8, p = NR), overall provider rating (adjusted % = 53.7 vs 48.0, p = NR), comprehensiveness (adjusted % = 48.4 vs 44.0, p = NR), care coordination (adjusted % = 59.9 vs 55.6, p = NR), shared decision-making (adjusted % = 42.3 vs 37.9, p = NR), and self-management (adjusted % = 52.6 vs 45.0, p = NR).[41] The other NRCS by these researchers found significantly higher positive experiences relating to access (aRD = 21.1, 95% CI [11.2, 31.0]), communication (aRD = 13.1, 95% CI [4.5, 21.7]), office staff helpfulness/courtesy (aRD = 12.3, 95% CI [3.5, 21.0]), and provider rating (aRD = 11.9, 95% CI [2.4, 21.4]) for Veterans enrolled in HPACT compared to similar Veterans at HPACT facilities who were not enrolled.[32] There was no significant difference in measures of comprehensiveness, coordination, self-management support, or shared decision-making between groups. The same study found slightly higher positive experiences relating to communication (aRD = 4.7, 95% CI [0.9, 8.4]) and self-management support (aRD = 4.6, 95% CI [0.7, 8.5]) for Veterans receiving primary care at HPACT facilities who were not enrolled in HPACT compared to Veterans receiving care at facilities without HPACT. There were no other significant differences between these groups.

One NRCS used PCQ-H to assess experiences of Veterans experiencing housing insecurity enrolled in HPACT to similar Veterans in PACT.[43] Veterans in HPACT compared to PACT had significantly lower unfavorable experience (indicating positive responses) weighted and adjusted scores (and

predicted percentages) for all domains, which included relationship, cooperation, access/coordination, and homeless-specific needs ($p < 0.001$ for all).

Another NRCS reported no significant differences in scores for domains of relationship (MD = -0.13, 95% CI [-0.44, 0.18]), cooperation (MD = -0.10, 95% CI [-0.46, 0.26]), access/coordination (MD = -0.04, 95% CI [-0.34, 0.26]), or homeless-specific needs (MD = -0.19, 95% CI [-0.45, 0.07]) for Veterans in homeless-tailored primary care compared to Veterans in usual primary care.[44]

One NRCS assessed multiple domains of satisfaction using a Likert scale (score 1-5, with 1 being strongly agree) for Veterans experiencing housing insecurity in HPACT and PACT.[15] The NRCS found no significant difference in domains relating to staff, care, contextual factors (such as cost and wait times), and perceived treatment between Veterans enrolled in HPACT and similar Veterans in PACT.

One single group study used the 2013 PCMH-SHEP to report experiences of care for Veterans experiencing housing insecurity enrolled in primary care.[31] This study found that more Veterans experiencing housing insecurity reported positive versus negative experiences with access (22.7% vs 16.0%, p = NR), communication (56.8% vs 13.0%, p = NR), office staff helpfulness/courtesy (55.0% vs 10.1%, p = NR), overall provider rating (45.6% vs 10.4%, p = NR), comprehensiveness (53.1% vs 18.8%, p = NR), care coordination (53.3% vs 12.6%, p = NR), mediation decision-making (41.3% vs 12.1%, p = NR), and self-management support (45.7% vs 31.4%, p = NR). Of note, the survey response options also included a moderate option (data omitted), and the study did not report data on experiences prior to enrollment in primary care.

Housing, Community Integration, and Food Insecurity

One single group study reported that 53.3% of Veterans receiving homeless-specialized primary care also received housing services.[38]

No study reported data on food insecurity.

Disease-Specific Outcomes

One NRCS reported no significant differences in any overdose outcomes (aOR = 1.09, 95% CI [0.92, 1.28]), drug-related overdose outcomes (aOR = 1.12, 95% CI [0.91, 1.38]), or alcohol-related overdose outcomes (aOR = 1.21, 95% CI [0.96, 1.53]) over 3 years for Veterans enrolled in HPACT compared to usual primary care.[47]

A second NRCS observed that significantly more Veterans achieved their target goal for lipid management in the homeless-oriented primary care group compared to non-tailored general internal medicine group (65.4% vs 45.5%, $p < 0.01$). However, the calculated odds ratio was not statistically significant (OR = 2.27, 95% CI [0.83, 6.18]). Finally, there were no significant differences in the odds of Veterans being at their target goal for overall blood pressure (OR = 1.24, 95% CI [0.41, 3.72]) or diabetes care (OR = 1.14, 95% CI [0.18, 7.28]).[36]

DISCUSSION

Establishing and engaging Veterans experiencing housing insecurity with primary care provides an opportunity to manage the complex medical and social needs of these Veterans. The present review synthesized available evidence on the benefits of primary care and homeless-tailored primary care for Veterans experiencing housing insecurity across a range of health care utilization and disease outcomes. We identified 4 studies that examined the effect of receiving primary care compared with not receiving primary care and 16 studies that compared homeless-tailored primary care to usual primary care. All the studies enrolled Veterans experiencing housing insecurity, but only 1 study analyzed Veterans exclusively from a named homeless program (HUD-VASH). The most frequently evaluated outcomes were emergency department use, satisfaction, inpatient, and special care use. Key findings include:

Effect of Engaging Veterans Experiencing Housing Insecurity in Primary Care

- Engaging Veterans experiencing housing insecurity in any primary care may significantly reduce hospitalizations and emergency department visits (moderate confidence).
- Among Veterans experiencing housing insecurity, primary care visits may be high after initial engagement in primary care and then decrease over time (low confidence).
- Studies provided insufficient evidence (no conclusion) for housing or community integration outcomes for housing-insecure Veterans who are versus are not established in primary care.
- The studies did not evaluate specialty care utilization, cost and return on investment, Veteran experience or satisfaction, or disease-specific outcomes.

Effect of Homeless-Tailored Primary Care versus Usual Primary Care

- Homeless-tailored primary care may reduce inpatient hospitalizations and emergency department visits and increase appropriate use of emergency care (low confidence).
- Studies provided insufficient evidence (no conclusion) on the effect of homeless-tailored compared to usual primary care on primary care utilization or overall specialty care utilization.
- Homeless-tailored primary care may reduce mental health and substance use visits (low confidence).
- Patient experiences may be better for housing-insecure Veterans in homeless-tailored primary care compared to usual primary care (low confidence).
- Homeless-tailored primary care may increase primary care costs and reduce emergency department and overall health care costs (low confidence).
- There is no evidence for a difference in disease-specific outcomes for Veterans in homeless-tailored primary care compared to usual care (low confidence).
- The studies did not evaluate housing and community integration outcomes.

Only 4 studies evaluated the effect (or association) of primary care (*ie,* yes or no primary care) on outcomes for Veterans experiencing housing insecurity. Two of the 4 studies included Veterans who were previously not established with primary care and 2 studies compared Veterans who did or did not

use primary care. Importantly, 2 of these studies were not originally designed to investigate the effect of primary care on outcomes. The studies identified fewer emergency department visits, as well as fewer inpatient admissions for Veterans experiencing housing insecurity engaged in primary care compared to those without primary care engagement. This finding is consistent with the broader literature that has concluded that increased access to primary care is generally associated with less use of acute care.[48, 49] Establishing and engaging Veterans in primary care likely prevents some acute events through better chronic disease management and diverting patients with low health needs that can be treated in primary care rather than the emergency deparment.[48, 50] Although the 4 studies did not evaluate cost, the findings of reduced acute care may translate into cost savings and a positive return on investment for engaging Veterans experiencing housing insecurity in primary care. One study found that for Veterans newly established in primary care, primary care use was initially high and then decreased over time. Although the study did not provide an explanation for this result, this finding may point to a high number of unmet health care needs in the population. These needs may be addressed during the initial primary care visits and then stabilize over time. Furthermore, studies provided insufficient evidence to determine the effect of engaging in primary care on housing or community integration outcomes, and no studies examined the effect of primary care on specialty care use or chronic disease management for Veterans experiencing housing insecurity.

More studies compared homeless-tailored primary care (either HPACT or a model of homeless-tailored primary care) to general or usual primary care. Studies likely focused on this comparison because VA providers (at the national and medical center levels) have implemented multiple models of homeless-tailored primary care, which can be compared to usual primary care. Models of homeless-tailored primary care have been labeled differently in the literature, but generally consist of high staff-to-patient ratios, traditional primary care services, non-medical social services, and outreach.[51] Homeless-tailored primary care may reduce inpatient hospitalizations and emergency department visits and increase appropriate use of emergency care. Of note, the studies did not consistently report whether hospitalizations or emergency department visits were for a specific cause or represented all-cause utilization. The reductions in acute care occurred despite insufficient evidence for primary care utilization or overall specialty care utilization for Veterans in homeless-tailored primary care compared to usual primary care. One study found that primary care costs were higher for those in HPACT compared to PACT, but emergency department and overall costs were lower. Again, studies were not designed nor reported data to fully understand the mechanism through which homeless-tailored primary care affects outcomes. Importantly, Veterans in homeless-tailored primary care had higher experience or satisfaction scores indicating that they rated the added services or attitudes typically provided with tailored care higher than usual care. Studies of the general population have demonstrated that satisfaction with health care is important and associated with better patient outcomes.[52] We concluded that tailored primary care may reduce mental health and substance use services. This may be because homeless-tailored primary care includes these services as part of their model of care. However, an alternative explanation is that Veterans in HPACT may not receive the same referrals for services as non-HPACT Veterans.

STRENGTHS AND LIMITATIONS OF THE EVIDENCE BASE

The overall evidence base has important methodological limitations. First, the studies varied considerably in design and aims, precluding simple summarization across studies or meta-analysis. Second, the studies used different terms to define the population of Veterans experiencing housing insecurity. Some studies labeled the population as homeless, while others used terms such as patients with homeless experiences, homeless-experienced, and people who have experienced homelessness.

Sometimes when the term "homeless" was used, it was unclear whether this meant homelessness at the time of inclusion into the study or a history of (prior) homelessness. Moving forward, there should be an eye towards consistent language to describe the population of "homeless" Veterans.

Third, the studies varied in their method of identifying relevant Veterans, with most studies using a combination of ICD codes and VA homeless service use or enrollment in HPACT or specialized primary care. In some cases, simply relying on ICD codes and homeless service use may not provide a full count of Veterans experiencing housing insecurity.[53] Moreover, the studies used different lookback periods when defining their inclusion criteria. Longer lookback periods will include more Veterans with a history of homelessness, but comparing someone who was homeless 3 years ago versus within the last year may not be comparable. Using program enrollment data is a strong approach but, in some cases, can still leave challenges with identifying a comparable comparison group.

Fourth, studies did not examine whether the benefits of primary care were consistent across important subpopulations of Veterans, many of which are disproportionately impacted by homelessness. Individuals experiencing homelessness may already face barriers to accessing appropriate health care, and those who are racial or ethnic minorities may encounter additional cultural or systemic barriers to appropriate health care utilization.[54] In addition, female Veterans may be more likely to experience housing insecurity and have more health and social unmet needs.[3, 4] Furthermore, the intersectionality between race and gender (and sexual and gender identity) may have important implications for these subpopulations. Subgroup analyses by race and ethnicity, gender, sexual identity, and other sociodemographic factors could provide a better understanding of how primary care access or tailored primary care use may differentially affect these groups.

Fifth, although of importance to operational partners, studies were inconsistent in whether they reported cost, return on investment, disease-specific outcomes, and housing outcomes.

Lastly, the evidence on the effect of establishing Veterans experiencing housing insecurity in primary care has additional unique challenges. It is typically not practical, and may not be ethical, to randomize Veterans to receive or not receive primary care. Thus, investigators must rely on observational data (mostly VA electronic medical records) to compare Veterans who do and do not engage in care. Even when controlling for confounders with robust VA data, the potential for selection bias is still likely to be high when investigating primary care as an exposure. Factors such as degree of treatment readiness and treatment engagement, history of stigmatization, contributing impacts of other social drivers of health, and co-occurring conditions can impact Veterans' engagement in primary care. Because of this, it may be challenging to draw conclusion from the current evidence without the need for several caveats to these results. Importantly, 2 of the 4 studies examining the effect of primary care exposure were designed to investigate a different question but reported sufficient data to allow us to extract relevant data for the purposes of this review.[34, 35]

Challenges for addressing selection bias persist for studies evaluating the effect of homeless-tailored primary care versus usual primary care. In multiple studies, there were concerns related to the representativeness of the comparator group or the use of crude unadjusted analyses. To address selection bias, some studies made use of natural variation in time and/or location of implementation of homeless-tailored primary care. For example, 1 study compared Veterans in homeless-tailored primary care to a historical comparison group,[36] and 4 studies compared Veterans in medical centers that did or did not offer HPACT.[14,32,36,41] However, in these studies there were still challenges with finding a comparable exposure time for the comparison group.

IMPLICATIONS FOR VA POLICY AND PRACTICE

There is a VHA priority to support Veterans' whole health. For Veterans experiencing housing insecurity, this includes primary care, housing, and treatment of medical and mental health conditions. We found that establishing and engaging Veterans experiencing housing insecurity in primary care was associated with lower emergency department use, including inappropriate emergency department use and fewer hospitalizations. In addition, Veterans enrolled in a homeless-tailored primary care felt more "satisfied" or had more positive experiences with their care. Because of the reduction in emergency and inpatient visits and efficient use of outpatient care, there is clear value in establishing Veterans experiencing housing insecurity in primary care. Although homeless-tailored primary care has some additional benefits over usual primary care, it is commonly accepted that any primary care is better than none.

Engaging and retaining Veterans experiencing housing insecurity in VA care is important because this population has housing, social, and medical needs that may be difficult to address outside the VA in a community setting. In comparison, the VA is uniquely able to provide these Veterans with comprehensive supports to address housing, social, and medical needs. The VA is positioned to enroll Veterans experiencing housing insecurity in primary care. The multiple VA programs to end Veteran homelessness typically have formal intake assessments, enrollments in programming, and multiple contacts with staff. During intake or other contacts with homeless program staff, there is an opportunity to refer Veterans to primary care. VA decision-makers should consider developing a formal protocol that facilitates referrals between homeless program staff and primary care staff. Any formal protocol should be evaluated using rigorous implementation science methods. Evaluating efforts to strengthen connections between programs may require adding additional questions or items to homeless program intake assessments, but adding items to program intake will need to be balanced against staff time and burden.

STRENGTHS AND LIMITATIONS OF THE SYSTEMATIC REVIEW PROCESS

Our review represents the most up-to-date report evaluating the effect of establishing Veterans experiencing housing insecurity in primary care and the effect of tailored primary care compared to usual primary care. We used a custom search and uniform screening protocol to identify studies relevant to the key questions of this review, and the review team included individuals with both methodological and topic expertise. We did not differentiate between different tailored primary care programs and instead evaluated them as a single group. In addition, we did not differentiate between the types of usual primary care, which consisted of programs described as PACT and general internal medicine primary care. Care provided across these programs (both intervention and usual care) may be different, making it challenging to understand what aspects of tailored primary care affect outcomes. Further, because many of these studies utilized the same VA data (medical centers with HPACT) or national Veteran surveys, the same Veterans may be included in more than one of the identified studies. Lastly, many studies were not designed to directly investigate the effect of primary care. As a result, it was necessary to exclude information from some comparison groups (such as from studies that compared Veterans experiencing housing insecurity to stably housed Veterans) and to evaluate some NRCSs as single group studies. Related, we may have missed some studies where the effect of primary care for Veterans experiencing housing insecurity was not the aim of the study and instead the study only used primary care as a covariate in a regression model.

FUTURE RESEARCH

The evidence base regarding the effect of establishing Veterans experiencing housing insecurity in primary care is small. Although it is not practical or ethical to randomize Veterans to primary care, there are opportunities for qualitative research to understand barriers and facilitators to accessing care and the perceived benefits of primary care.

Investigating homeless-tailored primary care compared to usual primary care may be an ideal scenario for site-level randomization (*ie,* randomized at the Medical Center level),[55, 56] such as that used in VA's Partnered Evidence-Based Policy Resource Center random program evaluation model. Cluster or site-level randomized trials may allow for higher quality studies while reducing the ethical considerations surrounding randomizing Veterans to homeless-tailored primary care or usual primary care. Future studies evaluating homeless-tailored primary care should also focus on describing the specific features of the tailored primary care model and understanding the aspects of tailored primary care that create value. For example, Multiphase Optimization Strategy (MOST) framework is one approach to understand the different features of homeless-tailored primary care that are most effective. Further, there was limited information for several outcomes of interest, including data on costs and disease-specific outcomes. Additional cost and cost-effectiveness data would be particularly powerful to help understand the resources required to deliver homeless-tailored primary care. For studies conducted in the VA, cost data may be relatively easy to evaluate (obtained from routinely captured VA data) and would not increase participant burden with surveys.

Additionally, there have also been several adaptations to HPACT, including the use of Mobile Medical Units, which may increase access to care for underserved communities.[57] Future studies should explore the impact of these HPACT adaptations. There is also a need for future studies to consider the contextual factors that influence care, such as neighborhood factors and transportation access.[58] Identified studies were too dissimilar to permit meta-analyses. While future studies should build on existing evidence, they should also be designed to be comparable to each other. VA researchers and staff should consider prospectively planning studies together or develop consensus about the best study designs to use and most actionable outcomes to assess.

CONCLUSIONS

Findings from this review highlight the potential value of establishing and engaging Veterans experiencing housing insecurity in primary care and more specifically homeless-tailored primary care. Benefits of primary care for Veterans experiencing housing insecurity include reducing hospitalizations and emergency department visits. Although these studies did not evaluate cost, the reductions in acute care may translate to cost savings and a return on investment. In addition, homeless-tailored primary care may provide some additional benefits over usual primary care for Veterans experiencing housing insecurity, including reduced inpatient hospitalizations and emergency department visits and increased appropriate use of emergency care, overall cost savings, and better experiences with care. Homeless-tailored primary care may reduce the use of mental health and substance treatment, but this could be because homeless-tailored primary care includes these services in its model of care or because referral practices differ for Veterans who are versus are not enrolled in HPACT. Additional data are needed on the effect of engagement in primary care on disease and community integration outcomes, and on cost and return on investment of homeless-tailored primary care. Future studies should also aim to understand the specific features of homeless-tailored primary care and how they affect outcomes.

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Appendix

APPENDIX A. SEARCH STRATEGIES

Search Date: 03/26/2024		Search Statement	Results
Ovid Medline	1	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 ((primary adj3 (care or healthcare)) or ((annual or health or wellness) adj3 (exam* or visit*)) or ((family or general) adj3 (doctor* or medicine or nurse* or physician* or practi*)) or (collaborative adj2 (care or model* or practi?e*)) or (community adj3 (health* or nurs*)) or (mobile adj3 (hospital* or health unit* or health van* or clinic*)) or ((coordinat* or co-locat* or colocat* or integrat*) adj3 (health service* or health care or healthcare)) or (patient-centered adj3 medical home*) or PCMH or (patient aligned adj (care or healthcare) adj team*) or PACT or PACTs).ti,ab,kf.	662562
	2	Veterans/ or Veterans Health/ or Veterans Health Services/ or veteran*.ti,ab,kf.	49894
	3	exp Ill-Housed Persons/ or exp Homeless Persons/ or (homeless* or ill-housed or "no fixed address" or roofless* or rough sleep* or squatter* or ((street or transient*) adj3 (adolescent* or adult* or dweller* or individual* or man or men or people* or person* or population* or teen* or woman or women or youth*)) or ((inequalit* or insecurit* or instabilit* or lack or nonpermanent or non-permanent or precarious or temporary or supportive or unstable* or vulnerab*) adj2 (home* or hous* or accommodation* or apartment* or shelter* or hostel* or dwelling*))).ti,ab,kf.	26748
	4	and/1-3	220
	5	(Compensated Work Therapy or CWT or Domiciliary Care for Homeless Veterans or DCHV or "Grants and Per Diem" or GPD or Health Care for Reentry Veterans or HCRV or Health Care for Homeless Veterans or HCHV or Homeless Veteran Community Employment or HVCES or Homeless Veterans Dental Program or Stand Down* or "Substance Use Disorder Treatment Enhancement Initiative" or Supportive Services for Veteran Families or SSVF or Veterans Affairs Supportive Housing or VA Supportive Housing or HUD-VASH or Veteran Justice Outreach or VJO).ti,ab,kf.	2429
	6	1 and 5	36
	7	(HPACT or HPACTs or Homeless Patient Aligned Care Team*).ti,ab,kf.	22
	8	4 or 6 or 7	247
Cochrane	1	MeSH descriptor: [Primary Health Care] explode all trees	11756
	2	MeSH descriptor: [Physicians, Family] this term only	538
	3	MeSH descriptor: [Physicians, Primary Care] this term only	243
	4	MeSH descriptor: [General Practitioners] this term only	592
	5	MeSH descriptor: [Family Practice] this term only	2373

6	MeSH descriptor: [Community Health Services] this term only	1371
7	MeSH descriptor: [Community Health Nursing] this term only	387
8	MeSH descriptor: [Community Health Centers] explode all trees	715
9	MeSH descriptor: [Family Nursing] this term only	48
10	MeSH descriptor: [Mobile Health Units] this term only	84
11	((primary NEAR/3 (care or healthcare)) or ((annual or health or wellness) NEAR/3 (exam* or visit*)) or ((family or general) NEAR/3 (doctor* or medicine or nurse* or physician* or practi*)) or (collaborative NEAR/2 (care or model* or practi?e*)) or (community NEAR/3 (health* or nurs*)) or (mobile NEAR/3 (hospital* or health unit* or health van* or clinic*)) or ((coordinat* or co-locat* or colocat* or integrat*) NEAR/3 (health service* or health care or healthcare)) or (patient-centered NEAR/3 medical home*) or PCMH or (patient aligned NEAR/1 (care or healthcare) NEAR/1 team*) or PACT or PACTs):ti,ab,kw	67505
12	{or #1-#11}	71931
13	MeSH descriptor: [Veterans] this term only	1665
14	MeSH descriptor: [Veterans Health] this term only	72
15	MeSH descriptor: [Veterans Health Services] this term only	9
16	veteran*:ti,ab,kw	7541
17	{or #13-#16}	7541
18	MeSH descriptor: [Ill-Housed Persons] explode all trees	543
19	(homeless* or ill-housed or "no fixed address" or roofless* or rough sleep* or squatter* or ((street or transient*) NEAR/3 (adolescent* or adult* or dweller* or individual* or man or men or people* or person* or population* or teen* or woman or women or youth*)) or ((inequalit* or insecurit* or instabilit* or lack or nonpermanent or non-permanent or precarious or temporary or supportive or unstable* or vulnerab*) NEAR/2 (home* or hous* or accommodation* or apartment* or shelter* or hostel* or dwelling*))):ti,ab,kw	1923
20	#18 or #19	1923
21	#12 and #17 and #20	40
22	(Compensated Work Therapy or CWT or Domiciliary Care for Homeless Veterans or DCHV or "Grants and Per Diem" or GPD or Health Care for Reentry Veterans or HCRV or Health Care for Homeless Veterans or HCHV or Homeless Veteran Community Employment or HVCES or Homeless Veterans Dental Program or Stand Down* or "Substance Use Disorder Treatment Enhancement Initiative" or Supportive Services for Veteran Families or SSVF or Veterans Affairs Supportive Housing or VA Supportive Housing or HUD-VASH or Veteran Justice Outreach or VJO):ti,ab,kw	919
23	#12 and #22	117
24	(HPACT or HPACTs or Homeless Patient Aligned Care Team*):ti,ab,kw	5
25	#21 or #23 or #24	97

CINAHL	1	((MH “Primary Health Care”) or (MH “Physicians, Family”) or (MH “Family Practice”) or (MH “Community Health Services+”) or (MH “Community Health Nursing+”) or (MH “Community Health Centers+”) or (MH “Family Nurses”) or (MH “Family Nursing”) or (MH “Family Nurse Practitioners”) or (MH “Mobile Health Units”)) OR TI (((primary N3 (care or healthcare)) or ((annual or health or wellness) N3 (exam* or visit*)) or ((family or general) N3 (doctor* or medicine or nurse* or physician* or practi*)) or (collaborative N2 (care or model* or practi?e*)) or (community N3 (health* or nurs*)) or (mobile N3 (hospital* or health unit* or health van* or clinic*)) or ((coordinat* or co-locat* or colocat* or integrat*) N3 (health service* or health care or healthcare)) or (patient-centered N3 medical home*) or PCMH or (patient aligned N1 (care or healthcare) N1 team*) or PACT or PACTs)) OR AB (((primary N3 (care or healthcare)) or ((annual or health or wellness) N3 (exam* or visit*)) or ((family or general) N3 (doctor* or medicine or nurse* or physician* or practi*)) or (collaborative N2 (care or model* or practi?e*)) or (community N3 (health* or nurs*)) or (mobile N3 (hospital* or health unit* or health van* or clinic*)) or ((coordinat* or co-locat* or colocat* or integrat*) N3 (health service* or health care or healthcare)) or (patient-centered N3 medical home*) or PCMH or (patient aligned N1 (care or healthcare) N1 team*) or PACT or PACTs))	819396
	2	(MH "Veterans+") or (MH “Veterans Health Services”) or veteran*	36592
	3	(MH "Homeless Persons") OR TI ((homeless* or ill-housed or "no fixed address" or roofless* or rough sleep* or squatter* or ((street or transient*) N3 (adolescent* or adult* or dweller* or individual* or man or men or people* or person* or population* or teen* or woman or women or youth*)) or ((inequalit* or insecurit* or instabilit* or lack or nonpermanent or non-permanent or precarious or temporary or supportive or unstable* or vulnerab*) N2 (home* or hous* or accommodation* or apartment* or shelter* or hostel* or dwelling*)))) OR AB ((homeless* or ill-housed or "no fixed address" or roofless* or rough sleep* or squatter* or ((street or transient*) N3 (adolescent* or adult* or dweller* or individual* or man or men or people* or person* or population* or teen* or woman or women or youth*)) or ((inequalit* or insecurit* or instabilit* or lack or nonpermanent or non-permanent or precarious or temporary or supportive or unstable* or vulnerab*) N2 (home* or hous* or accommodation* or apartment* or shelter* or hostel* or dwelling*))))	18001
	4	S1 and S2 and S3	187
	5	TI ((Compensated Work Therapy or CWT or Domiciliary Care for Homeless Veterans or DCHV or "Grants and Per Diem" or GPD or Health Care for Reentry Veterans or HCRV or Health Care for Homeless Veterans or HCHV or Homeless Veteran Community Employment or HVCES or Homeless Veterans Dental Program or Stand Down* or "Substance Use Disorder Treatment Enhancement Initiative" or Supportive Services for Veteran Families or SSVF or Veterans Affairs Supportive Housing or VA Supportive Housing or HUD-VASH or Veteran Justice Outreach or VJO)) OR AB ((Compensated Work	346

		Therapy or CWT or Domiciliary Care for Homeless Veterans or DCHV or "Grants and Per Diem" or GPD or Health Care for Reentry Veterans or HCRV or Health Care for Homeless Veterans or HCHV or Homeless Veteran Community Employment or HVCES or Homeless Veterans Dental Program or Stand Down* or "Substance Use Disorder Treatment Enhancement Initiative" or Supportive Services for Veteran Families or SSVF or Veterans Affairs Supportive Housing or VA Supportive Housing or HUD-VASH or Veteran Justice Outreach or VJO))	
	6	S1 and S5	41
	7	(HPACT or HPACTs or Homeless Patient Aligned Care Team*)	14
	8	S4 or S6 or S7	217
PsycInfo	1	exp Primary Health Care/ or Physicians, Family/ or General Practitioners/ or Family Medicine/ or exp Community Mental Health Services/ or Community Mental Health Centers/ or ((primary adj3 (care or healthcare)) or ((annual or health or wellness) adj3 (exam* or visit*)) or ((family or general) adj3 (doctor* or medicine or nurse* or physician* or practi*)) or (collaborative adj2 (care or model* or practi?e*)) or (community adj3 (health* or nurs*)) or (mobile adj3 (hospital* or health unit* or health van* or clinic*)) or ((coordinat* or co-locat* or colocat* or integrat*) adj3 (health service* or health care or healthcare)) or (patient-centered adj3 medical home*) or PCMH or (patient aligned adj (care or healthcare) adj team*) or PACT or PACTs).ti,ab	131367
	2	Military Veterans/ or veteran*.ti,ab	28094
	3	exp Homeless/ or (homeless* or ill-housed or "no fixed address" or roofless* or rough sleep* or squatter* or ((street or transient*) adj3 (adolescent* or adult* or dweller* or individual* or man or men or people* or person* or population* or teen* or woman or women or youth*)) or ((inequalit* or insecurit* or instabilit* or lack or nonpermanent or non-permanent or precarious or temporary or supportive or unstable* or vulnerab*) adj2 (home* or hous* or accommodation* or apartment* or shelter* or hostel* or dwelling*))).ti,ab	18002
	4	and/1-3	89
	5	(Compensated Work Therapy or CWT or Domiciliary Care for Homeless Veterans or DCHV or "Grants and Per Diem" or GPD or Health Care for Reentry Veterans or HCRV or Health Care for Homeless Veterans or HCHV or Homeless Veteran Community Employment or HVCES or Homeless Veterans Dental Program or Stand Down* or "Substance Use Disorder Treatment Enhancement Initiative" or Supportive Services for Veteran Families or SSVF or Veterans Affairs Supportive Housing or VA Supportive Housing or HUD-VASH or Veteran Justice Outreach or VJO).ti,ab	293
	6	1 and 5	8
	7	(HPACT or HPACTs or Homeless Patient Aligned Care Team*).ti,ab	4
	8	4 or 6 or 7	90

Scopus	1	TITLE-ABS-KEY((primary W/3 (care OR healthcare)) OR ((annual OR health OR wellness) W/3 (exam* OR visit*)) OR ((family OR general) W/3 (doctor* OR medicine OR nurse* OR physician* OR practi*)) OR (collaborative W/2 (care OR model* OR practi?e*)) OR (community W/3 (health* OR nurs*)) OR (mobile W/3 (hospital* OR "health unit" OR "health units" OR "health van" OR "health van" OR clinic*)) OR ((coordinat* OR co-locat* OR colocat* OR integrat*) W/3 ("health service" OR "health services" OR "health care" OR healthcare)) OR (patient-centered W/3 ("medical home" OR "medical homes")) OR pcmh OR (patient-aligned W/1 (care OR healthcare) W/1 team*) OR PACT OR PACTs)	896282
	2	TITLE-ABS-KEY(veteran*)	69228
	3	TITLE-ABS-KEY(homeless* or ill-housed or "no fixed address" or roofless* or “rough sleep” or “rough sleeping” or squatter* or ((street or transient*) W/3 (adolescent* or adult* or dweller* or individual* or man or men or people* or person* or population* or teen* or woman or women or youth*)) or ((inequalit* or insecurit* or instabilit* or lack or nonpermanent or non-permanent or precarious or temporary or supportive or unstable* or vulnerab*) W/2 (home* or hous* or accommodation* or apartment* or shelter* or hostel* or dwelling*)))	63849
	4	1 and 2 and 3	263
	5	TITLE-ABS-KEY(“Compensated Work Therapy” or CWT or “Domiciliary Care for Homeless Veterans” or DCHV or "Grants and Per Diem" or GPD or “Health Care for Reentry Veterans” or HCRV or “Health Care for Homeless Veterans” or HCHV or “Homeless Veteran Community Employment” or HVCES or “Homeless Veterans Dental Program” or “Stand Down” or “Stand Downs” or "Substance Use Disorder Treatment Enhancement Initiative" or “Supportive Services for Veteran Families” or SSVF or “Veterans Affairs Supportive Housing” or “VA Supportive Housing” or HUD-VASH or “Veteran Justice Outreach” or VJO)	11118
	6	1 and 5	50
	7	TITLE-ABS-KEY(HPACT or HPACTs or “Homeless Patient Aligned Care”)	25
	8	4 or 6 or 7	309
ClinicalTrials.gov	1	Condition/Disease: Homelessness and Other Terms: VA	
	2	Condition/Disease: Homelessness and Other Terms: veterans	
	3	Condition/Disease: Homelessness and Other Terms: PACT	
	4	Condition/Disease: Homelessness and Other Terms: HPACT	52
		Total	1,012
		Total after deduplication	**654**

APPENDIX B. STUDIES EXCLUDED DURING FULL-TEXT SCREENING

Citation and *Reason for Exclusion*
Bhalla IP, Stefanovics EA, Rosenheck RA. Social determinants of mental health care systems: intensive community based care in the Veterans Health Administration. *BMC Public Health.* 2020;20(1):1311. *Not comparison/outcome of interest.*
Blonigen D, Hyde J, McInnes DK, et al. Integrating data analytics, peer support, and whole health coaching to improve the health outcomes of homeless veterans: study protocol for an effectiveness-implementation trial. *Contemporary Clinical Trials. article (non-systematic), editorial, case report/case series, protocol, or other publication type not of interest.*
Blue-Howells J, McGuire J, Nakashima J. Co-location of health care services for homeless veterans: a case study of innovation in program implementation. *Social Work in Health Care.* 2008;47(3):219-31. *Review article (non-systematic), editorial, case report/case series, protocol, or other publication type not of interest.*
Chang ET, Zulman DM, Nelson KM, et al. Use of general primary care, specialized primary care, and other veterans affairs services among high-risk veterans. *JAMA Network Open.* 2020;3(6):E208120. *Duplicate.*
Chrystal JG, Glover DL, Young AS, et al. Experience of primary care among homeless individuals with mental health conditions. *PloS One.* 2015;10(2):e0117395. *Non-Veteran population.*
Chrystal JG, Glover DL, Young AS, et al. Experience of primary care among homeless individuals with mental health conditions. *PloS One.* 2015;10(2):e0117395. *Duplicate.*
Davis JA, Tsui I, Gelberg L, Gabrielian S, Lee ML, Chang ET. Risk factors for diabetic retinopathy among homeless veterans. *Psychological Services.* 2017;14(2):221-228. *Not comparison/outcome of interest.*
Etchin AG, LaCoursiere-Zucchero T, McDannold SE, McInnes DK. Dual use of Department of Veterans Affairs and community healthcare: homeless veterans' experiences, perspectives, and perceptions. *Journal of the American Association of Nurse Practitioners.* 2021;33(11):991-998. *Wrong study design.*
Gabrielian S, Hamilton AB, Alexandrino A, Hellemann G, Young AS. "They're homeless in a home": retaining homeless-experienced consumers in supported housing. *Psychological Services.* 2017;14(2):154-166. *Wrong study design.*
Gabrielian S, Jones AL, Hoge AE, et al. Enhancing primary care experiences for homeless patients with serious mental illness: results from a national survey. *Journal of Primary Care & Community Health*. 2021;12:2150132721993654. *Duplicate.*
Gabrielian S, Yuan AH, Andersen RM, Rubenstein LV, Gelberg L. VA health service utilization for homeless and low-income veterans: a spotlight on the VA Supportive Housing (VASH) program in greater Los Angeles. *Medical Care.* 2014;52(5):454-61. *Not comparison/outcome of interest.*
Gelberg L, Edwards ST, Hooker ER, et al. Integrating interprofessional trainees into a complex care program for veterans experiencing homelessness: effects on health services utilization. *Journal of General Internal Medicine.* 2021;36(12):3659-3664. *Not intervention of interest.*
Jones AL, Gordon AJ, Gabrielian SE, et al. Perceptions of care coordination among homeless veterans receiving medical care in the veterans health administration and community care settings results from a national survey. *Medical Care.* 2021;59(6):504-512. *Wrong setting.*
Jones AL, Hausmann LRM, Kertesz S, et al. Differences in experiences with care between homeless and nonhomeless patients in Veterans Affairs facilities with tailored and nontailored pimary care teams. *Medical Care.* 2018;56(7):610-618. *Duplicate.*
Jones AL, Hausmann LRM, Kertesz SG, et al. Providing positive primary care experiences for homeless veterans through tailored medical homes: the Veterans Health Administration's Homeless Patient Aligned Care Teams. *Medical Care.* 2019;57(4):270-278. *Duplicate.*
Kertesz SG, deRussy AJ, Kim Y-I, et al. Comparison of patient experience between primary care settings tailored for homeless clientele and mainstream care settings. *Medical Care.* 2021;59(6):495-503. *Duplicate.*

Citation and *Reason for Exclusion*
Kertesz SG, Holt CL, Steward JL, et al. Comparing homeless persons' care experiences in tailored versus nontailored primary care programs. *American Journal of Public Health.* 2013;103 Suppl 2:S331-9. *Duplicate.*
McGuire J, Gelberg L, Blue-Howells J, Rosenheck RA. Access to primary care for homeless veterans with serious mental illness or substance abuse: a follow-up evaluation of co-located primary care and homeless social services. *Administration and Policy in Mental Health*. 2009;36(4):255-64. *Not comparison/outcome of interest.*
McGuire J, Rosenheck R. The quality of preventive medical care for homeless veterans with mental illness. Journal for Healthcare Quality: Official Publication of the National Association for Healthcare Quality. 2005;27(6):26-32. *Not comparison/outcome of interest.*
Montgomery AE, Cusack M, Szymkowiak D, Fargo J, O'Toole T. Factors contributing to eviction from permanent supportive housing: lessons from HUD-VASH. *Evaluation and Program Planning.* 2017;61:55-63. *Not comparison/outcome of interest.*
O'Toole TP, Buckel L, Bourgault C, et al. Applying the chronic care model to homeless veterans: effect of a population approach to primary care on utilization and clinical outcomes. *American Journal of Public Health.* 2010;100(12):2493-9. *Duplicate.*
O'Toole TP, Buckel L, Bourgault C, et al. Applying the chronic care model to homeless veterans of a population approach to primary care on utilization and clinical outcomes. *American Journal of Public Health.* 2010;100(12):2493-2499. *Duplicate.*
O'Toole TP, Johnson EE, Borgia ML, Rose J. Tailoring outreach efforts to increase primary care use among homeless veterans: results of a randomized controlled trial. *Journal of General Internal Medicine.* 2015;30(7):886-98. *Not intervention of interest.*
O'Toole TP, Johnson EE, Redihan S, Borgia M, Rose J. Needing primary care but not getting it: the role of trust, stigma and organizational obstacles reported by homeless veterans. *Journal of Health Care for the Poor and Underserved.* 2015;26(3):1019-31. *Not comparison/outcome of interest.*
Simmons MM, Gabrielian S, Byrne T, et al. A Hybrid III stepped wedge cluster randomized trial testing an implementation strategy to facilitate the use of an evidence-based practice in VA Homeless Primary Care Treatment Programs. *Implementation Science*. 2017;12(1):46. *Review article (non-systematic), editorial, case report/case series, protocol, or other publication type not of interest.*
Swankoski KE, Reddy A, Grembowski D, Chang ET, Wong ES. Intensive care management for high-risk veterans in a patient-centered medical home – do some veterans benefit more than others? *Healthcare*. 2023;11(2)100677. *Not specific to individuals at risk of or experiencing homelessness.*
Temblique EKR, Foster K, Fujimoto J, Kopelson K, Borthwick KM, Capone-Newton P. A 1-Year review of a nationally led intervention to improve suicide prevention screening at a large homeless veterans clinic. *Federal Practitioner*. 2022;39(1):12-18. *No intervention of interest.*
Tsai J, Havlik J, Howell BA, Johnson E, Rosenthal D. Primary care for veterans experiencing homelessness: a narrative review of the Homeless Patient Aligned Care Team (HPACT) Model. *Journal of General Internal Medicine.* 2023;38(3):765-783. *Review article (non-systematic), editorial, case report/case series, protocol, or other publication type not of interest.*
Zulman DM, Chee CP, Ezeji-Okoye SC, et al. Effect of an intensive outpatient program to augment primary care for high-need veterans affairs patients a randomized clinical trial. Article. *JAMA Internal Medicine.* 2017;177(2):166-175. Not specific to individuals at risk of or experiencing homelessness.

Notes. Five excluded records were duplicates within this list.

APPENDIX C. RISK OF BIAS ASSESSMENTS

Author, Year, PMID, Design	Random sequence generation (selection bias)	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessor	Incomplete outcome data (attrition bias)	Selective Reporting (reporting bias)	Intention-to-treat analysis	Clear reporting with no discrepancies	Were eligibility criteria clear?	Were interventions adequately described?	Were the outcomes fully defined?	NRCS & Single: Representativeness of the cohort(s)	NRCS: Comparator representativeness	NRCS: Adjustment for confounders	Other bias	Overall RoB
Chang, 2020, 3259799, SG	NA	NA	NA	Unclear	Low	NA	NA	Yes	Yes	Yes	Yes	Low	NA	NA	High[a]	High[a]
Chinchilla,2019, 31297070, NRCS	NA	NA	NA	Low	Low	NA	NA	Yes	Yes	Yes	Yes	Low	Yes (low ROB)	Low[b]	Low	Low
Gabrielian, 2021, 33543675, NRCS	NA	NA	NA	High[c]	Low	NA	NA	Yes	Yes	Yes	Yes	Low	Yes (low ROB)	Low[b]	Low	Moderate
Gundlapalli, 2017, 28806373, NRCS	NA	NA	NA	Low	Low	NA	NA	No[d]	Yes	Yes	Yes	Low	No (high ROB)[e]	Low[b]	Low	High
Johnson, 2017, 28481601, NRCS	NA	NA	NA	Unclear	Low	Low	Low	Yes	Yes	Yes	Yes	Low	Yes (low ROB	High[f]	Low	Moderate
Jones, 2023, 35194740, SG	NA	NA	NA	Low	Unclear	NA	NA	Yes	Yes	Yes	Yes	Low	NA	NA	Lows	Low
Jones, 2018, 29412071, SG	NA	NA	NA	Low	Low	NA	NA	Yes	Yes	Yes	Yes	Low	NA	NA	Low	Low
Jones, 2023, 36810631, NRCS	NA	NA	NA	Low	Low	NA	NA	Yes	Yes	Yes	Yes	Unclear	Yes (low ROB)	Low[b]	Low	Low
Jones, 2017, 28481602, SG	NA	NA	NA	High [c]	Low	NA	NA	Yes	Yes	Yes	Yes	Low	NA	NA	High[a]	High[a]

Author, Year, PMID, Design	Random sequence generation (selection bias)	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessor	Incomplete outcome data (attrition bias)	Selective Reporting (reporting bias)	Intention-to-treat analysis	Clear reporting with no discrepancies	Were eligibility criteria clear?	Were interventions adequately described?	Were the outcomes fully defined?	NRCS & Single: Representativeness of the cohort(s)	NRCS: Comparator representativeness	NRCS: Adjustment for confounders	Other bias	Overall RoB
Jones, 2018, 29762272, NRCS	NA	NA	NA	High [c]	Low	NA	NA	Yes	Yes	Yes	Yes	Low	Yes (low ROB)	Low[b]	Low	Moderate
Jones, 2019, 30789541, NRCS	NA	NA	NA	High [c]	Low	NA	NA	Yes	Yes	Yes	Yes	Low	Yes (low ROB)	Low[b]	Low	Moderate
Kertesz, 2021, 33827104, NRCS	NA	NA	NA	High [c]	Low	NA	NA	Yes	Yes	Yes	Yes	Low	Yes (low ROB	Low[b]	Low	Moderate
Kertesz, 2013, 24148052, NRCS	NA	NA	NA	Low	Low	NA	NA	Yes	Yes	Yes	Yes	Low	Yes (low ROB	High[f]	Low	Moderate
O'Toole, 2010, 20966377, NRCS[g]	NA	NA	NA	Low	Low	NA	NA	Yes	Yes	Yes	Yes	Low	No (High)[h]	Low[b]	Low	Moderate
O'Toole, 2018, 29451116, NRCS	NA	NA	NA	High [c]	Low	NA	NA	Yes	Yes	Yes	Yes	Unclear	Yes (low ROB)	Low[b]	Low	Moderate
O'Toole, 2013, 24148042, SG	NA	NA	NA	Low	Low	NA	NA	Yes	Yes	Yes	Yes	Low	NA	NA	High[a]	High[a]
O'Toole, 2016, 27032987, SG	NA	NA	NA	Low	Low	NA	NA	Yes	Yes	Yes	Yes	Unclear	NA	NA	Low	Low

Author, Year, PMID, Design	Random sequence generation (selection bias)	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessor	Incomplete outcome data (attrition bias)	Selective Reporting (reporting bias)	Intention-to-treat analysis	Clear reporting with no discrepancies	Were eligibility criteria clear?	Were interventions adequately described?	Were the outcomes fully defined?	NRCS & Single: Representativeness of the cohort(s)	NRCS: Comparator representativeness	NRCS: Adjustment for confounders	Other bias	Overall RoB
Riggs, 2020, 32181829 NRCS	NA	NA	NA	Unclear	Unclear	NA	NA	Yes	Yes	Yes	Yes	Low	Unclear	Low[b]	Low	Moderate
Trivedi, 2018, 30151996, SG	NA	NA	NA	Low	Unclear	NA	NA	Yes	Yes	Yes	Yes	Low	NA	NA	High[a]	High[a]

Notes. [a]Single group, no baseline-follow up comparison; [b]Regression adjustment; [c]Self-reported outcomes and participants not blind to assessment; [d]Reported results of comparisons were not clear; [e]Comparison group data taken from a separate facility; [f]Crude analysis (unadjusted comparison between groups); [g]This study was evaluated as both a single group study and NRCS for different questions of interest; [h]Comparison group data was collected at a different time point, data did not surround any care engagement event, and there were baseline differences in mental health and substance use conditions, as well as health care utilization.

Abbreviations. NA=not applicable; NRCS=non-randomized comparative study; SG=single group study.

APPENDIX D. DESIGN DETAILS

Author Year PMID	Setting, Funding	Study Design,[a] Sample Source	Enrollment Dates	Inclusion Criteria	Exclusion Criteria	Supportive Program(s) Enrolled	Primary Care Program(s)
Chang, 2020, 32597993	Community, VA funded research	Single Group,[b] National	2015	Included all VHA patients assigned to primary care (general or specialized) as of September 30, 2015	Patients who had died during this period for the purpose of assigning a CAN (Care Assessment Needs) score.	Not specified	Primary Care (specialized homelessness)
Chinchilla, 2019, 31297070	Community, VA funded research and non-industry funding	NRCS, Medical Center	2014 to 2015	Participants enrolled in HUD-VASH who achieved housing within 1 year of program enrollment	Participants were excluded if they were enrolled in HUD-VASH program for more than 1 year; Participants data was excluded if they had duplicate or conflicting entries, and they did not have any report data on the primary outcomes of interest.	HUD-VASH	Primary Care (not specified)
Gabrielian, 2021, 33543675	Community, VA funded research	NRCS, National	2018	VA patients were eligible if they: (a) received ≥2 primary care visits at a study site; (b) had evidence of homelessness between May 2015 and November 2017 in VA's national electronic medical record and c) were assigned to a single primary care team. Survey respondents had to have at least 1 ICD-9/ICD-10 code for schizophrenia spectrum disorders, bipolar spectrum disorders, or other psychotic disorders in VA's national EMR between May 2015 and November 2017. Data were taken from a previously conducted survey (Riggs, 2020).	Participants were excluded if they had no available contact information or were deceased prior to the start of the survey	Not specified[c]	HPACT, mainstream primary care
Gundlapalli, 2017, 28806373	Community, VA funded research	NRCS, National	2012 to 2013	Veterans were required to have had at least 2 visits with their VHA medical center in the 6 months before enrollment in H-PACT and at least 1 visit in the	VHA sites that did not offer emergency department services were excluded to allow for comparability between comparator groups	Not specified[c,d]	HPACT, Usual care

Author Year PMID	Setting, Funding	Study Design,[a] Sample Source	Enrollment Dates	Inclusion Criteria	Exclusion Criteria	Supportive Program(s) Enrolled	Primary Care Program(s)
				6 months after enrollment; Veterans assigned a V60.0 ICD-9-CM code at least twice between January 1, 2012 and December 31, 2012 and verified to not have had an assignment with a PACT team at their site (for non-HPACT sites); Veterans assigned a V60.0 ICD-9-CM code at least twice between January 1, 2012 and December 31, 2012 and never having any evidence of enrollment in H-PACT or any other primary care team assignment (PACT) during the observation period.			
Johnson, 2017, 28481601	Community, VA funded research	NRCS, National	to 2017	Homeless veterans eligible for VA care (as confirmed by study protocol) who had not received any primary or longitudinal specialty care in the previous 6 months (by self-report and confirmed by review of VA records). Inclusion criteria from parent RCT:[e] The study population was currently homeless Veterans[f] eligible to receive VA services who were cognitively intact as measured by the Short Blessed test. Veterans currently receiving primary/continuity care for a chronic medical condition from a VA-based or non-VA-based provider (defined by any visit to an ambulatory care clinic in the previous 6 months and/or having a self-identified	Participants not planning to stay in the area for the 6 months study period, those whose housing status could not be ascertained, and those with significant cognitive impairment as measured by the Short Blessed Test. Exclusions criteria from parent study:[f] Veterans currently receiving primary/continuity care for a chronic medical condition from a VA-based or non-VA-based provider were excluded.	Not specified[f]	Primary care (not specified)

Author Year PMID	Setting, Funding	Study Design,[a] Sample Source	Enrollment Dates	Inclusion Criteria	Exclusion Criteria	Supportive Program(s) Enrolled	Primary Care Program(s)
				ambulatory care-based source for usual care) were excluded.			
Jones, 2017, 28481602	Community, VA funded research	Single Group,[b] National	2013	Data were taken from the Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP). Parent survey inclusion criteria: Veterans who received VHA outpatient services in the index month, had a primary care visit with an assigned PACT provider during the 10 months prior to index month, and did not participate in the prior year's survey. Inclusion for study: in year prior to the survey, they experienced One inpatient or two outpatient visits with and ICD-9 diagnosis for common MHSUDs.	Patients with missing data on variables of interest.	Not specified[c]	PACT
Jones, 2018, 29412071	Outpatient, VA funded research	Single Group,[g] Medical Center	2012 to 2013	Patients who had an initial clinic visit to the Veterans Affairs Pittsburgh Healthcare System (VAHPS) HPACT	NR	Not specified	HPACT
Jones, 2018, 29762272	Outpatient, VA funded research	NRCS, Other	2014 to 2015	Data were taken from the Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP). Parent survey inclusion criteria: Veterans outpatients who (1) had an outpatient visit with the lead provider of their primary care team in the past 10 months, and (2) did not participate in the prior year's survey.	Patients missing data on study variables	Not specified[c]	HPACT, Non-HPACT

Author Year PMID	Setting, Funding	Study Design,[a] Sample Source	Enrollment Dates	Inclusion Criteria	Exclusion Criteria	Supportive Program(s) Enrolled	Primary Care Program(s)
				Inclusion for study: Eligible veterans who visited a primary care provider at one of 510 VHA medical centers or CBOCs			
Jones, 2019, 30789541	Community, VA funded research	NRCS, National	2014 to 2015	Data were taken from the Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP). Parent survey inclusion criteria: Patients who received VHA outpatient services, had a primary care visit with the lead provider of their assigned primary care team lead in past 10 months, and did not participate in the prior year's survey. Inclusion for study: Had recent administrative evidence of homelessness.[c]	Veterans with missing data on study variables, patients assigned to H-PACT for only part of the year prior to survey, patients with H-PACT enrollment data who primarily received care at VHA facilities without any H-PACT.	Not Provided[c]	HPACT, standard primary care
Jones, 2023, 35194740	Outpatient, VA funded research	Single Group,[g] Medical Center	2018 to 2021	Veterans enrolled in the Vulnerable Veteran Innovative Patient-Aligned Care Team (VIP) Initiative at VA Salt Lake City Health Care System	NR	Not specified[c]	Integrated primary care (IPC)
Jones, 2023, 36810631	Outpatient, VA funded research	NRCS, VISN	2016 to 2019	Patients with positive depression screen and were formally diagnosed with a depressive disorder or prescribed an antidepressant in the 12 months following their positive screen.	Patients receiving depression treatment during the 6 months prior to screening.	Not specified	HPACT, other PACT
Kertesz, 2013, 24148052	Outpatient, VA funded research	NRCS, Medical Center	2011 to March 2012	Presumptive past or current homelessness and receipt of primary care at the site of care 2 or more times in the past 2 years.	NR	Not specified	VA homeless-tailored primary care program, non-tailored primary care

Author Year PMID	Setting, Funding	Study Design,[a] Sample Source	Enrollment Dates	Inclusion Criteria	Exclusion Criteria	Supportive Program(s) Enrolled	Primary Care Program(s)
Kertesz, 2021, 33827104	Community, VA funded research	NRCS, National	2015 to 2017	Evidence of homelessness and had 2 or more primary care visits in 24 months at the same site, assigned to a single mainstream PACT or H-PACT	Excluded homeless-experienced veterans (HEV) if their mainstream PACT care was located at an outlying clinic, remote from the Veterans Affairs Medical Centers that housed the HPACT	Not specified[c]	Mainstream PACT, H-PACT
O'Toole, 2010, 20966377	Outpatient, VA funded research	NRCS, Medical Center	2006 to 2008	Homeless patients who voluntarily enrolled in the Homeless-Oriented Primary Care Clinic at the Providence VA Medical Center or seasonally matched controls from the general internal medicine clinics identified from historic patient registry data	Excluded potential control participants if there was positive documentation that the patient was living in an apartment or house that the patient owned or paid rent for; Or if the patient moved out of the are or was institutionalized during a significant period of the 12-month study period	Not specified[f]	Homeless-Oriented Primary Care Clinic, General internal medicine clinics
O'Toole, 2013, 24148042	Outpatient, VA funded research	Single Group,[b] Medical Center	2008 to 2011	Newly enrolled HPACT patients who had at least 2 visits with their primary care team within the first 6 months of enrollment. HPACT requirements were: Current homelessness, including unsheltered, emergency sheltered, in transitional housing, or doubled-up with family or a friend, and having difficulty accessing care in a traditional clinic setting.	Individuals were excluded if they moved out of the area, were institutionalized, or were incarcerated during the study. Individuals already established in primary care, either within the VA medical center or at another facility, who then became homeless and transferred their care to the homeless PACT clinic were also excluded.	Not specified	HPACT
O'Toole, 2016, 27032987	Outpatient, VA funded research	Single Group,[g] National	2013 to2014	Homeless veterans enrolled in HPACT as of August 1, 2014	NR	HUD-VASH Grants and Per Diem (GPD) Veteran Justice Outreach (VJO) Health Care to Homeless Veterans,	HPACT

Author Year PMID	Setting, Funding	Study Design,[a] Sample Source	Enrollment Dates	Inclusion Criteria	Exclusion Criteria	Supportive Program(s) Enrolled	Primary Care Program(s)
						Veterans courts, and vocational assistance programs	
O'Toole, 2018, 29451116	Outpatient, VA funded research	NRCS, Medical Center	2012 to 2014	Homeless (to include: the unsheltered and those in emergency shelters, transitional housing, or unstable housing with family or friends) veterans enrolled in either PACT or HPACT at the selected study sites	Veterans that have moved into Section 8 housing or HUD-VASH housing units; Veterans enrolled in intensive case management programs	Not specified[f]	PACT, HPACT
Riggs, 2020, 32181829	Community, VA funded research	NRCS, National	2018	Eligible veterans were those who had evidence of having experienced homelessness in the preceding 30 months, used the VA's primary care services at 1 of 26 VA medical centers with HPACT available, including a single active panel assignment and 2 or more visits to a clinic with an administrative code indicating primary care at the same study site in the preceding 24 months.	Participants who had no contact information from VA or other records or had died prior to survey initiation.	Not specified[c]	HPACT, Mainstream Primary Care
Trivedi, 2018, 30151996	Community, VA funded research	Single Group,[h] Other	2013	HPACT enrollees with 12 months of Medicare Fee-for-Service Coverage in 2013	HPACT enrollees not enrolled in Medicare for 12 months in 2013; HPACT enrollees who had one or more months of Medicare Advantage enrollment	No Specified	HPACT

Notes. [a]Design listed is based on it use in this review; [b]Includes only those experiencing homelessness; [c]Peterson R, Gundlapalli AV, Metraux S, et al. Identifying homelessness among veterans using VA administrative data: opportunities to expand detection criteria. PloS One. 2015;10(7):e0132664; [d]US Department of Veterans Affairs Office of Inspector General VA Office of Inspector General. Homeless Incidence and Risk Factors for Becoming Homeless in Veterans. Washington, DC: VA Office of Inspector General; 2012. Available at: https://www.va.gov/oig/pubs/VAOIG-11-03428-173.pdf; [e]O'Toole TP, Johnson EE, Borgia ML, Rose J. Tailoring Outreach Efforts to Increase Primary Care Use Among Homeless Veterans: Results of a Randomized Controlled Trial. *J Gen Intern Med*. 2015;30(7):886-898. doi:10.1007/s11606-015-3193-x; [f]Defined by the Stewart B. McKinney-Vento Homeless Assistance Act; [g]Includes baseline and follow-up data; [h]High reliance group only.

Abbreviations. CBOs=community based organizations; HPACT=homeless patient aligned care teams; HUD-VASH=Housing and Urban Development-Veterans Affairs Supportive Housing; ICD=international classification of disease; MHSUDs=mental health and substance use disorders; NR=not reported; NRCS=non-randomized comparative study; PACT=patient aligned care teams; RCT=randomized controlled trial; VHA=Veterans Health Administration.

APPENDIX E. BASELINE CHARACTERISTICS

Author Year PMID, Study Design	Number	Race/Ethnicity, %	Age (Years); Mean (SD)	Male, %	Comorbidities, %	Served in Combat	Priority Status
Chang, 2020, 32597993[a]	2775	White: NR Hispanic: NR Black: NR Other: NR	NR	NR	Mental health: NR Substance use: NR Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR	NR	NR
Chinchilla, 2019, 31297070	560	White: 205 (38.2) Hispanic: 91 (16.6) Black: 307 (57.2) Other: NR	52.9 (12.9)	524 (93.6)	Mental health: 85 (15.2) Substance use: 35 (6.3) Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR	NR	NR
Gabrielian, 2021, 33543675	969	Non-Hispanic white: 365 (37.7) Hispanic, any race: 119 (12.3) Non-Hispanic black: 322 (33.2) Other: 163 (16.8)	18-54: 291 (30.0) 55-64: 516 (53.2) ≥65: 162 (16.7)	820 (84.6)	*Mental health* Schizophrenia spectrum disorders: 364 (37.6) Bipolar spectrum disorders: 543 (56.0) Other psychotic disorders: 308 (31.8) *Substance use* Alcohol problem: 298 (30.8) Drug problem: 192 (19.8) *Other* Dementia: NR Diabetes: 237 (24.6) Hypertension: 496 (51.4) Hyperlipidemia: NR	NR	NR
Gundlapalli, 2017, 28806373[b]	51886	White: 21020 (40.5) Hispanic: NR Black: 26754 (51.6) Other: 4090 (7.8)	53.0 (11.2)	47327 (91.2)	Mental health: NR Substance use: NR Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR	3081 (5.9)	NR

Author Year PMID, Study Design	Number	Race/Ethnicity, %	Age (Years); Mean (SD)	Male, %	Comorbidities, %	Served in Combat	Priority Status
Johnson, 2017, 28481601	142	White: 88 (62.0) Hispanic: NR Black: NR Other: NR	48.4 (11.1)	134 (94.4)	*Mental health* Depression 79 (55.6) Anxiety 66 (46.5) PTSD 44 (31.0) *Substance use* Alcohol 96 (67.6) Marijuana 47 (33.1) Cocaine 19 (13.4) *Other* Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR	NR	NR
Jones, 2017, 28481602[a,c]	4605	White: (47.15) Hispanic: (8.37) Black: (38.17) Other: (6.31)	18-44= 23.09 45-54= 33.60 55-64= 34.83 65+= 8.47	(87.3)	*Mental health* Depressive disorders (62.71) Post-traumatic stress disorder (30.68) Other anxiety disorders (25.08) Bipolar disorder (17.38) Psychotic disorders (11.87) *Substance use* Alcohol use disorder (36.73) Drug use disorder (36.51) *Other* Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR	NR	NR
Jones, 2018, 29412071	179	White: 100 (56.0) Hispanic: 7 (4.0) Black: 72 (40.0) Other: NR	NR	167 (93.0)	Mental health: 74 (41.0) *Substance use treatment* Tobacco: 73 (41.0) Alcohol: 46 (26.0) Opioid: 29 (16.0)	NR	NR

Author Year PMID, Study Design	Number	Race/Ethnicity, %	Age (Years); Mean (SD)	Male, %	Comorbidities, %	Served in Combat	Priority Status
					Cocaine: 16 (9.0) Cannabis: 13 (7.0) Polysubstance: 5 (3.0) Sedative/Hypnotic: 3 (2.0) *Other* Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR		
Jones, 2018, 29762272[a,b]	12170	White: 5600 (46.0) Hispanic: 1011 (8.3) Black: 4761 (39.1) Other: 806 (6.6)	N (%): 18-4: 2636 (21.7) 45-54: 3121 (25.7) 55-64: 4412 (36.3) 65+: 1997 (16.3)	10749 (88.3)	*Mental health* Mood Disorder: 5906 (48.5) Posttraumatic Stress Disorder: 3054 (25.1) Other Anxiety Disorders: 2287 (18.8) Psychotic Disorder: 1043 (8.5) *Substance use* Alcohol Use Disorder: 3275 (26.9) Drug Use Disorder: 3106 (25.5) *Other* Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR	NR	NR
Jones, 2019, 30789541[b,c]	11857	White: 5483 (46.2) Hispanic: NR Black: 4611 (38.8) Other: 1758 (14.8)	18-44: 2636 (22.2) 45-54: 3020 (24.4) 55-64: 4279 (36.1) 65+: 1968 (16.4)	10466 (88.3)	*Mental health* Mood disorder: 5746 (48.2) Post-traumatic stress disorder: 2984 (25.0) Other anxiety disorders: 2235 (18.5) Psychotic disorder: 1010 (8.3) *Substance use* Alcohol use disorder: 3163 (26.7) Drug use disorder: 2992 (25.2)	NR	NR

Author Year PMID, Study Design	Number	Race/Ethnicity, %	Age (Years); Mean (SD)	Male, %	Comorbidities, %	Served in Combat	Priority Status
					Other Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR		
Jones, 2023, 35194740[a]	123	White: 96 (78.7) Hispanic: 8 (6.6) Black: 12 (9.8) Other: 6 (4.9)	25–44= 42 (34.2) 45–64= 57 (46.3) 65+= 24 (19.5)	114 (92.7)	*Mental health* Depression: 81 (66.9) PTSD: 57 (46.3) Anxiety 50 (40.7) Serious Mental Illness 20 (16.3) Other 32 (26) Any of the above 119 (96.8) *Substance use* Alcohol Use Disorder: 53 (43.1) Opioid Use Disorder: 40 (32.5) Stimulant Use Disorder: 50 (40.7) Cannabis Use Disorder: 31 (35.2) Other Drug Use Disorder: 16 (13) Any of the above: 90 (74.8) *Other* Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR	NR	50-100% service connected: 44(35.8) <50% service connected: 28 (22.8) no service connection: 51(41.5)
Jones, 2023, 36810631	2843	White: 1189 (41.8) Hispanic: 537 (18.9) Black: 743 (26.1) Other: 159 (17.9)	49.1 (15.2)	2509 (88.3)	*Mental health* Anxiety disorder 1207 (42.5%) Post-traumatic stress disorder 1371 (48.2%) Bipolar, schizophrenia, or other psychotic disorders 253 (8.9%) *Substance use* Drug Use: 454 (16.0) Alcohol Use: 643 (22.6) *Other*	NR	NR

Author Year PMID, Study Design	Number	Race/Ethnicity, %	Age (Years); Mean (SD)	Male, %	Comorbidities, %	Served in Combat	Priority Status
					Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR		
Kertesz, 2013, 24148052[b,d]	406	White: 107 (26.4) Hispanic: 9 (2.2) Black: 271 (66.7) Other: 27 (6.7%)	53.5 (7.6)	379 (93.4)	Mental health: NR Substance use: NR Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR	NR	NR
Kertesz, 2021, 33827104	5766	White: 2367 (41.1) Hispanic: 602 (10.7) Black: 2252 (39.1) Other: 1147 (19.9)	58.7 (10.9)	5158 (90.7)	*Mental health* Presence of severe psychological distress, last 2 weeks: 1724 (32.6) Receipt of psychiatric medication in the last 30 days: 1961(34.7) *Substance use* Drug Problem: 782 (13.8) Alcohol problem: 1624 (28.7) Personal overdose experience in last 3 years: 379 (6.7) *Other* Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR		
O'Toole, 2010, 20966377[b]	177	White: 143 (80.8) Hispanic: Black: Other:	52.4 (4.3)	169 (95.4)	*Mental health* Depression: 98 (55.4) Anxiety: 59 (33.3) Bipolar: 34 (19.2) Schizophrenia: 13 (7.3) *Substance use* Alcohol: 114 (64.4) Cocaine: 51 (28.8) Heroin: 14 (7.9) Marijuana: 23 (12.9)	NR	NR

Author Year PMID, Study Design	Number	Race/Ethnicity, %	Age (Years); Mean (SD)	Male, %	Comorbidities, %	Served in Combat	Priority Status
					Other Dementia: NR Diabetes: 21 (11.8) Hypertension: 78 (44.1) Hyperlipidemia: 75 (42.4)		
O'Toole, 2013, 24148042[a, b]	127	White: 97 (76.4) Hispanic: NR Black: NR Other: NR	51.2 (NR)	120 (94.5)	Mental health: 75 (59.1) Substance use: 32 (25.4)[e] Dementia: NR Diabetes: 12 (9.4) Hypertension: 36 (28.3) Hyperlipidemia: NR	NR	NR
O'Toole, 2016, 27032987[f]	14088	White: NR Hispanic: NR Black: NR Other: NR	53.4 (NR)	13524 (95.9)	Mental health: NR Substance use: NR Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR	NR	NR
O'Toole, 2018, 29451116	266	White: 120 (45.1) Hispanic: NR Black: NR Other: NR	52.1 (9.2)	251(94.4)	*Mental health*[h] Any mental health condition: 207 (78.1) Depression: 180 (69.2) Anxiety: 165 (63.2) PTSD: 125 (50.8) Bipolar: 47 (19.2) *Substance use*[h] Any drinking past six months: 162 (61.1) Cocaine use in past six months: 60 (22.6) Heroin or nonprescribed opiate use in past six months: 24 (9.0) *Other* Dementia: NR Diabetes: NR Hypertension: 87 (33.1) Hyperlipidemia: NR	NR	NR

Author Year PMID, Study Design	Number	Race/Ethnicity, %	Age (Years); Mean (SD)	Male, %	Comorbidities, %	Served in Combat	Priority Status
Riggs, 2020, 32181829[b]	5694	White: 2345 (40.7) Black: 2225 (38.1) Hispanic: 593 (10.4)	56.4 (18.3)	5100 (91.6)	*Mental health* Receiving medication for mental health: 1947 (34.2) *Substance use* Alcohol problem: 1617 (28.4) Drug problem: 775 (13.6) *Other* Dementia: NR Diabetes: NR Hypertension: NR Hyperlipidemia: NR	NR	NR
Trivedi, 2018, 30151996[b,g]	1211	White: 618 (51) Hispanic: NR Black: 569 (47) Other: 24(2)	59.5 (9.7)	1175 (97)	*Mental health* Psychosis/Schizophrenia: 193 (16.0%) Depression: 109 (9.0%) *Substance use* Substance Abuse Disorder: 169 (14.0%) Alcohol Disorder: 205 (17.0%) *Other* Dementia: NR Diabetes: 96 (8.0) Hypertension: 230 (19.0) Hyperlipidemia: NR	NR	Group 1: 217 (18.0) Group 2: 48 (4.0) Group 3: 121 (10.0) Group 4: 24 (2.0) Group 5: 775 (64.0) Group 6,7,8: 24 (2.0)

Notes. [a]Only includes those experiencing homelessness; [b]Includes estimates calculated by research team based on data provided in the study; [c]Estimates use survey weights; [d]Does not include tailored non-VA care group; [e]Active substance abuse; [f]The demographic data reported in this study were for the August 2014 enrollment of patients, which corresponds with the ambulatory care use outcomes of this study. Demographic details of patients included in the pre-enrollment and post-enrollment acute care use data were not reported. All numbers calculated by the research team from percents provided in the study; [g]Only include high reliance group; [h]Some numbers or percents do not add up to 100%/266 due to missing data.

Abbreviations. NR=not reported; SD=standard deviation.

APPENDIX F. COMPARISONS AND HOMELESS IDENTIFICATION

Author Year PMID, Study Design	Data Source	Primary Care	Comparisons	Homelessness Identification
Chang, 2020, 32597993, Single Group	Electronic medical record data as of 2015	Homeless specialized primary care	None[a]	Those receiving homeless specialized primary care (not specified)
Chinchilla, 2019, 31297070, NRCS	Homeless Operations Management and Evaluation System (HOMES) data from 10/1/14 to 9/30/15	Primary care (Unspecified)	Primary care access, Yes vs No	Not specified (appeared to be based HUD-VASH enrollment)
Gabrielian, 2021, 33543675, NRCS	Data were part of the Primary Care Homeless Services Tailoring study	HPACT, Mainstream PACT	HPACT vs mainstream	Evidence of homelessness between May 2015 and November 2017 (ICD-9/ICD-10 diagnoses of homelessness or VA-specific indicators of receipt of homeless services)[b]
Gundlapalli, 2017, 28806373, NRCS	Medical records from January 2012 and June 2013	HPACT, Non-enrolled at HPACT site, Usual Care at non-HPACT site	Before vs after enrollment (HPACT); first 6 months vs second 6 months (other care) HPACT vs. Those at HPACT sites not enrolled in HPACT vs. Those in usual care sites without HPACT	identified using a combination of administrative codes indicating homelessness (ICD-9-CM code V60.0, lack of housing)[b,c,d]
Johnson, 2017, 28481601, NRCS	Post hoc analysis of a prospective, community-based randomized controlled trial of homeless veterans not receiving any ongoing primary or continuity care	Primary care (Unspecified)	Accessed primary care within 1 month of study enrollment vs not	Homeless veterans eligible for VA care (as confirmed by study protocol)[e,c,d]
Jones, 2017, 28481602, Single Group	2013 Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)	PACT (homeless not specified)	None[a]	Past-year ICD-9 codes in VHA administrative records one inpatient or outpatient visit where lack of housing (V60.0), unstable housing (V60.1), or other housing circumstances (V60.89, V60.9) were documented. [b]
Jones, 2018, 29412071, Single Group	Electronic medical records from May 2012 to December 2013.	HPACT	Before vs. After HPACT enrollment	Not specified (though all participants enrolled in HPACT)
Jones,	2014–2015 Patient-Centered	HPACT, Non-HPACT facilities	Receiving primary care at HPACT vs Non-HPACT Facilities	One inpatient or outpatient visit where lack of housing, unstable housing, or other housing circumstances were documented (ICD-9 codes V60.0, V60.1, V60.89,

Author Year PMID, Study Design	Data Source	Primary Care	Comparisons	Homelessness Identification
2018, 29762272, NRCS	Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)			V60.9), or they received VHA homeless services in the year before the PCMH-SHEP [b]
Jones, 2019, 30789541, NRCS	2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients (PCMH-SHEP)	HPACT, Standard primary care with H-PACT Available, PACT	HPACT vs. Standard PC with H-PACT Available vs. PACT	One inpatient or outpatient visit where lack of housing, unstable housing, or other housing circumstances were documented (ICD-9 codes V60.0, V60.1, V60.89, V60.9), or they received VHA homeless services in the year prior to the survey. [b]
Jones, 2023, 35194740, Single Group	Electronic medical records March 1, 2018, and September 30, 2019	Integrated Primary Care (IPC)	Before vs. After IPC enrollment	Homelessness was determined from international classification of disease (ICD) codes related to unstable housing and VA homeless service records. [b]
Jones, 2023, 36810631, NRCS	VA administrative and patient health records from 2016 to 2019.	HPACT, PACT	HPACT vs PACT	Homelessness was designated from international classification of disease (ICD) codes and/or use of VA homeless services in the study year (details not specified)
Kertesz, 2013, 24148052, NRCS	Face-to-face survey from January 2011 through March 2012	Homeless tailored primary care, Mainstream care	Tailored vs. Mainstream	Presumptive past or current homelessness was based on an International Classification of Diseases-9-CM code of V60.0 diagnosis.
Kertesz, 2021, 33827104, NRCS	National patient survey of 26 HPACT sites, dates of survey not specified.	HPACT, Mainstream PACT	HPACT vs. Mainstream PACT	Diagnosis of homelessness (V60.0, V60.1, V60.89 from ICD-9, and Z59.0, Z59.1, Z59.8, Z59.9 from ICD-10) or receipt of VA homeless services (VA administrative stop codes 504, 507, 508, 511, 522, 528-530, 555-556, 590, or 37between May 2015-November 2017. [b]
O'Toole, 2010, 20966377, NRCS	Medical records from 2006-2007 (or 2004–2006 for comparison group)	Homeless Oriented Primary Care (HOPC), General Internal Medicine Clinic care (GIM) (Historic control)	HOPC vs. GIM	For Homeless Orientated Primary Care group: Sheltering criteria of the Stewart B. McKinney Homeless Assistance Act.[d] Sheltering categories: no shelter; emergency shelter in a ''dusk-to-dawn'' shelter; transitional and supportive housing; and doubling up. For comparison group: According to the V.60 codes of the International Classification of Diseases, Ninth Revision (ICD-9)
O'Toole, 2013, 24148042 Single Group	Medical and administrative records from 2008 to 2011	HPACT	None[a]	For HPACT: Current homelessness, including unsheltered, emergency sheltered, in transitional housing, or doubled-up with family or a friend
O'Toole, 2016, 27032987 Single Group	Medical and administrative records to 2014	HPACT	Before vs. After HPACT enrollment	Not specified (though all participants enrolled in HPACT)

Author Year PMID, Study Design	Data Source	Primary Care	Comparisons	Homelessness Identification
O'Toole, 2018, 29451116, NRCS	Medical and administrative records and prospective survey from 2012 to 2014	HPACT, PACT	HPACT vs PACT	Homelessness was defined according to criteria of the McKinney–Vento Act[d] following a sheltering typology that includes unsheltered, staying in an emergency shelter, or staying in transitional housing. We also included veterans in unstable (nonpermanent) doubled-up arrangements with family or friends.
Riggs, 2020, 32181829	Medical and administrative records and prospective survey	HPACT, Mainstream Primary Care	HPACT vs Mainstream Primary Care	Homelessness defined at least 1 ICD-9 or ICD-10 diagnosis of homelessness or VA-specific administrative indicators of receipt of VA homeless services in the preceding 30 months.[b]
Trivedi, 2018, 30151996 Single Group	Registry of all Veterans enrolled in HPACT as of January 1, 2013	HPACT	None[a]	Not specified (though all participants enrolled in HPACT)

Notes. [a]Only includes those from the homeless group; [b]Peterson R, Gundlapalli AV, Metraux S, et al. Identifying homelessness among veterans using VA administrative data: opportunities to expand detection criteria. PloS One. 2015;10(7):e0132664; [c]US Department of Veterans Affairs Office of Inspector General VA Office of Inspector General. Homeless Incidence and Risk Factors for Becoming Homeless in Veterans. Washington, DC: VA Office of Inspector General; 2012. Available at: https://www.va.gov/oig/pubs/VAOIG-11-03428-173.pdf; [d]Defined by the Stewart B. McKinney-Vento Homeless Assistance Act; [e]O'Toole TP, Johnson EE, Borgia ML, Rose J. Tailoring Outreach Efforts to Increase Primary Care Use Among Homeless Veterans: Results of a Randomized Controlled Trial. *J Gen Intern Med*. 2015;30(7):886-898. doi:10.1007/s11606-015-3193-x.

Abbreviations. HPACT=homeless patient aligned care teams; HUD-VASH=Housing and Urban Development-Veterans Affairs Supportive Housing; ICD=international classification of disease; NRCS=non-randomized comparative study; PACT=patient aligned care teams.

APPENDIX G. CATEGORICAL OUTCOMES

G1. Primary Care

Author, Year, PMID	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
Jones, 2018, 29412071	Percentages of patients with any health care visit before and after HPACT- Primary Care Visits	HPACT	7-12 months before enrollment	49/179 (27)	aOR (95% CI): 0–6 months after HPACT enrollment vs 0-6 months before = 4.91 (2.94, 8.20) 7–12 months after HPACT enrollment vs 0-6 months before = 2.30 (1.42, 3.72)
			0-6 months before enrollment	70/179 (39)	
			0-6 months after enrollment	124/179 (69)	
			7-12 months after enrollment	99/179 (55)	

Abbreviations. aOR=adjusted odds ratio; CI=confidence interval; HPACT=homeless patient aligned care teams; N=number.

G2. Emergency Department

Author, Year, PMID	Outcome Definition	Sample/Groups, Comparisons	Timepoint	n/N (%)	Effect size, p-value
Jones, 2018, 29412071	Percentages of patients with any health care visit before and after HPACT- Any emergency department visit	HPACT	7-12 months before enrollment	40/179 (22)	aOR (95% CI) 0–6 months after HPACT enrollment vs 0-6 months before = 0.57 (0.34, 0.94) 7–12 months after HPACT enrollment vs 0-6 months before = 0.55 (0.33, 0.91)
			0-6 months before enrollment	77/179 (43)	
			0-6 months after enrollment	60/179 (34	
			7-12 months after enrollment	59/179 (33)	
Gundlapalli, 2017	Emergent emergency department care needed: Not preventable/Avoidable, % of total visits	HPACT Enrolled	6 months before enrollment	nr/NR (8.7)	NR, p=0.01
			6 months after enrollment	nr/NR (10)	
		HPACT Site Nonenrolled	First 6 months of data	nr/NR (5.6)	NR, p=0.39
			Second 6 months of data	nr/NR (5.8)	
		Usual Care Site	First 6 months of data	nr/NR (8.4)	NR, p=0.01
			Second 6 months of data	nr/NR (9.1)	
Gundlapalli, 2017	Emergent emergency department care needed: Preventable/Avoidable, % of total visits	HPACT Enrolled	6 months before enrollment	nr/NR (5.1)	NR, p=0.53
			6 months after enrollment	nr/NR (5.3)	

Author, Year, PMID	Outcome Definition	Sample/Groups, Comparisons	Timepoint	n/N (%)	Effect size, p-value
		HPACT Site Nonenrolled	First 6 months of data	nr/NR (3.7)	NR, p=0.16
			Second 6 months of data	nr/NR (3.9)	
		Usual Care Site	First 6 months of data	nr/NR (4.1)	NR, p=0.75
			Second 6 months of data	nr/NR (4)	
Gundlapalli, 2017	Emergent/Primary care treatable, % of total visits	HPACT Enrolled	6 months before enrollment	nr/NR (12.9)	NR, p=0.92
			6 months after enrollment	nr/NR (12.8)	
		HPACT Site Nonenrolled	First 6 months of data	nr/NR (12)	NR, p=0.002
			Second 6 months of data	nr/NR (12.9)	
		Usual Care Site	First 6 months of data	nr/NR (13.4)	NR, p=0.04
			Second 6 months of data	nr/NR (14.1)	
Gundlapalli, 2017	Nonemergent, % of total visits	HPACT Enrolled	6 months before enrollment	nr/NR (22.3)	NR, p=0.004
			6 months after enrollment	nr/NR (24.4)	
		HPACT Site Nonenrolled	First 6 months of data	nr/NR (24)	NR, p<0.001
			Second 6 months of data	nr/NR (25.9)	
		Usual Care Site	First 6 months of data	nr/NR (26.5)	NR, p=1.00
			Second 6 months of data	nr/NR (26.5)	
Gundlapalli, 2017	Unclassified, % of total visits	HPACT Enrolled	6 months before enrollment	nr/NR (51.1)	NR, p<0.001
			6 months after enrollment	nr/NR (47.5)	
		HPACT Site Nonenrolled	First 6 months of data	nr/NR (54.8)	NR, p<0.001
			Second 6 months of data	nr/NR (51.6)	
		Usual Care Site	First 6 months of data	nr/NR (47.7)	NR, p=0.01
			Second 6 months of data	nr/NR (46.3)	
Gundlapalli, 2017	Emergent emergency department care needed: Not preventable/Avoidable, % of total visits	HPACT Enrolled, High Utilizers	6 months before enrollment	nr/NR (9)	NR, p=0.91
			6 months after enrollment	nr/NR (8.9)	
		HPACT Site Nonenrolled, High utilizers	First 6 months of data	nr/NR (5)	NR, p=0.60
			Second 6 months of data	nr/NR (5.5)	

Author, Year, PMID	Outcome Definition	Sample/Groups, Comparisons	Timepoint	n/N (%)	Effect size, p-value
		Usual Care Site, High utilizers	First 6 months of data	nr/NR (8.5)	NR, p=0.03
			Second 6 months of data	nr/NR (9.5)	
Gundlapalli, 2017	Emergent emergency department care needed: Preventable/Avoidable, % of total visits	HPACT Enrolled, High Utilizers	6 months before enrollment	nr/NR (6.2)	NR, p=0.56
			6 months after enrollment	nr/NR (5.8)	
		HPACT Site Nonenrolled, High utilizers	First 6 months of data	nr/NR (4.2)	NR, p=0.72
			Second 6 months of data	nr/NR (3.9)	
		Usual Care Site, High ED utilizers	First 6 months of data	nr/NR (4.7)	NR, p=0.21
			Second 6 months of data	nr/NR (5.2)	
Gundlapalli, 2017	Emergent/Primary care treatable, % of total visits	HPACT Enrolled, High Utilizers	6 months before enrollment	nr/NR (12.5)	NR, p=0.10
			6 months after enrollment	nr/NR (11.2)	
		HPACT Site Nonenrolled, High utilizers	First 6 months of data	nr/NR (10)	NR, p=0.53
			Second 6 months of data	nr/NR (10.8)	
		Usual Care Site, High utilizers	First 6 months of data	nr/NR (13.7)	NR, p=0.07
			Second 6 months of data	nr/NR (14.8)	
Gundlapalli, 2017	Nonemergent, % of total visits	HPACT Enrolled, High Utilizers	6 months before enrollment	nr/NR (20.6)	NR, p<0.001
			6 months after enrollment	nr/NR (24.4)	
		HPACT Site Nonenrolled, High utilizers	First 6 months of data	nr/NR (21.2)	NR, p=0.80
			Second 6 months of data	nr/NR (21.6)	
		Usual Care Site, High utilizers	First 6 months of data	nr/NR (26.8)	NR, p=0.48
			Second 6 months of data	nr/NR (26.3)	
Gundlapalli, 2017	Unclassified, % of total visits	HPACT Enrolled, High Utilizers	6 months before enrollment	nr/NR (51.7)	NR, p=0.13
			6 months after enrollment	nr/NR (49.8)	
			First 6 months of data	nr/NR (59.6)	NR, p=0.46

Author, Year, PMID	Outcome Definition	Sample/Groups, Comparisons	Timepoint	n/N (%)	Effect size, p-value
		HPACT Site Nonenrolled, High utilizers	Second 6 months of data	nr/NR (58.3)	
		Usual Care Site, High utilizers	First 6 months of data	nr/NR (46.3)	NR, p=0.02
			Second 6 months of data	nr/NR (44.2)	
Jones, 2023, 35194740	Emergency Department- Utilization Before and After Integrated Primary Care Enrollment	Integrated Primary Care	Pre-enrollment slope (rate of utilization in 4 quarters prior to enrollment)	nr/NR	IRR (SE) 1.49 (0.14), p <0.001
		Integrated Primary Care	Level change (change in Q1 after enrollment vs Q prior to enrollment)	nr/NR	IRR (SE) 0.69 (0.18), p= 0.16
		Integrated Primary Care	Post-enrollment slope (rate in utilization in the 4 quarters after enrollment)	nr/NR	IRR (SE) 1.03 (0.04), p= 0.55
		Integrated Primary Care	Trend change (%) (% change in post-enrollment slope vs pre-enrollment slope)	nr/NR	-31%, p <0.001
O'Toole, 2010, 20966377	Access emergency department	HOPC	First 6 months	44[a]/79 (55.3)	HOPC, pre vs post, p <0.01 GIM, pre vs post, p= 0.53 HOPC vs GIM (Second 6 months) OR (95% CI)= 0.84 (0.46, 1.55)[a] p= 0.57
			Second 6 months	29 [a]/79 (36.8)	
		GIM	First 6 months	43 [a]/98 (44.2)	
			Second 6 months	40 [a]/98 (41.1)	
O'Toole, 2010, 20966377	Access emergency department, nonemergency care	HOPC	First 6 months	18 [a]/79 (22.4)	HOPC, pre vs post, p=0.02 GIM, pre vs post, p= 0.62 HOPC vs GIM (Second 6 months) OR (95% CI)= 0.50 (0.22, 1.13)[a] p= 0.13
			Second 6 months	10 [a]/79 (13.2)	
		GIM	First 6 months	24 [a]/98 (24.2)	
			Second 6 months	22 [a]/98 (22.1)	
O'Toole, 2010, 20966377	Proportion of emergency department visits that were non-emergency	HOPC	First 6 months	29/123 (23.6)	HOPC, pre vs post, p=0.39 GIM, pre vs post, p= 0.29 HOPC vs GIM (Second 6 months) OR (95% CI)= 0.46 (0.22, 0.93)[a] P<0.01
			Second 6 months	18/81 (18.5)	
		GIM	First 6 months	40/115 (34.8)	
			Second 6 months	27/70 (38.6)	
O'Toole, 2010, 20966377	Emergency department for a nonacute condition	HOPC	2006-2007	nr/79 (NR)	aOR (95% CI) 0.4 (0.2, 0.8)
		GIM	2004-2006	nr/98 (NR)	
O'Toole, 2018		HPACT	June 2012–January 2014	111/183 (61.0)	

Author, Year, PMID	Outcome Definition	Sample/Groups, Comparisons	Timepoint	n/N (%)	Effect size, p-value
	Percent of participants accessing care- Emergency department (any)	PACT	June 2012–January 2014	54/83 (65.9)	p=0 .45 OR (95% CI)= 0.83 (0.48, 1.42)[a]
O'Toole, 2018	Percent of participants accessing care- Emergency department (mental health-related)	HPACT	June 2012–January 2014	62/183 (34.1)	p=0.04 OR (95% CI)= 0.58 (0.34, 0.98)[a]
		PACT	June 2012–January 2014	39/83 (47.6)	
O'Toole, 2018	Acute care event- All-cause emergency department visits and hospitalizations as well as emergency department visits and hospitalizations for ambulatory care–sensitive conditions	HPACT	June 2012–January 2014	nr/NR	aOR (95% CI) = 0.41 (0.21, 0.80)
		PACT	June 2012–January 2014	nr/NR	

Notes. [a]Calculated by the research team.

Abbreviations. aOR=adjusted odds ratio; CI=confidence interval; GIM=general internal medicine; HOPC=homeless oriented primary care; HPACT=homeless patient aligned care teams; IRR=incidence rate ratios; N=number; NR=not reported; OR=odds ratio; PACT=patient aligned care teams; Q=quarter; SE=standard error.

G3. Emergency Department (Non-Comparative)

Author, Year, PMID	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
O'Toole, 2013	Services Utilization During First 6 Months of Primary Care Enrollment- Emergency Department Visits	Homeless PACT	2008–2011	61[a]/127 (48)	

Notes. [a]Calculated by the research team.

Abbreviations. N=number; PACT=patient aligned care teams.

G4. Hospitalizations

Author, Year, PMID	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect Size, p-value
Jones, 2018, 29412071	Percentages of patients with any health care visit before and after HPACT- Inpatient stay	HPACT	7-12 months before enrollment	30/179 (17)	aOR (95% CI) 0–6 months after HPACT enrollment vs 0-6 months before = 0.43 (0.25, 0.76) 7–12 months after HPACT enrollment vs 0-6 months before = 0.45 (0.26, 0.80)
			0-6 months before enrollment	56/179 (31)	
			0-6 months after enrollment	35/179 (20)	
			7-12 months after enrollment	36/179 (20)	
Jones, 2023, 35194740	Hospitalizations- Utilization Before and After Integrated Primary Care Enrollment	Integrated Primary Care	Pre-enrollment slope (rate of utilization in 4 quarters prior to enrollment)	nr/NR	IRR (SE) 1.54 (0.18) , p <0.001
			Level change (change in Q1 after enrollment vs Q prior to enrollment)	nr/NR	IRR (SE) 0.33 (0.11) , p <0.001
			Post-enrollment slope (rate in utilization in the 4 quarters after enrollment)	nr/NR	IRR (SE) 1.17 (0.11) , p= 0.08
			Trend change (%) (% change in post-enrollment slope vs pre-enrollment slope)	nr/NR	-34%, p= 0.04
O'Toole, 2010, 20966377	Total number of hospitalizations	HOPC	12 months	72/NR	NR, p=0.02
		GIM	12 months	47/NR	
O'Toole, 2010, 20966377	Proportion of hospitalizations not related to drug or alcohol use or mental health	HOPC	First 6 months	10/35 (28.6)	HOPC, pre vs post, P<0.01 GIM, pre vs post, p= 0.6 HOPC vs GIM (Second 6 months) OR (95% CI)= 0.15 (0.04, 0.61)[a] P<0.01
			Second 6 months	4/37 (10.8)	
		GIM	First 6 months	14/29 (48.2)	
			Second 6 months	8/18 (44.4)	
O'Toole, 2018	Percent of participants accessing care-Hospitalizations	HPACT	June 2012–January 2014	42/183 (23.1)	p=0.04 OR (95% CI)= 0.55 (0.31, 0.98)[a]
		PACT	June 2012–January 2014	29/83 (35.4)	

Note. [a]Calculated by the research team.

Abbreviations. aOR=adjusted odds ratio; CI=confidence interval; GIM=general internal medicine; HOPC=homeless oriented primary care; HPACT=homeless patient aligned care teams; IRR=Incidence rate ratios; N=number; NR=not reported; OR=odds ratio; PACT=patient aligned care teams; Q=quarter; SE=standard error.

G5. Specialty Care

Author, Year, PMID	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect Sze, p-value
Jones, 2018, 29412071	Percentages of patients with any health care visit before and after HPACT- Medical specialist visit	HPACT	7-12 months before enrollment	39/179 (22)	aOR (95% CI) 0–6 months after HPACT enrollment vs 0-6 months before= 1.38 (0.86, 2.23) 7–12 months after HPACT enrollment vs 0-6 months before = 0.81 (0.49, 1.31)
			0-6 months before enrollment	66/179 (37)	
			0-6 months after enrollment	77/179 (43)	
			7-12 months after enrollment	59/179 (33)	
Jones, 2018, 29412071	Percentages of patients with any health care visit before and after HPACT- Mental health specialist visit	HPACT	7-12 months before enrollment	41/179 (23)	aOR (95% CI) 0–6 months after HPACT enrollment vs 0-6 months before = 0.90 (0.53, 1.51) 7–12 months after HPACT enrollment vs 0-6 months before =0.35 (0.20, 0.60)
			0-6 months before enrollment	85/179 (47)	
			0-6 months after enrollment	82/179 (46)	
			7-12 months after enrollment	56/179 (31)	
Jones, 2018, 29412071	Percentages of patients with any health care visit before and after HPACT- Addiction specialist visit	HPACT	7-12 months before enrollment	14/179 (8)	aOR (95% CI) 0–6 months after HPACT enrollment vs 0-6 months before = 0.51 (0.24, 1.06) 7–12 months after HPACT enrollment vs 0-6 months before = 0.39 (0.18, 0.84)
			0-6 months before enrollment	25/179 (14)	
			0-6 months after enrollment	15/179 (8)	
			7-12 months after enrollment	12/179 (7)	
Jones, 2023, 35194740	Mental health Clinic- Utilization Before and After Integrated Primary Care Enrollment	Integrated Primary Care	Pre-enrollment slope (rate of utilization in 4 quarters prior to enrollment)	nr/NR	IRR (SE) 1.35 (0.06) , p <0.001
			Level change (change in Q1 after enrollment vs Q prior to enrollment)	nr/NR	IRR (SE) 0.46 (0.06) , p <0.001
			Post-enrollment slope (rate in utilization in the 4 quarters after enrollment)	nr/NR	IRR (SE) 0.94 (0.03) , p <0.001
			Trend change (%) (% change in post-enrollment slope vs pre-enrollment slope)	nr/NR	-30%, p= 0.1
Jones, 2023, 35194740	Specialty SUD Clinic - Utilization Before and After Integrated Primary Care Enrollment	Integrated Primary Care	Pre-enrollment slope (rate of utilization in 4 quarters prior to enrollment)	nr/NR	IRR (SE) 1.31 (0.06) , p <0.001

Author, Year, PMID	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect Sze, p-value
			Level change (change in Q1 after enrollment vs Q prior to enrollment)	nr/NR	IRR (SE) 0.66 (0.09) , p <0.001
			Post-enrollment slope (rate in utilization in the 4 quarters after enrollment)	nr/NR	IRR (SE) 0.78 (0.03) , p <0.001
			Trend change (%) (% change in post-enrollment slope vs pre-enrollment slope)	nr/NR	-40%, p <0.001
Jones, 2023, 36810631	Rates of Depression Follow-up and Treatment	HPACT	Within 84 days	234[a]/374 (62.6)	aOR (95% CI)= 1.61 (1.21–2.15), p<.001
		PACT	Within 84 days	1133[a]/2469 (45.9)	
		HPACT	Within 180 days	291[a]/374 (77.8)	aOR (95% CI)= 1.51 (1.15–1.99), p<.001
		PACT	Within 180 days	1618[a]/2469 (65.5)	
Jones, 2023, 36810631	Receiving 60+ day supply of antidepressant prescriptions, 4+ mental health specialist visits, or 3+ psychotherapy visits	HPACT	Within 365 days following a positive depression screen	334[a]/374 (89.3)	aOR (95% CI)= 1.58 (1.15–2.16), p<.01
		PACT	Within 365 days following a positive depression screen	2,017[a]/2469 (81.7)	
O'Toole, 2018	Percent of participants accessing care- Psychiatry	HPACT	June 2012–January 2014	102/183 (56.0)	p= 0.26 OR (95% CI)= 0.75 (0.44, 1.28)[a]
		PACT	June 2012–January 2014	52/83 (63.4)	
O'Toole, 2018	Percent of participants accessing care- Psychology	HPACT	June 2012–January 2014	59/183 (32.4)	p=0.30 OR (95% CI)= 0.76 (0.44, 1.30)[a]
		PACT	June 2012–January 2014	32/83 (39.0)	
O'Toole, 2018	Percent of participants accessing care- Group Therapy	HPACT	June 2012–January 2014	73/183 (40.1)	p=0 .04 OR (95% CI)= 0.59 (0.35, 0.99)[a]
		PACT	June 2012–January 2014	44/83 (53.7)	

Notes. [a]Calculated by the research team.

Abbreviations. aOR=adjusted odds ratio; CI=confidence interval; GIM=general internal medicine; HOPC=homeless oriented primary care; HPACT=homeless patient aligned care teams; IRR=incidence rate ratios; N=number; NR=not reported; OR=odds ratio; PACT=patient aligned care teams; Q=quarter; SE=standard error.

G6. Specialty Care (Non-Comparative)

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect Size, p-value
O'Toole, 2013	Services Utilization During First 6 Months of Primary Care Enrollment- Mental Health Care	Homeless PACT	2008–2011	112[a]/127 (88.2)	-
	Services Utilization During First 6 Months of Primary Care Enrollment- Using substance abuse treatment services	Homeless PACT	2008–2011	48[a]/127 (37.8)	
	Services Utilization During First 6 Months of Primary Care Enrollment- Specialty Care	Homeless PACT	2008–2011	110[a]/127 (86.6)	
Chang 2020	Receipt of any add-on intensive services- Telehealth services	Those receiving homeless specialized primary care	October 2015- September 2016	124/2775 (4.5)	-
	Receipt of any add-on intensive services- Palliative care or hospice services	Those receiving homeless specialized primary care	October 2015- September 2016	47/2775 (1.7)	
	Receipt of any add-on intensive services- Intensive mental health case management services	Those receiving homeless specialized primary care	October 2015- September 2016	79/2775 (2.8)	

Notes. [a]Calculated by the research team.

Abbreviations. N=number; PACT=patient aligned care teams.

G7. Patient Experience/Satisfaction

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
Gabrielian, 2021	Accessibility and coordination (Primary Care Quality-Homeless [PCQ-H] questionnaire), Favorable (Unadjusted)	HPACT	March - October 2018	278/626 (45.3)	-
		Mainstream Primary Care	March - October 2018	94/343 (28.4)	
	Accessibility and coordination (Primary Care Quality-Homeless [PCQ-H] questionnaire), Favorable (Adjusted)	HPACT	March - October 2018	nr/NR (46.2)	aOR (95% CI) = 2.2 (1.6, 3.1), p<0.05
		Mainstream Primary Care	March - October 2018	nr/NR (28.0)	
	Accessibility and coordination (Primary Care Quality-Homeless [PCQ-H] questionnaire), Unfavorable (Unadjusted)	HPACT	March - October 2018	170/626 (27.7)	-
		Mainstream Primary Care	March - October 2018	124/343 (37.5)	
	Accessibility and coordination (Primary Care Quality-Homeless [PCQ-H] questionnaire), Unfavorable (Adjusted)	HPACT	March - October 2018	nr/NR (26.4)	aOR (95% CI) = 0.6 (0.4, 0.8), p<0.05
		Mainstream Primary Care	March - October 2018	nr/NR (38.4)	
Gabrielian, 2021	Patient-clinician relationship (Primary Care Quality-Homeless [PCQ-H] questionnaire), Favorable (Unadjusted)	HPACT	March - October 2018	279/626 (45.2)	-
		Mainstream Primary Care	March - October 2018	114/343 (33.8)	
	Patient-clinician relationship (Primary Care Quality-Homeless [PCQ-H] questionnaire), Favorable (Adjusted)	HPACT	March - October 2018	nr/NR (46.8)	aOR (95% CI)= 1.9 (1.4, 2.6), p<0.05
		Mainstream Primary Care	March - October 2018	nr/NR (31.7)	
	Patient-clinician relationship (Primary Care Quality-Homeless [PCQ-H] questionnaire), Unfavorable (Unadjusted)	HPACT	March - October 2018	178/626 (28.9)	-
		Mainstream Primary Care	March - October 2018	131/343 (38.9)	
	Patient-clinician relationship(Primary Care Quality-Homeless [PCQ-H] questionnaire), Unfavorable (Adjusted)	HPACT	March - October 2018	nr/NR (26.5)	aOR (95% CI) =0.5 (0.3, 0.6), p<0.05
		Mainstream Primary Care	March - October 2018	nr/NR (42.4)	
Gabrielian, 2021	Perceived cooperation among clinician (Primary Care Quality-Homeless [PCQ-H] questionnaire), Favorable (Unadjusted)	HPACT	March - October 2018	211/626 (38.0)	-
		Mainstream Primary Care	March - October 2018	96/343 (30.9)	
	Perceived cooperation among clinician (Primary Care Quality-Homeless [PCQ-H] questionnaire), Favorable (Adjusted)	HPACT	March - October 2018	nr/NR (40.1)	aOR (95% CI) = 1.9 (1.4, 2.6), p<0.05
		Mainstream Primary Care	March - October 2018	nr/NR (28.6)	
	Perceived cooperation among clinician (Primary Care Quality-Homeless [PCQ-H] questionnaire), Unfavorable (Unadjusted)	HPACT	March - October 2018	155/626 (27.9)	-
		Mainstream Primary Care	March - October 2018	116/343 (37.3)	
		HPACT	March - October 2018	nr/NR (25.6)	aOR (95% CI) =0.5 (0.3, 0.6), p<0.05

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
	Perceived cooperation among clinician (Primary Care Quality-Homeless [PCQ-H] questionnaire), Unfavorable (Adjusted)	Mainstream Primary Care	March - October 2018	nr/NR (38.8)	
Gabrielian, 2021	Homeless-specific needs (Primary Care Quality-Homeless [PCQ-H] questionnaire), Favorable (Unadjusted)	HPACT	March - October 2018	236/626 (39.9)	-
		Mainstream Primary Care	March - October 2018	77/343 (25.1)	
	Homeless-specific needs (Primary Care Quality-Homeless [PCQ-H] questionnaire), Favorable (Adjusted)	HPACT	March - October 2018	nr/NR (40.2)	aOR (95% CI) = 2.1 (1.5, 2.9), p<0.05
		Mainstream Primary Care	March - October 2018	nr/NR (24.5)	
	Homeless-specific needs (Primary Care Quality-Homeless [PCQ-H] questionnaire), Unfavorable (Unadjusted)	HPACT	March - October 2018	253/626 (42.7)	-
		Mainstream Primary Care	March - October 2018	182/343 (59.3)	
	Homeless-specific needs (Primary Care Quality-Homeless [PCQ-H] questionnaire), Unfavorable (Adjusted)	HPACT	March - October 2018	nr/NR (41.9)	aOR (95% CI) =0.5 (0.4, 0.7), p<0.05
		Mainstream Primary Care	March - October 2018	nr/NR (59.1)	
Jones, 2018 29762272	Access (2014–2015 Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Negative experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 9.3 vs 9.9
		Non-HPACT Facilities	2014–2015	nr/10148	
	Access (2014–2015 Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Positive experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 45.5 vs 42.2
		Non-HPACT Facilities	2014–2015	nr/10148	
Jones, 2018 29762272	Communication (2014–2015 Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Negative experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 10.8 vs 14.1
		Non-HPACT Facilities	2014–2015	nr/10148	
	Communication (2014–2015 Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Positive experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 65.8 vs 58.9
		Non-HPACT Facilities	2014–2015	nr/10148	
Jones, 2018 29762272	Office Staff Helpfulness/Courtesy (2014–2015 Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Negative experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 10.7 vs 12.3
		Non-HPACT Facilities	2014–2015	nr/10148	
	Office Staff Helpfulness/Courtesy (2014–2015 Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Positive experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 60.0 vs 58.8
		Non-HPACT Facilities	2014–2015	nr/10148	

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
Jones, 2018 29762272	Overall Provider Rating (2014–2015 Patient-Centered Medical Home-Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Negative experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 9.9 vs 12.5
		Non-HPACT Facilities	2014–2015	nr/10148	
	Overall Provider Rating (2014–2015 Patient-Centered Medical Home-Survey of Health care Experiences of Patients [PCMH-SHEP]), Positive experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 53.7 vs48.0
		Non-HPACT Facilities	2014–2015	nr/10148	
Jones, 2018 29762272	Comprehensiveness (2014–2015 Patient-Centered Medical Home-Survey of Health care Experiences of Patients [PCMH-SHEP]), Negative experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 17.1 vs 21.6
		Non-HPACT Facilities	2014–2015	nr/10148	
	Comprehensiveness (2014–2015 Patient-Centered Medical Home-Survey of Health care Experiences of Patients [PCMH-SHEP]), Positive experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 48.4 vs 44.0
		Non-HPACT Facilities	2014–2015	nr/10148	
Jones, 2018 29762272	Care Coordination (2014–2015 Patient-Centered Medical Home-Survey of Health care Experiences of Patients [PCMH-SHEP]), Negative experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 7.7 vs 10.4
		Non-HPACT Facilities	2014–2015	nr/10148	
	Care Coordination (2014–2015 Patient-Centered Medical Home-Survey of Health care Experiences of Patients [PCMH-SHEP]), Positive experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 59.9 vs 55.6
		Non-HPACT Facilities	2014–2015	nr/10148	
Jones, 2018 29762272	Shared Decision-Making (2014–2015 Patient-Centered Medical Home-Survey of Health care Experiences of Patients [PCMH-SHEP]), Negative experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 9.8 vs15.2
		Non-HPACT Facilities	2014–2015	nr/10148	
	Shared Decision-Making (2014–2015 Patient-Centered Medical Home-Survey of Health care Experiences of Patients [PCMH-SHEP]), Positive experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 42.3 vs 37.9
		Non-HPACT Facilities	2014–2015	nr/10148	
Jones, 2018 29762272	Self-Management Support (2014–2015 Patient-Centered Medical Home-Survey of Health care Experiences of Patients [PCMH-SHEP]), Negative experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 25.1 vs 30.0
		Non-HPACT Facilities	2014–2015	nr/10148	
	Self-Management Support (2014–2015 Patient-Centered Medical Home-Survey of Health care Experiences of Patients [PCMH-SHEP]), Positive experiences	HPACT Facilities	2014–2015	nr/2022	HPACT vs Non-HPACT, Adjusted %= 52.6 vs 45.0
		Non-HPACT Facilities	2014–2015	nr/10148	

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
Jones, 2019	Access (2014-2015 Patient Centered Medical Home Survey of Health care Experiences of Patients [PCMH-SHEP]), Positive (Unadjusted), (% [SE])	HPACT	2014–2015	140[a]/251 (55.7 [4.5])	-
		Standard PC with H-PACT Available	2014–2015	534[a]/1,527 (35.0 [1.8])	
		Standard PC (HPACT unavailable)	2014–2015	3497[a]/10,079 (34.7 [0.8])	
	Access (2014-2015 Patient Centered Medical Home Survey of Health care Experiences of Patients [PCMH-SHEP]), Moderate (Unadjusted), % (SE)	HPACT	2014–2015	95[a]/251 (37.9 [4.3])	-
		Standard PC with H-PACT Available	2014–2015	785[a]/1,527 (51.4 [1.9])	
		Standard PC (HPACT unavailable)	2014–2015	5150[a]/10,079 (51.1 [0.8])	
	Access (2014-2015 Patient Centered Medical Home Survey of Health care Experiences of Patients [PCMH-SHEP]), Negative (Unadjusted), % (SE)	HPACT	2014–2015	16[a]/251 (6.4 [2.7])	-
		Standard PC with H-PACT Available	2014–2015	208[a]/1,527 (13.6 [1.5])	
		Standard PC (HPACT unavailable)	2014–2015	1441[a]/10,079 (14.3 [0.6])	
	Access (2014-2015 Patient Centered Medical Home Survey of Health care Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience	HPACT	2014–2015	129[a]/251 (51.5)	aRD (95% CI): H-PACT versus standard PC in facility with H-PACT = 17.4 (8.1, 26.7), p<.001 Standard PC in facility with H-PACT versus facility without H-PACT = −0.9 (−4.6, 2.9), p= NS
		Standard PC with H-PACT Available	2014–2015	521[a]/1,527 (34.1)	
		Standard PC (HPACT unavailable)	2014–2015	3528[a]/10,079 (35.0)	
	Access (2014-2015 Patient Centered Medical Home Survey of Health care Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience, Controlling for Site and Patient Covariate	HPACT	2014–2015	141[a]/251 (56.2)	aRD (95% CI) : 21.1 (11.2, 31.0), p<.001
		Standard PC with H-PACT Available	2014–2015	534[a]/1527 (35.0)	
Jones, 2019	Communication (2014-2015 Patient Centered Medical Home Survey of Health care Experiences of Patients [PCMH-SHEP]), Positive (Unadjusted), % (SE)	HPACT	2014–2015	189[a]/251 (75.1 [3.9])	-
		Standard PC with H-PACT Available	2014–2015	889[a]/1,527 (58.2 [1.8])	
		Standard PC (HPACT unavailable)	2014–2015	5241[a]/10,079 (52.0 [0.8])	
		HPACT	2014–2015	48[a]/251 (19.2 [3.4])	-

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
	Communication (2014-2015 Patient Centered Medical Home Survey of Health care Experiences of Patients [PCMH-SHEP]), Moderate (Unadjusted), % (SE)	Standard PC with H-PACT Available	2014–2015	391[a]/1,527 (25.6 [1.5])	
		Standard PC (HPACT unavailable)	2014–2015	2812[a]/10,079 (27.9 [0.7])	
	Communication (2014-2015 Patient Centered Medical Home Survey of Health care Experiences of Patients [PCMH-SHEP]), Negative (Unadjusted), % (SE)	HPACT	2014–2015	14[a]/251 (5.7 [2.4])	-
		Standard PC with H-PACT Available	2014–2015	247[a]/1,527 (16.2 [1.5])	
		Standard PC (HPACT unavailable)	2014–2015	2026[a]/10,079 (20.1 [0.6])	
	Communication (2014-2015 Patient Centered Medical Home Survey of Health care Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience	HPACT	2014–2015	178[a]/251 (71.0)	aRD (95% CI): H-PACT versus standard PC in facility with H-PACT= 13.9 (5.2, 22.6), p<.01 Standard PC in facility with H-PACT versus facility without H-PACT= 4.7 (0.9, 8.4), p<.05
		Standard PC with H-PACT Available	2014–2015	872[a]/1,527 (57.1)	
		Standard PC (HPACT unavailable)	2014–2015	5291[a]/10,079 (52.5)	
	Communication (2014-2015 Patient Centered Medical Home Survey of Health care Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience, Controlling for Site and Patient Covariate	HPACT	2014–2015	180[a]/251 (71.8)	aRD (95% CI) 13.1 (4.5, 21.7), p<.01
		Standard PC with H-PACT Available	2014–2015	896[a]/1,527 (58.7)	
Jones, 2019	Office staff helpfulness/courtesy (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Positive (Unadjusted), % (SE)	HPACT	2014–2015	168[a]/251 (66.8 [4.2])	-
		Standard PC with H-PACT Available	2014–2015	776[a]/1,527 (50.8 [1.8])	
		Standard PC (HPACT unavailable)	2014–2015	5423[a]/10,079 (53.8 [0.8])	
	Office staff helpfulness/courtesy (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Moderate (Unadjusted), % (SE)	HPACT	2014–2015	52[a]/251 (20.9 [3.6])	-
		Standard PC with H-PACT Available	2014–2015	505[a]/1,527 (33.1 [1.7])	
		Standard PC (HPACT unavailable)	2014–2015	2993[a]/10,079 (29.7 [0.7])	
	Office staff helpfulness/courtesy (2014-2015 Patient Centered Medical Home Survey of	HPACT	2014–2015	31[a]/251 (12.3 [3.1])	-
		Standard PC with H-PACT Available	2014–2015	246[a]/1,527 (16.1 [1.3])	

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
	Healthcare Experiences of Patients [PCMH-SHEP]), Negative (Unadjusted), % (SE)	Standard PC (HPACT unavailable)	2014–2015	1663[a]/10,079 (16.5 [0.7])	
	Office staff helpfulness/courtesy (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience	HPACT	2014–2015	159[a]/251 (63.5)	aRD (95% CI): H-PACT versus standard PC in facility with H-PACT= 13.1 (4.1, 22.2), p<.01 Standard PC in facility with H-PACT versus facility without H-PACT= −3.6 (−7.5, 0.3), p=NS
		Standard PC with H-PACT Available	2014–2015	770[a]/1,527 (50.4)	
		Standard PC (HPACT unavailable)	2014–2015	5443[a]/10,079 (54.0)	
	Office staff helpfulness/courtesy (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience, Controlling for Site and Patient Covariates	HPACT	2014–2015	160[a]/251 (63.6)	aRD (95% CI): 12.3 (3.5, 21.0), p<.01
		Standard PC with H-PACT Available	2014–2015	783[a]/1,527 (51.3)	
Jones, 2019	Provider rating (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Positive (Unadjusted), % (SE)	HPACT	2014–2015	163[a]/251 (65.1 [4.2])	-
		Standard PC with H-PACT Available	2014–2015	770[a]/1,527 (50.4 [1.8])	
		Standard PC (HPACT unavailable)	2014–2015	4364[a]/10,079 (43.3 [0.8])	
	Provider rating (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Moderate (Unadjusted), % (SE)	HPACT	2014–2015	75[a]/251 (29.8 [3.9])	-
		Standard PC with H-PACT Available	2014–2015	542[a]/1,527 (35.5 [1.7])	
		Standard PC (HPACT unavailable)	2014–2015	3971[a]/10,079 (39.4 [0.8])	
	Provider rating (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Negative (Unadjusted), % (SE)	HPACT	2014–2015	13[a]/251 (5.1 [2.4])	-
		Standard PC with H-PACT Available	2014–2015	215[a]/1,527 (14.1 [1.4])	
		Standard PC (HPACT unavailable)	2014–2015	1744[a]/10,079 (17.3 [0.6])	
	Provider rating (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]),	HPACT	2014–2015	148[a]/251 (58.9)	aRD (95% CI): H-PACT versus standard PC in facility with H-PACT= 11.0 (1.9, 20.1), p<.05
		Standard PC with H-PACT Available	2014–2015	730[a]/1,527 (47.8)	

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
	Adjusted probability of reporting a positive experience	Standard PC (HPACT unavailable)	2014–2015	445[a]/10,079 (44.1)	Standard PC in facility with H-PACT versus facility without H-PACT= 3.8 (−0.1, 7.6), p= NS
	Provider rating (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience, Controlling for Site and Patient Covariates	HPACT	2014–2015	157[a]/251 (62.6)	aRD (95% CI): 11.9 (2.4, 21.4), p<.05
		Standard PC with H-PACT Available	2014–2015	774[a]/1,527 (50.7)	
Jones, 2019	Comprehensiveness (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Positive (Unadjusted), % (SE)	HPACT	2014–2015	165[a]/251 (65.6 [4.0])	-
		Standard PC with H-PACT Available	2014–2015	825 [a]/1,527 (54.0 [1.8])	
		Standard PC (HPACT unavailable)	2014–2015	5241[a]/10,079 (52.0 [0.8])	
	Comprehensiveness (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Moderate (Unadjusted), % (SE)	HPACT	2014–2015	61[a]/251 (24.4 [3.7])	-
		Standard PC with H-PACT Available	2014–2015	441[a]/1,527 (28.9 [1.7])	
		Standard PC (HPACT unavailable)	2014–2015	2883[a]/10,079 (28.6 [0.7])	
	Comprehensiveness (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Negative (Unadjusted), % (SE)	HPACT	2014–2015	25[a]/251 (10.0 [2.2])	-
		Standard PC with H-PACT Available	2014–2015	260[a]/1,527 (17.0 [1.3])	
		Standard PC (HPACT unavailable)	2014–2015	1965[a]/10,079 (19.5 [0.6])	
	Comprehensiveness (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience	HPACT	2014–2015	157[a]/251 (62.6)	aRD (95% CI): H-PACT versus standard PC in facility with H-PACT= 9.3 (0.8, 17.9), p<.05
		Standard PC with H-PACT Available	2014–2015	814[a]/1,527 (53.3)	
		Standard PC (HPACT unavailable)	2014–2015	5271[a]/10,079 (52.3)	Standard PC in facility with H-PACT versus facility without H-PACT= 1.0 (−3.0, 5.0), p= NS
	Comprehensiveness (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive	HPACT	2014–2015	156[a]/251 (62.0)	aRD (95% CI): 7.5 (−1.6, 16.6), p= NS
		Standard PC with H-PACT Available	2014–2015	832[a]/1,527 (54.5)	

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
	experience, Controlling for Site and Patient Covariates				
Jones, 2019	Coordination (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Positive (Unadjusted), % (SE)	HPACT	2014–2015	170[a]/251 (67.9 [5.3])	-
		Standard PC with H-PACT Available	2014–2015	869[a]/1,527 (56.9 [2.1])	
		Standard PC (HPACT unavailable)	2014–2015	5261[a]/10,079 (52.2 [0.9])	
	Coordination (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Moderate (Unadjusted), % (SE)	HPACT	2014–2015	71[a]/251 (28.3 [4.9])	-
		Standard PC with H-PACT Available	2014–2015	519[a]/1,527 (34.0 [2.0])	
		Standard PC (HPACT unavailable)	2014–2015	3528[a]/10,079 (35.0 [0.9])	
	Coordination (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Negative (Unadjusted), % (SE)	HPACT	2014–2015	9[a]/251 (3.7 [3.2])	-
		Standard PC with H-PACT Available	2014–2015	139[a]/1,527 (9.1 [1.4])	
		Standard PC (HPACT unavailable)	2014–2015	1300[a]/10,079 (12.9 [0.7])	
	Coordination (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience	HPACT	2014–2015	160[a]/251 (63.7)	aRD (95% CI): H-PACT versus standard PC in facility with H-PACT= 8.9 (−1.0, 21.0), p= NS Standard PC in facility with H-PACT versus facility without H-PACT= 2.0 (−1.8, 7.1), p= NS
		Standard PC with H-PACT Available	2014–2015	837[a]/1,527 (54.8)	
		Standard PC (HPACT unavailable)	2014–2015	5322[a]/10,079 (52.8)	
	Coordination (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience, Controlling for Site and Patient Covariates	HPACT	2014–2015	165[a]/251 (65.8)	aRD (95% CI): 8.6 (−2.9, 20.1), p= NS
		Standard PC with H-PACT Available	2014–2015	873[a]/1,527 (57.2)	
Jones, 2019	Self-management support (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Positive (Unadjusted), % (SE)	HPACT	2014–2015	163[a]/251 (64.8 [4.2])	-
		Standard PC with H-PACT Available	2014–2015	806[a]/1,527 (52.8 [1.8])	

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
		Standard PC (HPACT unavailable)	2014–2015	4667[a]/10,079 (46.3 [0.8])	
	Self-management support (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Moderate (Unadjusted), % (SE)	HPACT	2014–2015	55[a]/251 (22.1 [3.7])	-
		Standard PC with H-PACT Available	2014–2015	324[a]/1,527 (21.2 [1.4])	
		Standard PC (HPACT unavailable)	2014–2015	2339[a]/10,079 (23.8 [0.7])	
	Self-management support (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Negative (Unadjusted), % (SE)	HPACT	2014–2015	33[a]/251 (13.0 [3.0])	-
		Standard PC with H-PACT Available	2014–2015	389[a]/1,527 (25.5 [1.6])	
		Standard PC (HPACT unavailable)	2014–2015	3014[a]/10,079 (29.9 [0.7])	
	Self-management support (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience	HPACT	2014–2015	149[a]/251 (59.5)	aRD (95% CI): H-PACT versus standard PC in facility with H-PACT= 8.0 (−1.3, 17.4), p= NS Standard PC in facility with H-PACT versus facility without H-PACT= 4.6 (0.7, 8.5), p<.05
		Standard PC with H-PACT Available	2014–2015	785[a]/1,527 (51.4)	
		Standard PC (HPACT unavailable)	2014–2015	4717[a]/10,079 (46.8)	
	Self-management support (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience, Controlling for Site and Patient Covariates	HPACT	2014–2015	151[a]/251 (60.3)	aRD (95% CI): 6.9 (−2.7, 16.6), p= NS
		Standard PC with H-PACT Available	2014–2015	815[a]/1,527 (53.4)	
Jones, 2019	Shared decision-making (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Positive (Unadjusted), % (SE)	HPACT	2014–2015	135[a]/251 (53.6 [5.2])	-
		Standard PC with H-PACT Available	2014–2015	634[a]/1,527 (41.5 [2.1])	
		Standard PC (HPACT unavailable)	2014–2015	3719[a]/10,079 (36.9 [0.9])	
	Shared decision-making (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Moderate (Unadjusted), % (SE)	HPACT	2014–2015	99[a]/251 (39.6 [5.1])	-
		Standard PC with H-PACT Available	2014–2015	719[a]/1,527 (47.1 [2.1])	
		Standard PC (HPACT unavailable)	2014–2015	4505[a]/10,079 (44.7 [1.0])	

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
	Shared decision-making (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Negative (Unadjusted), % (SE)	HPACT	2014–2015	17[a]/251 (6.8 [3.2])	-
		Standard PC with H-PACT Available	2014–2015	176[a]/1,527 (11.5 [1.3])	
		Standard PC (HPACT unavailable)	2014–2015	1855[a]/10,079 (18.4 [0.8])	
	Shared decision-making (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience	HPACT	2014–2015	120[a]/251 (48.0)	aRD (95% CI) H-PACT versus standard PC in facility with H-PACT= 8.4 (−2.3, 6.6), p= NS Standard PC in facility with H-PACT versus facility without H-PACT= 2.1 (−2.9, 19.7), p= NS
		Standard PC with H-PACT Available	2014–2015	605[a]/1,527 (39.6)	
		Standard PC (HPACT unavailable)	2014–2015	3780[a]/10,079 (37.5)	
	Shared decision-making (2014-2015 Patient Centered Medical Home Survey of Healthcare Experiences of Patients [PCMH-SHEP]), Adjusted probability of reporting a positive experience, Controlling for Site and Patient Covariates	HPACT	2014–2015	130[a]/251 (51.8)	aRD (95% CI): 10.2 (−2.0, 22.3), p= NS
		Standard PC with H-PACT Available	2014–2015	637[a]/1,527 (41.7)	
Kertesz, 2021	Unfavorable Experience, Primary Care Quality-Homeless (PCQ-H) Scores-Relationship (Unadjusted), N(%)	HPACT	2015–2017	894/3323[a] (26.9)	p<.001
		Mainstream PACT	2015–2017	767/2303[a] (33.3)	
	Unfavorable Experience, Primary Care Quality-Homeless (PCQ-H) Scores-Relationship (Weighted and Adjusted), Predicted Percentage (95% CI)	HPACT	2015–2017	nr/NR	26.2% (22.6%–29.7%) vs 38.0% (33.7%–42.3%), p<.001
		Mainstream PACT	2015–2017	nr/NR	
Kertesz, 2021	Unfavorable Experience, Primary Care Quality-Homeless (PCQ-H) Scores-Cooperation (Unadjusted), N(%)	HPACT	2015–2017	828/2947[a] (28.1)	p<.001
		Mainstream PACT	2015–2017	747/2041[a] (36.6)	
	Unfavorable Experience, Primary Care Quality-Homeless (PCQ-H) Scores-Cooperation (Weighted and Adjusted), Predicted Percentage (95% CI)	HPACT	2015–2017	nr/NR	27.9% (24.1%–31.6%) vs 39.3% (34.9%–43.7%), p<.001
		Mainstream PACT	2015–2017	nr/NR	
Kertesz, 2021	Unfavorable Experience, Primary Care Quality-Homeless (PCQ-H) Scores-Access/Coordination (Unadjusted), N(%)	HPACT	2015–2017	881/3300[a] (26.7)	p<.001
		Mainstream PACT	2015–2017	802/2284[a] (35.1)	

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
	Unfavorable Experience, Primary Care Quality-Homeless (PCQ-H) Scores-Access/Coordination (Weighted and Adjusted), Predicted Percentage (95% CI)	HPACT	2015–2017	nr/NR	25.0% (21.4%–28.6%) vs 36.7% (32.3%–41.0%), p<.001
		Mainstream PACT	2015–2017	nr/NR	
Kertesz, 2021	Unfavorable Experience, Primary Care Quality-Homeless (PCQ-H) Scores-Homeless-specific needs (Unadjusted), N(%)	HPACT	2015–2017	1362/3123[a] (43.6)	p<.001
		Mainstream PACT	2015–2017	1046/1,940[a] (53.9)	
	Unfavorable Experience, Primary Care Quality-Homeless (PCQ-H) Scores-Homeless-specific needs (Weighted and Adjusted), Predicted Percentage (95% CI)	HPACT	2015–2017	nr/NR	48.3% (43.7%–52.9%) vs 60.9% (56.5%–65.4%), p<.001
		Mainstream PACT	2015–2017	nr/NR	

Notes. [a]Calculated by the research team.

Abbreviations. aOR=adjusted odds ratio; aRD=adjusted risk difference; CI=confidence interval; GIM=general internal medicine; HOPC=homeless oriented primary care; HPACT=homeless patient aligned care teams; N=number; NR=not reported; OR=odds ratio; PACT=patient aligned care teams.

G8. Patient Experience/Satisfaction (Non-Comparative)

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
Jones, 2017	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Access, Negative (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (18.88)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Access, Positive (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (20.60)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Access, Negative (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (15.98)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Access, Positive (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (22.72)	-
Jones, 2017	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Communication, Negative (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (15.17)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Communication, Positive (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (53.43)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Communication, Negative (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (13.00)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Communication, Positive (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (56.81)	-
Jones, 2017	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Office staff helpfulness/courtesy, Negative (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (11.10)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Office staff helpfulness/courtesy, Positive (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (53.48)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Office staff helpfulness/courtesy, Negative (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (10.10)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-	PACT (homeless only)	October 2012- September 2013	nr/NR (55.00)	-

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
	SHEP)- Office staff helpfulness/courtesy, Positive (Adjusted), %				
Jones, 2017	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Overall provider rating, Negative (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (12.51)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Overall provider rating, Positive (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (42.47)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Overall provider rating, Negative (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (10.42)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Overall provider rating, Positive (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (45.56)	-
Jones, 2017	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Comprehensiveness, Negative (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (19.03)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Comprehensiveness, Positive (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (53.20)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Comprehensiveness, Negative (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (18.80)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Comprehensiveness, Positive (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (53.11)	-
Jones, 2017	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Care coordination, Negative (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (13.08)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Care coordination, Positive (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (51.69)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-	PACT	October 2012- September 2013	nr/NR (12.59)	-

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect size, p-value
	SHEP)- Care coordination, Negative (Adjusted), %	(homeless only)			
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Care coordination, Positive (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (53.32)	-
Jones, 2017	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Medication decision making, Negative (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (13.32)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Medication decision making, Positive (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (39.18)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Medication decision making, Negative (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (12.06)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Medication decision making, Positive (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (41.27)	-
Jones, 2017	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Self-management support, Negative (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (30.78)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Self-management support, Positive (Unadjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (44.98)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Self-management support, Negative (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (31.44)	-
	Patient- Centered Medical Home-Survey of Healthcare Experiences of Patients (PCMH-SHEP)- Self-management support, Positive (Adjusted), %	PACT (homeless only)	October 2012- September 2013	nr/NR (45.71)	-

Abbreviations. NR=not reported; PACT=patient aligned care teams.

G9. Housing and Community Integration

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect Size, p-value
Chinchilla	Community Adjustment based on primary care status (N=418)	Primary Care Access, Yes	1 year after housing	nr/NR	aOR (95% CI)= 1.01 (0.98, 1.04), p= 0.47
		Primary Care Access, No	1 year after housing	nr/NR	
	Housing Stability based on primary care status (N=426)	Primary Care Access, Yes	1 year after housing	nr/NR	aOR (95% CI)= 1.00 (0.95, 1.05), p= 0.87
		Primary Care Access, No	1 year after housing	nr/NR	
	Employment based on primary care status (N=144)	Primary Care Access, Yes	1 year after housing	nr/NR	aOR (95% CI)= 0.96 (0.88, 1.06), p= 0.44
		Primary Care Access, No	1 year after housing	nr/NR	
Johnson, 2017	Housing status change during the study- Remained in or moved to unstable housing	Accessed primary care within 1 month of study enrollment	6 months	9/81 (11)	OR (95% CI)= 0.38 (0.16, 0.95), p= 0.038[a]
		Did not access primary care within 1 month of study enrollment	6 months	15/61 (24.6)	
	Housing status change during the study- Began in unstable housing & moved to stable housing	Accessed primary care within 1 month of study enrollment	6 months	25/81 (30.9)	OR (95% CI)= 2.03 (0.91, 4.54), p= 0.085[a]
		Did not access primary care within 1 month of study enrollment	6 months	11/61 (18)	
	Housing status change during the study- Remained in stable housing	Accessed primary care within 1 month of study enrollment	6 months	47/81 (58)	OR (95% CI)= 1.03 (0.52, 2.01), p= 0.938[a]
		Did not access primary care within 1 month of study enrollment	6 months	35/61 (57.4)	

Notes. [a]Calculated by the research team.

Abbreviations. aOR=adjusted odds ratio; CI=confidence interval; N=number; NR=not reported; OR=odds ratio.

G10. Housing and Community Integration (Non-Comparative)

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect Size, p-value
Chang 2020	Receipt of any add-on intensive services-Housing services	Those receiving homeless specialized primary care	October 2015-September 2016	1484/2775 (53.5)	-

Abbreviations. N=number.

G11. Disease-Specific Outcomes

Study	Outcome Definition	Sample/Groups	Timepoint	n/N (%)	Effect Size, p-value
O'Toole 2010	Patients at target goal- Blood Pressure under 140/90 mm Hg	HOPC	6 months	26[a]/33 (78.8)	p= 0.45 OR (95% CI)= 1.24 (0.41, 3.72)[a]
		GIM	6 months	30[a]/40 (75.0)	
O'Toole 2010	Patients at target goal- Diabetes Care, HbA1c under 7.0	HOPC	6 months	4[a]/7 (57.1)	p= 0.76 OR (95% CI)= 1.14 (0.18, 7.28)[a]
		GIM	6 months	7[a]/13 (53.8)	
O'Toole 2010	Patients at target goal- Lipid Management, LDL under 100 mg/dL for patients with comorbid diabetes and coronary artery disease and under 130 mg/dL for all others	HOPC	6 months	17[a]/26 (65.4)	p<0.01 OR (95% CI)= 2.27 (0.83, 6.18)[a]
		GIM	6 months	20[a]/44 (45.5)	
Riggs, 2020, 32181829	Overdose (any) in the last 3 years	HPACT	2018	nr/NR	aOR= 1.09 (0.92, 1.28)
		Mainstream Primary Care	2018	nr/NR	
Riggs, 2020, 32181829	Overdose (drug-related) in the last 3 years	HPACT	2018	nr/NR	aOR= 1.12 (0.91, 1.38)
		Mainstream Primary Care	2018	nr/NR	
Riggs, 2020, 32181829	Overdose (alcohol-related) in the last 3 years	HPACT	2018	nr/NR	aOR= 1.21 (0.96, 1.53)
		Mainstream Primary Care	2018	nr/NR	

Notes. [a]Calculated by the research team.

Abbreviations. aOR=adjusted odds ratio; CI=confidence interval; GIM=general internal medicine; HOPC=homeless oriented primary care; HPACT=homeless patient aligned care teams; N=number; NR=not reported; OR=odds ratio.

APPENDIX H. CONTINUOUS OUTCOMES

H1. Primary Care

Author, Year, PMID	Outcome Details	Sample/Groups	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
Jones, 2018, 29412071	Primary care	HPACT	0-12 months before enrollment	179	1.56 (2.56)	MD (95% CI) 1.13 (0.57; 1.69), p=0.0001[a]
			0-12 months after enrollment	179	2.69 (2.80)	
Gundlapalli, 2017, 28806373	Medicine primary	HPACT, High utilizers	6 months before enrollment	511	0.1 (NR)	MD = -0.012[a] p=0.015
			6 months after enrollment	511	0.088 (NR)	
		HPACT site Nonenrolled, High utilizers	First 6 months of data	2787	0.063 (NR)	MD = -0.014[a] p=NR
			Second 6 months of data	2787	0.049 (NR)	Difference-in-differences HPACT versus nonenrolled 0.002[a], p<0.001
		Usual care, High utilizers	First 6 months of data	1689	0.034 (NR)	MD = 0.012[a] p=NR
			Second 6 months of data	1689	0.046 (NR)	Difference-in-differences HPACT versus usual care -0.02[a], p=0.23
O'Toole, 2010, 20966377	Primary care visits	HOPC	First 6 months of data	79	5.96 (4.13)	MD = -3.95[a] p<0.01
			Second 6 months of data	79	2.01 (3.56)	
		GIM	First 6 months of data	98	1.63 (1.26)	MD = -0.32[a] p=0.1
			Second 6 months of data	98	1.31 (1.17)	
		HOPC	Second 6 months of data	79	2.01 (3.56)	MD (95% CI) 0.7 (-0.01 ; 1.46)[a] P=0.05
		GIM	Second 6 months of data	98	1.31 (1.17)	
O'Toole, 2018, 29451116	Primary care provider-specific visits	HPACT	June 2012–January 2014	183	5.1(4.1)	p=0.001 MD (95% CI)[a] 1.5 (0.5; 2.5)
		PACT	June 2012–January 2014	83	3.6 (2.8)	

Author, Year, PMID	Outcome Details	Sample/Groups	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
O'Toole, 2018, 29451116	Primary care provider and nursing visits	HPACT	June 2012–January 2014	183	8.8 (7.1)	p=0.06 MD (95% CI)[a] 1.7 (-0.10 ; 3.5)
		PACT	June 2012–January 2014	83	7.1 (6.4)	

Notes. [a]Calculated by the research team.

Abbreviations. CI=confidence interval; GIM=general internal medicine; HOPC=homeless oriented primary care; HPACT=homeless patient aligned care teams; MD=mean difference; N=number; NR=not reported; PACT=patient aligned care teams; SD=standard deviation.

H2. Primary Care (Non-Comparative)

Author, Year, PMID	Outcome Details	Sample/Groups	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
O'Toole, 2013, 24148042	Primary care visits	Homeless PACT	First 6 months	127	8.4 (5.0)	NA
O'Toole, 2016, 27032987	Primary care visits	HPACT	October 2013 – March 2014	3,543	3.4 (NR)	NA
Chang, 2020, 32597993	Any primary care visit	Those receiving homeless specialized primary care	October 2015- September 2016	2,746	7.7 (8.1)	NA

Abbreviations. HPACT=homeless patient aligned care teams; N=number; NA=not applicable; NR=not reported; SD=standard deviation.

H3. Emergency Department

Author, Year, PMID	Outcome Details	Group/Comparators	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
Jones, 2018, 29412071	Any emergency department visit	HPACT	0-12 months before enrollment	179	1.13 (1.99)	MD (95% CI) 0.15(-0.28; 0.58) p=0.4938[a]
			0-12 months after enrollment	179	1.28 (2.15)	
Jones, 2018, 29412071	Inappropriate emergency department visit	HPACT	0-12 months before enrollment	179	0.55 (1.41)	MD (95% CI) -0.08 (-0.32; 0.16), p=0.5294[a]
			0-12 months after enrollment	179	0.47 (0.95)	
O'Toole, 2016, 27032987	Emergency department visits	HPACT	6 months before enrollment	3,543	3,022 (NR)	Change in emergency department visits from pre to post -19%
			6 months after enrollment	3,543	2,477 (NR)	
Gundlapalli, 2017, 28806373	Emergency department visits- mean per veteran; HPACT compared with usual care	Usual care – 0 visits	6 months before enrollment	23,542	0.57 (NR)	Pre-post difference = -0.30
			6 months after enrollment	23,542	0.27 (NR)	
		HPACT - 0 visits	6 months before	3,987	0.34 (NR)	Pre-post difference = 0.14
			6 months after enrollment	3,987	0.48 (NR)	Adj Difference-in-differences Usual care versus HPACT 0.44, p < 0.05
		Usual care – 1 visit	6 months before	23,542	1.04 (NR)	Pre-post difference = 0.56
			6 months after enrollment	23,542	1.60 (NR)	
		HPACT - 1 visit	6 months before	3,987	1.47 (NR)	Pre-post difference = -0.58
			6 months after enrollment	3,987	0.89 (NR)	Adj Difference-in-differences Usual care versus HPACT -1.13, p < 0.05
		Usual care – 2 or more visits	6 months before	23,542	2.10 (NR)	Pre-post difference = 2.09
			6 months after enrollment	23,542	4.19 (NR)	
		HPACT – 2 or more visits	6 months before	3,987	1.47 (NR)	Pre-post difference = -2.34
			6 months after enrollment	3,987	0.89 (NR)	Adj Difference-in-differences Usual care versus HPACT -4.43, p < 0.05

Author, Year, PMID	Outcome Details	Group/Comparators	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
Gundlapalli, 2017, 28806373	Emergency department visits mean per veteran; H-PACT compared with nonenrolled	HPACT - 0 visits	6 months before	3,987	0.32 (NR)	Pre-post difference = 0.13
			6 months after enrollment	3,987	0.46 (NR)	
		Nonenrolled – 0 visits	6 months before	24,363	0.19 (NR)	Pre-post difference = 0.42
			6 months after enrollment	24,363	0.62 (NR)	Adj Difference-in-differences Usual care versus HPACT nonenrolled 0.29, p < 0.05
		HPACT - 1 visit	6 months before	3,987	1.40 (NR)	Pre-post difference = -0.55
			6 months after enrollment	3,987	0.85 (NR)	
		Nonenrolled – 1 visit	6 months before	24,363	1.31 (NR)	Pre-post difference = -0.35
			6 months after enrollment	24,363	0.96 (NR)	Adj Difference-in-differences Usual care versus HPACT -0.20, p < 0.05
		HPACT – 2 or more visits	6 months before	3,987	4.51 (NR)	Pre-post difference = -2.24
			6 months after enrollment	3,987	2.28 (NR)	
		Nonenrolled – 2 or more visits	6 months before	24,363	3.81 (NR)	Pre-post difference = -1.95
			6 months after enrollment	24,363	1.86 (NR)	Adj Difference-in-differences Usual care versus HPACT -0.29, p < 0.05
Gundlapalli, 2017, 28806373	Emergency and urgent care visits mean per veteran per month	HPACT, High utilizers	6 months before	511	0.12 (NR)	MD = -0.061[a] p<0.001
			6 months after enrollment	511	0.059 (NR)	
		HPACT nonenrolled, High utilizers	First 6 months of data	2,787	0.083 (NR)	MD = -0.042[a] p = NR
			Second 6 months of data	2,787	0.041 (NR)	Difference-in-differences HPACT versus nonenrolled -0.02[a], p=0.27
		Usual care, High utilizers	First 6 months of data	1,689	0.029 (NR)	MD = 0.029 p = NR
			Second 6 months of data	1,689	0.058 (NR)	Difference-in-differences

Author, Year, PMID	Outcome Details	Group/Comparators	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
						HPACT versus usual care -0.09[a], p=0.89
O'Toole, 2010, 20966377	Emergency department visits	HOPC	First 6 months of data	79	1.62 (2.53)	MD (95% CI) -0.55 (-0.1.32; 0.22)[a] p=0.06
			Second 6 months of data	79	1.07 (2.35)	
		GIM	First 6 months of data	98	1.21 (1.91)	MD (95% CI) -0.46 (-0.91; -0.01)[a] p=0.05
			Second 6 months of data	98	0.75 (1.17)	
		HOPC	Second 6 months of data	79	1.07 (2.35)	MD (95% CI) 0.32 (-0.22; 0.86)[a] P=0.27
		GIM	Second 6 months of data	98	0.75 (1.17)	
O'Toole, 2010, 20966377	Emergency Department Visits (Non-Emergency Care)	HOPC	First 6 months of data	79	0.38 (1.13)	MD (95% CI) -0.18 (-0.46; 0.10)[a] p=0.22
			Second 6 months of data	79	0.20 (0.60)	
		GIM	First 6 months of data	98	0.42 (1.00)	MD (95% CI) -0.13 (-0.36; 0.10)[a] p=0.26
			Second 6 months of data	98	0.29 (0.59)	
		HOPC	Second 6 months of data	79	0.20 (0.60)	MD (95% CI) -0.09 (-0.27; 0.09)[a] P=0.29
		GIM	Second 6 months of data	98	0.29 (0.59)	
O'Toole, 2010, 20966377	Emergency Department Visits (Substance Abuse-Related)	HOPC	First 6 months of data	79	0.46 (1.15)	MD (95C%) -0.03 (-0.49; 0.43)[a] p<.99
			Second 6 months of data	79	0.43 (1.74)	
		GIM	First 6 months of data	98	0.21 (0.64)	MD (95% CI) -0.10 (-0.25; 0.05)[a] p=0.13
			Second 6 months of data	98	0.11 (0.42)	
		HOPC	Second 6 months of data	79	0.43 (1.74)	MD (95% CI) 0.32 (-0.04 ; 0.68)[a] p=0.06
		GIM	Second 6 months of data	98	0.11 (0.42)	
O'Toole, 2018, 29451116	Emergency department visits	HPACT	June 2012–January 2014	183	2.6 (4.4)	MD (95% CI) -0.3 (-1.4; 0.8)[a] p=0.57
		PACT	June 2012–January 2014	83	2.9 (3.9)	
		HPACT	June 2012–January 2014	183	0 (0.2)	MD (95% CI)

Author, Year, PMID	Outcome Details	Group/Comparators	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
O'Toole, 2018, 29451116	Emergency department visits for ambulatory-care-sensitive conditions	PACT	June 2012–January 2014	83	0.2 (0.6),	-0.2 (-0.3 ; -0.1)[a] p=0.04

Notes. [a]Calculated by the research team.

Abbreviations. CI=confidence interval; GIM=general internal medicine; HOPC=homeless oriented primary care; HPACT=homeless patient aligned care teams; MD=mean difference; N=number; NR=not reported; PACT=patient aligned care teams; SD=standard deviation.

H4. Emergency Department (Non-Comparative)

Author, Year, PMID	Outcome Details	Group/Comparators	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
Chang, 2020, 32597993	Emergency room visit	Those receiving homeless specialized primary care	October 2015-September 2016	2,746	2.2 (4.2)	NA
O'Toole, 2013, 24148042	Emergency department visits	Homeless PACT	First 6 months	127	1.0	NA

Abbreviations. N=number; NA=not applicable; PACT=patient aligned care teams; SD=standard deviation.

H5. Hospitalization/Inpatient

Author, Year, PMID	Outcome Details	Group/Comparators	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
Jones, 2018, 29412071	Inpatient stay	HPACT	0-12 months before enrollment	179	0.74 (1.43)	MD (95% CI) -0.04 (-0.35; 028) p=0.8032[a]
			0-12 months after enrollment	179	0.70 (1.60)	
O'Toole, 2016, 27032987	Hospitalizations	HPACT	6 months before enrollment	3,543	812 (NR)	Change in hospitalizations from pre to post -34.7%
			6 months after enrollment	3,543	530 (NR)	
			Second 6 months of data	1,689	0.004 (NR)	
O'Toole, 2010, 20966377	Hospitalization admissions/person	HOPC	First 6 months of data	79	0.46 (0.85)	MD (95% CI) 0.01 (0.32; 0.34)[a] 0.02 p=0.94
			Second 6 months of data	79	0.47 (1.21)	
		GIM	First 6 months of data	86	0.30 (0.72)	MD (95% CI) -0.15 (-0.32; 0.02)[a] p=0.11
			Second 6 months of data	86	0.15 (0.48)	
		HOPC	Second 6 months of data	79	0.47 (1.21)	MD (95% CI) 0.32 (0.04 ; 0.60)[a] p = 0.0247
		GIM	Second 6 months of data	86	0.15 (0.48)	
O'Toole, 2018, 29451116	Hospitalizations	HPACT	June 2012–January 2014	183	0.4 (0.8)	MD (95% CI)[a] -0.2 (-0.5; 0.1) p=0.06
		PACT	June 2012–January 2014	83	0.6 (1.2)	
O'Toole, 2018, 29451116	Hospitalizations (not a VA Hospital)	HPACT	June 2012–January 2014	183	0 (0.1)	MD (95% CI)[a] -0.1 (-1.5; 1.3) p=0.29
		PACT	June 2012–January 2014	83	0.1 (9.7)	

Notes. [a]Calculated by the research team.

Abbreviations. CI=confidence interval; GIM=general internal medicine; HOPC=homeless oriented primary care; HPACT=homeless patient aligned care teams; MD=mean difference; N=number; NR=not reported; PACT=patient aligned care teams; SD=standard deviation.

H6. Hospitalization/Inpatient (Non-Comparative)

Author, Year, PMID	Outcome Details	Group/Comparators	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
Trivedi, 2018, 30151996	Total VA-and Medicare -financed acute care hospitalizations	Veterans with higher reliance	12 months	1,211	1.49 (1.26; 1.71)	NA
Trivedi, 2018, 30151996	VA-financed acute care hospitalizations	Veterans with higher reliance	12 months	1,211	0.63 (0.48; 0.78)	NA
Trivedi, 2018, 30151996	Medicare-financed acute care hospitalizations	Veterans with higher reliance	12 months	1,211	0.85 (0.72; 0.98)	NA
Trivedi, 2018, 30151996	Medicare acute hospitalizations	Veterans with higher reliance- Overall	12 months	1,211	0.71 (0.60; 0.82)[a]	NA
Trivedi, 2018, 30151996	VA acute hospitalizations	Veterans with higher reliance-Overall	12 months	1,211	0.55 (0.39; 0.71)[a]	NA
Trivedi, 2018, 30151996	Medicare acute hospitalizations	Veterans with higher reliance-Low intensity (0–22 visits)	12 months	1,211	0.21 (0.12; 0.31)[a]	NA
Trivedi, 2018, 30151996	VA acute hospitalizations	Veterans with higher reliance-Low intensity (0–22 visits)	12 months	1,211	0.27 (0.11; 0.43)[a]	NA
Trivedi, 2018, 30151996	Medicare acute hospitalizations	Veterans with higher reliance- Medium intensity (23–55 visits)	12 months	1,211	0.64 (0.51; 0.78)[a]	NA
Trivedi, 2018, 30151996	VA acute hospitalizations	Veterans with higher reliance- Medium intensity (23–55 visits)	12 months	1,211	0.50 (0.26; 0.73)[a]	NA
Trivedi, 2018, 30151996	Medicare acute hospitalizations	Veterans with higher reliance- High intensity (>55 visits)	12 months	1,211	1.31 (1.04; 1.58)[a]	NA
Trivedi, 2018, 30151996	VA acute hospitalizations	Veterans with higher reliance- High intensity (>55 visits)	12 months	1,211	1.17 (0.70; 1.63)[a]	NA

Notes. [a]Adjusted mean annual hospitalizations.

Abbreviations. N=number; NA=not applicable; SD=standard deviation.

H7. Specialized Care/Other

Author, Year, PMID	Outcome Details	Group/Comparators	Follow-up	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
Jones, 2018, 29412071	Medical specialist	HPACT	0-12 months before enrollment	179	1.28 (2.18)	MD (95% CI) 1.44 (0.31; 2.56), p=0.0122[a]
			0-12 months after enrollment	179	2.72 (7.33)	
Jones, 2018, 29412071	Mental health specialist	HPACT	0-12 months before enrollment	179	2.97 (5.25)	MD (95% CI) 0.14 (-0.98; 1.25), p=0.8054[a]
			0-12 months after enrollment	179	3.11 (5.49)	
Jones, 2018, 29412071	Addiction specialist visit	HPACT	0-12 months before enrollment	179	0.31 (0.71)	MD (95% CI) -0.07 (-0.22; 0.08), p=0.3550[a]
			0-12 months after enrollment	179	0.24 (0.72)	
Gundlapalli, 2017, 28806373	Dental service	HPACT, High utilizers	6 months before enrollment	511	0.013 (NR)	MD = 0.001[a] p = 0.97
			6 months after enrollment	511	0.014 (NR)	
		HPACT nonenrolled, High utilizers	First 6 months of data	2,787	0.013 (NR)	MD = -0.001[a] p = NR Difference-in-differences HPACT versus nonenrolled 0.002[a], p=0.0059
			Second 6 months of data	2,787	0.012 (NR)	
		Usual care, High utilizers	First 6 months of data	1,689	0.0037 (NR)	MD = 0.0015[a] p = NR Difference-in-differences HPACT versus usual care -0.0004[a], p=0.056
			Second 6 months of data	1,689	0.0052 (NR)	
Gundlapalli, 2017, 28806373	Diagnostic (laboratory and imaging)	HPACT, High utilizers	6 months before enrollment	511	0.19 (NR)	MD = -0.05[a] p=0.039
			6 months after enrollment	511	0.14 (NR)	
		HPACT nonenrolled, High utilizers	First 6 months of data	2,787	0.15 (NR)	MD = -0.05[a] p = NR Difference-in-differences
			Second 6 months of data	2,787	0.10 (NR)	

Author, Year, PMID	Outcome Details	Group/Comparators	Follow-up	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
						HPACT versus nonenrolled 0[a], p=0.016
		Usual care, High utilizers	First 6 months of data	1,689	0.063 (NR)	MD = 0.028 p = NR Difference-in-differences HPACT versus usual care -0.078[a], p=0.64
			Second 6 months of data	1,689	0.091 (NR)	
Gundlapalli, 2017, 28806373	Medical specialty	HPACT, High utilizers	6 months before enrollment	511	0.059 (NR)	MD = -0.007[a] p=0.24
			6 months after enrollment	511	0.052 (NR)	
		HPACT nonenrolled, High utilizers	First 6 months of data	2,787	0.058 (NR)	MD = -0.009[a] p = NR Difference-in-differences HPACT versus nonenrolled 0.002[a], p=0.0022
			Second 6 months of data	2,787	0.049 (NR)	
		Usual care, High utilizers	First 6 months of data	1,689	0.027 (NR)	MD = 0.009[a] p = NR Difference-in-differences HPACT versus usual care -0.016[a], p=0.42
			Second 6 months of data	1,689	0.036 (NR)	
Gundlapalli, 2017, 28806373	Mental health	HPACT, High utilizers	6 months before enrollment	511	0.2 (NR)	MD = -0.04[a] p=0.0031
			6 months after enrollment	511	0.16 (NR)	
		HPACT nonenrolled, High utilizers	First 6 months of data	2,787	0.16 (NR)	MD = -0.04[a] p=NR Difference-in-differences HPACT versus nonenrolled 0[a], p=0.22
			Second 6 months of data	2,787	0.12 (NR)	
		Usual care, High utilizers	First 6 months of data	1,689	0.084 (NR)	MD = 0.026[a] p=NR Difference-in-differences
			Second 6 months of data	1,689	0.11 (NR)	

Author, Year, PMID	Outcome Details	Group/Comparators	Follow-up	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
						HPACT versus usual care -0.066[a], p=0.88
Gundlapalli, 2017, 28806373	Rehabilitation	HPACT, High utilizers	6 months before enrollment	511	0.062 (NR)	MD = -0.014[a] p=0.0068
			6 months after enrollment	511	0.048 (NR)	
		HPACT nonenrolled, High utilizers	First 6 months of data	2,787	0.062 (NR)	MD = -0.014[a] p=NR Difference-in-differences HPACT versus nonenrolled 0[a], p=0.014
			Second 6 months of data	2,787	0.048 (NR)	
		Usual care, High utilizers	First 6 months of data	1,689	0.037 (NR)	MD = 0.012[a] p=NR Difference-in-differences HPACT versus usual care -0.026[a], p=0.049
			Second 6 months of data	1,689	0.049 (NR)	
Gundlapalli, 2017, 28806373	Social work	HPACT, High utilizers	6 months before enrollment	511	0.038 (NR)	MD = -0.012[a] p=0.008
			6 months after enrollment	511	0.026 (NR)	
		HPACT nonenrolled, High utilizers	First 6 months of data	2,787	0.033 (NR)	MD = -0.013[a] p=NR Difference-in-differences HPACT versus nonenrolled 0.001[a], p=0.062
			Second 6 months of data	2,787	0.02 (NR)	
		Usual care, High utilizers	First 6 months of data	1,689	0.0094 (NR)	MD = 0.0066[a] p=NR Difference-in-differences HPACT versus usual care -0.0186[a], p=0.24
			Second 6 months of data	1,689	0.016 (NR)	
Gundlapalli, 2017, 28806373	Homeless Care	HPACT, High utilizers	6 months before enrollment	511	0.18 (NR)	MD = 0.02[a] p<0.001
			6 months after enrollment	511	0.20 (NR)	

Author, Year, PMID	Outcome Details	Group/Comparators	Follow-up	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
		HPACT nonenrolled, High utilizers	First 6 months of data	2,787	0.12 (NR)	MD = -0.01[a] p = NR Difference-in-differences HPACT versus nonenrolled 0.03[a], p<0.001
			Second 6 months of data	2,787	0.11 (NR)	
		Usual care, High utilizers	First 6 months of data	1,689	0.046 (NR)	MD = 0.024[a] p = NR Difference-in-differences HPACT versus usual care -0.004[a], p<0.001
			Second 6 months of data	1,689	0.07	
Gundlapalli, 2017, 28806373	Substance abuse	HPACT, High utilizers	6 months before enrollment	511	0.2 (NR)	MD = -0.05[a] p=0.72
			6 months after enrollment	511	0.15 (NR)	
		HPACT nonenrolled, High utilizers	First 6 months of data	2,787	0.16 (NR)	MD = -0.05[a] p=NR Difference-in-differences HPACT versus nonenrolled 0[a], p=0.47
			Second 6 months of data	2,787	0.11 (NR)	
		Usual care, High utilizers	First 6 months of data	1,689	0.05 (NR)	MD = 0.018[a] p=NR Difference-in-differences HPACT versus usual care -0.068[a], p=0.14
			Second 6 months of data	1,689	0.068 (NR)	
Gundlapalli, 2017, 28806373	Surgery	HPACT, High utilizers	6 months before enrollment	511	0.0084 (NR)	MD = -0.0032 [a] p=0.019
			6 months after enrollment	511	0.0052 (NR),	
		HPACT nonenrolled, High utilizers	First 6 months of data	2,787	0.0059 (NR)	MD =-0.0019[a] p=NR Difference-in-differences HPACT versus nonenrolled -0.001[a], p=0.32
			Second 6 months of data	2,787	0.004 (NR)	

Author, Year, PMID	Outcome Details	Group/Comparators	Follow-up	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
		Usual care, High utilizers	First 6 months of data	1,689	0.003 (NR)	MD = 0.001[a] p=NR Difference-in-differences HPACT versus usual care -0.004[a], p=0.83
Gundlapalli, 2017, 28806373	Surgical specialty	HPACT, High utilizers	6 months before enrollment	511	0.031 (NR)	MD = -0.009[a] p=0.76
			6 months after enrollment	511	0.022 (NR)	
		HPACT nonenrolled, High utilizers	First 6 months of data	2,787	0.024 (NR)	MD = -0.006[a] p=NR Difference-in-differences HPACT versus nonenrolled -0.003[a], p=0.6
			Second 6 months of data	2,787	0.018 (NR)	
		Usual care, High utilizers	First 6 months of data	1,689	0.01 (NR)	MD = 0.005[a] p=NR Difference-in-differences HPACT versus usual care -0.01[a], p=0.17
			Second 6 months of data	1,689	0.015 (NR)	
O'Toole, 2018, 29451116	Specialty care visits	HPACT	June 2012–January 2014	183	3.1 (5.0)	MD (95% CI)[a] -0.5 (-1.8 ; 0.8) p=0.41
		PACT	June 2012–January 2014	83	3.6 (4.5)	
O'Toole, 2018, 29451116	Social work visits	HPACT	June 2012–January 2014	183	4.6 (3.7)	MD (95% CI)[a] 1.9 (1.0 ; 2.8) p=0.001
		PACT	June 2012–January 2014	83	2.7 (2.1)	
O'Toole, 2018, 29451116	Mental health care visits	HPACT	June 2012–January 2014	183	8.8 (11.8)	MD (95% CI)[a] -4.6 (-7.9 ; -1.3) p=0.01
		PACT	June 2012–January 2014	83	13.4 (14.3)	
O'Toole, 2018, 29451116	30-day prescription drug fills	HPACT	June 2012–January 2014	183	40.5 (39.5)	MD (95% CI)[a] -18.3 (-29.9 ; -6.7) p=0.001
		PACT	June 2012–January 2014	83	58.8 (53.9)	

Notes. [a]Calculated by the research team.

Abbreviations. CI=confidence interval; GIM=general internal medicine; HOPC=homeless oriented primary care; MD=mean difference; N=number; NR=not reported; SD=standard deviation.

H8. Specialized Care/Other (Non-Comparative)

Author, Year, PMID	Outcome Details	Group/Comparators	Follow-up	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
O'Toole, 2013, 24148042	Mental health care	Homeless PACT	First 6 months	127	12.0	NA
O'Toole, 2013, 24148042	Specialty care	Homeless PACT	First 6 months	127	6.9	NA
O'Toole, 2016, 27032987	Specialty clinic visits	HPACT	October 2013 – March 2014	3,543	1.5 (NR)	NA
O'Toole, 2016, 27032987	HPACT member visits (excluding PCP visits)	HPACT	October 2013 – March 2014	3,543	5.9 (NR)	NA
Chang, 2020, 32597993	Mental health care visit	Those receiving homeless specialized primary care	October 2015-September 2016	2,746	34.9 (39.1)	NA
Chang, 2020, 32597993	Specialty care visit	Those receiving homeless specialized primary care	October 2015-September 2016	2,746	2.6 (4.0)	NA
Chang, 2020, 32597993	Other visits	Those receiving homeless specialized primary care	October 2015-September 2016	2,746	15.4 (18.9)	NA

Abbreviations. N=number; NA=not applicable; PACT=patient aligned care teams; PCP=primary care provider; SD=standard deviation.

H9. Patient Experience/Satisfaction

Author, Year, PMID	Outcome Details	Group/ Comparators	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
O'Toole, 2018, 29451116	Staff are respectful	HPACT	June 2012–January 2014	183	1.5 (0.7)	MD (95% CI)[a] 0.1 (-0.1; 0.3) p=0.66
		PACT	June 2012–January 2014	83	1.4 (0.6)	
O'Toole, 2018, 29451116	Staff are sensitive do needs	HPACT	June 2012–January 2014	183	1.6 (0.9)	MD (95% CI)[a] 0 (-0.2; 0.2) p=0.84
		PACT	June 2012–January 2014	83	1.6 (0.9)	
O'Toole, 2018, 29451116	Staff not as competent as staff in non-VA care	HPACT	June 2012–January 2014	183	4.3 (1.1)	MD (95% CI)[a] 0.3 (0.01; 0.6) p=0.07
		PACT	June 2012–January 2014	83	4.0 (1.2)	
O'Toole, 2018, 29451116	Care is helpful	HPACT	June 2012–January 2014	183	1.3 (0.7)	MD (95% CI)[a] -0.1 (-0.3; 0.1) p=0.20
		PACT	June 2012–January 2014	83	1.4 (0.9)	
O'Toole, 2018, 29451116	Care is better than elsewhere	HPACT	June 2012–January 2014	183	1.4 (0.8)	MD (95% CI)[a] -0.2 (-0.4; 0.02) p=0.36
		PACT	June 2012–January 2014	83	1.6 (0.9)	
O'Toole, 2018, 29451116	Long wait	HPACT	June 2012–January 2014	183	3.6 (1.3)	MD (95% CI)[a] 0.2 (-0.1; 0.5) p=0.31
		PACT	June 2012–January 2014	83	3.4 (1.3)	
O'Toole, 2018, 29451116	More affordable that non-VA care	HPACT	June 2012–January 2014	183	1.2 (0.7)	MD (95% CI)[a] 0.1 (-0.1; 0.3) p=0.54
		PACT	June 2012–January 2014	83	1.1 (0.4),	
O'Toole, 2018, 29451116	All questions answered	HPACT	June 2012–January 2014	183	1.6 (1.0)	MD (95% CI)[a] -0.2 (-0.5; 0.1) p=0.36
		PACT	June 2012–January 2014	83	1.8 (1.0)	
O'Toole, 2018, 29451116	Included in care decisions	HPACT	June 2012–January 2014	183	1.6 (1.0)	MD (95% CI)[a] -0.1 (-0.4; 0.2) p=0.85
		PACT	June 2012–January 2014	83	1.7 (1.0)	
O'Toole, 2018, 29451116	Provider listens to you	HPACT	June 2012–January 2014	183	1.5 (0.9)	MD (95% CI)[a] -0.1 (-0.3; 0.1) p=0.31
		PACT	June 2012–January 2014	83	1.6 (1.0)	
O'Toole, 2018, 29451116	Get everything you need without being sent elsewhere	HPACT	June 2012–January 2014	183	1.8 (1.1)	MD (95% CI)[a] -0.2 (-0.5; 0.1) p=0.26
		PACT	June 2012–January 2014	83	2.0 (1.2)	
O'Toole, 2018, 29451116	Treated better because homeless	HPACT	June 2012–January 2014	183	3.5 (1.6)	MD (95% CI)[a] -0.1 (-0.5; 0.3)
		PACT	June 2012–January 2014	83	3.6 (1.4)	

Author, Year, PMID	Outcome Details	Group/ Comparators	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
						p=0.66
O'Toole, 2018, 29451116	Treated worse because homeless	HPACT	June 2012–January 2014	183	4.2 (1.3)	MD (95% CI)[a] -0.1 (-0.4; 0.2) p=0.65
		PACT	June 2012–January 2014	83	4.3 (1.2)	
O'Toole, 2018, 29451116	Hard time getting there	HPACT	June 2012–January 2014	183	3.6 (1.5)	MD (95% CI)[a] -0.2 (-0.6; 0.2) p=0.44
		PACT	June 2012–January 2014	83	3.8 (1.4)	
O'Toole, 2018, 29451116	Too much bureaucracy	HPACT	June 2012–January 2014	183	3.5 (1.5)	MD (95% CI)[a] 0.2 (-0.2; 0.6) p=0.34
		PACT	June 2012–January 2014	83	3.3 (1.5)	
Kertesz, 2021, 33827104	Primary Care Quality-Homeless (PCQ-H) Scores and Unfavorable experiences - Relationship	HPACT	2015–2017	3394	3.20 (0.56)	MD (95% CI)[a] 0.11 (0.08; 0.14) p<0.001
		Mainstream PACT	2015–2017	2372	3.09 (0.60)	
Kertesz, 2021, 33827104	Primary Care Quality-Homeless (PCQ-H) Scores and Unfavorable experiences - Cooperation	HPACT	2015–2017	3394	2.79 (0.74)	MD (95% CI)[a] 0.14 (0.10; 0.18) p<0.001
		Mainstream PACT	2015–2017	2372	2.65 (0.79)	
Kertesz, 2021, 33827104	Primary Care Quality-Homeless (PCQ-H) Scores and Unfavorable experiences – Access/Coordination	HPACT	2015–2017	3394	3.07 (0.52)	MD (95% CI)[a] 0.12 (0.09; 0.15) p<0.001
		Mainstream PACT	2015–2017	2372	2.95 (0.55)	
Kertesz, 2021, 33827104	Primary Care Quality-Homeless (PCQ-H) Scores and Unfavorable experiences – Specific needs	HPACT	2015–2017	3394	3.02 (0.61)	MD (95% CI)[a] 0.2 (0.17; 0.23) p<0.001
		Mainstream PACT	2015–2017	2372	2.82 (0.67)	
Kertesz, 2021, 33827104	Primary Care Quality-Homeless (PCQ-H) Scores -Relationship, Weighted and Adjusted Estimate (SE)	HPACT	2015–2017	3394	3.21 (0.03)	p<.001
		Mainstream PACT	2015–2017	2372	3.05 (0.03)	
Kertesz, 2021 33827104	Primary Care Quality-Homeless (PCQ-H) Scores -Cooperation, Weighted and Adjusted Estimate (SE)	HPACT	2015–2017	3394	2.82 (0.04)	p<.001
		Mainstream PACT	2015–2017	2372	2.64 (0.04)	
Kertesz, 2021 33827104	Primary Care Quality-Homeless (PCQ-H) Scores - Access/Coordination, Adjusted Estimate (SE)	HPACT	2015–2017	3394	3.07 (0.03)	p<.001
		Mainstream PACT	2015–2017	2372	2.92 (0.03)	
Kertesz, 2021 33827104	Primary Care Quality-Homeless (PCQ-H) Scores - Homeless-specific needs, Adjusted Estimate (SE)	HPACT	2015–2017	3394	3.01 (0.03)	p<.001
		Mainstream PACT	2015–2017	2372	2.79 (0.03)	
Kertesz, 2013, 24148052	Primary Care Quality Homeless Scores - Relationship	Tailored	January 2011–March 2012	94	3.38 (0.97)	MD (95% CI) -0.13 (-0.44; 0.18), p=0.4123[a]
		Mainstream VA	January 2011–March 2012	312	3.25 (1.44)[a]	

Author, Year, PMID	Outcome Details	Group/ Comparators	Timepoint	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
Kertesz, 2013, 24148052	Primary Care Quality-Homeless Scores - Cooperation	Tailored	January 2011–March 2012	94	2.96 (1.45)	MD (95% CI) -0.10 (-0.46; 0.26), p=0.5840[a]
		Mainstream VA	January 2011–March 2012	312	2.86 (1.58)[a]	
Kertesz, 2013, 24148052	Primary Care Quality-Homeless Scores - Access/coordination	Tailored	January 2011–March 2012	94	3.19 (0.97)	MD (95% CI) -0.04 (-0.34; 0.26), p=0.7959[a]
		Mainstream VA	January 2011–March 2012	312	3.15 (1.40)[a]	
Kertesz, 2013, 24148052	Primary Care Quality-Homeless Scores - Homeless-specific	Tailored	January 2011–March 2012	94	3.38 (1.07)	MD (95% CI) -0.19 (-0.45 ; 0.07), p=0.1488[a]
		Mainstream VA	January 2011–March 2012	312	3.19 (1.13)[a]	

Notes. [a]Calculated by the research team.

Abbreviations. CI=confidence interval; HPACT=homeless patient aligned care teams; MD=mean difference; N=number; NR=not reported; PACT=patient aligned care teams; SE=standard error; SD=standard deviation.

H10. Cost

Author, Year, PMID	Outcome Details	Group/Comparators	Follow-up	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
O'Toole, 2018, 29451116	Costs – Overall	HPACT	June 2012–January 2014	183	28,036 (27,036)	MD (95% CI)[a] -9,352 (-17,281; -1,422) p=0.04
		PACT	June 2012–January 2014	83	37,415 (36,872)	
O'Toole, 2018, 29451116	Costs – Specialty care	HPACT	June 2012–January 2014	183	1,824 (3,838)	MD (95% CI)[a] -56 (-1.002; 890) p=0.90
		PACT	June 2012–January 2014	83	1,880 (3,131)	
O'Toole, 2018, 29451116	Costs – Mental Health-related substance abuse treatment	HPACT	June 2012–January 2014	183	3,378 (4,759)	MD (95% CI)[a] -1,392 (-2,658; -125) p=0.03
		PACT	June 2012–January 2014	83	4,770 (5,084)	
O'Toole, 2018, 29451116	Costs – Non VA-based care	HPACT	June 2012–January 2014	183	19 (252)	MD (95% CI)[a] -1,016 (-2,222; 190) p=0.27
		PACT	June 2012–January 2014	83	1,035 (8,298)	

Author, Year, PMID	Outcome Details	Group/Comparators	Follow-up	N	Mean (SD) or Median [25th , 75th percentiles]	Effect Size, p-value
O'Toole, 2018, 29451116	Costs – Prescription drugs	HPACT	June 2012–January 2014	183	1,698 (2,441)	MD (95% CI)[a] -1,483 (-3,232; 266) p=0.25
		PACT	June 2012–January 2014	83	3,181 (11,483)	
O'Toole, 2018, 29451116	Costs – Hospitalizations	HPACT	June 2012–January 2014	183	5,530 (18,138)	MD (95% CI)[a] -4,899 (-10,188 ; 390) p=0.10
		PACT	June 2012–January 2014	83	10,429 (24,427)	
O'Toole, 2018, 29451116	Costs- Emergency department	HPACT	June 2012–January 2014	183	1,978 (3,627)	MD (95% CI) -257 (-1,239 ; 725)[a] p=0.6071
		PACT	June 2012–January 2014	83	2,235 (4,076)	
O'Toole, 2018, 29451116	Costs- Emergency department for ambulatory care-sensitive conditions	HPACT	June 2012–January 2014	183	19 (165)	MD (95% CI) -86 (-169 ; -2)[a] p=0.04
		PACT	June 2012–January 2014	83	105 (517)	
O'Toole, 2018, 29451116	Costs – Primary Care	HPACT	June 2012–January 2014	183	2,947 (2,511)	p=0.03 MD (95% CI)[a] 681 (45 ; 1,316)
		PACT	June 2012–January 2014	83	2,266 (2,266)	

Notes. [a]Calculated by the research team.

Abbreviations. CI=confidence interval; HPACT=homeless patient aligned care teams; MD=mean difference; N=number; PACT=patient aligned care teams; SD=standard deviation.

PEER REVIEW COMMENTS AND RESPONSES

Comment Number	Reviewer Number	Reviewer Comment	Response
Are the objectives, scope, and methods for this review clearly described?			
1	1	Yes	Thank you.
2	2	Yes	Thank you.
3	3	Yes	Thank you.
4	5	Yes	Thank you.
5	7	Yes	Thank you.
Is there any indication of bias in our synthesis of the evidence?			
6	1	No	Thank you.
7	2	No	Thank you.
8	3	No	Thank you.
9	5	No	Thank you.
10	7	No	Thank you.
Are you aware of any published or unpublished studies that we may have overlooked?			
11	1	No	Thank you.
12	2	No	Thank you.
13	3	No	Thank you.
14	5	No	Thank you.
15	7	No	Thank you.
Additional suggestions or comments can be provided below. If applicable, please indicate the page and line numbers from the draft report.			
16	1	Overall, I think this was a good review and I appreciated that the GRADE approach was used to gauge the level of confidence in different findings. A few minor comments	Thank you.
17	1	I think Key Question #1 could perhaps be stated a bit simpler? The question is posed with a several of names of different programs, perhaps come up with a simpler way to phrase the Key Question for readers to quickly understand the scope and not be drowned in the abbreviations and program names?	Thank you. We revised Key Question 1 per the reviewer's suggestion. *Among Veterans enrolled in VA programs for those experiencing housing insecurity[a], what is the effect of receiving primary care through PACT and/or HPACT on Veteran-reported, clinical, health service use, and housing outcomes?*

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			Footnote [a] states the specific VA homeless programs.
18	1	This work was described as a systematic review but were certain review guidelines used such as Cochrane, Campbell, PRISMA, and if not, that's okay but should be stated either way.	Thank you. We have added the following statement to the Methods section: *The review followed the PRISMA guidelines.*
19	1	Since there are new adaptations developed in HPACT with the deployment of Mobile Medical Units (MMUs), it may be worth mentioning they are new so new no research has been conducted on them although they hold potential as new ways to provide primary care in communities.	Thank you. We have added the following text to the Future Research section of the discussion: *Additionally, there have also been several adaptations to HPACT, including the use of Mobile Medical Units, which may increase access to care for underserved communities. Future studies should explore the impact of these HPACT adaptations.*
20	1	In the Implications for VA Policy and Practice, it's not clear how the findings are relevant to MISSION Act and of course, there is a lot of concern/scrutiny around community care right now in VA but not sure the relation or implications of the findings that speak to that.	Thank you. We agree with this comment and have removed the sentence about the Mission Act in this report.
21	1	The Conclusions paragraph seemed to state findings with a bit more confidence then the evidence warrants, e.g., cost savings. There is also some redundancy so suggest revising the Conclusions to succinctly state the conclusions accurately.	Thank you. We revised the Conclusion per this comment.
22	2	The report is thorough, well-written and objective. The team working on this needs to be commended as they clearly met and exceeded the goals of the project.	Thank you.
23	2	My only concern (less specific to this review as to the literature overall) is that less discernible factors such as degree of treatment readiness and treatment engagement, history of stigmatization, contributing impacts of other social drivers of health and co-occurring conditions which may manifest in whether the veteran is new patient or already established patient when being compared, all likely impact the primary outcomes of these studies and, when not measured, also introduce inherent biases to any comparison group included in this research review. While this is implied as a bias, I feel it needs to be more explicitly stated as an inherent reason why some conclusions can not be drawn. Additionally, the ethical considerations inherent in this work do introduce challenges to truly having an matched comparator group or being able to manage an intervention objectively. These are upfront limitations to all of this research are addressed to some degree in the limitations section on page 37 - however, I feel could be better acknowledged and/or explicitly noted as the basis for	Thank you and we agree. We edited the text to call out the challenges noted by the reviewer. Examples of our edits are below. *Factors such as degree of treatment readiness and treatment engagement, history of stigmatization, contributing impacts of other social drivers of health and co-occurring conditions can impact Veterans' engagement in primary care. Because of this, it may be challenging to draw conclusion from the current evidence without the need for several caveats to these results*.

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		no conclusions being drawn as opposed to negative results (if and when that was the case).	
24	2	The specific description of reference 21 (Gundlapalli et al on emergency department utilization) was difficult to follow in the text. Albeit I had challenges when it first was published as well and had to meet with the authors to explain it better to me but some simplification/clarity on outcomes and subgroup qualifiers may help with readability.	Thank you and we agree. We have edited the description of ref 21 for clarity.
25	2	There are some typos on page 21 (line 59) and page 5 (lines 55 and 58).	Thank you. We have fixed these typos.
26	3	I appreciate this comprehensive evidence synthesis report regarding the impacts of engaging housing insecure Veterans in primary care - housing is so often considered the key outcome in VA's homeless program, the report nicely highlights the importance of primary care in VA's whole health approach to vulnerable Veterans, and makes clear the value of strengthening linkages between VA's homeless programs and medical services. Overall, I found the report to be well-written and comprehensive. I appreciated the comment in the discussion about the need to move towards consistent language to describe the population named as housing insecure in the report.	Thank you.
27	3	I did think the authors made the assumption that the readers had some fundamental knowledge of the topic at play (probably not an unreasonable assumption), and that some of the assumed knowledge might benefit from being described in the background introduction. More specifically, a variety of outcomes are discussed throughout the report, including service use (inpatient and outpatient), housing, food insecurity, experience / satisfaction, community integration - a conceptual framework that shows how these domains all fit together, and why they are relevant, would have anchored the report for the reader from the get go. In addition, there is a significant focus on comparing PACT versus HPACT - a worthy comparison. However, though there is a relatively simple description of HPACT, more details about HPACT as a model would be helpful.	Thank you. We revised the Introduction to note the relationship between housing and health / social outcomes. *Conceptually, housing security and health are interrelated. Housing insecurity may lead to increased risk of poor social and health outcomes due to stress, poor access to clean water and proper hygiene, and exposure to the elements. Simultaneously, poor health, financial difficulties, untreated substance misuse can lead to housing insecurity.* The Introduction now includes more details about HPACT. *HPACT functions in a similar way to traditional PACT but incorporate additional team members such as social workers, substance use counselors, and homeless program staff who offer services that can help lead to permanent supportive housing. In addition, HPACT may also include walk-in clinics or*

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			extended hours, integrated services such mental health services, continuity of care across the VA and community agencies through team-based care, and staff with specialized training in homeless care.
28	3	The title of the report refers more broadly to engaging housing insecure Veterans in VHA health care - but, the focus is primary care. Might it be helpful to make that clear in the title?	Thank you. We have updated the title to state: *Engaging Veterans Experiencing Homelessness in Primary Care: A Systematic Review*
29	3	KQ1 is interested in that it is specific to a range of VA homeless program participants - I believe that the list of programs of interest is nearly all encompassing of homeless programs. Are any left out? It might be helpful to have clarity that the KQ1 is focused on Veterans engaged in VA homeless services, across the breadth of services, and then listing out the individual programs included	Thank you. We edited Key Question 1 for clarity. *Among Veterans enrolled in VA programs for those experiencing housing insecurity[a], what is the effect of PACT and/or HPACT on Veteran-reported clinical, health service use and housing outcomes?* Footnote [a] states the specific VA homeless programs.
30	3	Throughout the report, one of the more salient findings is that primary care engagement decreases hospitalizations - is this all hospitalizations? Med/surg hospitalizations? Psychiatry hospitalizations? Perhaps this distinction isn't made in the literature but it would be helpful to define hospitalizations for the reader	Thank you. In the results section we note when findings are related to a cause specific hospitalization or all cause hospitalization. In addition, we revised the discussion to note that some studies did not clearly report whether acute care utilization was for a specific cause or represented all causes. *The studies did not consistently indicate the reason for hospitalization.*
31	3	A temporal change in primary care use is described at several points in the report, specifically with regards to Veterans in homeless programs initially perhaps using primary care in higher rates at first, and then this decreasing, which is consistent with my experience. It would be helpful for the authors to speculate why this may be happening, and also to talk about the potential relevance of temporal trends in primary care use as it isn't intuitive that this is aligned with either of the KQs	Thank you. We edited the text in the discussion section to address this point: *Although the study did not provide an explanation for this result, this finding may point to a high number of unmet health care needs in the population. These needs may be addressed during the initial primary care visits and then stabilize over time.*
32	3	At several points, the report discusses "appropriate ED utilization" - on page 20, line 34, there is no definition of appropriateness that I could find. There was a comment about substance abuse related visits but unclear how that relates to appropriateness. Later on, on page 26, line 54, the	Thank you. The studies reported different measures of appropriate emergency department use or alternatively inappropriate emergency department use. Sometimes studies used well known measures

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		authors refer to ACSC conditions, which is how I thought this would be defined from the get go. Then, on page 27, line 23, appropriate comes up again but I'm not sure if the reference is still to ACSC conditions, or some other definition	and other times studies did not clearly report the measure used to define appropriate use. In the results section we describe how each study defines appropriate or inappropriate emergency use.
33	3	Page 25, line 7, talks about physician primary care encounters. At first pass, I thought the reference was physicians versus physician extenders (e.g., NPs, PAs) but the rest of the sentence made it sound like the term physician was a term used to encompass all prescribing providers as opposed to nurse visits	Thank you. This study reported data from primary care provider (PCP)-specific visits and PCP and nursing visits combined. We have updated the text for clarification: *One NRCS found significantly more primary care physician encounters…* *The overall number of combined primary care physician and nursing visits …*
34	3	At several points, the notion of a "general internal medicine" comparison group is raised (page 25, line 24; page 28, line 57; page 29, line 29) - is this prior to PACT implementation? How does general internal medicine differ from HPACT.	Thank you. Studies used different terms to describe primary care. For clarity we have added the specification of “non-tailored” general internal medicine throughout.
35	3	There is a sense in the executive summary as well as implications of the main report that with the one-stop shop model of HPACT, with embedded mental health, less specialty MH care was needed than in traditional PACT. But later, page 30, line 59, it sounds like psychiatry/psychology visit rates were similar and really the HPACT patients had fewer group therapy visits (these can account for an enormous amount of visits and might explain the finding). It seems that the conclusion from the way it is written is that actually it's not that HPACT has embedded mental health, but rather that in HPACT Veterans are not getting referred to group therapy. You can skew the valence of this in several ways, depending on how you want to think about it.	Thank you. We agree that there are several possible interpretations of why Veterans in HPACT have fewer mental health care. We revised the text to comment on the proposed alternative explanation. *One explanation for reduced mental health and substance use care is that homeless-tailored primary care includes these services as part of their model of care. However, an alternative explanation is that those in HPACT may not receive the same referrals for services as non-HPACT Veterans.*
36	3	The report talks about satisfaction / experience. But, in the discussion section, the notion of "feeling engaged in care" is seemingly made equivalent to satisfaction / experience. I would just check that parallel nomenclature is used throughout.	Thank you. We revised the text for consistency and the sentence now states: *In addition, Veterans enrolled in a homeless-tailored primary care felt more “satisfied” or had more positive experiences with their care.*
37	5	Thank you for the opportunity to review this manuscript. Minor comments: Page 10, line 45 - consider adding emphasis on HPACT model reducing barriers to care for homeless veterans while incorporating additional team members	Thank you, we have added the following text to the background section to further describe HPACT:

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			HPACT functions in a similar way to traditional PACT but incorporate additional team members such as social workers, substance use counselors, and homeless program staff who offer services that can help lead to permanent supportive housing. In addition, HPACT may also include walk-in clinics or extended hours, integrated services such mental health services, continuity of care across the VA and community agencies through team-based care, and staff with specialized training in homeless care.
38	5	Page 21, line 59 - "HAPCT" should be HPACT.	Thank you. We have corrected this typo.
39	5	Page 36, line 7 - "...associated with less use of acute..." acute what? (care?)	Thank you. We have added “care” to the end of this sentence.
40	5	Page 38, lines 20-26 - For awareness, there is a question in the formal HOMES assessment (intake form, entry for VA homeless programs) asking about healthcare and if referral for care needed.	Thank you. We have updated this sentence to include this information: *VA decision makers should consider developing a formal protocol that facilitates transitions between homeless program staff and primary care staff. Any formal protocol should be evaluated using rigorous implementation science methods.*
41	7	This paper did a nice job describing the literature related to primary care use among Veterans experiencing housing instability. Although I noted that I am not aware of existing literature that looks specifically at this issue, it is important to note that much of the published literature related to health services use among Veterans with experience of housing instability does include primary care (and other services) utilization as correlates of a variety of outcomes including housing, mortality, etc.	Thank you for this comment. We edited the text to note the challenges with examining the association of receiving primary care on outcomes, and that many studies among Veterans experiencing housing insecurity include primary care use as a covariate rather than the primary exposure of focus. We also note in the Limitations that we may have missed studies that only included primary care as a covariate in a regression model. *Related, we may have missed some studies where the effect of primary care for Veterans experiencing housing insecurity was not the aim of the study and instead the study only used primary care as a covariate in a regression model.*
42	7	Throughout: This is simply semantics, but I would recommend a term other than “housing insecure Veterans” for several reasons: (1) person-first language is preferred (i.e., Veterans experiencing housing insecurity), and (2) placing “housing” as a unit modifier is sometimes confusing as it is also a verb. In the discussion, the authors mention inconsistent language	Thank you. We have updated the terminology in the text to “Veterans experiencing housing insecurity” throughout.

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		across the papers reviewed for this report; however, the authors have chosen an additional way to refer to Veterans experiencing housing instability. Perhaps pick one of the options that occurs frequently and use that consistently throughout. In addition, it may be useful to address this issue up front as I had several questions about who this population really was as I read through the background, results, etc. (including on page 10, line 22).	
43	7	In the Key Findings (page 1) and Background (page 10) sections, the authors hint at Housing First, which prioritizes housing, and then states that quality health care for Veterans experiencing housing instability is also warranted. This seems unnecessary and unnuanced. Part of Housing First is to make available all of these needed services but not necessarily require them. I think that including these broad statements, and briefly focusing on permanent supportive housing (including on page 35, line 53), confuses the issue a bit.	Thank you and we agree. We revised the text throughout to reflect this comment.
44	7	The Background (page 10) seems a bit naive. Again, I don't think it's accurate to state that the VA was "guided by Housing First" to invest in homeless services. Rather, these investments were guided by leadership declaring homelessness a priority and specific enhancements to VA homeless services were influenced by Housing First. I think that the authors can mention the reduction in homelessness as reported in the Annual Homeless Assessment Report to Congress, but we do not have the data make a causal link; there is very likely an association, but we cannot say with total confidence.	Thank you. We have edited the Background to reflect this and previous comment. We now specifically note that VA investments in homeless services may have contributed to a decrease in the number of Veterans experiencing homelessness.
45	7	Page 1, line 11: Define "at first." Is this after becoming homeless or being identified as homeless or following recent/new engagement in primary care?	Thank you. We have edited this text, which now states: *Among Veterans experiencing housing insecurity, primary care visits may be high after initial engagement in primary care and then decrease over time (low confidence).*
46	7	Page 2, line 39: Adding assessment items to HOMES may actually require quite a bit of burden.	Thank you. We have removed this part of the sentence.
47	7	Page 11, sentence beginning on line 9: I think that a word is missing on line 13 ("Veteran-reported" what?).	Thank you. This was referencing Veteran-reported outcomes. We revised the text for clarity.
48	7	Page 16, line 20: What is the difference between services to address social determinants of health and social services?	Thank you. We edited the sentence for clarity. *Homeless-tailored primary care was labeled differently in the literature (eg, HPACT, homeless oriented primary care, and integrated primary care)*

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			but typically consisted of a combination of physical health care, mental health care, substance use treatment, and social services for Veterans experiencing housing insecurity.
49	7	Page 17, line 39: Studies evaluate the Veterans or their care?	Thank you. We have specified "care" in this sentence.
50	7	Page 22, line 35: I'm not sure I understand this statement. Does this mean that there was not a difference in the amount of utilization? Or Veterans' utilization of regular primary care vs tailored primary was not associated with improvement in outcomes? Maybe there is a word missing? Similar issue on page 35, lines35-36.	Thank you. The referenced statements note the available studies provided insufficient evidence (meaning we could not make a conclusion) for the specified outcomes. We revised the text for clarity.
51	7	Page 35, line 6: What was the comparator?	Thank you. The text now states: *We identified 4 studies that examined the effect of receiving primary care compared with not receiving primary care…*
52	7	Page 35, line 17: In any primary care? Tailored or otherwise?	Thank you. We have specified "any" primary care as this included, but was not specific to, tailored care.