Association of Promoting Housing Affordability and Stability With Improved Health Outcomes
A Systematic Review
Katherine L. Chen, MD; Isomi M. Miake-Lye, PhD; Meron M. Begashaw, MPH; Frederick J. Zimmerman, PhD; Jody Larkin, MS; Emily L. McGrath, MBA; Paul G. Shekelle, MD, PhD

Abstract

IMPORTANCE Housing insecurity—that is, difficulty with housing affordability and stability—is prevalent and results in increased risk for both homelessness and poor health. However, whether interventions that prevent housing insecurity upstream of homelessness improve health remains uncertain.

OBJECTIVE To review evidence characterizing associations of primary prevention strategies for housing insecurity with adult physical health, mental health, health-related behaviors, health care use, and health care access.

EVIDENCE REVIEW Pairs of independent reviewers systematically searched PubMed, Web of Science, EconLit, and the Social Interventions Research and Evaluation Network for quantitative studies published from 2005 to 2021 that evaluated interventions intended to directly improve housing affordability and/or stability either by supporting at-risk households (targeted primary prevention) or by enhancing community-level housing supply and affordability in partnership with the health sector (structural primary prevention). Risk of bias was appraised using validated tools, and the evidence was synthesized using modified Grading of Recommendations Assessment, Development, and Evaluation criteria.

FINDINGS A total of 26 articles describing 3 randomized trials and 20 observational studies (16 longitudinal designs and 4 cross-sectional quasi–waiting list control designs) were included. Existing interventions have focused primarily on mitigating housing insecurity for the most vulnerable individuals rather than preventing housing insecurity outright. Moderate-certainty evidence was found that eviction moratoriums were associated with reduced COVID-19 cases and deaths. Certainty of evidence was low or very low for health associations of other targeted primary prevention interventions, including emergency rent assistance, legal assistance with waiting list priority for public housing, long-term rent subsidies, and homeownership assistance. No studies evaluated health system–partnered structural primary prevention strategies.

CONCLUSIONS AND RELEVANCE This systematic review found mixed and mostly low-certainty evidence that interventions to prevent housing insecurity by promoting housing affordability and stability were associated with improved health outcomes, with the highest-certainty evidence suggesting that eviction moratoriums were associated with improved COVID-19 outcomes.

Key Points

Question Are interventions to prevent housing insecurity by promoting housing affordability and stability associated with improved health outcomes?

Findings This systematic review of 26 randomized trials and observational studies found mixed and mostly low-certainty evidence that interventions to prevent housing insecurity were associated with improved health outcomes, with the highest-certainty evidence suggesting that eviction moratoriums were associated with improved COVID-19 outcomes.

Meaning This study suggests that because current data provide only limited-certainty evidence that preventing housing insecurity is associated with measurable health gains, payers and policy makers should consider pairing housing insecurity interventions with other efforts to improve the structural factors associated with improved health.
Introduction

Keeping people stably and affordably housed is increasingly recognized as a priority for both public health and health care. Historically, most efforts to jointly improve housing security and health have focused on preventing existing housing crises from worsening (secondary prevention) or housing chronically homeless individuals to avoid further complications (tertiary prevention). In contrast, primary prevention of housing insecurity aims to improve housing affordability and stability and avert displacement and homelessness for the 37 million households living in unaffordable housing and the 2 million households facing eviction summonses annually. Like homelessness, these less severe but more prevalent dimensions of housing insecurity are associated with less access to health care, worse mental and physical health, and increased mortality.

Recognizing the health implications of housing insecurity, health systems have begun to invest in housing, and Medicare Advantage plans can now provide rental assistance to eligible enrollees if there is a reasonable expectation of health improvement. Prior reviews have evaluated the association of primary prevention interventions for housing insecurity with health outcomes, but decades-old data, pediatric focus, and inconclusive findings limit their utility for stakeholders deciding where in the prevention pathway to target housing investments to improve adult health in a contemporary context. To address these gaps, we systematically reviewed adult health outcomes associated with primary prevention interventions that directly promote housing affordability and stability. In addition, given the role of racist housing policies in entrenching housing insecurity in minoritized communities, we examined how studies of primary prevention interventions for housing insecurity addressed concepts associated with race and racism.

Conceptual Framework

We based our review strategy on a conceptual framework positing that (1) housing is associated with health via multiple pathways, including affordability and stability, and that (2) health can be improved by targeting housing affordability and stability problems (housing insecurity) via multiple levels of prevention, akin to approaches used to address homelessness. Affordability and stability are associated with both structural, population-level factors (including housing supply and demand factors, which may influence market prices and may shape—and may be shaped by—broader societal conditions) and individual-level factors (including household income and expenses). To generate findings relevant to the health care sector, we considered associations of health outcomes with (1) health system–partnered, structural primary prevention to promote housing affordability and stability as contextual conditions associated with the distribution of population risk and (2) targeted primary prevention to help at-risk households remain stably and affordably housed via short-term (<1 year) and long-term (≥1 year) interventions. Key intervention examples, informed by the public health and urban planning literature, are defined in Table 1.

Methods

We performed a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) reporting guideline. Our protocol was registered in PROSPERO and deemed exempt by the institutional review board at the University of California, Los Angeles, because the study analyzed only previously published results and did not meet Regulations for the Protection of Human Subjects (45 CFR §46) criteria.

Data Sources and Searches

Search strategy details and excluded studies are described in eAppendix 1 and eAppendix 2 in the Supplement. In brief, we searched PubMed, Web of Science, and EconLit for English-language articles from 2005 to 2021 using terms related to health and affordable housing, housing services, rental assistance, rent stabilization, legal assistance, tenant protections, evictions, and foreclosure. We added terms for
COVID-19 because the Centers for Disease Control and Prevention’s moratorium on evictions during the pandemic heightened attention to housing security as a factor associated with health outcomes. Next, we searched the Social Interventions Research and Evaluation Network database for studies related to housing stability and then performed a search of the gray literature via Google. Finally, we screened studies identified via reference mining and expert consultation, with no restriction on publication date.

**Study Selection**

Two of us (K.L.C. and P.G.S.) independently screened titles, abstracts, and full texts, reconciling disagreements through team discussion (eAppendix 3 in the Supplement). We included studies evaluating health-related outcomes of interventions to improve housing affordability or stability at the household level (targeted primary prevention) or population level (structural primary prevention).

**Figure 1. Conceptual Model of Housing Insecurity Prevention to Improve Health Outcomes**

This framework for the levels of prevention of housing insecurity (defined as problems with housing affordability and stability) is informed by models of homelessness prevention.24-28 Housing affordability and stability are associated with both structural, population-level factors (including housing supply and demand factors, which may influence market prices and may shape—and may be shaped by—broader societal conditions) and individual-level factors (including household income and expenses).28 Interventions to prevent housing insecurity are posited to be associated with health via their direct and indirect associations with 4 intersecting pathways described by Taylor:28

- housing affordability and stability (the focus of this review) as well as quality, safety, and neighborhood conditions. Preventing housing insecurity is hypothesized to be associated with improved physical health, mental health, health-related behaviors, and health care access. Up and down arrows represent anticipated associations with positive and negative health outcomes, respectively. The direction of association with health care use is uncertain because, by enhancing health care access, improved housing affordability and stability could be associated with increased use of appropriate services and/or decreased need for services for costly and preventable conditions. Our systematic review focuses on measuring health-related outcomes associated with targeted primary prevention of housing insecurity and with structural primary prevention that involves the health system. Prevention strategies shown in the figure represent key examples within each category but are not exhaustive. Secondary and tertiary prevention interventions, reviewed elsewhere, are outside the scope of this review.
prevention), so long as the latter was conducted by or with health sector stakeholders. Because some interventions, such as eviction moratoriums, are essentially impossible to implement randomly, we included both randomized clinical trials (RCTs) and rigorous quantitative observational designs aimed at reducing selection bias (eAppendix 3 in the Supplement). Given the potentially vague boundary between precarious housing and acute homelessness, we included studies that enrolled participants with shorter-term homelessness, but we excluded studies focused on adults with chronic homelessness. We excluded evaluations of the Moving to Opportunity study, described in detail elsewhere, because interventions in that trial were intended to assess the effect of improved neighborhood conditions, rather than of improved housing affordability or stability.

Table 1. Definitions of Key Interventions for Primary Prevention of Housing Insecurity

<table>
<thead>
<tr>
<th>Level and type of intervention</th>
<th>Definition and comments*≤≤</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural primary prevention: health-system-involved strategies*≤≤</td>
<td>Health systems can address housing shortages by donating land and/or investing capital to build new housing or renovate existing housing, often in partnership with housing developers. Affordable housing is defined as housing for which the occupant spends ≤30% of household income, but even the production of more market-rate housing can help address housing supply needs across the income spectrum.</td>
</tr>
<tr>
<td>Construction and restoration of housing units, especially affordable housing</td>
<td>Health systems can offer low-cost or no-cost loans or grant writing assistance to help nonprofit developers build or renovate affordable housing. They can help preserve affordable housing through financing the purchase of older, privately owned housing stock to prevent conversion to condominiums or upmarket housing that displaces low-income tenants.</td>
</tr>
<tr>
<td>Financing for affordable housing construction or preservation</td>
<td>Health systems can use their political capital to lobby for policy changes that make it easier to address housing shortages and affordability, such as by removing restrictions that make housing construction prohibitively slow or costly, allocating public funds to rehabilitate or preserve affordable housing, reducing density limits on housing development or making density limits more equitable across neighborhoods, and enhancing tenants’ rights.</td>
</tr>
<tr>
<td>Advocacy to facilitate housing production, preserve existing affordable housing, and/or remove exclusionary housing regulations</td>
<td>Health systems can offer low-cost or no-cost loans or grant writing assistance to help nonprofit developers build or renovate affordable housing. They can help preserve affordable housing through financing the purchase of older, privately owned housing stock to prevent conversion to condominiums or upmarket housing that displaces low-income tenants.</td>
</tr>
<tr>
<td>Targeted primary prevention: short-term strategies*≤≤</td>
<td>Temporary aid to help renters experiencing financial hardship pay for rent as well as utility bills or other housing costs.</td>
</tr>
<tr>
<td>Emergency rent assistance</td>
<td>Help from a lawyer to address housing-related legal issues. Includes programs that offer or guarantee free or low-cost legal representation to tenants facing eviction or landlord conflicts. Sometimes provided via medical-legal partnerships.</td>
</tr>
<tr>
<td>Housing-related legal assistance</td>
<td>Policies, such as those enacted during the COVID-19 pandemic, temporarily prohibiting various stages of the eviction process, from notice of intent to file eviction, to actual court filings, eviction hearings, judgments, or enforcement.</td>
</tr>
<tr>
<td>Eviction moratoriums</td>
<td>Laws prohibiting landlords from exhibiting behaviors that create a hostile living environment or force a tenant to vacate rental housing.</td>
</tr>
<tr>
<td>Protections against harassment by landlords</td>
<td>Subsidies to help low-income households rent in the private housing market. Subsidies provided by HUD are currently called housing choice vouchers but previously have been termed Section 8 certificates or vouchers. Tenants receiving housing choice vouchers pay 30% of their income toward rent, with the remainder subsidized by HUD, within constraints of fair-market rent standards set by housing authorities. Tenant-based rent subsidies follow tenants between homes so long as regulatory requirements are met.</td>
</tr>
<tr>
<td>Tenant-based rent subsidies (vouchers)</td>
<td>Housing whose production and maintenance costs are subsidized by HUD such that tenants pay discounted rent. Includes public housing (owned and operated by the local public housing authority; rent typically calculated as a percentage of household income) and multifamily or mixed-income housing (privately owned and operated but publicly subsidized, often through tax credits; rent charged as a flat rate or percentage of household income, depending on program). Unit-based rent subsidies are restricted to use by the current occupant of the subsidized housing unit; they transfer between subsequent tenants in that unit but do not follow tenants after they leave the unit. Also called project-based subsidies or project-based vouchers.</td>
</tr>
<tr>
<td>Unit-based rent subsidies (public housing or multifamily or mixed-income housing)</td>
<td>Rent stabilization</td>
</tr>
<tr>
<td>Homeownership assistance</td>
<td>Programs to help low-income renters purchase homes. Includes zero-interest-down payment assistance loans, subsidies to help renters buy their homes, and rent-to-own contracts that give renters an option to buy their home after a period of renting.</td>
</tr>
</tbody>
</table>

Abbreviation: HUD, US Department of Housing and Urban Development.

* “Health systems” refers broadly to health care professionals, hospitals, and insurers. Examples of health system-involved structural prevention strategies were informed by Reynolds et al12 and Tuller.11

≤≤ Details regarding housing regulation, construction, and financing were informed by Collinson et al9 and Phillips.22

* We defined targeted primary prevention strategies as short-term if they generally acted over a period of less than 1 year and long-term if they generally acted over 1 year or more.
Data Extraction and Quality Assessment
Data elements extracted in duplicate included study design, intervention, population, sample size, follow-up, outcomes, and reporting on race and ethnicity (eAppendix 3 in the Supplement). We assessed risk of bias using the Cochrane risk-of-bias tool and the Risk of Bias in Non-Randomized Studies of Interventions tool.

Data Synthesis and Grading
We narratively synthesized findings by intervention level and outcome category (physical health, mental health, health-related behaviors, health care use, or health care access). Study heterogeneity precluded meta-analysis. We rated certainty of the evidence using a modified version of the Grading of Recommendations Assessment, Development, and Evaluation system as adopted by a committee of the National Academies of Sciences, Engineering, and Medicine for evaluating complex public health interventions (see eAppendix 3 in the Supplement for details and worked examples).

Results
After screening 2294 titles, 243 abstracts, and 81 full texts, 26 articles met criteria for inclusion (Figure 2), comprising 3 RCTs described in 6 articles and 20 observational studies (16 longitudinal designs and 4 cross-sectional quasi–waiting list control designs comparing current vs future recipients of an intervention) (Figure 3, eTable 1 in the Supplement). Most studies selected participants based on medical or social vulnerability. All studies were conducted in the US except 2 in Canada and 1 in the United Kingdom. Although interventions were assigned in RCTs, observational

Figure 2. Study Flow Diagram

2294 Total titles screened

→ 2051 Titles excluded

243 Abstracts screened

→ 188 Excluded

122 Study design
49 No intervention
8 Chronically homeless population
7 Not adults
2 Setting

16 Identified via reference mining and/or expert consultation

10 Gray literature search results included for detailed review (250 gray literature search results in initial screening)

→ 81 Full-text articles reviewed

55 Excluded
24 Wrong intervention
23 Study design
3 Not adults
2 Duplicates
1 Chronically homeless population
1 No full text available
1 No relevant outcomes

→ 26 Full-text articles included

Flow diagram summarizing number of articles identified, included, and excluded, along with reasons for exclusion at abstract and full-text screening stages.
studies used a range of self-reported and administrative measures to ascertain intervention participation. Study outcomes included both self-reported and administrative measures.

Risk-of-Bias Assessment
Because of the nature of most housing interventions, all RCTs had a high risk of bias owing to nonblinding of participants and personnel; we did not emphasize this domain when assessing a study’s limitations. Risk of selective reporting was low for all RCTs, whereas blinding of outcome assessment was high-risk for most RCTs (eTable 2 in the Supplement). About half of the observational studies had a high risk of bias owing to confounding, and most had an uncertain risk of bias in selection of reported results (eTable 3 in the Supplement).

Targeted Primary Prevention: Short-term Strategies
One RCT37 and 6 observational studies38-43 assessed health associations of short-term interventions for targeted primary prevention, including eviction moratoriums, emergency rent assistance, and housing-related legal assistance. No studies evaluated protections against landlord harassment.

Eviction Moratoriums
Three observational difference-in-differences studies showed an association between eviction moratoriums and improved COVID-19 outcomes.38-40 Moratoriums were associated with a 2.4 percentage point reduction in the cumulative hazard of COVID-19 infection at 12 weeks,40 a 2-fold decrease in COVID-19 cases and a 5-fold decrease in COVID-19 mortality at 16 weeks,39 and up to 0.03 fewer cases and 0.001 fewer deaths per capita at 8 months.38 One observational study demonstrated an association between stronger eviction moratorium protections and lower risk of psychological distress.
especially for the Hispanic subgroup, whereas another found that eviction moratoriums were associated with reduced anxiety and depression symptoms for Black subpopulations only.

**Emergency Rent Assistance**

One observational study involved provision of temporary financial assistance for housing-related expenses, such as rent, utilities, and security deposits, to veterans at imminent risk of homelessness. It was associated with $219 per quarter in total health care cost savings.

**Housing-Related Legal Assistance With Public Housing Waiting List Priority**

A small RCT (n = 78) offered housing-related legal assistance and/or public housing waiting list priority to parents in medically vulnerable families with unstable housing. It found that the intervention group exhibited greater improvement in anxiety and depression symptom scores after 6 months.

**Targeted Primary Prevention: Long-term Strategies**

Nineteen articles evaluated long-term, targeted primary prevention strategies. Besides 1 study assessing homeownership assistance, all focused on long-term rent subsidies. In the US, such subsidies are mostly sponsored by the Department of Housing and Urban Development and can be tenant based (ie, vouchers) or unit based (ie, public or multifamily housing) (Table 1). Four of 15 articles comparing long-term subsidies with usual care described the Family Options Study (FOS), a multisite, multigroup trial that randomized families in emergency shelters to receive long-term subsidies or usual care (rapid rehousing and transitional housing study groups were excluded from this review). No studies evaluated health associations of rent stabilization.

**Long-term Rent Subsidies**

**Physical Health Outcomes** Among studies assessing physical health outcomes, the FOS and 2 observational studies showed no significant association between long-term rent subsidies and self-rated health or quality of life. Four other studies found mixed results. Tenant-based subsidies were associated with improved quality of life in 1 observational study of veterans experiencing homelessness. In contrast, in an RCT of adults with HIV with homelessness or severe housing insecurity, Wolitski et al reported results suggesting that people randomized to receive long-term subsidies vs usual care experienced slower improvement in physical health scores, although statistical analyses did not test this finding directly. Public housing was associated with improved self-rated health in one observational study and worse self-rated health in another.

Associations between long-term rent subsidies and chronic disease outcomes were also inconclusive. Observational data suggested that these subsidies might be associated with a modest improvement in HIV viral load and CD4 cell count among people living with HIV, but the RCT by Wolitski et al found no evidence of an association with trends in HIV outcomes. Two other observational studies found no significant associations between long-term subsidies and chronic conditions or body mass index and obesity, whereas 1 study found that moving into public housing was associated with increased risk of obesity.

**Mental Health Outcomes** Long-term subsidies, and vouchers in particular, were associated with, at best, a small mental health benefit. The FOS demonstrated a modest reduction in psychological distress at 20 months, but this association lost statistical significance at 37 months. The RCT by Wolitski et al found that long-term tenant-based subsidies significantly modified time trends in stress and depression symptoms, with point estimates suggesting—but not directly confirming—earlier improvements in both compared with usual care. One observational study found that public housing, but not vouchers or multifamily housing, was associated with decreased psychological distress. Three additional observational studies demonstrated no evidence of an association between long-term subsidies and mental health.
Health-Related Behaviors | There was no evidence of an association between long-term rent subsidies and drug or alcohol use in the FOS, nor in 3 observational studies. One observational study of previously homeless veterans found that subsidies were associated with small improvements in alcohol- and drug-related addiction severity measures but were not significantly associated with frequency of alcohol or drug use. Two observational studies estimated that long-term rent subsidies were associated with increased smoking, whereas a third observational study found no significant association. Of 2 studies analyzing physical activity among nonelderly adults who obtained long-term rent subsidies, 1 found a positive association, whereas the other found no significant association. Finally, 1 RCT found no significant evidence that subsidies were associated with trends in risky sexual behavior among people with HIV.

Health Care Use and Access | Among people with HIV, long-term subsidies did not significantly modify temporal patterns in health care use or treatment adherence in an RCT, but they were associated with modest increases in the receipt of HIV surveillance tests in an observational study. A pair of observational studies from Canada found that although hospitalizations, general practitioner visits, and prescriptions decreased slightly after people moved into public housing, these changes largely paralleled those of matched controls. Other observational studies found no significant association between long-term subsidies and health care spending or age-appropriate cancer screening. One observational study found that long-term rent subsidies were associated with lower rates of uninsurance and fewer cost-related unmet medical needs, especially among public housing recipients.

Homeownership Assistance
One ecological study compared sizes of subsidies to help renters buy their homes. It was found that larger subsidies were associated with lower prevalence of longstanding health conditions and fewer health problems.

Structural Primary Prevention
No included studies evaluated health system-involved structural primary prevention interventions for housing insecurity.

Certainty of Evidence
The strongest (moderate-certainty) evidence supported an association between eviction moratoriums and improved COVID-19 outcomes (Table 2). Certainty of evidence was overall low for health associations of the remaining interventions owing to small numbers of studies, study design limitations, and indirectness.

Reporting on Race and Ethnicity
Five articles (19%) reported race and ethnicity in descriptive tables but did not include it in regression models (eTable 4 in the Supplement). Sixteen articles (62%) controlled for race and ethnicity as a confounder, and 3 (12%) analyzed race and ethnicity as a moderator. Of 5 articles (19%) that did not report on or control for race and ethnicity, I noted the absence of this information as a data limitation. Five articles (19%) included text describing the conceptual significance of race and ethnicity or racism to housing insecurity and/or health.

Discussion
In this systematic review of interventions to improve health outcomes by promoting housing affordability and stability to prevent housing insecurity, we found moderate-certainty evidence that eviction moratoriums are associated with reduced COVID-19 cases and deaths. Associations of long-term rent subsidies, emergency rent assistance, legal assistance, and homeownership...
### Table 2. Certainty of Evidence by Intervention Category, Type, and Outcome

<table>
<thead>
<tr>
<th>Category, intervention or outcome</th>
<th>No. of studies a</th>
<th>Study limitations (risk of bias)</th>
<th>Indirectness</th>
<th>Consistency</th>
<th>Precision</th>
<th>Other considerations</th>
<th>Overall certainty of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short-term interventions for primary prevention of housing insecurity</strong></td>
<td></td>
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<tr>
<td>Association of eviction moratoriums with health-related outcomes</td>
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<td></td>
</tr>
<tr>
<td>Fewer COVID-19 cases and deaths</td>
<td>3 Observational</td>
<td>Serious</td>
<td>No serious indirectness</td>
<td>Consistent</td>
<td>No serious imprecision</td>
<td>NA</td>
<td>Moderate</td>
</tr>
<tr>
<td>Improved mental health</td>
<td>2 Observational</td>
<td>Serious</td>
<td>No serious indirectness</td>
<td>Inconsistent</td>
<td>Serious imprecision</td>
<td>Parallel evidence</td>
<td>Low</td>
</tr>
<tr>
<td>Association of emergency rent assistance with reduced health care costs</td>
<td>1 Observational</td>
<td>No serious limitations</td>
<td>Serious indirectness</td>
<td>NA</td>
<td>Serious imprecision</td>
<td>NA</td>
<td>Very low</td>
</tr>
<tr>
<td>Association of legal assistance and waiting list priority for public housing with improved mental health</td>
<td>1 RCT</td>
<td>No serious limitations</td>
<td>Serious indirectness</td>
<td>NA</td>
<td>No serious imprecision</td>
<td>NA</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Long-term interventions for primary prevention of housing insecurity</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Association between long-term rent subsidies and health-related outcomes</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No association with health status or quality of life</td>
<td>2 RCTs</td>
<td>Serious</td>
<td>Serious indirectness</td>
<td>Inconsistent</td>
<td>Serious imprecision</td>
<td>NA</td>
<td>Very low</td>
</tr>
<tr>
<td>No association with chronic disease outcomes</td>
<td>1 RCT</td>
<td>Serious</td>
<td>No serious indirectness</td>
<td>Inconsistent</td>
<td>Serious imprecision</td>
<td>NA</td>
<td>Very low</td>
</tr>
<tr>
<td>Small to no association with improved mental health</td>
<td>2 RCTs</td>
<td>Serious</td>
<td>Serious indirectness</td>
<td>Consistent</td>
<td>Serious imprecision</td>
<td>NA</td>
<td>Low</td>
</tr>
<tr>
<td>No association with drug and alcohol use</td>
<td>1 RCT</td>
<td>Serious</td>
<td>Serious indirectness</td>
<td>Consistent</td>
<td>Serious imprecision</td>
<td>NA</td>
<td>Low</td>
</tr>
<tr>
<td>Increased smoking</td>
<td>3 Observational</td>
<td>Serious</td>
<td>No serious indirectness</td>
<td>Inconsistent</td>
<td>No serious imprecision</td>
<td>NA</td>
<td>Low</td>
</tr>
<tr>
<td>Increased physical activity among nonelderly adults</td>
<td>2 Observational</td>
<td>Serious</td>
<td>No serious indirectness</td>
<td>Inconsistent</td>
<td>Serious imprecision</td>
<td>NA</td>
<td>Very low</td>
</tr>
<tr>
<td>No association with risky sexual behaviors</td>
<td>1 RCT</td>
<td>Very serious</td>
<td>Serious indirectness</td>
<td>NA</td>
<td>Serious imprecision</td>
<td>NA</td>
<td>Very low</td>
</tr>
<tr>
<td>No association with health care use</td>
<td>1 RCT</td>
<td>Serious</td>
<td>Serious indirectness</td>
<td>Inconsistent</td>
<td>Serious imprecision</td>
<td>NA</td>
<td>Very low</td>
</tr>
<tr>
<td>Improved health care access with receipt of public housing</td>
<td>1 Observational</td>
<td>No serious limitations</td>
<td>No serious indirectness</td>
<td>NA</td>
<td>No serious imprecision</td>
<td>Parallel evidence</td>
<td>Low</td>
</tr>
<tr>
<td>Association of rent-to-own subsidy and fewer chronic health conditions</td>
<td>1 Observational</td>
<td>Serious</td>
<td>Serious indirectness</td>
<td>NA</td>
<td>No serious imprecision</td>
<td>NA</td>
<td>Low</td>
</tr>
</tbody>
</table>

Abbreviations: NA, not applicable; RCT, randomized clinical trial.

a Although results were reported in multiple articles, we counted the Family Options Study as 1 RCT.
assistance with health outcomes were inconclusive, largely owing to serious methodological issues. We could not assess the association of health outcomes with health system–partnered, structural primary prevention owing to a lack of relevant studies. Attention to the role of racism in housing and health outcomes was largely limited to controlling for race and ethnicity without conceptual justification. Although our review updates and expands on prior reviews, substantive knowledge gaps remain around the potential for preventive strategies in housing to improve health outcomes and health equity.

There are several potential explanations for why studies aimed at preventing housing insecurity have demonstrated limited evidence of an association with health benefits, despite evidence linking housing insecurity to poor health. Probably the most consistent explanation is that household-level interventions, which comprised all included studies, have only a limited association with health outcomes, because they do not modify the overall supply of housing nor the structural causes of economic segregation and health disparities, such as barriers in access to education, wealth, childcare, or employment, thus leaving other basic needs unmet. This finding is consistent with prior findings that although long-term rent subsidies are highly effective at promoting housing affordability and preventing displacement and homelessness, alone they have little to no association with poverty, and they should likely be combined with other social interventions plus case management to connect people with resources. Another possibility is that the health benefits associated with preventing housing insecurity are too diffuse to measure and/or manifest on longer time scales than those in the included studies. This possibility may explain why the strongest signal came from studies of eviction moratoriums, which, compared with long-term rent subsidies, target a short and direct causal pathway, from blocking imminent eviction to preventing household crowding or homelessness, which is directly associated with COVID-19 risk. A third possible explanation is that interventions were not adequately targeted to populations. Interventions may have been too narrow or too far downstream to meaningfully benefit socially and medically vulnerable study populations, which included people who had already lost their homes. A measurable association with health outcomes might require targeting existing long-term rent subsidy programs (which often require burdensome waiting periods and impose restrictions based on criminal records, immigration status, substance use, or eviction history) to tenants with more modest levels of need while dedicating more comprehensive and flexible supports to people with greater needs.

A fourth possibility, supported by the 3 studies that explored moderation by race and ethnicity, is that some interventions had heterogeneous associations with health outcomes. If a housing intervention’s association with outcomes is influenced by structural racism, such as through housing discrimination and segregation of neighborhood opportunities, failure to disaggregate associations of treatment with outcomes could produce ambiguous results and obscure insights into opportunities to combat structural racism through housing policy. Fifth, we cannot exclude the possibility that adverse effects offset potential benefits. For example, subsidies might concentrate renters in lower-opportunity neighborhoods, which are associated with worse health. Last, regression to the mean is possible, given that low-income populations, and applicants for housing assistance in particular, tend to have relatively poor health at baseline that might be expected to improve over time without specific intervention. Although this is a potentially plausible explanation for some of the observational results, it would be less likely to occur in RCTs. Because we did not see a marked difference in results based on study design, we judge regression to the mean as an unlikely explanation for these results.

Findings from this review have implications for practice, policy, and research. Our review suggests that payers or policy makers who aim to improve health by addressing housing insecurity could be disappointed if they focus narrowly on household-level housing interventions, which might achieve the goal of helping prevent homelessness but might not, on their own, produce measurable health benefits. As officials overseeing Medicare (and, increasingly, Medicaid) consider whether housing interventions merit coverage as health care benefits, research to identify ways to make subsidies and other primary prevention strategies more effective at improving population health—
whether by modifying existing interventions or better linking them to additional social supports—
would be particularly helpful. In addition, as more nonprofit hospitals seek designation as community
anchor organizations, research to quantify health outcomes of health-system efforts to improve
housing at the population level would fill a timely research gap. In future investigations of structural
interventions, it may also be prudent to consider the community-level social impact in addition to
individual health outcomes. Finally, our study highlights openings for research on the health
outcomes of policies guaranteeing legal counsel to low-income tenants in eviction courts, stabilizing
rents, and reforming municipal zoning.

Limitations
This study has some limitations; principal among them was the limited scope and quality of existing
evidence. Several of the primary prevention interventions identified in our conceptual framework
were entirely lacking from the health literature, and most studies relied on observational data and/or
small sample sizes. Second, many studies enrolled participants experiencing homelessness,
contributing only indirect evidence on how the interventions of interest would work as primary
prevention. Relatedly, although evidence from studies on narrowly focused populations, such as
those defined in the included RCTs, can yield higher internal validity, generalizability to the broader
adult population may be limited. Third, residual confounding may have biased the observational
findings, as most housing assistance is assigned nonrandomly. Fourth, statistically significant
findings from the FOS, which measured hundreds of outcomes, should be interpreted cautiously
given the risk of type I error. Fifth, few studies outside of the FOS considered sustained program
engagement. Sixth, although most studies were conducted in the US, our review may mask regional
differences in social structure and safety-net program availability, which could influence the
association between housing interventions and health; similarly, findings from international contexts
might not apply to the US setting and vice versa. Seventh, by focusing on adults, we may have missed
long-term health outcomes associated with interventions delivered in childhood. Eighth, our search
criteria excluded studies addressing socioeconomic interventions that did not directly involve
housing and/or that addressed multiple social needs, which nonetheless might have improved
housing security.

Conclusions
This systematic review found mixed and mostly low-certainty evidence that interventions to increase
housing affordability and stability and prevent housing insecurity were associated with health
outcomes, with the strongest evidence suggesting that eviction moratoriums reduced COVID-19
cases and deaths. Multiple hypotheses can explain our findings, but results are probably most
compatible with the conclusion that existing strategies to prevent housing insecurity, while
necessary, are not sufficient to achieve long-term health gains for vulnerable populations and may
need to be both modified and partnered with other policies to redress social inequity, including
racism in housing. Future research exploring population-health outcomes associated with other
interventions to increase housing affordability and stability at both the population and household
levels can help health care stakeholders identify win-win opportunities to improve health outcomes
by preventing housing insecurity.

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Chen KL et al. JAMA Network Open.
Corresponding Author: Katherine L. Chen, MD, Division of General Internal Medicine and Health Services Research, Department of Medicine, David Geffen School of Medicine at University of California, Los Angeles, 1100 Glendon Ave, Ste 900, Los Angeles, CA 90024 (kichen@mednet.ucla.edu).

Author Affiliations: Division of General Internal Medicine and Health Services Research, Department of Medicine, David Geffen School of Medicine, University of California, Los Angeles (Chen, Shekelle); Fielding School of Public Health, University of California, Los Angeles (Chen, Mika-Lye, Zimmerman); Greater Los Angeles Veterans Affairs Healthcare System, Los Angeles, California (Mika-Lye, Begashaw, Shekelle); RAND Corporation, Southern California Evidence-Based Practice Center, Santa Monica, California (Larkin); Health Equity and Population Health, Humana Inc, Louisville, Kentucky (McGrath).

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Concept and design: Chen, Mika-Lye, Zimmerman, McGrath, Shekelle.

Acquisition, analysis, or interpretation of data: All authors.

Drafting of the manuscript: Chen, Mika-Lye, Begashaw, Larkin, Shekelle.

Critical revision of the manuscript for important intellectual content: Chen, Mika-Lye, Begashaw, Zimmerman, McGrath, Shekelle.

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REFERENCES


**SUPPLEMENT.**

- **eTable 1.** Details of Studies of Primary Prevention of Housing Insecurity to Improve Health
- **eTable 2.** Cochrane Risk of Bias for Randomized Controlled Trials
- **eTable 3.** Risk of Bias in Non-Randomized Studies of Intervention (ROBINS-I)
- **eTable 4.** Reporting on Race/Ethnicity
- **eAppendix 1.** Detailed Search Strategy
- **eAppendix 2.** Studies Excluded After Full-Text Review, by Reason for Exclusion
- **eAppendix 3.** Detailed Description of Methods
- **eReferences.**