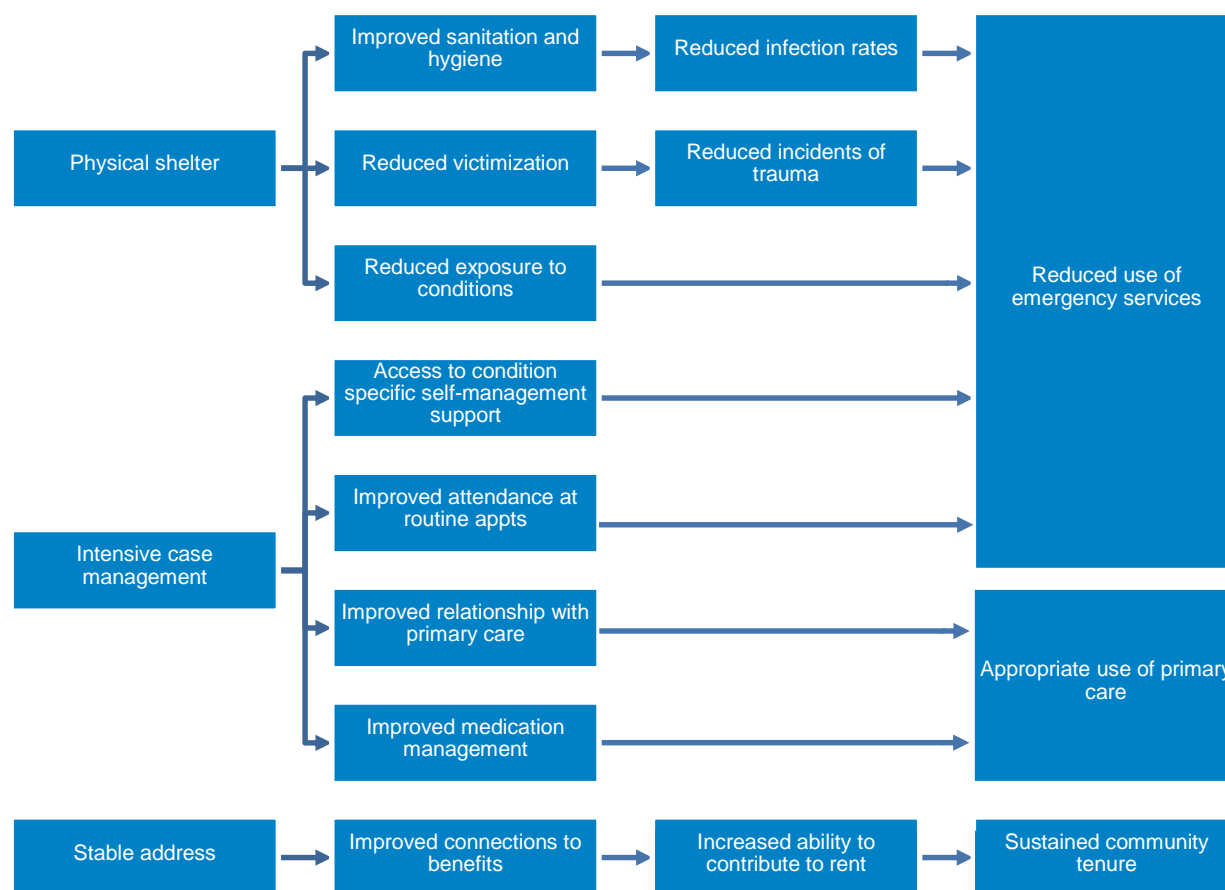


“Housing as healthcare” is the mantra often used to describe the critical impact of housing on the health needs of vulnerable populations. Homeless individuals have been known to accrue healthcare expenditure nearly four times greater than the average Medicaid recipient.<sup>1</sup> The costly episodes, which often result from the use of acute services, can also be associated with worse health and quality of life outcomes and increases in health disparities.

Supportive housing can facilitate stronger connections to primary care and more appropriate healthcare utilization by providing a stable environment in which to manage health and by connecting individuals to services that support relationships with primary healthcare providers. Based on this mechanism, we would expect to see an initial increase in routine services as individuals stabilize their health, particularly after first coming into contact with support services, and a decrease in emergency or acute services or levels of care. In addition to these impacts, housing stability may improve nutrition, improve hygiene and sanitation conditions, and reduce incidents of victimization and abuse. These mechanisms are summarized in Figure 1.

**Figure 1: Impact of supportive housing on healthcare utilization outcomes**



<sup>1</sup> Bharel, Monica et al. “Health Care Utilization Patterns of Homeless Individuals in Boston: Preparing for Medicaid Expansion Under the Affordable Care Act.” *American Journal of Public Health* 103.Suppl 2 (2013): S311–S317. *PMC*. Web. 13 Oct. 2016.

While these links between poor health and living on the streets or in unstable accommodation are intuitive for many stakeholders in the supportive housing sector, the literature on this topic is wide-ranging and immense. In order to clarify the scope of existing literature, we have reviewed twenty-five studies published between 2002 and 2017 to determine:

- Healthcare metrics best evaluated in the evidence base
- Studies that describe anticipated cost avoidance and cost savings for the healthcare sector

In addressing these topics, we highlight areas of concern with the current evidence base and the limitations of studies published to date. We hope that supportive housing and healthcare providers can use this briefing as a starting point for further exploration of the studies that most closely align with their interests.

Please note that this is not an academic meta-analysis of supportive housing studies nor has it been peer reviewed. We do not make any claim as to the strength of individual studies. Instead, this briefing describes the content of a subset of publicly available evaluations in order to draw attention to studies that may be of interest to our audience.

### ***Overview of Studies***

Studies included in this analysis (see Figure 1 below) were selected on the basis that they measured the impact of housing interventions on healthcare service metrics. We drew from existing compilations of the literature, including the Supportive Housing Network of New York's research archive, web searches of medical journals such as the *Journal of the American Medical Association*, and internal CSH documents. Studies were not included if they included non-US geographies, as cost data was not considered comparable. We do not claim this sample is comprehensive or systematic, and we encourage stakeholders to conduct their own reviews as well.

One challenge when reviewing the literature is understanding the implementation of 'supportive housing' as an intervention. We have tried to ensure that the included studies adhere to the CSH definition of supportive housing – affordable housing with voluntary service offerings – but the implementation of this model varies widely and some of its tenets may be applied differently between studies. We encourage organizations looking to replicate results from a study listed here to examine in detail the service delivery models used.

The number of participants in each study recorded in Figure 1 is matched as closely as possible to the number of participants for whom healthcare data was collected. For example, if only 500 out of 1,000 participants were sampled for healthcare data, we have used 500 as the participant number.

The majority of studies utilized pre/post methodology for data analysis related to healthcare service metrics. Pre/post methodology uses data from the same individuals collected at points before and after the intervention in order to determine the intervention impact. It is considered the least robust evaluation methodology, as it does not take into account what would have happened to the individuals without the intervention. It is also susceptible to a phenomenon called ‘regression to the mean’ in which individuals with unusually high service usage at baseline will naturally have less service usage at follow-up. Results should therefore be treated with caution.

**Chart 1: Overview of studies**

Study	Year	Geography	Participants	Study design	Metrics
Culhane (2002)	2002	New York, NY	3,365	Pre/post study	Outpatient stays Hospital bed days Medicaid costs
Tsemberis et al (2004)	2004	New York, NY	225	RCT	Substance abuse treatment services
Direct Access to Housing (2004)	2004	San Francisco, CA	483	Pre/post study	ER visits Inpatient stays Outpatient stays
Denver Housing First Collaborative (2006)	2006	Denver, CO	19	Pre/post study	ER visits Inpatient stays Outpatient stays Detox visits
Martinez et al (2006)	2006	San Francisco, CA	236	Pre/post study	ER visits Inpatient stays
Mondello et al (2007)	2007	Portland, ME	99	Pre/post study	ER visits Ambulance trips
Linkins et al (2008)	2008	State of California	1,180	Pre/post study	ER visits Inpatient stays Hospital bed days
Hirsch et al (2008)	2008	State of Rhode Island	50	Pre/post study	ER visits Inpatient stays

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Hall (2008)	2008	Seattle, WA	20	Pre/post study	ER visits Inpatient stays Detox visits
Mondelo et al (2009)	2009	State of Maine	163	Pre/post study	ER visits Inpatient stays Ambulance trips
SH in Illinois: A Wise Investment (2009)	2009	State of Illinois	177	Pre/post study	ER visits Hospital bed days Outpatient stays Ambulance trips
Flaming, Burns, Matsunaga (2009)	2009	Los Angeles, CA	279	Pre/post study	Inpatient stays
Sadowski et al (2009)	2009	Chicago, IL	201	RCT	ER visits Inpatient stays Hospital bed days
Larimer, Malone, Garner et al (2009)	2009	Seattle, WA	95	Quasi-experimental design	Medicaid costs Ambulance trips
Basu et al (2012)	2012	Chicago, IL	407	RCT	ER visits Inpatient stays Hospital bed days Outpatient visits Substance abuse treatment days Nursing home days
MA Housing & Shelter Alliance (2012)	2012	State of Massachusetts	96	Pre/post study	ER visits Inpatient stays Detox visits Ambulance trips
City of Knoxville (2012)	2012	Knoxville, TN	47	Pre/post study	ER visits Inpatient stays Outpatient stays Primary care visits
Flaming, Lee, Burns, Sumner (2013)	2013	Los Angeles, CA	36	Pre/post study	ER visits Inpatient stays Hospital bed days

Aidala et al (2013)	2013	New York, NY	72	Comparison group (constructed via propensity score matching)	ER visits Inpatient stays Detox visits Ambulance trips
NY/NYIII Supportive Housing (2013)	2013	New York, NY	1,695	Comparison group (constructed via propensity score matching)	Medicaid costs
Thomas et al (2014)	2014	Charlotte, NC	73	Pre/post study	ER visits Inpatient stays Hospital bed days
CORE (2014)	2014	Portland, OR	59	Pre/post study	ER visits Inpatient stays Outpatient stays
CSH Social Innovation Fund Initiative (2017)	2017	Multiple locations, United States	726	RCT & quasi-experimental study	ER visits Hospitalizations Hospital bed days Outpatient visits
Hunter et al (2017)	2017	Los Angeles County	890	Pre/post study	ER visits Inpatient stays Outpatient stays Health costs
Listwan and LaCourse (2017)	2017	Mecklenburg County, NC	42	Pre/post study	Hospital costs Ambulance costs

**Healthcare Metrics**

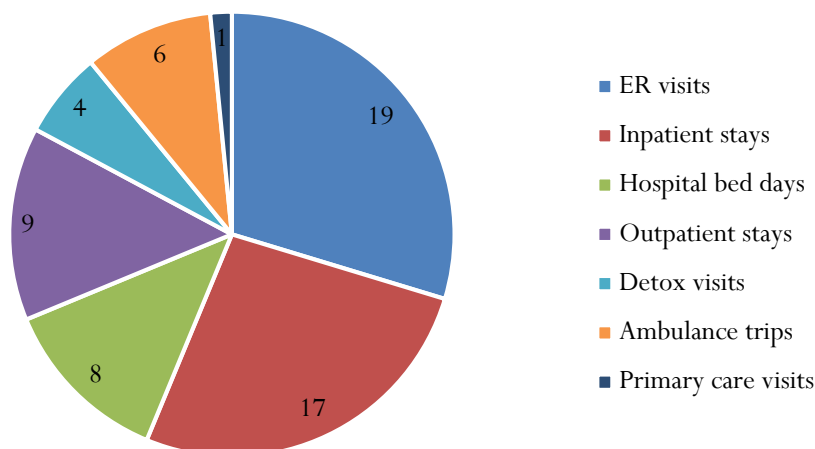
The seven healthcare service most frequently evaluated in the studies are examined below. Emergency room visits and inpatient stays are the most frequently measured, followed by hospital bed days, outpatient stays and ambulance trips. The less well evidenced metrics include detox visits and primary care visits.

While we have focused on physical health service usage, some studies included psychiatric inpatient visits within their physical inpatient data. We did not include data that only examined psychiatric inpatient



data, such as in Culhane (2002). If using these papers to predict impacts on services, we recommend further understanding the papers' treatment of psychiatric services.

**Figure 1: Number of studies in sample evaluating healthcare metrics**



Evaluation metrics are often selected on the basis that there is a theory of change linking the intervention to the measured outcomes. In the case of these supportive housing studies, the theory of change is that a stable home environment is likely to lead to improved health.

### ***Impact on Healthcare Metrics***

The majority of studies included in this report found reductions in one or more of Emergency Room (ER) visits, inpatient stays, hospital bed days and ambulance trips post-housing. The data underpinning these impacts was largely collected from hospital and medical records and analyzed using matching based on participant names. However, some studies used patient-reported data which is limited by patient recall and should be treated with caution.

For each study, we determined the change in service usage from the baseline to the end of the first year in supportive housing. Figure 2 below shows an average of these impacts for each metric that was most frequently evaluated. Some studies that measure the outcomes are not included in our description because the data was not available in a format that could be easily used or compared to other studies. For example, one study reported data only for baseline and the end



of the second year. Additionally, the CSH SIF Evaluation study reported impacts for each site but the pooled impacts across the sites were not significant, so those numbers are not included.

**Figure 2: Average reductions in healthcare service usage across studies\***

	Number of studies	Baseline to year 1	Impact range
ER visits	17	-44%	-78%, -2%
Inpatient stays	13	-39%	-79%, +5%
Hospital bed days	9	-45%	-84%, +3%
Outpatient stays	6	36%	-25%, +132%
Detox visits	4	-47%	-82%, 0%
Ambulance trips	6	-34%	-60%, +50%

\*In some cases data has been transformed to obtain comparable information between studies, e.g. calculating service usage from the total reported costs and the cost per service. Average reductions have not been independently verified.

**Anticipated Cost Avoidance and Cost Savings in the Healthcare Sector**

Some but not all of the twenty-five studies included in this report record healthcare costs as an outcome. Cost items included in the analysis vary widely between studies. Questions to consider when interpreting cost outcomes include:

- What year are the costs recorded or relevant to? Should costs be inflated for older studies?
- Does the cost data include Medicaid and non-Medicaid costs? In what proportion?
- Are these costs gross or net of the intervention cost? Over what time period?
- Did local variations in hospital costs influence the data?
- Has the Medicaid reimbursement system changed since costs were reported?
- What data sets were matched to participants and what services and systems are covered in those data sets? What systems and data sets are missing that might also show cost savings?

With these caveats in mind, Chart 2 shows the estimated annual per-person cost savings related to supportive housing reported across studies in this sample.

**Chart 2: Cost data by study**

Study	Net cost saving reported	Costs included
Culhane (2002)	\$16,282 per person	Emergency shelter days Hospitalizations Hospital days Days incarcerated

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Colorado Coalition for Homeless (2006)	\$4,745 per person	Emergency Room Hospitalizations Outpatient medical Detox services Incarceration Emergency shelter days
Mondello et al (2007)	\$944 per person	Health Care Mental Health Care Emergency Room Jail Ambulance Police
Hirsch et al (2008)	\$7,946 per person	Hospital days Mental health days Alcohol/drug days Emergency Room Jail/prison days Shelter days
Mondello et al (2009)	\$1,348 per person	Mental Health Care Emergency Room Jail Ambulance Emergency shelter
MA Housing & Shelter Alliance (2012)	\$17,675 per person	Emergency Room Hospitalizations Ambulance Respite days Detox days Days incarcerated
Basu (2012)	\$8,593 per person	Hospitalizations Emergency Room Outpatient Residential Substance Abuse Treatment Nursing home
Listwan and LaCourse (2017)	\$9,082 per person over a three-year period / \$1,119 per person	Hospital charges / Ambulance charges
CSH Social Innovation Fund (2017)	\$7,800 per person in Connecticut site	Emergency Room Hospitalizations
Hunter et al (2017)	\$22,732 per person	DHS Emergency Services DHS Inpatient & Outpatient DMH Inpatient & Outpatient DMH Residential DMH Crisis Stabilization



While many studies use the terms ‘cost savings’ and ‘cost avoidance’ interchangeably, there is in fact a distinction that may be helpful for potential beneficiaries of reduced services.

Cost savings refers to a reduction that causes future spending to fall below the level of current spending. These cost savings may then be removed from budgets, reinvested, or redirected to other spending priorities.

Cost avoidance refers to reductions that cause future spending to fall, but *not* below the level of current spending. Often cost avoidance involves slowing the rate of cost increases. In other words, future spending would have increased *even more* in the absence of cost avoidance measures. Cost avoidance may incur higher (or additional) costs in the short run but the final or life cycle cost would be lower.

For example, individuals experiencing homelessness have shorter life expectancies than the average population. As such, people who have been homeless and are engaged in supportive housing in their forties or fifties may be presenting with physiological challenges of medically fragile people in their sixties or seventies. The cost of stabilizing their healthcare may be immediately expensive but could delay the onset of even more severe conditions that are likely to present in the next few years.

From the standpoint of cost-benefit analysis, both cost savings and cost avoidance can be considered payer benefits, because both reduce the amount of resources necessary to fund operations. However, the difference between cost savings and cost avoidance has practical implications from a budgetary perspective. If strategies focus on cost avoidance rather than on cost savings, surplus dollars for reinvestment may be slower or more difficult to generate. On the other hand, cost avoidance initiatives can help to contain and control costs and may create cost savings in the future.

The reductions in service usage highlighted in the previous section make it clear that there is both cost saving and cost avoidance potential for healthcare providers and funders of supportive housing tenants. The exact amounts will depend on the existing levels of service usage per participant and the way individual healthcare costs are funded. When basing budget decisions on programs similar to the ones highlighted in these studies, it is perhaps helpful to consider the program part of a wider array of cost savings or cost avoidance measures.

### ***Discussion***

The studies described here report impacts of supportive housing on healthcare metrics, including a majority that show reduced utilization of emergency healthcare services. The noted reductions in service usage are likely to lead to cost savings, although all cost considerations should be viewed in the context of their funding system. It should also be noted that cost savings and cost avoidance are not the only political drivers of

supportive housing. Supportive housing can be created or scaled for reasons that include a focus on supporting priority populations, community integration for persons with disabilities, community focus on ending homelessness, or an understanding that housing is a platform for individuals or families to stabilize chaotic lifestyles, improve health and increase community engagement.

A further area for consideration is the impact of supportive housing by sub-population group. It is likely that high utilizers of healthcare services and the chronically homeless will have higher levels of baseline service usage and may see a greater proportional reduction in that usage after entering supportive housing. In addition, some studies, including the CSH Social Innovation Fund evaluation, examine impacts of housing on populations segmented by chronic health conditions. This understanding of how housing can stabilize particular sub-populations or particular health conditions should be explored further.

Finally, there are many benefits of supportive housing that accrue to sectors beyond healthcare. The estimation of cost savings across multiple public sector budgets could lead to partnerships between healthcare and prison or other criminal justice providers with similar incentives to increase access to supportive housing. Data integration challenges have slowed the ability of studies to include outcomes from across systems, but the impacts of supportive housing as a holistic intervention cannot be fully understood without this cross-sector view.

*To complete this paper, CSH leveraged resources made available through the Corporation for National and Community Service (CNCS), a federal agency for volunteering, service, and civic engagement. The CNCS Social Innovation Fund (SIF) engaged CSH to help create a learning network of organizations working to implement innovative and effective evidence-based solutions to local and national challenges. For more information on CNCS, visit [NationalService.gov](http://NationalService.gov).*

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