Medicaid Utilization and Spending among Homeless Adults in New Jersey: Implications for Medicaid-Funded Tenancy Support Services

Joel C. Cantor, Sc.D. (corresponding author)
Rutgers Center for State Health Policy
112 Paterson Street, 5th Floor
New Brunswick, NJ 08901
(848) 932-4653
jcantor@ifh.rutgers.edu

Sujoy Chakravarty, Ph.D.
Rutgers Center for State Health Policy

Jose Nova, M.S.
Rutgers Center for State Health Policy

Taiisa Kelly, B.A.
Monarch Housing Associates

Derek DeLia, Ph.D.
Medstar Health Research Institute

Emmy Tiderington, Ph.D., M.S.W.
Rutgers School of Social Work

Richard W. Brown, B.A.
Monarch Housing Associates (retired)

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Policy Points

- Large numbers of homeless adults gained Medicaid coverage under the Affordable Care Act, increasing policymaker interest in strategies to improve care and reduce avoidable hospital costs for homeless populations.
- Drawing on linked homeless services and Medicaid data for New Jersey, this analysis compares Medicaid utilization and spending among adults experiencing homelessness to matched non-homeless Medicaid enrollees and outlines implications for Medicaid-funded tenancy support services

Abstract

Context: There is growing interest in developing Medicaid-funded tenancy support services (TSS) for homeless populations due to greater enrollment of homeless persons following the Affordable Care Act (ACA) Medicaid expansion and an emerging body of evidence that such services can reduce avoidable healthcare spending.

Methods: Drawing on linked Homeless Management Information System and Medicaid claims and encounter data, this study describes the characteristics of adults who could be eligible for Medicaid TSS in New Jersey and compares their utilization and Medicaid spending patterns to matched non-homeless beneficiaries.

Findings: More than 8,400 adults are estimated to be eligible for Medicaid TSS benefits in 2016 including approximately 4,000 living in permanent supportive housing, 800 formally designated as "chronically homeless" according to federal guidelines, 1,300 who are likely to be eligible for chronically homeless designation, and over 2,000 who are at risk of becoming chronically homeless. The groups of homeless adults are disproportionately ages 30-64, male, and African

American and suffer very high burdens of mental health and substance use disorders, including opioid-related conditions. Medicaid spending for beneficiaries who are potentially eligible for TSS is 10% ($1,362) to 27% ($5,727) more than non-homeless Medicaid beneficiaries matched on demographic and clinical characteristics. Hospital inpatient and emergency department utilization accounts for three fourths or more of "excess" Medicaid spending among the homeless groups.

Conclusions: The analysis identifies a large group of high-need Medicaid beneficiaries who could benefit from TSS and specific areas where Medicaid funding for TSS could potentially reduce avoidable Medicaid utilization and spending.

Keywords

Medicaid, homelessness, health care utilization, health expenditures

Introduction

Studies have demonstrated that permanent supportive housing (PSH), including tenancy support services (TSS), for certain homeless populations is associated with improved housing stability and reduced hospital emergency department (ED) and inpatient (IP) utilization.[1-4] TSS may include service planning, tenant orientation and move-in assistance, landlord dispute resolution, and other services.[5] Since many homeless individuals are low income adults without dependents, the Affordable Care Act (ACA) Medicaid expansion greatly increased the program's responsibility for paying for healthcare for homeless persons.[6,7] Together, the Medicaid expansion and prior evidence about the potential benefits of PSH, raise the prospect that Medicaid funded TSS may be a cost-effective strategy for improving the health of this vulnerable population while reducing avoidable costs.

Historically, state Medicaid programs have ventured into covering TSS with the narrow focus of reducing institutionalization among populations eligible for Medicaid-financed long-term care facility placements. But the potential of extending such benefits to address the needs of homeless populations not eligible for nursing home level of care is gaining attention. The National Academies of Sciences, Engineering, and Medicine (NASEM) recommended that "…states should pursue opportunities to expand the use of Medicaid reimbursement for housing-related services to beneficiaries whose medical care cannot be well provided without safe, secure, and stable housing,"[8(pp139-140)] and states are increasingly exploring doing so with the encouragement of federal officials.

To date, eight states have been approved for Medicaid Section 1115 waivers to fund TSS, and the federal government has also allowed three others to add these benefits through home and community-based services state plan amendments.[9] Moreover, in November 2018, US

Department of Health and Human Services Secretary Alex Azar signaled that Medicaid may permit hospitals and health systems to directly pay for housing and other services to mitigate health needs, suggesting for the first time that Medicaid could pay for rental assistance, not just support services.[10]

Federal demonstration waivers require federal budget neutrality, and, regardless of the mechanism through which Medicaid TSS benefits are deemed permissible, interest in covering these services likely stems at least in part from the prospect that enabling homeless persons to achieve stable housing will lead to Medicaid savings. While, as noted above, studies have documented reduced health care spending from supportive housing, there are significant gaps in the evidence demonstrating whether Medicaid TSS benefits can, in fact, be budget neutral.[8(p74),11]

To help address this evidence gap, our study draws on homeless services and Medicaid data to estimate the number and characteristics of persons potentially eligible for Medicaid-financed TSS in New Jersey and to quantify their overall and potentially avoidable Medicaid service utilization and spending. While not an empirical evaluation of an actual TSS benefit or a forecast of savings, our analysis quantitatively frames the level of potentially avoidable utilization and spending associated with homelessness by comparing potentially TSS-eligible Medicaid beneficiaries to demographically and clinically matched beneficiaries not experiencing homelessness.

Data and Measures

Linked Administrative Data Sources

The study uses individually linked data for 2014 to 2016 from two sources: the state Medicaid Management Information System (MMIS) and Homeless Management Information System

(HMIS). The MMIS includes data for all NJ Medicaid recipients obtained at enrollment and at each health care encounter, whether paid on a fee-for-service basis or through a managed care organization contracting with the state. Enrollment records provide data on demographic characteristics, including age, sex, and race/ethnicity; and enrollment category ("Aged, Blind and Disabled"/ABD, NJ FamilyCare children and parents, ACA expansion population, and other groups). Encounter records contain information on type of service used (e.g., emergency department visits, inpatient hospitalizations), dates of service, and detailed diagnostic and procedure codes.

The HMIS was established by the US Department of Housing and Urban Development to record information about homeless services users and services provided.[12] In New Jersey, 19 of the state's 21 counties use a common statewide HMIS platform, and the other two counties (Middlesex and Bergen) submit data to the statewide system on emergency shelter and safe haven service utilizations. Each HMIS record contains information on the type of service used, dates of service, client health and demographic characteristics, sources of client income, and client-reported housing status prior to entry into the service program.

Measures of Medicaid Utilization and Spending

We draw on five measures of utilization and spending in 2016 for our analysis. While the services we measure may be appropriate or even essential at the time they are delivered, our focus is on measuring utilization that is potentially avoidable in the presence of high quality community-based care and healthful living conditions. Thus, we compare rates of potentially avoidable healthcare use among homeless individuals to comparable non-homeless populations to examine possible differences in utilization attributable to the constellation of circumstances

associated with homelessness. Our strategy for constructing comparison groups is described below.

We begin by measuring rates of ED treat-and-release visits and IP admissions. In addition to comparing means of ED visits and IP stays, we examine the probability of any ED visit or IP stay and the likelihood of being a "high user" of these services. We define ED high use as six or more visits and IP high use as three or more admissions, both on a one-year basis.

We also examine Ambulatory Care Sensitive (ACS) admission rates and 30-day all-cause hospital readmission rates. ACS admissions result from short- and long-term complications of chronic and acute medical conditions including diabetes, asthma, heart failure, bacterial pneumonia, and have been shown to occur more frequently when community-based ambulatory care is not adequate, either because it is inaccessible or because it is of poor quality.[13-15] For this metric we use the validated prevention quality indicators from the federal Agency for Healthcare Research and Quality.[16] Hospital readmissions may occur when there are gaps in inpatient or outpatient care or hospital-to-community transitions are poorly managed.[17,18] For example, readmission rates are likely to be higher in the absence of adequate ambulatory follow-up care following discharge. Specifically, this measure captures unplanned all-cause readmissions following hospitalization for any condition.

Next we examine total Medicaid spending and spending for specific categories of utilization, including the services discussed above (ED visits, IP stays, ACS admissions and 30-day hospital readmissions) as well as other types of ambulatory care, prescription drug spending, and all other spending. It is important to examine spending on non-emergency ambulatory care and prescription drugs because these services may be under-utilized by persons with poor access to care, and may therefore increase once TSS services are provided. For individuals with less

than a full year of Medicaid enrollment, we annualize their spending amounts by multiplying the given amount by the ratio of days in the year to enrolled days.

Covariates

We draw on key covariates to describe, and adjust for, factors that are likely to be important drivers of utilization and spending that may not be avoidable. Measures of age, sex, race and ethnicity, and Medicaid eligibility group (ABD, expansion, and other) were drawn from the MMIS. Further, MMIS diagnostic data on Medicaid claims and encounter records was used to calculate each beneficiary's count of physical chronic conditions,[19] and whether they have been diagnosed with a serious mental illness (SMI), other mental illness, or a substance use disorder (SUD). We separately estimate the prevalence of diagnostic codes indicating opioid use and dependence among our study groups. We also adjust for the diagnosis-based Chronic Illness and Disability Payment System (CDPS) risk score, a measure of diagnostic mix and burden of illness with higher values indicating greater disease burden.[20]

Study Population

Populations Potentially Eligible for TSS

Our analysis focuses on persons who may have been eligible for Medicaid-funded TSS in 2016 had such benefits been offered that year. Specifically, the analysis includes Medicaid-enrolled adults (age 18 or older) who were homeless or placed in PSH in 2016. Homelessness is defined based on use of certain homeless services during the year (discussed further below). Children are excluded from the analysis because they often receive homeless services because their parent or guardian meets service eligibility criteria. Further, any beneficiary living in Medicaid funded

facilities such as a nursing home at any time during 2016 was not classified homeless. To achieve stable estimates of Medicaid utilization and spending, we further restrict our analytic population to persons who had at least 10 months of Medicaid enrollment in 2016.

Within the study population, we classify persons who may have been eligible for Medicaid-funded TSS into four groups. The first, "Group A", comprises persons already placed in PSH in 2016. Second, "Group B", includes persons not placed in PSH but flagged as "chronically homeless" in the HMIS in 2016. This flag is automatically generated by HMIS for persons for whom documentation is assembled demonstrating that they meet U.S. Department of Housing and Urban Development (HUD) criteria for chronic homelessness, making them eligible for certain PSH placements. To meet these criteria, persons must have both a qualifying disabling condition and sufficient history of homelessness. Qualifying disabling conditions include: a) developmental disabilities, b) acquired immunodeficiency syndrome and related conditions, and c) other physical, mental, or emotional impairments that are expected to be long-term, impede individuals' ability to live independently, and could be improved with more suitable housing.[21]

The HUD homeless history criterion requires that individuals be homeless for at least 12 continuous months or a total of 12 months in four or more episodes over three years. Periods of homelessness may include time spent in emergency shelters, safe havens, certain institutional care facilities, or "place not fit for human habitation."[22] Safe havens are type of shelter that provide services for "hard-to-reach homeless persons with severe mental illness."[21(p1)]

Third, "Group C," comprises other individuals who we found to have had a qualifying homeless history and a qualifying disability in our linked 2014 to 2016 dataset but who were not flagged as chronically homeless in the HMIS. Here we include individuals for whom the HMIS

indicates that they received disability income or had a disabling condition. Such persons may not be flagged as being "chronically homeless" due to lack of adequate documentation. In addition, this group includes additional individuals identified in the MMIS as having a developmental disability[23] or SMI[24,25] on any Medicaid claim or encounter record over this period.

Finally, we designate a category of "at risk" persons as "Group D." We determined that these individuals have a qualifying disability, as described above, but fall short of the required homeless history. Here we include persons homeless for three to 11 months over the three-year period. A Medicaid TSS benefit might be tailored for such a group to prevent transition to chronic homelessness.

Comparison Population

To establish a benchmark to compare potentially avoidable Medicaid utilization and spending among persons potentially eligible for Medicaid TSS, we generate a comparison group of persons matched by clinical and demographic characteristics but who did not use any homeless services (i.e., do not appear in the HMIS) during the study period. To do this, we identify five comparison Medicaid recipients separately for each recipient in Groups B, C, and D described above. Since the effects of homelessness were likely mitigated by PSH placement, and evaluation research techniques can directly estimate the effects on utilization and spending of placement in PSH (Group A), we do not include comparisons for that group in our analysis. Matching procedures are discussed below.

Analysis

Our analysis focuses on key measures of Medicaid utilization and spending in 2016. We use data from 2014 and 2015 (and sometimes 2016) to adjust for covariates, as explained below. We first describe demographic and health differences in our study variables by our TSS eligibility Groups A-D. For reference, we also show distributions for the ABD and expansion populations that did not match to any HMIS record during the study period, referred to as the "non-homeless" population. Next, we examine differences in our metrics of utilization and spending for each of Groups B-D and their matched comparison groups.

We selected five comparison individuals for each homeless person in each of the three groups potentially eligible for Medicaid TSS (i.e., Groups B-D) who were similar based on pre-specified characteristics that are risk factors for healthcare utilization. To account for predisposing risk factors for 2016 outcomes, we matched characteristics using 2015 data for individuals with at least ten months of 2015 Medicaid enrollment. For individuals with insufficient Medicaid enrollment in 2015, we matched on 2014 characteristics and defaulted to 2016 data if neither earlier year was available. Most matching (84%) was done with 2015 data with the remainder from 2016 (13%) and 2014 (3%).

Matching took place in two steps. First, we selected comparison individuals who were exact matches of homeless individuals based on eight characteristics: Medicaid eligibility category, sex, race/ethnicity, year of data match, mental health diagnosis, SUD diagnosis, SMI diagnosis and the quartile including the individual's CDPS score. Out of the pool of exactly matched comparison individuals based on these characteristics, we employed Mahalanobis distance matching to select the five comparison observations who were most similar based on

age, number of chronic conditions, number of Medicaid days enrolled, and the actual CDPS score.[26] Mahalanobis matching was conducted using the 'mahapick' command in Stata 15.1.[27]

Findings

Study Sample

Table 1 shows the number of individuals identified in each the groups potentially eligible for Medicaid-funded TSS as well as the number of non-homeless persons who are in the Medicaid ABD and expansion populations, which are included for reference. Across New Jersey, more than 8,400 individuals were potentially eligible for Medicaid-financed TSS services in 2016. Just under half of these were already placed in a PSH program (Group A) and another 10 percent (n=849) were designated "chronically homeless" in the New Jersey HMIS (Group B). An additional 1,355 individuals who were not flagged but likely could meet criteria for the chronically homeless designation accounted for 16 percent of those potentially eligible for TSS (Group C). Finally, 2,160 individuals, or about a quarter of those potentially TSS eligible, were classified as "at risk" of chronic homelessness.

{TABLE 1 ABOUT HERE}

Characteristics of Populations Potentially Eligible for TSS

The four TSS groups as well as the non-homeless expansion population were predominantly ages 30-64, especially in Groups B and C (Table 2). Most of the study groups exhibited gender parity except Groups B and C, which were disproportionately male. In contrast to the non-homeless populations, the four TSS groups had disproportionate representation of non-Hispanic black

race/ethnicity. Although the plurality of the PSH population (Group A) was enrolled in Medicaid through the ABD category, the remaining TSS groups were more likely to be covered under the ACA expansion.

Behavioral health diagnoses were substantially more common among the TSS groups, especially among those not placed in PSH (i.e., Groups B-D). About half to two thirds of the TSS groups not in PSH had both mental health and SUD diagnoses. Nearly one-in-three persons in the non-PSH homeless groups had at least one Medicaid record with a code indicating opioid abuse or dependence code during 2016. This rate was much lower in the PSH group, and lower still among the non-homeless study groups.

The prevalence of non-behavioral health chronic conditions among the potentially TSS-eligible subgroups is higher than the non-homeless expansion population but lower than the non-homeless ABD population. There are minor differences in the distribution of the number of chronic conditions across potentially TSS-eligible subgroups.

{TABLE 2 ABOUT HERE}

Utilization and Spending among TSS Eligible and Matched Non-Eligible Groups

Hospital utilization and avoidable use metrics for homeless persons potentially eligible for Medicaid TSS benefits (Groups B-D) and their matched comparison populations are shown in Table 3. Across all three groups, we observe significantly higher ED and IP use, including a higher likelihood of any use and high use, defined as six or more ED visits and three or more IP stays. For these metrics, differences in Group B, those designated in HMIS as chronically homeless, are larger relative to matched comparisons than Groups C and D. A similar pattern is

evident for Ambulatory Care Sensitive admission rates, with large absolute differences between the groups of interest and their comparison populations. Again, the ACS rate in Group B relative to comparison patients is highest among the three TSS groups. We did not observe a significantly higher hospital readmission rate in Group B, the HMIS designated chronically homeless, although such differences are significant for Groups C and D.

Total Medicaid spending was higher in Groups B-D relative to matched comparison patients (Table 3). Spending among those flagged as chronically homeless in the HMIS (Group B) was 27% greater than their comparison patients, a difference of $5,727 on average in 2016. There was also "excess" spending in Groups C and D relative to their comparisons, but to a lesser degree (16% and 10% greater spending, respectively). Emergency department spending in Group B was 73% higher than their matched comparisons, and ED spending Groups C and D were nearly 50% greater than their respective comparison patients. Spending on IP admissions followed a similar pattern, with the TSS Group B spending exceeding its comparison group by 47% and the other groups spending about 30% more than their comparison patients on average. Spending on ACS admissions exhibits a similar pattern but differences did not achieve statistical significance for Groups B and C. Prescription drug spending and non-emergent ambulatory spending was similar for the TSS groups relative to their comparisons as was spending on all other services.

{TABLE 3 ABOUT HERE}

Discussion

Interest in developing Medicaid-funded tenancy support services (TSS) for homeless populations is growing due the ACA Medicaid expansion and a body of evidence that such services can reduce avoidable healthcare spending. This study estimated the number and characteristics of individuals who could be eligible for Medicaid TSS in New Jersey and compared their utilization and Medicaid spending patterns to matched non-homeless beneficiaries.

To describe the population potentially eligible for Medicaid TSS using linked Medicaid and homeless services data, we examined persons already placed in PSH and applied disability and homeless history eligibility criteria common to PSH to others. Based on these criteria, we found that over 8,400 adults could have been eligible for TSS in 2016. Nearly half of this group was already placed in PSH. Of the remaining potentially TSS eligible, only a small share was designated "chronically homeless" in state's Homeless Management Information System (HMIS). This finding is not surprising because formal chronic homelessness designation based on HUD regulations requires case workers in to obtain extensive documentation of each individual's disability and homeless histories. Our analysis suggests that the number of chronically homeless in New Jersey was likely more than double the number formally flagged as such in the HMIS. In addition, we estimate that over one-in-four of potential Medicaid TSS recipients had qualifying disabilities but did not have homeless histories sufficient to classify them as chronically homeless. This comparatively large group "at risk" of chronic homelessness may benefit from prevention-oriented TSS services.

Compared to other Medicaid beneficiaries, the TSS-eligible groups are disproportionately ages 30 to 64, male, and African American, reflecting the demographics of New Jersey's homeless population.[28] They notably bear very high burdens of behavioral health conditions.

Eighty to ninety percent of those in the three groups of potentially TSS eligible homeless persons not placed in PSH (study Groups B-D) had at least one behavioral health condition, and the majority of those had co-occurring mental health and SUD diagnoses. In contrast, about two thirds of adults placed in PSH (Group A) had a behavioral health diagnosis. Rates of SMI are also high and reflect a similar pattern across our study groups. It is especially noteworthy that about 30 percent of those in the TSS groups not placed PSH had a diagnosis of opioid abuse or dependence, nearly three times higher than those living in PSH. Findings from studies evaluating PSH program outcomes suggest that the lower prevalence of mental illness and SUD of those placed in PSH compared to homeless adults in our analyses is almost certainly due to patterns of selection into PSH rather than to improvements in these conditions following PSH placement.[8] Collectively, these statistics suggest that engaging homeless adults in our eligibility groups in PSH and sustaining their tenancy may be more challenging than those already receiving such placements.

Our findings also suggest that addressing the needs of the chronically homeless in New Jersey would require a large expansion of PSH capacity, as much as doubling the number of placements available to Medicaid patients, depending on program eligibility criteria. Such an expansion would likely require new resources for rental subsidies and investments in expanded affordable housing stock in many areas. In most cases, Medicaid funds cannot be used for these purposes.[5]

The high burden of behavioral health disorders, including SMI, SUD in general, and opioid dependence specifically, in groups of homeless adults we studied suggest that PSH models, such as Housing First, are needed. Housing First has documented success enrolling and retaining "difficult to engage" populations in PSH. Housing retention rates in Housing First

among those with high-needs have been recorded at 85% at one-year post-housing[29,30] and up to 80% at two or more years post-housing.[30-32] Multi-site randomized controlled trials and a large-scale federal demonstration project administered by HUD and the Departments Veterans Affairs also show that individuals with high-needs who reside in Housing First programs have better housing stability in comparison to those receiving "care as usual"[33-35] which provides further support for a successful expansion of PSH to these high-needs populations. Acknowledging the importance of meeting the needs of homeless populations with behavioral health disorders, beginning in federal fiscal year 2013 HUD has sought to increase the share of supportive housing programs adhering to Housing First principles.[36] Housing First has the potential to address housing needs of persons with behavioral health disorders, but the high prevalence of these conditions among Medicaid TSS-eligible populations underscores the importance of assuring adequate treatment capacity and effective integration of behavioral health services with medical care and TSS, compounding long-standing challenges for Medicaid programs.[37]

The literature on cost savings from PSH is mixed, but the strongest studies indicate that reduced spending on hospital services is likely, especially for the highest need patients.[2,4,38] Medicaid spending in 2016 for the high-need homeless adults that we examined was substantially higher than for non-homeless persons matched on demographic and clinical characteristics, suggesting that Medicaid spending would plausibly be offset by savings associated with the delivery of TSS. We found the greatest potential cost offsets among HMIS-documented as chronically homeless. Medicaid spending for this group of homeless individuals (Group B) was $5,727 or 27% more than their non-homeless comparison population. Corresponding spending differences for those not formally classified as chronically homeless but who likely meet those criteria (Group C) or those similarly disabled but with shorter histories of

homelessness (Group D) were smaller: $2,569 and $1,362, respectively. These findings indicate that the most intensive tenancy support resources should be targeted to those already documented as chronically homeless, but that service packages for other persons at risk of chronic homelessness may also lead to offsetting Medicaid savings.

Our findings of spending differences between homeless and matched comparison populations should not be interpreted as projections of actual savings if PSH were made available to our study population. Homeless individuals not placed in PSH may differ in important ways from non-homeless comparison individuals that may not be adjusted for in our analyses. For example, while we matched on the presence of SMI, we have no way to control for severity of these conditions.

Nevertheless, patterns of utilization and spending by type of service in our study are largely consistent with findings of experimental and quasi-experimental studies of PSH interventions.[2,3] Like most PSH evaluations, we found that inpatient admission and emergency department visit rates were much higher among TSS-eligible groups relative to matched non-homeless individuals. Illustrating this pattern, hospital spending on behalf of designated chronically homeless adults (Group B) in excess of their comparison group in our study, $3,377, was roughly equivalent to estimated Medicaid inpatient savings from housing placement in one large study of PSH placement for individuals with SMI in New Your City ($2,825 in 1999 dollars, equivalent to about $4,070 in 2016).[4] Also consistent with the literature, we did not find large "excess" spending for non-emergency ambulatory care and prescription drugs among the TSS eligible. Our study did not formally forecast savings from PSH, yet the extant evaluative literature suggests savings of a magnitude similar to our estimates may be possible. While our study suggests that there would be healthcare spending reductions that could offset the cost of

targeted Medicaid-funded tenancy support benefits, our estimates do not constitute formal budget neutrality estimates that would be required for federal approval of state demonstration waivers authorizing coverage of such services.[39]

We did not observe significant differences in ambulatory care spending between groups of homeless adults and their matched counterparts. Lower ambulatory spending among homeless individuals may have been expected in light of likely barriers to care in this population. However, differences in disease severity or acuity which we cannot account for in our matching procedures may drive higher need for such care among homeless individuals. Future research decomposing components of ambulatory care (e.g., primary and preventive care, specialty services, physical therapy, etc.) or using richer clinical data is needed to shed more light on ambulatory care utilization patterns in this population.

Finally, our results suggest that improving ambulatory care can address only a small portion unmet needs of high morbidity homeless patients. While patterns of Ambulatory Care Sensitive admissions and spending across our potentially TSS-eligible groups mirrored those of hospital spending overall, ACS admissions represented less than 10 percent of total hospital spending and ACS-related spending was not always significantly different between TSS-eligible to comparison groups. Likewise, 30-day inpatient readmissions represent only a small portion of potentially avoidable hospital use in our study groups.

Limitations

Our study is limited to a single state. We note, however, that New Jersey is demographically and economically diverse, suggesting that our findings may be applicable to other jurisdictions.[40] Our study also focused only on possible savings to Medicaid from expanded TSS, but the

literature clearly shows other sources of cost reduction from effective PSH programs, including savings from reduced shelter use and criminal justice involvement.[2,38] If we were able to account for such costs, the possible return on investment from expanded TSS would certainly be greater than our estimates suggest.

While linking Medicaid and homeless services data provides a rich source of information, administrative data have limitations.[41] Claims data do not capture undiagnosed illness or services paid by other sources such as Medicare. Further, our data do not have direct measures of disabilities, outside of those that can be derived from diagnostic data.

Further, while the NJ HMIS captures shelter and safe haven use statewide, two mainly suburban counties do not contribute data on other homeless services. This gap likely biases downward our estimates of time spent in places "not fit for human habitation," a data field that is recorded on some record types that the two counties do not contribute to the state HMIS. Likewise, homeless persons in New Jersey may also receive housing services in neighboring New York City, Philadelphia, or other jurisdictions, which we would not capture on our data. In contrast, Medicaid funded services delivered out of state are recorded in our data. Additionally, to achieve stable estimates for our population in 2016, we limited our analysis to individuals who were Medicaid enrolled for at least 10 months that year. Without this exclusion, our study population of TSS eligible individuals (Groups A-D) would have increased by 21.2% (1,790 excluded individuals). Because of these gaps, our counts of potentially TSS eligible individuals should be considered conservative.

We focused on a selected group of homeless persons. According to national data, only about 15% of homeless persons at a point in time can be considered chronically homeless.[38] The larger group of homeless persons is beyond the scope of this study. Evidence suggesting that the

464 greatest potential savings from delivering TSS are most likely to arise from those with the
465 greatest health needs, thus the groups we studied are likely to be of greatest interest to Medicaid
466 policy makers.[2,38]

467 Finally, our matching procedures effectively adjusts for the demographic and health
468 characteristics of the study population in a cross-sectional analysis. It is important to note that
469 demographic changes in the homeless population, in particular the rising average age of
470 homeless adults,[42] will increase demands on Medicaid programs to develop effective TSS and
471 care strategies to most effectively serve this population.

472 In spite of these limitations, this study provides important new information relevant to the
473 design of Medicaid TSS for homeless persons. Using novel linked statewide data, we found that
474 a significant number of very high need Medicaid enrollees bear great burdens of homelessness
475 that could potentially be mitigated by expanding supportive housing programs. Comparisons of
476 homeless populations to demographically and clinically similar non-homeless persons indicate
477 that there may be significant offsetting savings in reduced avoidable hospital use from new
478 investments in TSS.

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Table 1. Study Population

Study Group	Group Definition	N
Non-Homeless Beneficiaries		
Aged, Blind, and Disabled		221,320
Expansion	Not linked to NJ HMIS 2014-2016	282,649
Other		339,329
Total Non-Homeless Beneficiaries		843,298
Beneficiaries Potentially Eligible for Tenancy Support Services (TSS) Groups		
A: Permanent Supportive Housing	PSH placement any time in 2016	4,081
B: HMIS Flagged Chronically Homeless	Not in Group A, HMIS flagged as chronically homeless in 2016	849
C: Probably Chronically Homeless	Not in Group B, Meets three year HUD homeless history criteria and has disability consistent with chronic homelessness definition	1,355
D: At-Risk of Chronic Homelessness	Not in Group C, Has three-11 month homeless history 2014-2016 and has disability consistent with chronic homeless definition	2,160
Total Potentially Eligible for TSS		8,445

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Table 2. Demographic, Medicaid Eligibility, and Health Characteristics of Selected Persons Not Receiving Homeless Services and Persons Potentially Eligible for Tenancy Support Services, 2016

	Not HMIS Linked		Potentially Eligible for Tenancy Support Services				
	ABD[a]	Expansion[b]	PSH[c]	HMIS CH[d]	Probably CH[d]	At Risk of CH[d]	*P*
Age Group, %							
18-29	10.7	30.6	21.5	14.7	13.7	20.5	<0.0001
30-49	17.4	31.5	36.1	41.3	43.2	44.0	
50-64	25.9	36.9	38.1	40.8	39.2	33.1	
65 or older	45.9	0.9	4.3	3.2	3.8	2.4	
Male, %	40.7	51.1	44.8	67.6	57.3	49.6	<0.0001
Race/Ethnicity, %							
White, non-Hispanic	37.8	31.4	28.3	41.7	41.5	37.7	<0.0001
Black, non-Hispanic	23.3	20.2	59.3	42.5	46.1	50.0	
Hispanic	13.8	16.7	7.6	9.7	9.1	8.3	
Other	25.1	31.7	4.8	6.1	3.2	4.0	
Medicaid Eligibility Category, %							
Aged, Blind, or Disabled (ABD)	100.0	0.0	43.9	37.0	33.9	27.0	<0.0001
Expansion[b]	0.0	100.0	27.2	56.4	52.1	50.6	
Other	0.0	0.0	28.9	6.6	13.9	22.4	
Behavioral Health Diagnoses, %							
Any Behavioral Health Diagnosis	48.1	33.5	65.8	90.0	82.9	81.7	<0.0001
Both Mental Health and SUD	11.0	10.7	31.5	62.9	50.0	48.8	<0.0001
Substance Use Disorder (SUD) Only	4.9	9.7	11.5	13.9	17.4	16.9	<0.0001
Mental Health Only	32.2	13.1	22.8	13.2	15.5	16.0	<0.0001
Opioid Abuse or Dependence	3.9	6.3	13.0	32.0	31.0	28.5	<0.0001

Serious Mental Illness (SMI)	24.1	16.4	47.1	72.2	65.8	64.4	<0.0001
Number of Chronic Conditions,[e] %							
None	35.9	27.6	32.7	36.0	27.9	48.2	0.0009
One	24.0	24.7	25.2	25.3	18.2	24.6	
2-3	22.7	25.6	25.0	22.9	23.6	17.2	
4 or more	17.4	22.1	17.1	15.8	30.3	10.0	

[a]ABD = Aged, Blind, and Disabled.
[b]Includes a small number of General Assistance recipients who were Medicaid eligible prior to the Affordable Care Act.
[c]PSH = Permanent Supportive Housing.
[d]CH = Chronically Homeless.
[e]Out of 27 non-behavioral health chronic conditions, based on the CMS Chronic Condition Warehouse.

Table 3. Hospital Utilization and Medicaid Spending for Persons Potentially Eligible for Tenancy Support Services and Matched Comparison Groups, 2016

	HMIS Chronically Homeless				Probably Chronically Homeless				At Risk of Chronic Homelessness			
	TSS[a]	Comp[b]	Diff[c]	*P*	TSS[a]	Comp[b]	Diff[c]	*P*	TSS[a]	Comp[b]	Diff[c]	*P*
Emergency Department Visits												
At least one, %	78.8	54.2	24.6	<0.0001	64.8	50.1	14.7	<0.0001	67.3	51.7	15.6	<0.0001
Six or more, %	31.3	7.4	23.9	<0.0001	15.2	6.3	8.9	<0.0001	13.9	6.0	7.9	<0.0001
Mean	6.4	2.0	4.4	<0.0001	3.0	1.6	1.4	<0.0001	2.9	1.5	1.4	<0.0001
Inpatient Admissions												
At least one, %	39.6	24.7	14.9	<0.0001	26.5	20.2	6.3	<0.0001	25.2	19.0	6.2	<0.0001
Three or more, %	12.2	4.2	8.0	<0.0001	5.5	2.9	2.6	<0.0001	3.9	2.3	1.6	0.0001
Mean	1.0	0.5	0.5	<0.0001	0.5	0.4	0.1	<0.0001	0.4	0.3	0.1	<0.0001
Ambulatory Care Sensitive Admissions per 1,000 Adults	90.0	44.1	45.9	<0.0001	55.2	36.8	18.4	0.0033	42.1	28.1	14.0	0.0012
30-day Readmissions per 100 Index Admissions	20.8	18.9	1.9	0.4501	20.5	15.7	4.8	0.0259	16.2	11.5	4.7	0.0061
Medicaid Spending,[d] $												
Total	21,307	15,580	5,727	<0.0001	15,786	13,217	2,569	0.0003	13,545	12,183	1,362	0.0131
Inpatient Admissions	7,225	3,848	3,377	<0.0001	4,192	2,842	1,350	0.0002	3,627	2,539	1,088	0.0003
ACS[e] Admissions	605	261	344	0.0740	309	210	99	0.1977	339	161	177	0.0371
ED Visits	2,546	701	1,845	<0.0001	1,133	589	544	<0.0001	1,048	564	484	<0.0001
Ambulatory Care[f]	7,546	6,882	664	0.1577	5,873	6,015	(142)	0.6484	5,467	5,673	(206)	0.4192
Prescription Drugs	2,990	3,450	(460)	0.2130	3,779	3,048	731	0.0310	2,527	2,748	(221)	0.2891
All Other	1,000	699	301	0.0062	809	723	86	0.1641	875	658	217	0.0009

[a]TSS = Tenancy Support Service Group.
[b]Comp = Matched Comparison Group.
[c]Diff = Percentage point difference.
[d]Adjusted for time enrolled during the year.
[e]Ambulatory Care Sensitive.
[f]Excludes emergency department (ED) visits, includes outpatient facility, physician, and clinic.