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FOR SOCIAL POLICY

A DATA-DRIVEN RE-DESIGN OF HOUSING SUPPORTS AND SERVICES FOR AGING ADULTS WHO EXPERIENCE HOMELESSNESS IN NEW YORK CITY

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I. INTRODUCTION

Homelessness is increasingly understood as a public health problem as a growing body of research cements the relationship between housing instability, health crises, and increased health care utilization (Hwang, 2001). Mortality rates among homeless adults are more than double those of the general population, and there is burgeoning evidence that suggests a revolving door between homelessness and hospitals. In addition, the barriers to accessing preventative and primary care while homeless lead to receipt of health care only when morbidities are more acute (Kushel et al, 2006, Reid, Vittinghoff, & Kushel, 2008, Lim et al., 2002), meaning that there is a disproportionate use of inpatient hospitalization and other costly medical and behavioral health services among persons experiencing homelessness (Kushel et al., 2002; Salit, Kuhn, & Hartz, 1998; Hwang et al., 2011; Doran et al., 2013). As a result, homelessness is expensive for health care systems and for society as a whole (Latimer, Rabouin, & Cao, 2017; Flaming, Burns, & Matsunaga, 2009; Culhane, 2008). Given this, there has been growing interest in recent years in using health care systems as a platform to address homelessness.

This report focuses on the homelessness and health care use of older homeless adults in New York City, specifically those 55 years of age or older. Recent evidence suggests a unique cohort effect of post-World War II "baby boomers" born between 1955 and 1965 who have shown a disproportionately high risk of homelessness over the last two decades (Culhane et al, 2013). And even beyond the heightened health care use of their younger homeless counterparts, older homeless adults have medical needs that exceed the norms for their biological ages, experiencing geriatric medical conditions at rates on par with their housed counterparts 20 years older (Brown et al., 2012; Brown, Hemati, & Riley, 2017). Moreover, with homeless persons having a life expectancy of 64 years (Metraux, Eng, Bainbridge, & Culhane, 2011), older homeless individuals experience old-age related mortality earlier than their housed counterparts, reaching their life expectancy over the next 5–15 years. Addressing the needs of this growing elderly homeless population in a meaningful way requires shifting from a system focused on remedial health care toward an orientation centered around social determinants of health with an emphasis on addressing housing needs.

This report forecasts the future of the aged homeless population in New York City, outlines one approach to consider the scope and cost of this future aged homeless population, and suggests a range of policy interventions. In particular, we address the following objectives:

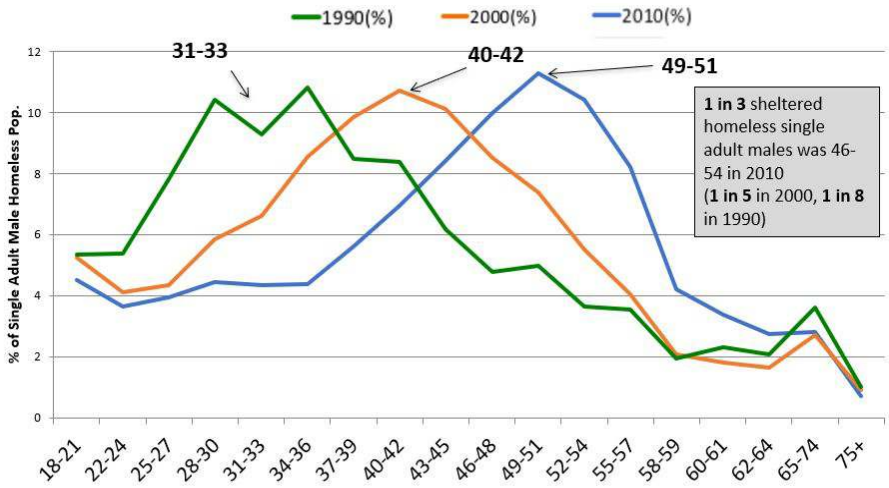
1. Project aging dynamics of the sheltered homeless population through 2030
2. Evaluate the health care and shelter use and cost, and apply these age-specific costs to the population projections
3. Create clusters within the population based on shelter and health care use to envision potential housing and service interventions

4. Draw upon prior research to estimate potential reductions in shelter and health care service costs

This study of the confluence of aging, shelter, and health care use in New York City is one of three studies, with companion projects in Boston and Los Angeles County, that describe the aging trends in local homeless population, health care utilization by homeless persons, and the potential returns on investment associated with identifying and intervening with this population.

II. AGING DYNAMICS AMONG THE NEW YORK CITY HOMELESS POPULATION

Research is beginning to document the advancing age of the homeless population. Figure II-1 shows the age distribution of homelessness among single adult male shelter users in the United States. Using decennial Census data from 1990 through 2010, Culhane and colleagues (2013) demonstrate a cohort effect whereby the age distribution becomes noticeably older over time. While those ages 46-54 represented only one of every eight single homeless men in 1990, 20 years later they represent a third of that population.



Source: Culhane et al. (2013)/ U.S. Census Bureau Decennial Census Special Tabulation

Figure II-1 – Age Distributions of Male Shelter Users, United States

Figure II-2 presents similar trends for sheltered single homeless men in New York City. Those 46-54 represent one of every nine in 1990, and approximately one-quarter in 2010.

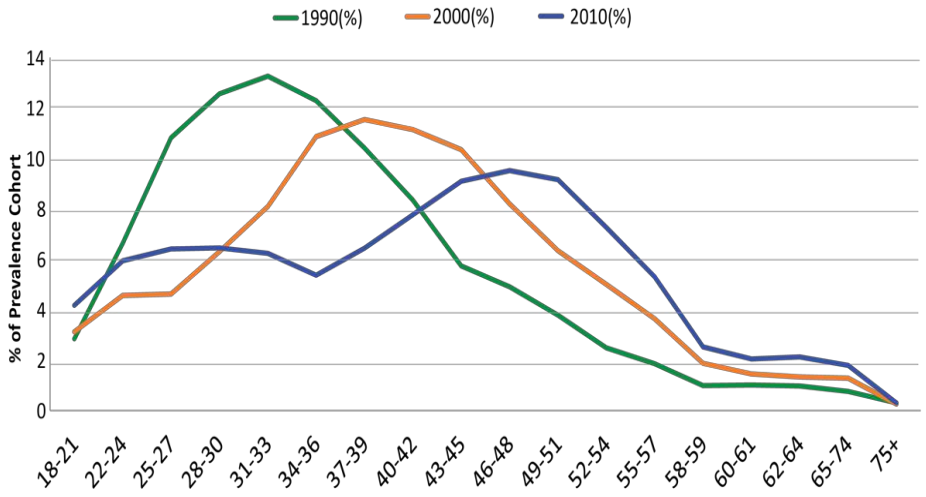


Figure II-2 – Age distribution of the single adult sheltered population in New York City: 1990-2010.

These trends are especially stark in the context of increasing homelessness in New York City. The number of adults unaccompanied by children grew by approximately 30% from 2004 to 2017, but the number of those adults 50 years and older more than doubled, and those 65 and older more than tripled.

Given these trends, demographic methods were applied to age-specific data over time on sheltered adults without minor children to forecast aging dynamics among the homeless population through 2030.

Data for these forecasts come from the New York City Department of Social Services' (DSS) CARES database, which records all shelter stays in New York City's Department of Homeless Services (DHS). In particular, data from the Single Adults and Adult Family shelter systems was used, excluding cases in which there is a minor (under the age of 18).

To forecast year to year changes (i.e., persistence) in the aged homeless shelter population, an "age-period-cohort" modeling approach was used (Sasieni, 2012)[1]. In short this approach makes forecasts based on people's birth year (cohort: being born in particular years may impact people's risk of entering shelter later in life), age (different age groups have different risks of homelessness—for example, to state the obvious, there are very few individuals that are 90 years old in homeless shelters), and calendar year (period: the shelter population in general has been steadily increasing in recent years).

[1] The year to year change or persistence of homelessness is defined as the ratio of stock of homeless individuals in a single-year age cohort (e.g., adults born in 1960) who are present in year n+1 divided by the number present in year n (e.g., those remaining in 2018 as a share of those present in 2017). The ratio is analogous to the individual probability of persistence or exit, though in this case persistence reflects a combination of individuals who remain in the shelter as well as new entries. We conducted extensive exploratory analysis of prior trends in homeless shelter persistence by age, period, and cohort. We then conducted age-period cohort spline Poisson regression models using the apcspline procedure in Stata 15, and used these models to predict the annual probability of persistence for each single-year age group, controlling for age and period.

Note that forecasted homeless trends will differ based on 1) assumptions about how age affects homelessness, 2) assumptions about how the given time period affects homelessness, 3) assumptions about how cohort affects homelessness, 4) the base year of the model, 5) whether the model estimation is based on all ages or only ages under 69, and 6) whether the model is based on raw population counts or population shares. To account for this uncertainty, we systematically varied these parameters in a range of models and then averaged the results of these models to arrive at the forecast presented below.

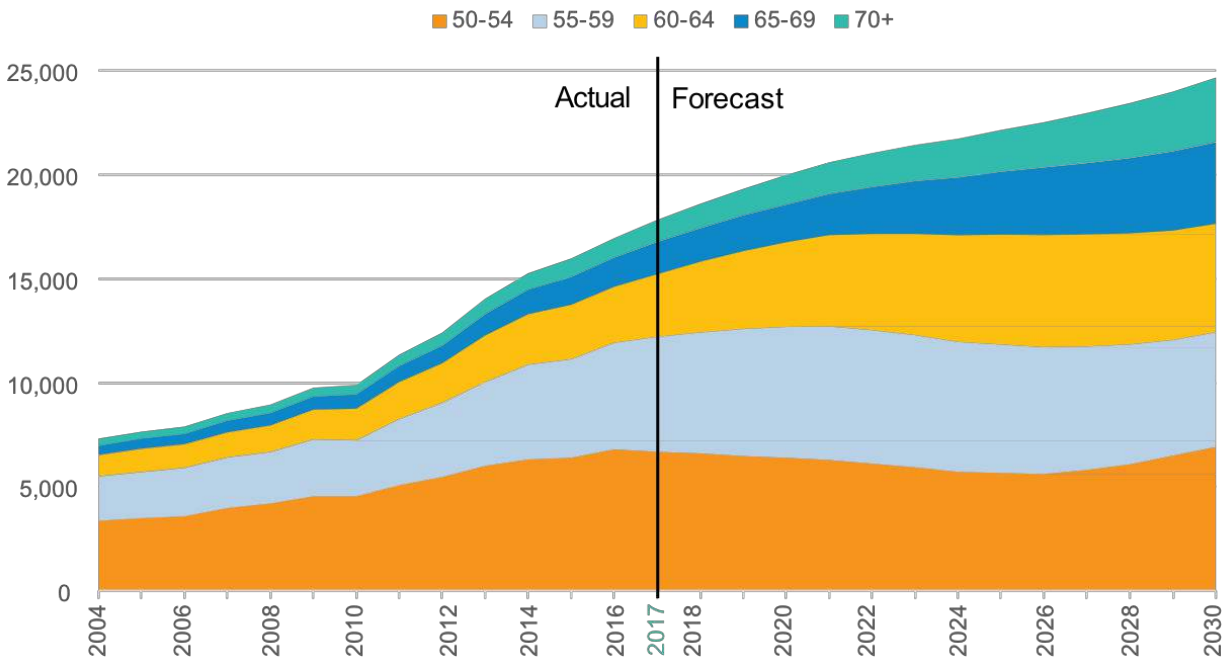


Figure II-3 – Total shelter population forecast; age 50+: Actual counts (2004-2017) and forecast (2018-2030)

Figure II-3 illustrates actual (2004-2017) and forecasted (2018-2030) homelessness prevalence for five-year age groups beginning at age 50. The youngest age group has begun to decline during the actual period but older groups, on the other hand, will continue to grow as a proportion of this older cohort. While the average annual projected growth for those 55-64 is approximately zero, the population of those ages 65 and older is projected to grow at an average annual rate of about 7%.

It is important to note that these trends, particularly that of the 65 and older cohort, are not unique to New York City. Figure II-4 presents the proportionate change in the population 65 and older in New York City, as well as in the other two localities that participated in this multi-site study, Los Angeles County and Boston. Compared to 2017, the last year for which we had available data in New York City, the 65 and older cohort will nearly triple by the year 2030, experiencing relative growths in the middle of Boston and Los Angeles County.

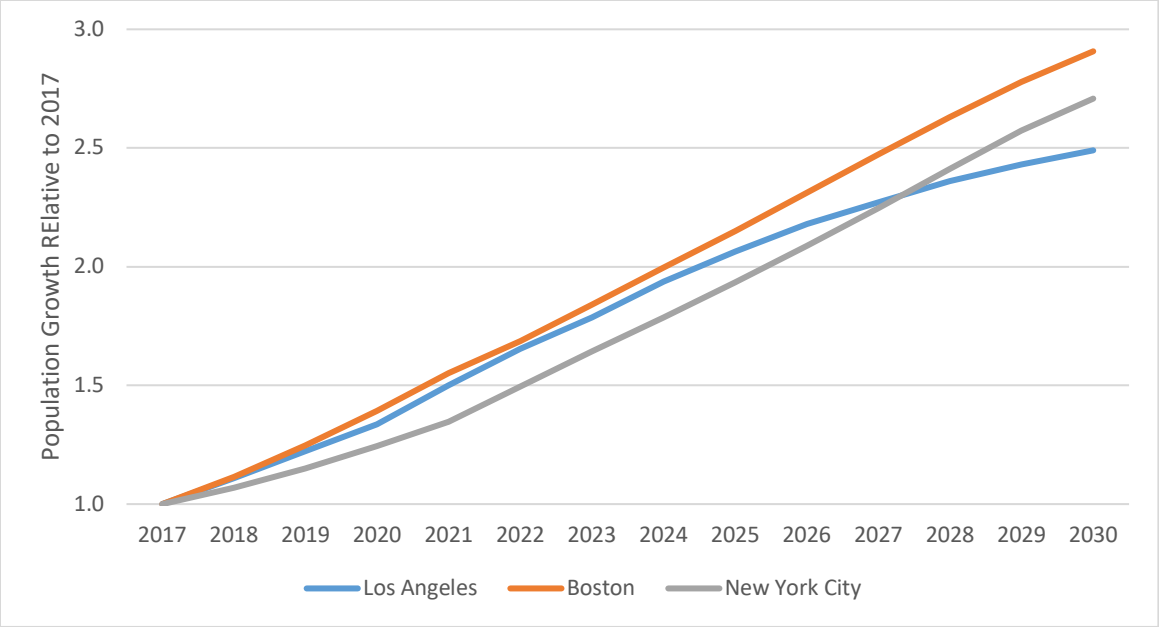


Figure II-4: Proportionate Change in 65+ Homeless Population Relative to 2017

III. AGE-GROUP SPECIFIC HEALTH CARE AND SHELTER COST ESTIMATES

In this section, we estimate the prevalence and corresponding costs of shelter and three health care services – Emergency Department visits, inpatient hospitalizations, and nursing home use – for homeless adults 55 years old and over. Then we apply this estimate to the actual and forecasted number of homeless individuals between 2004 and 2030. This is accomplished by multiplying the average cost of a person in a particular age range (e.g., 55-60) by the number of people in or projected to be in that age range each year.

To arrive at an estimate for the individual-level costs in a year, analyses examined the adults who used shelter while aged 55 and older in the Department of Homeless Service's Single Adult or Adult Family shelter system between 2011 and 2013 (n = 13,427). From this sample, service use between 2011 and 2015 was then examined. Emergency Department and inpatient hospitalization data come from the New York State Department of Health's Statewide Planning and Research Cooperative (SPARCS) database, which includes admission and discharge dates and diagnoses for all non-VA hospital visits in New York State (NYS Department of Health, 2018). Nursing Home data come from the Center for Medicare and Medicaid Service's (CMS) Long Term Care Minimum Dataset (MDS), which includes nursing home assessment dates along with screening and diagnostic information for all residents of long-term care facilities certified to participate in Medicare or Medicaid (Center for Medicare & Medicaid Services, 2018).

MDS data are a collection of patient assessments and do not have specific dates that demarcate entries and exits from nursing home care. As a result, stay duration estimates were made based upon the dates of MDS assessments. Start and end dates were estimated for all persons identified as having stayed in nursing homes using a pre-determined set of decision rules, truncated to months where there was record of activity. Thus, these records are conservative, almost certainly underassessing the actual lengths of stay for the study population.

		55-59	60-64	65-69	70-74	75-79	80+
Emergency Department	**# of visits**	1.8	1.7	1.7	1.2	1.1	0.4
Inpatient Hospitalization	**# of days**	4.5	4.3	4.7	4.6	4.6	3.7
Nursing Home	**# of days**	6.4	8.4	14.6	20.3	26.7	29.8
Shelter	**# of days**	67.5	62.6	60.8	57.2	60.8	53.1

Table III-1: Average Per Person Annual Shelter and Health Care Service Use

Average annual shelter and health care service usage is presented in Table III-1. A few trends are visible here. Shelter use, generally speaking, decreases with age, from an average of 67.5 days per year for those 55-59 year old to 53.1 days per year for those 80 and older. Emergency Department visits present a much starker decline from 1.8 visits per year in the youngest cohort to .4 visits per year for the oldest.

The opposite is true in long-term nursing care; nursing home use goes up in each advancing age group, more than quadrupling between the youngest and oldest cohorts.

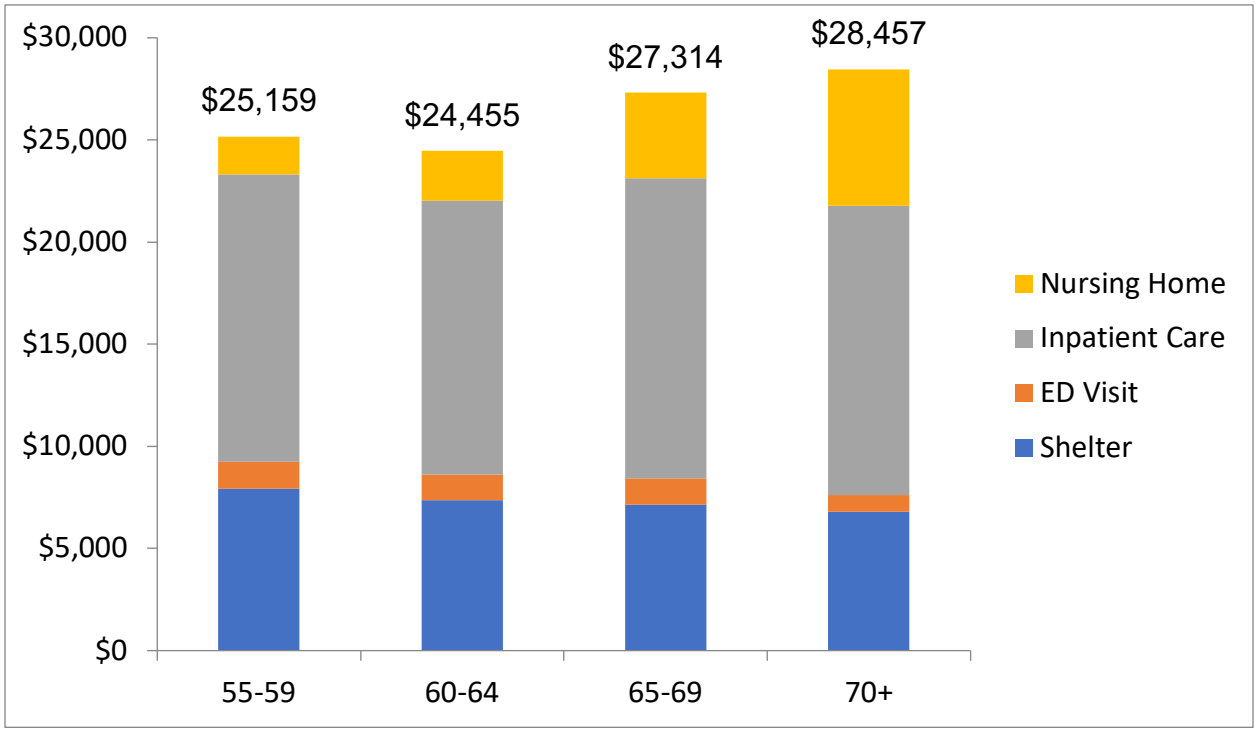


Figure III-1 Total average services cost per person among four age groups in the New York City shelter population

Figure III-1 presents average annual cost data for the 13,427 individuals included in the sample, broken into 4 age groups for services used between 2011 and 2015.[2] Costs decrease by $700, from the 55-59 age group to the 60-64 age group, and increased for the older two groups representing service users aged 65-69 and 70 and older. Annual shelter costs decrease by more than $1,000 from the youngest to the oldest group, and from 32% to 24% of total cohort costs. Much of the increase in costs by age are attributable to nursing home use, which jumps from $1,800 per person per year for the 55-59 age group to $6,671 for those 70 and older, and from 7% to 23% as a share of total costs.

Even within age groups, these costs varied substantially and were concentrated in a small portion of the population. Figure III-2 presents the average cost for each decile of annual spending. This shows stark disparities in services use and cost in less and more expensive shelter users. Shelter costs make up the majority of spending for 80% of the sample, exceeding 60% of spending in deciles 1 through 7, but accounts for only 7% of spending in the most expensive decile. Emergency department spending is

[2] Shelter cost per day is estimated at $117.44, based on the Fiscal Year 2018 City of New York Mayor's Management Report. Nursing home cost is estimated at $288.61 per day, based on data from the NYS Department of Health; Emergency Department visit costs are estimated at $742 per visit based on NYS Department of Health Statistical Brief #4, published in October 2014; inpatient hospitalization costs are estimated at $3,145 per day, based on inpatient data from the NYS Department of Health. All costs are in 2018 dollars.

similarly concentrated in less expensive deciles, making up 29% of costs for decile 1 and 10% or less for all but the cheapest 2 deciles.

Inpatient and nursing home spending make up an increasing share of spending as we move from less to more costly service users. Inpatient spending makes up only 1% of the least expensive decile, but 73% (an average of $89,900 per year) for the costliest decile. Nursing homes make up between 1% and 6% of spending for deciles 1 through 8, but 15% (18,800) for decile 10.

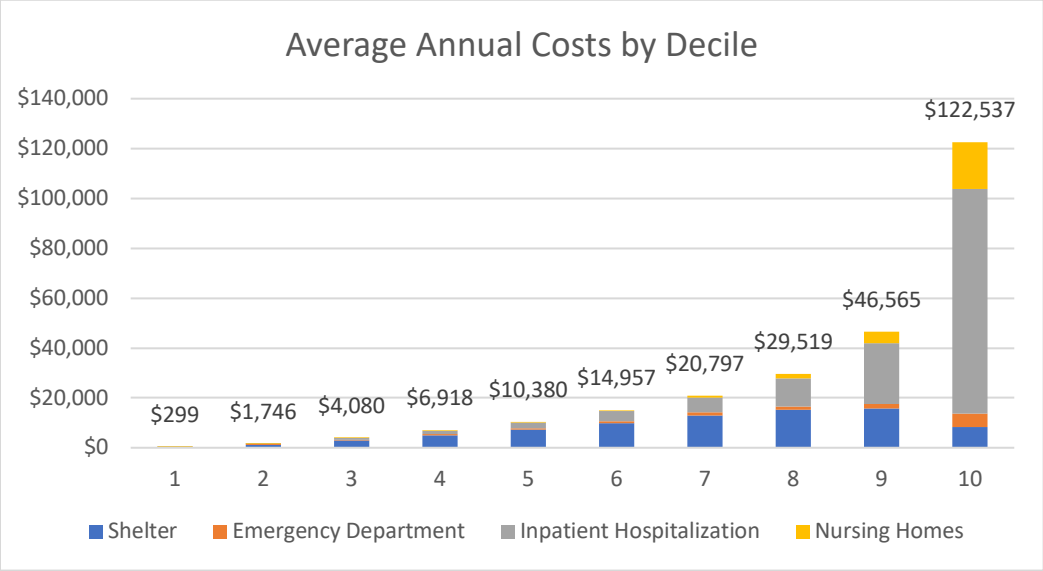


Figure III-2: Average annual costs by decile

Next, we apply these age-specific cost estimates to the population forecasts from Section II to estimate historical costs as well as project future costs. This is accomplished by multiplying the average cost of a person in a particular age range estimated above by the number of people who were in that age range in each year of the actual/historical data (i.e., <= 2017) or who are projected to be in that age range in each future year (through 2030). As seen in Figure III-3, costs more than doubled from $100m in 2004 to $284m in 2017 and are expected to grow by another $177m through 2030. These costs are increasingly concentrated in the oldest groups, due both to both their growing proportion of the anticipated homeless population, as well as the higher cost associated with them versus their younger counterparts.

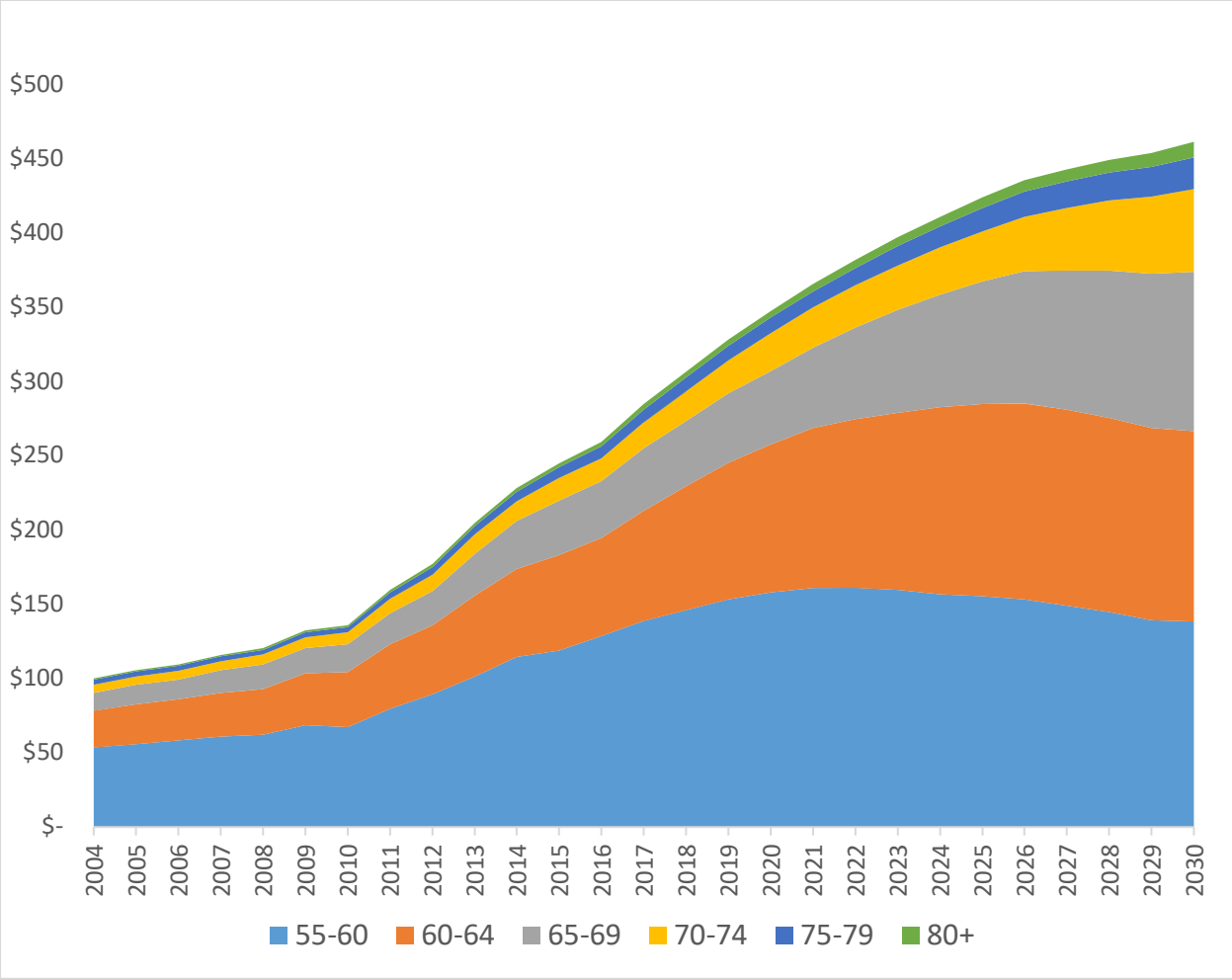


Figure III-3, Estimated service costs from 2004 – 2030.

IV. MATCHING SHELTERED SUB-POPULATIONS TO DIFFERENT HOUSING INTERVENTIONS AND ESTIMATED SERVICE COSTS BASED UPON CLUSTER ANALYSIS

Older homeless adults, as demonstrated in Section III, are a relatively heterogenous group. Even within narrow age groups, their use of social and health care services varies widely (Flaming, Burns, & Matsunaga, 2009). Prior research has demonstrated significant variation in homelessness dynamics with most people having one or two short spells of homelessness (Kuhn & Culhane, 1998). This means that addressing housing and health care needs for this group requires a continuum of housing and health-focused interventions based on the mix of services being used by our sample. This provides a rough sense for the proportions of aged homeless adults likely needing different types of interventions. Then, based on the characteristics of each of these clusters, we used cluster analysis to better categorize the mix of services used by the sample, and based on that information, envision a range of appropriate service models.

We used a combination of shelter use, health care use, and medical acuity metrics to create clusters. The total days spent in shelter was calculated using CARES data from 2009 through 2015, the number of inpatient hospital days was calculated from 2011 through 2015 from SPARCS, and medical acuity was estimated through the Gagne Comorbidity Index (Gagne et al, 2011), which uses ICD-9 codes to estimate 1-year mortality risk for older adults. This was also calculated using SPARCS data from 2011 – 2015.

These three criteria – the number of days spent in shelter, the number of days spent hospitalized, and the medical comorbidity score – were used for *k*-means cluster analysis. Similar methods have been used to designate typologies among homeless populations (e.g., Lee et al., 2016; McAllister, Lennon & Kuang 2011; Kuhn & Culhane 1998). We tested several cluster solutions and combinations of variables, and ultimately found that the 4-cluster solution with these three variables provided the most clearly delineated groups, summarized by figure IV-1 and table IV-1.

Cluster 1 comprised the largest share of our sample (84.6%). People in this cluster used moderate amounts of shelter (an average of 44 days per year) and had a moderate level of health care use on par with Clusters 2 and 3. Cluster 1 was also the least expensive cluster at $18,536. Clusters 2 (comprising 11.4% of the sample) and 3 (1.4% of the sample) had similarly moderate levels of health care use but increasing amounts of shelter use (6.5 months and 11 months per year, respectively. Their costs were incrementally higher than Clusters 2 and 3 ($38,888 and $48,919 per year, respectively). Cluster 4 used the least shelter, about one week per year, on average, but had health care costs of $175,400 per year. These subgroups represent cross-sections in an average year, and that people will move across these groups over time.

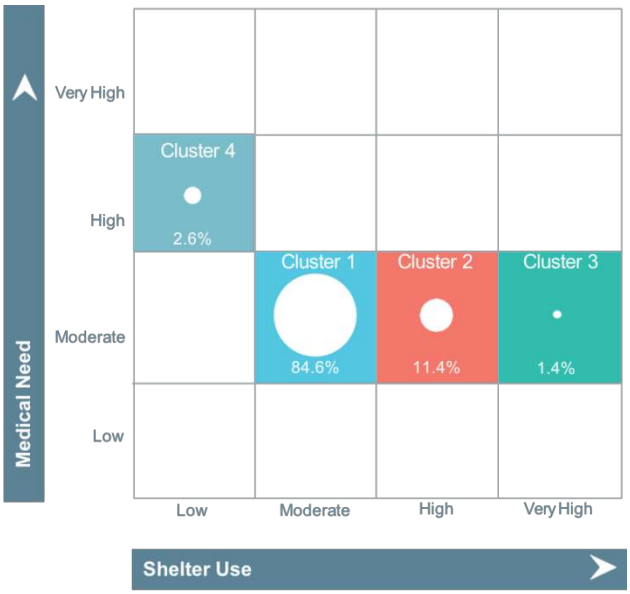


Figure IV-1: Summarizing a cluster analysis of the older homeless adults

	Shelter Days	Inpatient Days	ED Visits	Nursing Home Days	Shelter Cost	Health Services Cost	Total Services Cost
Cluster 1	44	3	1	9	$5,167	$13,369	$18,536
Cluster 2	196	4	2	6	$23,018	$15,870	$38,888
Cluster 3	329	3	1	3	$38,638	$10,281	$48,919
Cluster 4	9	51	10	32	$1,075	$175,437	$176,494

Table IV-1: Summary of shelter and health care use

The service use patterns for these groups correspond to three widely used housing interventions. Each has been used in practice with older homeless adults, although evidence on effectiveness varies. The largest group, Cluster 1, encompassed approximately 85% of the sample and used modest amounts of shelter and health care services. Compared to Clusters 2, 3, and 4, they are most likely to be able to live in community-based independent housing, with minimal supports. To the extent that any housing

interventions are required, they would follow a progressive engagement model that could include shallow rental subsidies, housing vouchers, or rapid rehousing, along with limited social services:[3]

- 33% would be expected to self-resolve their homelessness, a conservative estimate based on available research (Kuhn & Culhane, 1998; Kushel, 2018).

- 22% could receive rapid re-housing (RRH) services, helping them quickly exit homelessness and return to community housing. RRH generally includes case management and linking clients with community services; move-in costs and security deposits; and short -term rental assistance to facilitate stabilization. We estimate RRH costs at $3,872, the average cost per household served by the VA's Supportive Services for Veterans and Families (SSVF) program, the nation's largest RRH provider (US Department of Veterans Affairs, 2017).

- 22% would receive a shallow rental subsidy in addition to moderate case management supports. This would be ongoing rental assistance that stabilizes households and may allow for partners to live together in community-based housing, or for multiple homeless individuals to afford housing together. We estimate this cost at $500 per month ($6,000 over the year) for housing plus $1,500 year to cover case management.

- 22% would require a traditional housing voucher structure, along the lines of what is available through HUD's Housing Choice Voucher program. The cost for these vouchers is estimated by taking HUD's fair market rent for an efficiency apartment in FY 2018 and subtracting a client contribution estimated at 30% of Supplemental Security Income (SSI). In addition, we anticipate $1,500 in social services cost for this cluster.

The weighted average of intervention costs across Cluster 1 is $6,444 per person.

Cluster 2 and 3 (collectively 13% of the sample) had similarly moderate health service use but higher shelter costs. Therefore, we expect they could benefit from permanent supportive housing (PSH), which provides ongoing, subsidized housing with a range of case management and flexible services that can accommodate a range of disability and health needs (Corporation for Supportive Housing, 2011). A large evidence base suggests that it can improve housing stability and reduce reliance on shelter and many health care services and can, for certain groups, reduce net costs (Goldberg, Lang & Barrington 2016). For Clusters 2 and 3, costs are estimated as the cost of a voucher minus a client contribution equal to 30% of SSI, plus $11,500 per year in services.

Those in cluster 4, representing 3% of the cohort, had the lowest shelter use and highest medical use and costs. They may be best served by a PSH model that, as compared to a traditional PSH model, provides more extensive case management and skilled nursing care and that allows for nursing in place. In addition, some people in this group may require PSH that facilitates nursing home transitions and even palliative care. We expect the additional services to result in doubled service costs compared to those required for Clusters 2 and 3.

[3] We use the "progressive engagement" approach as defined in Culhane, Metraux, & Byrne's "A Prevention Centered Approach to Homeless Assistance: A Paradigm Shift?" (2010).

It is important to note that this is not an exhaustive list of approaches and housing models that could be suitable and even appropriate for older persons experiencing homelessness. Rather, they were selected as examples that were likely to correspond with the general level and intensity of housing and other needs of different segments of the older homeless adult population.

	Intervention	Annual Housing Cost	Annual Service Cost	Total Annual Cost
Cluster 1	Self-Resolve + Subsidy,	$4,795	$1,650	$6,444
Cluster 2	PSH	$15,468	$11,500	$26,968
Cluster 3	PSH	$15,468	$11,500	$26,968
Cluster 4	PSH + Additional Supports	$15,468	$23,000	$38,468

Table IV-2 – Cluster Groups, Corresponding Housing Models, and Related Costs

V. POTENTIAL SERVICE COST REDUCTIONS ASSOCIATED WITH HOUSING MODELS

Having developed a broad understanding of the service use of older homeless adults as well as possible interventions, we now estimate the financial impact that these interventions would have if implemented. To do so we mimicked a meta-analysis, a statistical tool for combining data from multiple studies. Specifically, we aggregated information from 15 published studies examining the impact of permanent supportive housing interventions on shelter and health care costs for persons experiencing homelessness. While we considered multiple intervention types in Section IV, we rely exclusively on studies of permanent supportive housing here because of the robust body of relevant literature in this area, while the available evidence of other interventions is prohibitively limited. The studies included were selected due to their methodological rigor.[4] See Appendix A for a complete list of all studies included in this meta-analysis.

To incorporate the uncertainty around service cost reduction estimates seen in these studies, we generated two scenarios: a more conservative projection in which findings from all 15 studies—including those identifying no change in health care costs in certain cost categories—were considered equally, and a less conservative projection in which we only included findings of significant cost reductions. This latter scenario represents cost reductions that might be expected should the implementation of the housing intervention approach described in the previous section have an effect more in line with what studies identifying relatively larger impacts have found. Descriptors of each scenario and the estimation of resulting cost reductions are below and in Table V-1.[5]

- **Scenario 1:** Scenario 1 is a more conservative estimate of the reductions in usage and concomitant decrease in costs associated with an applied intervention. It is created from a pooled average of the percentage change in health care costs associated with housing placement, from all 15 studies included in our analyses - including those identifying no change in health care costs in certain cost categories.

[4] The studies that we included in estimating these cost reductions varied in their methodological rigor, the locations in which they were conducted, the populations and specific interventions that they considered, and the type of health care costs that they examined. They also varied in terms of whether, and by how much, they showed reductions in health care costs. To better aggregate cost reductions across these multiple studies, each study was assigned a weight based on its methodological rigor. Studies using an experimental design were assigned a 3; those involving a quasi-experimental design with a comparison group were assigned a 2; and those involving a quasi-experimental design with a single group pre/post comparison were assigned a 1.

[5] One important note is that while PSH impacts on shelter, emergency department, and hospitalizations were common in the studies included in this analysis, only one study has examined the effect on nursing home costs. We therefore use a nursing home reduction of 90% in our less conservative scenario, consistent with the results of a prior descriptive analysis of cost reductions associated with placing older homeless adults residing in skilled nursing facilities into permanent supportive housing.

- **Scenario 2:** Scenario 2 is a less conservative estimate of health care cost reductions, calculated as a pooled average from only those studies that identified a significant reduction in health care costs.

Cost Category	Scenario 1 (more conservative)	Scenario 2 (less conservative)
Inpatient medical	-18%	-33%
Emergency Department	-6%	-45%
Nursing home	-42%	-90%
Shelter	-71%	-71%

Table V-1 - Summary of Health Care and Shelter Cost Reduction Scenarios

Figure V-1 summarizes results of our cost-reduction estimation. We estimate the pooled cost of the intervention – a weighted average of the four clusters - at $11,033 per person per year, including the housing component – usually rent – along with necessary supportive and stabilizing services. Based on cost reduction estimates outlined in Table V-1, we estimate service cost reductions – across shelters, nursing homes, emergency departments, and hospitalizations, of between $9,171 and $13,215 per person per year. On a net per person basis, we therefore expect that this scaled set of interventions could cost as much as $1,800 per person or save up to $2,200 per person. This means that the cost of the housing and services falls within the range of potential cost offsets estimated here and could either mostly or completely be recouped by corresponding reductions in shelter and health care systems included here.

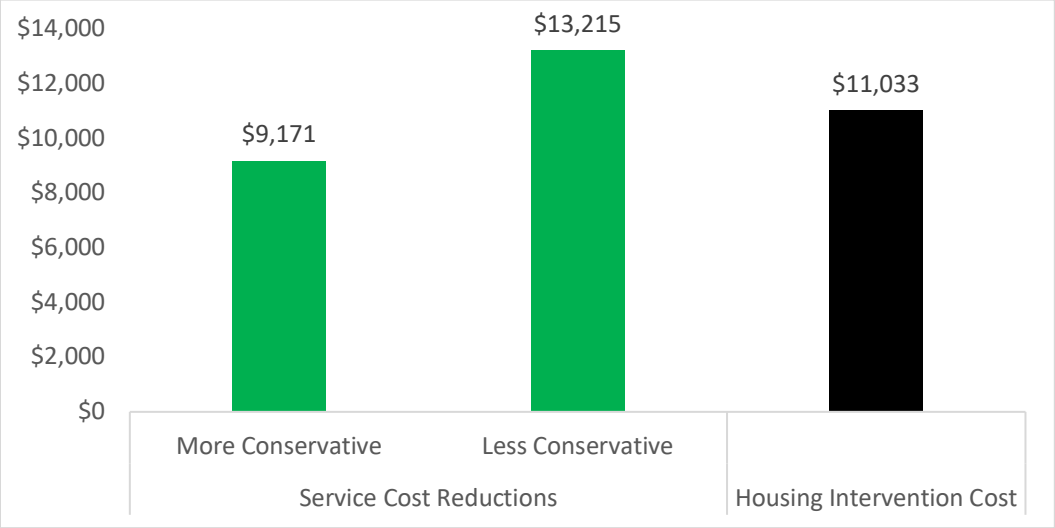


Figure V-1 –Average Service Cost Reductions per Person per Year, Compared to the Average Housing and Services Costs of a Scaled intervention

VI. DISCUSSION

The purpose of this study was to engage in an empirically informed thought experiment and foster dialogue about an impending public health crisis. A coming wave of aged homelessness among the latter half of baby boomers is certain, and with it will come an equally certain increase in their aging-related health care costs. The *excess* costs associated with their homelessness—not to mention the avoidable illnesses, exacerbated morbidity, premature disability, and accelerated mortality—should compel us to reflect and act.

By simulating potential service cost reduction scenarios and comparing those to potential intervention costs, this study is calling for urgent reflection on how society could advance funding for housing solutions that would avoid excess shelter, health, and nursing home costs. The complex streams of funding that are currently accessed to address homelessness and health care among this aged cohort make this no easy task. However, that large sums of public funding will go toward this crisis whether we act or not should compel us to find the best and most responsible use of those funds. We can spend those dollars on potentially unnecessary hospital and nursing home days, or we can improve the quality of life of these vulnerable citizens, reduce the daily demands on hospitals and emergency departments to care for them, and relieve shelters of the burden for large-scale, aging-related care for which they are ill-suited.

Limitations

This study was based on historical shelter and health care records, and the forecasts for future population growth and costs involve some uncertainty. Intermediate estimates were used in choosing population projections, and conservative choices were made whenever possible to estimate health care costs. Limitations on the MDS (nursing home) data required some estimation of the number of days consumed, and this was arranged to be conservative. We used average per diem and per service estimates for healthcare services which, while less exact than billing data, provided reasonable estimates for analyses. Assumptions involving housing costs and extent of offsets were also limited to available data and research and were estimated conservatively.

Although the best available statistical methods were applied, actual population counts and costs in the future will be somewhat different than predicted, even if the projections are strongly anticipated to be in the direction and magnitude reported here. Also, the projections applied here assume no change in patterns of homelessness exits or health care use, and those may change due to unanticipated policy changes.

The analyses reported here are also limited in being cross-sectional. The study results are not based on following cohorts of individuals over time to estimate their trajectories of services use, or subgroups of persons and their trajectories. A study based on trajectories would yield more specific results than reported here; such an approach was beyond the scope of this project and should be considered for future research. Similarly, a cross-sectional analysis is going to produce a cruder result than an analysis more sensitive to the timing of homelessness exits and mortality within groups and across time, which should be considered for future research. Policy and program planning based on this study will require further analysis of the impact of varying eligibility and enrollment criteria, the trajectories of people across and between interventions, and the rates at which people will exit or accrue within programs.

Such analyses were beyond the scope of this study, but would be needed to further inform more discrete intervention planning decisions.

This study is also limited in that it did not include data on people who are exclusively unsheltered. While this group incurs public costs from sanitation, policing, emergency medical services, and other areas, data on these costs were not available for this study and are typically not possible to track and allocate at an individual level. Such costs are therefore undercounted here.

The sum of this study is not an exact forecast of costs and potential offsets over the next decade, but a demonstration that for this growing group of older homeless adults, the cost of providing housing and related services falls roughly into the range of shelter and healthcare expenditures to that are part of being homeless. Dollars and cents should not be the primary motivation for providing housing and services for such a vulnerable population but, when combined with moral and ethical justifications, may provide the stimulus necessary for action.

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