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Dementia-focused programs in older adult centers and health care use among individuals with dementia

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Abstract

There is growing attention to community-based services for preventing adverse health care outcomes among people aging with dementia. We explored whether the availability of dementia-centered programming within older adult centers (ie, senior centers)—specifically, adult day services (ADS), social adult day centers (SADCs), memory cafes, and caregiver support—is associated with reduced hospitalization, emergency room use, and total Medicare costs for community-dwelling individuals ages 75 and older with Alzheimer's disease and related dementias (ADRD), and whether associations differ by the relative size of the local jurisdiction. We used a novel dataset that links Medicare claims data with data from an organizational census of municipally based Massachusetts older adult centers. Living in a community with an older adult center that facilitates access to ADS and/or SADCs was associated with reduced hospital utilization and costs among residents in smaller jurisdictions. We found no evidence for associations concerning memory cafes or support groups. These findings underscore the potential of older adult centers in curbing health care costs and acute care usage among individuals with ADRD, particularly in smaller communities with centers that provide access to ADS.

Key words: long-term services and supports; community-based services; affordability; accessibility; Medicare; senior centers; adult day care; respite; memory cafes; caregiver support; mild cognitive impairment; municipal services; aging services; aging in place; utilization.

Introduction

An estimated 6.7 million individuals in the United States are living with Alzheimer's disease and related dementias (ADRD).[1] The majority are 75 years and older[1] and do not reside in nursing homes.[2] Many older persons with ADRD have chronic conditions, functional limitations, and behavioral and psychological symptoms.[3,4] Persons living with ADRD often receive fragmented care, leading to high rates of hospitalization and emergency department visits.[5] Studies examining health care expenditures have shown varied, but consistently higher, estimates relative to persons without ADRD[6,7] (excluding costs of home- or community-based supports, as Medicare does not provide coverage for these services).

Practitioners, researchers, and policymakers alike have recognized the benefits of community-based services to improve the quality of life for people living with ADRD and their care partners. These programs and services are often offered in senior centers—hereafter referred to as "older adult centers," which is aligned with more age-inclusive, bias-free language,[8] that serve as "designated places that play an important role in the aging services network to make a broad spectrum of activities and services available to older persons on a frequent and regular basis…."[9] Research has found that adults ages 75 and older are most likely to attend older adult centers.[10,11] As part of a broader, dementia-friendly communities movement,[12] older adult centers are increasingly offering dementia-centered programming and enhancing their capacity to include individuals aging with ADRD.[13]

Dementia-centered programming can include a diverse array of supportive services. In the current study, we explore 4 dementia-centered programs that older adult centers potentially offer or engage with, including the following: (1) adult day health services (ADS), (2) social adult day centers (SADCs), (3) memory cafes, and (4) caregiver support groups.

Adult day health services

Adult day health services "support the health, nutritional, social, and daily living needs of adults with functional limitations in a group setting during daytime hours."[14] Adult day health services programs offer specialized clinical care for participants, including nursing and skilled nursing services, health monitoring, medication administration, and occupational therapy. Adult day health services programs vary in

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their funding sources, including support from the state, insurance providers, and private funding sources.[15] Quasi-experimental and longitudinal research has suggested that the use of ADS is associated with lower levels of depressive symptoms[16] and stress[17] among individuals living with dementia. In addition, several studies have found that ADS programs reduce care partners' role overload and depression.[18-20] To explore the effect of ADS use on health care utilization specifically, a few studies have used methods such as propensity score matching, case control, and survival analysis, and have investigated outcomes such as emergency room (ER) use, hospital admissions, and length of stay. These studies found significant associations between ADS use and lower rates of ER registrations and days in the hospital,[21] as well as reductions in hospital and nursing home admissions,[22,23] while others have yielded null results.[24] However, none of these studies explored the impact of older adult centers' programming related to ADS (or SADCs, as described below) on health care utilization among people with dementia at the population level.

Social adult day centers

A related program model is SADCs, which provide social and recreational activities in a supervised setting for people with mild or acute conditions. Unlike ADS, SADCs are not licensed to provide clinical services.[25] The social model of care "promote(s) social interaction and therapeutic recreation with less emphasis on rehabilitation and health maintenance… social programs may be more likely to offer entertainment and therapeutic recreation activities."[25] Much like ADS, SADCs vary in their funding sources, including funding from the state, philanthropic funding, and other private sources. Research has demonstrated that, despite differences in programmatic characteristics, attending either ADS or SADCs results in similar outcomes for care partners, including improved mental health.[25] In terms of key differences, ADS clients are more likely to be women and belong to ethno-racially minoritized backgrounds compared with SADCs, which may be because some ADS programs are covered by Medicaid.[25] Older adult centers theoretically can increase access to and affordability of both ADS and SADCs by offering these programs in-house, subsidized by grant funding and contracts, and/or providing access to these programs (eg, by offering transportation services, making timely referrals, conducting education and outreach).

Memory cafes

Another type of dementia-focused program is memory cafes (also referred to as "dementia cafes"), which are "psychosocial interventions that aim to provide socialization and interpersonal support for those living with dementia and their care partners."[26] Memory cafes vary in their structure and location, as they are often held at different places—such as older adult centers, restaurants, libraries, and museums—and involve a variety of activities for care partners and persons with dementia to engage in together—such as art projects, games, experiences in nature, and education about community resources.[27] There is preliminary evidence from largely qualitative research studies conducted outside of the United States that engagement with memory cafes can reduce stress, improve social connection, and enhance quality of life and a sense of belonging among care partners of people with dementia.[26,28-30]

Support groups

Finally, many older adult centers offer support groups for people living with dementia and their care partners. Support groups that target care partners "provide family caregivers with knowledge, self-care strategies, and support from their peers….are led by trained professionals….and provide opportunities for caregivers to learn new skills, connect with other caregivers, and get information about community resources."[31] Support groups specifically designed for people living with dementia "provide an opportunity to share experiences and talk with others about dealing with challenges and continuing to live a meaningful life."[32] Most studies investigating support groups focus on the impact of support groups on care partners of people living with dementia. For example, research has demonstrated that support groups improve quality of life[33] and lower depression levels among care partners.[34,35]

Focus of the current study

We investigated associations between the provision of dementia-focused programming of older adult centers (ADS, SADCs, memory cafes, and support groups) and health care usage among all individuals with ADRD living in the communities served by these older adult centers. We posited that living in a jurisdiction with an older adult center that engages in each of these 4 service types will be associated with lower population-level estimates of health care utilization and costs, with the idea that these programs offered through older adult centers enhance access to and affordability of local dementia-focused support. More specifically, we hypothesized that dementia-focused programs in older adult centers are associated with reduced utilization of hospital services and decreased Medicare costs at the population-health level among community-dwelling persons with ADRD.

Moreover, we examined whether associations between dementia-focused programs in older adult centers and health care outcomes vary by the size of the local jurisdiction. In Massachusetts, which is the setting for our study, all but 1 of the 351 municipal administrations have a Council on Aging (COA), which are municipal agencies established "for the purpose of coordinating or carrying out programs designed to meet the problems of the aging…."[36] In most cases, COAs operate as older adult centers and provide some degree of community-based programming. Most COAs in Massachusetts report offering food/nutrition services, referral and benefits counselling, educational workshops, and recreational programs.[37]

Evaluation research on community-level initiatives posits that the population health impact of an initiative is inversely associated with the size of the intervention's jurisdiction.[38] More specifically, interventions implemented in smaller jurisdictions are likely to have higher rates of reach (ie, the number of people affected by a strategy divided by target population size).[39] In contrast, interventions implemented in larger jurisdictions are likely to have weaker or more nuanced effects because of the many other factors driving variations in outcomes among populations of greater size and potentially more heterogeneity.[40] Therefore, we hypothesized that associations between dementia-focused programming in older adult centers and health care outcomes within relatively smaller jurisdictions will be stronger in contrast to associations within relatively larger jurisdictions.

Data and methods

Data

We constructed a novel multilevel dataset, utilizing data from the US Centers for Medicare and Medicaid Services (CMS), originally collected for health services operations, as well as data from a statewide census of municipally based older adult centers in Massachusetts conducted in 2016–2017, which were initially procured for advocacy and planning purposes. The dataset consists of persons nested within municipalities. Person-level data were limited to Medicare beneficiaries diagnosed with mild cognitive impairment (MCI) or ADRD between 2016 and 2018. The primary independent variables were at the municipality level and derived from the statewide census with questions about the older adult center's capacity, including its programmatic activities. Information about this data source is described elsewhere.[37]

Outcome variables regarding health care utilization (in 2019) were derived from Medicare records (claims) from the CMS. Specifically, we examined (1) number of hospital stays, (2) total number of days in the hospital, (3) number of ER visits, and (4) total Medicare Parts A and B payments. Refer to Technical Appendix Table S1 for more information on each of the outcome variables (to access the Appendix, click on the Details tab of the article online).

With regard to the construction of the multilevel dataset, in Massachusetts older adult centers operate within the boundaries of a municipality (ie, county subdivisions in Massachusetts),[41] yet the boundaries of 5-digit zip codes cross over municipalities. Therefore, we used 9-digit zip codes of Medicare beneficiaries available from CMS enrollment files, utilizing data from the Neighborhood Atlas[42] to create a crosswalk file between the 9-digit zip codes and the 11-digit census tract codes. We then used this crosswalk file to construct the multilevel dataset by merging the older adult center dataset with the CMS beneficiary dataset (see Technical Appendix Figure S1 for more details). The initial number of people in the dataset was 171 150 Medicare beneficiaries who had a diagnosis of ADRD or MCI between 2016 and 2018. Dual-eligible beneficiaries were beyond the scope of the current study as their access to long-term services and supports are financed by Medicaid, unlike those covered by Medicare alone. We also excluded those who were younger than 75 years old (given that most people who engage with older adult centers are ages 75 and older[10,11]), those who were enrolled in Medicare Advantage, those who did not have 12 months coverage of Medicare Part A and B in 2018, those who were nursing home residents, and those who moved to Massachusetts or moved between municipalities in the study years. We further excluded those with missing information on all covariates and residents of Boston due to missing information on the primary explanatory variables. The final sample included 48 474 adults ages 75 years and older who were community-dwelling in 2018 from 349 county subdivisions (of the 351 populated county subdivisions in Massachusetts) and for whom we had information on their health care utilization in 2019. The final sample constitutes 28% of the Medicare beneficiaries in our initial dataset. Refer to Technical Appendix Figure S2 for further details on the component datasets, inclusion/exclusion criteria, and merging of datasets.

To test our hypothesis about the heterogenous effects of these services based on jurisdiction size, we defined relatively small and large jurisdictions based on the population size of the county subdivisions. To distinguish jurisdictions of relatively small vs large size, we created a binary variable that categorized subdivisions with a population of 17 350 or less as relatively smaller jurisdictions. The cutoff (ie, 17 350 residents) is the average population of the 349 subdivisions represented in our sample.

Explanatory variables

The statewide census asked respondents, "Does your COA [Council on Aging/older adult center]…(a) operate a social supportive adult day care (yes/no), (b) provide access to social supportive adult day care in the local area or neighboring communities (yes/no), (c) operate adult day health services (yes/no), (d) provide access to adult day health services in the local area or neighboring communities (yes/no), and (e) operate a memory care (yes/no)?" The census also asked whether their COA offers any support groups, and then to "check all" from a list of support groups, including "caregiver support" and "Alzheimer's/other dementias." We used responses across these items to create 2 sets of explanatory variables (1 for ADS and the other for SADCs): (a) no service, (b) provides access to the service, and (c) operates the service (exactly 3 centers reported providing both access and operating an ADS, which were coded under operating ADS). We further created a categorical variable for support groups: (a) no service, (b) caregiver support group only, and (c) dementia support group (either alone or along with caregiver support group). Finally, we created a binary measure for whether or not they operated a memory cafe. Table 1 provides descriptives for these and all other analytic variables for all participants in the dataset, and electronic Table S1 (Table eS1) provides further details on the conceptual definitions for each service category, as well as the number/percentage of jurisdictions offering them.

Other covariates in the model included individual- and census-tract–level characteristics. Measures of individual-level characteristics included age (continuous), sex (binary), racialized identity (multi-categorical), and chronic conditions (dichotomized for each of 6 conditions; Table 1). Information on chronic conditions was derived from the CMS 30 CCW Chronic Conditions File D. We also included measures of characteristics of each individual's census tract: percentage of the population with limited English proficiency, percentage of the population below 150% of the poverty line, and percentage of the population with no high school diploma.[43]

Analytic strategy

Because of strong correlations across the measures of services provided at the center level (ie, the primary explanatory variables), we estimated 4 separate models to describe the association between each explanatory variable (ie, ADS, SADCs, memory cafes, and support groups) and the utilization outcomes. We estimated multilevel mixed-effects generalized linear models using Stata version 18 "*meglm*" commands to account for the hierarchical structure of the dataset and the resulting nonindependence in the data. Because of the nature of the distribution of the outcome variables, we specified a negative binomial family and log link in the models. Models included random intercepts for municipalities, accounting for unmeasured variation among centers and municipalities that may influence the outcomes. The fixed portion of the model included the primary independent variable, as well as the covariates. We present exponentiated coefficients (incident rate ratios) that allow for clearer interpretation of results. To test our second hypothesis, in subsequent models, we included an interaction term between each of the

Table 1. Number/percentage of participants corresponding to each analytic variable across the total sample, as well as among residents of smaller vs larger jurisdictions.

	Overall		Smaller jurisdiction areas		Larger jurisdiction areas		Difference
	Frequency	% or SD	Frequency	% or SD	Frequency	% or SD	
Older adult centers' dementia-centered programs							
Adult day health services							
No service	21 505	44.36%	6279	43.52%	15 226	44.72%	***
Access to service	22 192	45.78%	6105	42.31%	16 087	47.25%	
Operate service	1948	4.02%	526	3.65%	1422	4.18%	
Social adult day care							
No service	21 643	44.65%	5523	38.28%	16 120	47.35%	***
Access to service	17 676	36.46%	5300	36.73%	12 376	36.35%	
Operate service	6545	13.50%	2168	15.03%	4377	12.86%	
Memory cafe	9023	18.61%	1143	7.92%	7880	23.15%	***
Support group services							
No support group	21 023	43.37%	7804	54.09%	13 219	38.83%	***
Caregiver support group only	12 648	26.09%	2515	17.43%	10 133	29.76%	
Dementia support group[a]	13 319	27.48%	3443	23.86%	9876	29.01%	
Outcome variables in 2019 (mean and SD)							
No. of hospital stays	0.74	1.18	0.70	1.15	0.76	1.19	***
No. of days in hospital	3.79	7.98	3.51	7.51	3.91	8.17	***
Total ER visits (IP + OP)	1.48	1.97	1.46	1.97	1.49	1.97	ns
Total Medicare payment in USD[b]	28 455	38 099	27 873	37 789	28 702	38 228	*
Other covariates							
Female	28 979	59.78%	8440	58.49%	20 539	60.33%	**
Racialized identities							
African American	747	1.54%	98	0.68%	649	1.91%	***
Hispanic	65	0.13%	12	0.08%	53	0.16%	*
Other race	725	1.50%	147	1.02%	578	1.70%	***
White	46 937	96.83%	14 172	98.22%	32 767	96.24%	***
Age (mean and SD), y	84.79	6.23	84.80	6.17	85.05	6.25	**
Chronic conditions							
Kidney disease	22 244	45.89%	6252	43.33%	15 992	46.97%	***
Lung disease	8414	17.36%	2450	16.98%	5964	17.52%	ns
Heart disease	21 728	44.82%	6378	44.20%	15 350	45.09%	ns
Heart failure	16 130	33.28%	4733	32.80%	11 397	27.38%	ns
Diabetes	13 142	27.11%	3821	26.48%	9321	27.54%	*
Stroke	5122	10.57%	1537	10.65%	3585	10.53%	ns
Hypertension	37 220	76.78%	10 848	75.18%	26 372	77.46%	***
Depression	16 961	34.99%	4867	33.73%	12 094	35.52%	**
Community characteristics at the census-tract level (mean and SD), %							
Population with limited English proficiency	2.59	3.94	0.93	1.12	3.29	4.46	***
Population below 150% poverty line	11.65	8.71	9.51	5.45	12.56	9.62	***
Population with no high school diploma	6.44	5.88	4.68	3.28	7.19	6.54	***
Total *n*	48 474		14 429	29.77%	34 045	70.23%	

Source: Authors' analysis of the multilevel dataset with information on older adult centers and administrative data from CMS. Some percentages do not add up to 100 due to missing values. Difference represents statistical significance associated with the difference between the two means/proportions between sample population in small jurisdiction areas and large jurisdiction areas. To assess this differences, we used *chi-square* tests for categorical variables and *t* test for continuous variables (Medicare payment, age). $^{*}P < .05$, $^{**}P < .01$, $^{***}P < .001$, ns, not significant.
Abbreviations: CMS, Centers for Medicare and Medicaid Services; ER, emergency room; IP, inpatient; OP, outpatient; USD, US dollars.
[a]Dementia support group: either dementia support alone or along with caregiver support group.
[b]Medicare payments without Part D payments.

primary explanatory variables and relative jurisdiction size. The estimated values of interaction terms do not represent the differential effects of the exposure on outcome. Consequently, post-estimation, we calculated the predicted outcomes for smaller jurisdictions, with and without the measures of services in question for ease of interpretation.

Sensitivity analyses

We conducted multiple sensitivity tests to probe the robustness of our findings. First, considering that older adult centers with missing information on the primary explanatory variables are mostly unlikely to offer the focal service, we assigned a "0" value for these variables (ie, specific types of services). Specifically, we assigned "0" values for 52 (15%) older adult centers in the sample with missing information on ADS, 50 (14%) older adult centers with missing information on SADCs, 46 (13%) older adult centers with missing information on memory cafes, and 32 (9%) older adult centers with missing information on support groups. Second, we estimated subgroup results for residents of small and large jurisdictions separately (instead of specifying an interaction term) to isolate the heterogeneous effect of small-jurisdiction residence.

Study limitations

The population was limited to older adults receiving health insurance through traditional Medicare and not through

Medicare Advantage or through Medicaid and Medicare (ie, dual). We further excluded the residents of the city of Boston due to missing information on independent variables, exacerbating the racial homogeneity of the sample. Moreover, we do not have data on other individual- and family-level characteristics, such as functional limitations and care partner well-being, which might influence both the utilization of older adult center services and health care utilization.[44,45] In addition, we investigated how population-level health care utilization measures are associated with living in municipalities characterized by older adult centers' engagement in ADS, SADCs, memory cafes, and support groups. Our study design and data source do not allow for testing whether individuals' participation in these programs is associated with health care utilization, which limits our study's ability to address the effectiveness of these services for individual outcomes.[38] The census of older adult centers describes the availability, but not the volume, of the services within a given older adult center or other details regarding implementation to assess uniformity of services across older adult centers. Finally, we were not able to incorporate measures of dementia-focused programming offered outside of older adult centers (eg, stand-alone ADS services, memory cafes operating from a local library), which would provide important contextual information to further probe the population health impact of community-based service for people with dementia.

Results

Table 1 displays the descriptive statistics for the overall sample and separately for residents of relatively smaller (30%; $n = 14\,429$) and larger (70%; $n = 34\,045$) jurisdiction areas. In our sample, 46% ($n = 22\,192$) of participants were living in communities where older adult centers provided access to ADS and 36% ($n = 17\,676$) of participants were living in communities with older adult centers providing access to SADCs. Living in a community with an older adult center operating an SADC (14%; $n = 6545$) or ADS (4%; $n = 1948$) was the least common. With respect to outcome variables in 2019, the average number of hospital stays was 0.74 and the average total length of stay was 3.79 days. On average, there were 1.48 ER visits, and the average Medicare payment, excluding Part D payments, was $28 455 per person. All measures of outcome variables (except the ER visits) were higher among residents of larger jurisdiction areas than among smaller jurisdiction areas. With respect to the covariates, 60% ($n = 28\,979$) of the sample was female, and an overwhelming majority of the study population was non-Hispanic White (97%; $n = 46\,937$). The mean age was 85 years. Residents of the smaller jurisdiction areas were more likely to be male and White compared with residents of larger jurisdiction areas. Residents in larger jurisdictions also had higher levels of socioeconomic vulnerability at the census-tract levels of their residence compared with their counterparts in smaller jurisdictions.

Dementia-focused programming in older adult centers and health care utilization in the overall sample

Partially aligned with our first hypothesis, we found a significant reduction in the number of hospital stays in 2019 associated with living in a municipality whose older adult center reported providing access to ADS (Table 2; Adult day health services). The ratio of the expected number of hospital stays of older adults in municipalities with older adult centers offering access to ADS when compared with those without was 0.96. We found the same pattern with respect to older adult

Table 2. Results of multilevel models with health care utilization and Medicare payment in 2019 as outcomes (exponentiated coefficients or incident rate ratios).

	Hospital stays	Acute days	Total ER visits	Medicare payment[a]
Adult day health services				
Access to adult day health services	0.96*	0.96	0.98	0.99
	[0.93, 1.00]	[0.91, 1.02]	[0.95, 1.02]	[0.96, 1.01]
Operate adult day health services	1.00	1.01	0.99	1.04
	[0.91, 1.10]	[0.88, 1.16]	[0.90, 1.08]	[0.96, 1.12]
Number	45 645	45 645	45 645	45 645
Social adult day care				
Access to social adult day care	0.95*	0.96	0.97	0.99
	[0.92, 0.99]	[0.91, 1.02]	[0.93, 1.00]	[0.96, 1.02]
Operate social adult day care	0.97	1.01	0.98	1.02
	[0.92, 1.02]	[0.93, 1.09]	[0.93, 1.04]	[0.98, 1.07]
Number	45 864	45 864	45 864	45 864
Memory cafe				
Offers a memory cafe	1.00	0.99	0.98	1.02
	[0.96, 1.05]	[0.92, 1.06]	[0.93, 1.02]	[0.98, 1.06]
Number	46 270	46 270	46 270	46 270
Support group				
Caregiving support group only	1.03	1.01	1.02	1.02
	[0.98, 1.07]	[0.94, 1.07]	[0.98, 1.07]	[0.98, 1.05]
Dementia support group[b]	0.98	0.99	0.98	1.00
	[0.94, 1.02]	[0.93, 1.06]	[0.94, 1.03]	[0.97, 1.04]
Number	46 990	46 990	46 990	46 990

Source: Authors' analysis of the multilevel dataset with information on older adult centers and administrative data from CMS. Exponentiated coefficients; 95% CIs in brackets. Mixed-effects GLM models control for age, gender, race, chronic conditions, % of population with limited English proficiency, % of population below 150% poverty line, and % of population with no high school diploma. *$P < .05$.
Abbreviations: CMS, Centers for Medicare and Medicaid Services; ER, emergency room; GLM, generalized linear model.
[a]Total Medicare payments without Part D payments.
[b]Dementia support group: either dementia support alone or along with caregiver support group.

centers that provided access to SADCs (Table 2; Social adult day care). We did not observe this pattern with respect to the other outcome variables (ie, number of acute days, ER visits, and total Medicare payments in 2019). Furthermore, we did not observe associations between exposure to memory cafes or support groups and any of the outcomes.

Dementia-focused programming in older adult centers and health care utilization among older adults residing in small jurisdictions

As hypothesized, we observed stronger associations between dementia-focused programming in older adult centers and health care utilization in 2019 among residents in relatively smaller jurisdictions compared with residents in larger jurisdictions (see Table 3). We found a significant reduction in number of stays, length of stay, and total Medicare payment among residents in smaller jurisdictions with older adult centers offering access to ADS (Table 3; Adult day health services, row d). Access to SADCs by older adult centers in smaller jurisdictions also was associated with a significant reduction in length of stay in hospitals and total Medicare payments (Table 3; Social adult day care, row d). We did not observe any associations involving memory cafes or support groups and health care utilization among older adults with ADRD in smaller vs larger jurisdictions (Table 3; Memory cafe,

Table 3. Results of multilevel models with interaction between main predictor variables and jurisdiction size with health care utilization and Medicare payment in 2019 as outcomes (exponentiated coefficients or incident rate ratio).

	Hospital stays	Acute days	Total ER visits	Medicare payment[a]
Adult day health services				
a. Access to adult day health services	0.99 [0.95, 1.04]	1.02 [0.95, 1.09]	0.99 [0.94, 1.04]	1.02 [0.99, 1.06]
b. Operate adult day health services	0.96 [0.86, 1.08]	0.93 [0.78, 1.10]	0.96 [0.85, 1.09]	1.02 [0.93, 1.12]
c. Small-juris residence	1.00 [0.95, 1.05]	1.00 [0.93, 1.08]	1.03 [0.98, 1.08]	1.05* [1.00, 1.09]
d. Access # Small-juris residence	0.93* [0.86, 0.99]	0.87* [0.78, 0.97]	0.99 [0.92, 1.06]	0.91** [0.86, 0.96]
e. Operate # Small-juris residence	1.11 [0.92, 1.33]	1.23 [0.93, 1.62]	1.06 [0.88, 1.28]	1.05 [0.90, 1.22]
Number	45 645	45 645	45 645	45 645
Social adult day care				
a. Access to social adult day care	0.97 [0.93, 1.02]	1.02 [0.95, 1.10]	0.98 [0.93, 1.03]	1.02 [0.98, 1.06]
b. Operate social adult day care	0.97 [0.91, 1.04]	1.00 [0.91, 1.11]	1.01 [0.94, 1.09]	1.01 [0.96, 1.07]
c. Small-juris residence	0.99 [0.94, 1.05]	1.01 [0.93, 1.10]	1.05 [1.00, 1.11]	1.03 [0.99, 1.07]
d. Access # Small-juris residence	0.96 [0.89, 1.04]	0.85** [0.76, 0.95]	0.98 [0.91, 1.05]	0.93* [0.88, 0.99]
e. Operate # Small-juris residence	0.99 [0.89, 1.10]	1.00 [0.85, 1.17]	0.94 [0.85, 1.05]	1.01 [0.93, 1.10]
Number	45 864	45 864	45 864	45 864
Memory cafe				
a. Memory cafe	1.00 [0.95, 1.05]	0.99 [0.91, 1.07]	0.97 [0.92, 1.03]	1.03 [0.99, 1.07]
b. Small-juris residence	0.97 [0.93, 1.01]	0.95 [0.89, 1.00]	1.02 [0.98, 1.06]	1.01 [0.98, 1.04]
c. Memory cafe # Small-juris residence	1.02 [0.91, 1.14]	1.02 [0.86, 1.21]	1.01 [0.91, 1.13]	0.97 [0.89, 1.06]
Number	46 270	46 270	46 270	46 270
Support group				
a. Caregiving support group only	1.03 [0.97, 1.08]	1.00 [0.92, 1.08]	1.00 [0.95, 1.06]	1.00 [0.96, 1.05]
b. Dementia support group[b]	0.99 [0.94, 1.05]	0.98 [0.91, 1.06]	1.00 [0.94, 1.05]	0.99 [0.95, 1.03]
c. Small-juris residence	0.98 [0.94, 1.03]	0.94 [0.87, 1.01]	1.03 [0.98, 1.08]	0.99 [0.95, 1.03]
d. Caregiving support group # Small-juris residence	1.02 [0.93, 1.11]	1.02 [0.89, 1.17]	1.04 [0.96, 1.14]	1.04 [0.96, 1.11]
e. Dementia support group # Small-juris residence	0.96 [0.88, 1.05]	1.02 [0.90, 1.16]	0.96 [0.88, 1.05]	1.03 [0.96, 1.10]
Number	46 990	46 990	46 990	46 990

Source: Authors' analysis of the multilevel dataset with information on older adult centers and administrative data from CMS. Exponentiated coefficients; 95% CIs in brackets. Mixed-effects GLM models control for age, gender, race, chronic conditions, % of population with limited English proficiency, % of population below 150% poverty line, and % of population with no high school diploma. Jurisdiction size based on population of the county subdivision. Those counties with population below average of 17 350 residents considered as smaller jurisdiction. *$P < .05$, **$P < .01$. # denotes the interaction term.
Abbreviations: CMS, Centers for Medicare and Medicaid Services; ER, emergency room; GLM, generalized linear model; Small-juris, small-jurisdiction.
[a]Total Medicare payments without Part D payments.
[b]Dementia support group: either dementia support alone or along with caregiver support group.

Support group), which is consistent with the findings from the main effects models (refer to Tables S2–S5 with results from the full model with all variables reported).

Figure 1 displays the post-estimation predicted outcomes for residents of smaller jurisdictions with or without older adult centers reporting access to ADS, as well as with or without SADCs. Access to ADS was associated with 0.06 fewer hospitalizations (ADS-Hospital stays). Access to ADS and access to SADCs were associated with 0.5 fewer days in hospitals for smaller jurisdiction areas (ADS-No. of days in the hospital; SADC-No. of days in the hospital). Moreover, we found that, on average, there was a reduction of $2106 per person in small jurisdictions with older adult centers providing access to ADS compared with smaller jurisdictions not engaging with ADS. Similarly, living in a smaller jurisdiction with an older adult center that provides access to SADCs was associated with a reduction in annual Medicare payments by $1463 per person compared with smaller jurisdictions not engaging with SADCs.

Sensitivity analyses

Results from sensitivity analyses are presented in Tables S6–S8. Results were consistent with our main interaction model on assigning a "no service" value for those with missing information on the primary explanatory variables (Table S6). Stratified models with subgroups of residents from relatively smaller jurisdictions vs larger jurisdictions also yielded results consistent with the interaction models (Tables S7 and S8).

Discussion

Our study is the first to provide evidence that residing in a municipality with an older adult center engaging in dementia-focused programming is associated with lower health care utilization and cost among people living with ADRD. Specifically, we found that, among older adults ages 75 years and older with ADRD residing in relatively smaller jurisdictions, having a local older adult center that provides access to either ADS or SADCs is associated with decreased hospital utilization and reduced overall health care expenses at the population level. As hypothesized, it is important to note that we found associations specifically with respect to residents in smaller jurisdictions. It is possible that, within smaller jurisdictions, the centers' "footprint" within the network of community-based support organizations is relatively large; thus, we detect the effect. In some instances, dementia-focused programming provided in partnership with local older adult centers may be the only accessible service within the jurisdiction for individuals living with ADRD and their care partners.[9] Another possible interpretation could be that, in relatively smaller communities, services that align with local norms and values may be endorsed by trusted providers in older adult centers—which may lead to better health outcomes.[46]

Two potential mechanisms might underlie the association between improved access to dementia-focused programming—specifically ADS and SADCs—and reduced health care utilization. First, facilitation of ADS and SADCs through older adult centers might have a direct impact on the person living with ADRD through better management of ambulatory-sensitive conditions or prevention of acute events. In addition, older adult centers that enhance access to adult day services may indirectly impact health care utilization by increasing the capacity of family care partners, who are largely responsible for

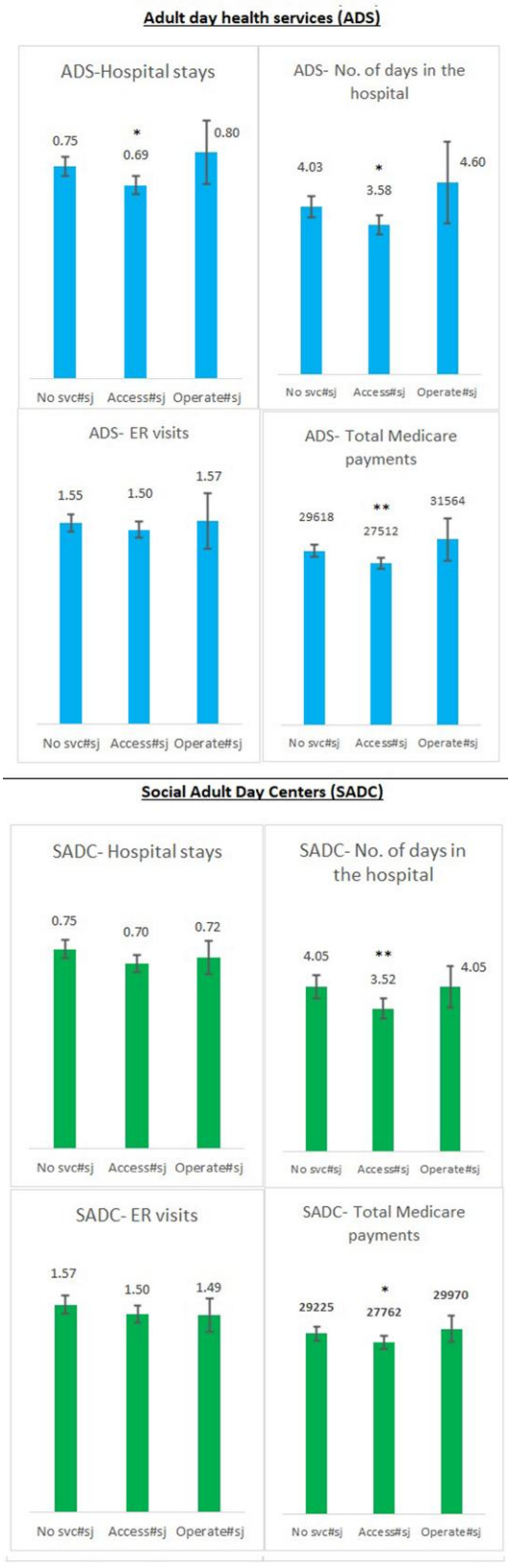

Figure 1. Predicted outcomes in 2019 for residents in smaller jurisdiction (sj) areas. Source: Authors' analysis of the multilevel dataset with information on older adult centers and administrative data from CMS. Mixed-effects GLMs control for age, gender, race, chronic conditions, % popln with limited English proficiency, % popln below 150% poverty line, % popln with no high school diploma. Abbreviations: CMS, Centers for Medicare and Medicaid Services; ER, emergency room; GLM, generalized linear model; popln, population; svc, service. $^{*}P < .05$, $^{**}P < .01$.

managing the complex health care needs of the individual living with ADRD.[47,48] This increased capacity, in turn, may lead to enhanced coordination of health care services, improved medication management, and a decrease in low-value care of the person with dementia—all of which can lead to less hospitalizations. Likewise, Gitlin and colleagues[49] explored the impacts of Adult Day Services Plus—"a low-cost care management intervention designed to enhance caregiver well-being…and decrease nursing home placement of impaired older adults enrolled in adult day care centers"—and found that caregivers reported less depression and more confidence managing behaviors, while the older adults they cared for had fewer nursing home placements. Much like that study, our findings support that lower-cost interventions offered by older adult centers have implications for potentially improving health outcomes and utilization among older adults living with dementia.[49]

In addition, we found that older adult centers that operate ADS were associated with increased health care utilization and costs, and while these results were not significant, this finding was opposite of what we would expect. Although we are cautious about interpreting nonsignificant findings, future work should use qualitative methods to explore the ways in which older adult center staff are operating ADS and how other associated factors (eg, funding sources, client eligibility, staffing, etc) might have implications for health care utilization in the community.

Furthermore, we did not find any evidence for associations between memory cafes or support groups and health care utilization. While individuals living with dementia participate in memory cafes and are a focus of support groups, these programs primarily target caregivers by providing respite and emotional support. Studies using qualitative designs have found that cafes can address care partners' feelings of isolation and stress.[26] It is also plausible that the effects of potential care partner gains on individuals' health care utilization were not large enough to detect with the current research design.[38] Null findings related to cafes also could be related to a "dosage" issue, as cafes and caregiver support programs are for a shorter span of time and meet more infrequently compared with ADS and SADCs. Adult day services and SADCs further operate more as caregiver respite programs—consistently and continuously providing relief to care partners—unlike the design of memory cafes and caregiver support groups.

Although our study does not include measures of service provision through older adult centers beyond the self-reported indicators, it is possible that Massachusetts' older adult centers offering ADS and SADCs are mirroring services provided through the Program for All-Inclusive Care for the Elderly (PACE) model. PACE is "a community-based care model that delivers collaborative care via an interdisciplinary team to meet the medical and social needs of older adults eligible for nursing home placement" (p 2956).[50] However, there are some notable differences between PACE programs and the ADS and SADC services offered in older adult centers explored in the current study. First, while most PACE programs are not-for-profit and serve dually eligible beneficiaries,[51] there are also some for-profit PACE programs that serve beneficiaries of managed care plans.[52] In contrast, the older adult centers in the current study are municipally funded entities whose ADS and SADCs are primarily funded by grants, donations, and privately paying individuals (see, for example, the supportive adult day program governed by the Dighton Council on Aging in Massachusetts).[53] Second, PACE participants are eligible if they are 55 years or older, meet the need for nursing home placement, and able to live safely in the community,[54] while the older adult centers in the current study serve all older adults over 60, regardless of their functional status or living situation. Yet, despite differences in their funding structure and target population, these models demonstrate positive impacts on health care utilization among older adults. For example, studies have found that PACE programs reduce unnecessary hospitalizations and rehospitalizations[51,55] and result in shorter hospital stays.[56,57]

It is important to note that our findings are based on data on older adult centers and residents of Massachusetts. Massachusetts' unique policy context, whereby nearly all jurisdictions operate a local COA, enhances our research design: the presence of a municipally based older adult center is applicable to all jurisdictions, and therefore, we can assess variation specifically in their extent of offering dementia-focused programs and correspondent jurisdictional effects. At the same time, unique characteristics of Massachusetts—including the predominant racial homogeneity of its population aged 75 years and older, alongside the overrepresentation of relatively small,[58] yet relatively dense, municipal jurisdictions—present limitations to the generalizability of our findings. While reflective of Massachusetts' older adult population, the lack of racial diversity in our sample is a significant limitation. These features of our study emphasize the importance of replicating this study in other geographic and socio-political contexts, particularly in more racially diverse areas.[59]

Conclusion

We found evidence that dementia-focused programs in older adult centers—specifically access to ADS and SADCs—are associated with lower hospital utilization and costs at the population level among community-dwelling people living with ADRD, especially within municipal jurisdictions of relatively smaller size. Consistent with growing interest in increasing public health funding for community-based organizations to improve health,[60] as well as the need to bolster social care in response to population aging,[61,62] our work provides empirical evidence to support the idea that older adult centers should be recognized and developed as community-based assets with potential to bring value to health care systems.[63,64] Continued research on how organizational and community contexts influence health care utilization among people aging in place with dementia is important for improving policy, practices, and resource allocations to benefit individuals, families, and societies.

Supplementary material

Supplementary material is available at *Health Affairs Scholar* online.

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Conflicts of interest

Please see ICMJE form(s) for author conflicts of interest. These have been provided as supplementary materials.

Notes

1. Alzheimer's Association. 2023 Alzheimer's disease facts and figures. Published 2023. Accessed April 26, 2022. https://www.alz.org/media/Documents/alzheimers-facts-and-figures.pdf
2. Chi W, Graf E, Hughes J, Hastie J, Khatutsky G. Community-dwelling older adults with dementia and their caregivers: key indicators from the National Health and Aging Trends Study. Published 2019. Accessed January 30, 2022. https://aspe.hhs.gov/sites/default/files/private/pdf/260371/DemChartbook.pdf
3. Hurd MD, Martorell P, Langa K. Future monetary costs of dementia in the United States under alternative dementia prevalence scenarios. *J Popul Ageing*. 2015;8(1-2):101-112. https://doi.org/10.1007/s12062-015-9112-4
4. Abreu W, Tolson D, Jackson GA, Staines H, Costa N. The relationship between frailty, functional dependence, and healthcare needs among community-dwelling people with moderate to severe dementia. *Health Soc Care Community*. 2019;27(3):642-653. https://doi.org/10.1111/hsc.12678
5. Haaksma ML, Rizzuto D, Ramakers IHGB, et al. The impact of frailty and comorbidity on institutionalization and mortality in persons with dementia: a prospective cohort study. *J Am Med Dir Assoc*. 2019;20(2):165-170.e2. https://doi.org/10.1016/j.jamda.2018.06.020
6. Zhu CW, Ornstein KA, Cosentino S, Gu Y, Andrews H, Stern Y. Medicaid contributes substantial costs to dementia care in an ethnically diverse community. *J Gerontol B Psychol Sci Soc Sci*. 2020;75(7):1527-1537. https://doi.org/10.1093/geronb/gbz108
7. Chen Y, Wilson L, Kornak J, et al. The costs of dementia subtypes to California Medicare fee-for-service, 2015. *Alzheimers Dement*. 2019;15(7):899-906. https://doi.org/10.1016/j.jalz.2019.03.015
8. American Psychological Association. Age. https://apastyle.apa.org. Accessed May 31, 2024. https://apastyle.apa.org/style-grammar-guidelines/bias-free-language/age
9. Pardasani MP. Senior centers. *Act Adapt Aging*. 2004;28(4):27-44. https://doi.org/10.1300/J016v28n04_03
10. Pardasani M. Senior centers: characteristics of participants and nonparticipants. *Act Adapt Aging*. 2010;34(1):48-70. https://doi.org/10.1080/01924780903552295
11. Somerville C, Roldan NV, Coyle CE, Mutchler J. Why don't older adults use senior centers? Evidence from adults age 50 and older in Massachusetts. *J Elder Policy*. 2022;2(1):103–129.
12. Novak LS, Horne E, Brackett JR, Meyer K, Ajtai RM. Dementia-friendly communities: a review of current literature and reflections on implementation. *Curr Geriatr Rep*. 2020;9(3):176-182. https://doi.org/10.1007/s13670-020-00325-7
13. Scher CJ, Somerville C, Greenfield EA, Coyle C. Organizational characteristics of senior centers and engagement in dementia-friendly communities. *Innov Aging*. 2023;7(5):igad050. https://doi.org/10.1093/geroni/igad050
14. Fields NL, Anderson KA, Dabelko-Schoeny H. The effectiveness of adult day services for older adults: a review of the literature from 2000 to 2011. *J Appl Gerontol Off J South Gerontol Soc*. 2014;33(2):130-163. https://doi.org/10.1177/0733464812443308
15. Massachusetts Adult Day Services Association. ABOUT. Accessed May 31, 2024. https://madsa.net/
16. Logsdon RG, Pike KC, Korte L, Goehring C. Memory care and wellness services: efficacy of specialized dementia care in adult day services. *Gerontologist*. 2016;56(2):318-325. https://doi.org/10.1093/geront/gnu012
17. Williams C, Tappen R, Wiese L, et al. Stress in persons with dementia: benefits of a memory center day program. *Arch Psychiatr Nurs*. 2016;30(5):531-538. https://doi.org/10.1016/j.apnu.2016.04.011
18. Gaugler JE, Jarrott SE, Zarit SH, Stephens MAP, Townsend A, Greene R. Adult day service use and reductions in caregiving hours: effects on stress and psychological well-being for dementia caregivers. *Int J Geriatr Psychiatry*. 2003;18(1):55-62. https://doi.org/10.1002/gps.772
19. Gitlin LN, Roth DL, Marx K, et al. Embedding caregiver support within adult day services: outcomes of a multisite trial. *Gerontologist*. 2024;64(4):gnad107. https://doi.org/10.1093/geront/gnad107
20. Parker LJ, Gitlin LN. Does adult day service use improve well-being of Black caregivers of people living with dementia? *Innov Aging*. 2021;5(4):igab037. https://doi.org/10.1093/geroni/igab037
21. Kelly R. The effect of adult day program attendance on emergency room registrations, hospital admissions, and days in hospital: a propensity-matching study. *Gerontologist*. 2017;57(3):552-562. https://doi.org/10.1093/geront/gnv145
22. Kelly R, Puurveen G, Gill R. The effect of adult day services on delay to institutional placement. *J Appl Gerontol*. 2016;35(8):814-835. https://doi.org/10.1177/0733464814521319
23. Jutkowitz E, Pizzi LT, Shewmaker P, et al. Cost effectiveness of non-drug interventions that reduce nursing home admissions for people living with dementia. *Alzheimers Dement*. 2023;19(9):3867-3893. https://doi.org/10.1002/alz.12964
24. Iecovich E, Biderman A. Use of adult day care centers: do they offset utilization of health care services? *Gerontologist*. 2013;53(1):123-132. https://doi.org/10.1093/geront/gns036
25. Leitsch SA, Zarit SH, Townsend A, Greene R. Medical and social adult day service programs: a comparison of characteristics, dementia clients, and their family caregivers. *Res Aging*. 2001;23(4):473-498. https://doi.org/10.1177/0164027501234005
26. Protoolis HA, Burton J, Riley L, Jancey J. More than memory: a qualitative analysis of carer-reported psychosocial benefits of memory cafés. *Health Promot J Aust Off J Aust Assoc Health Promot Prof*. 2022;33 Suppl 1(S1):358-366. https://doi.org/10.1002/hpja.573
27. Jewish Family & Children's Service. *Directory of Memory Cafés in Massachusetts*. Accessed May 31, 2024. https://www.jfcsboston.org/our-services/services-for-older-adults/home-community-supports/alzheimers-related-dementias-family-support/memorycafedirectory
28. Chesterton L, Innes A, Smith SK, Morris L. Self-reported benefits for care partners of attending a person-centered dementia cafe. *Int J Care Caring*. 2022;6(4):586-603.
29. Greenwood N, Smith R, Akhtar F, Richardson A. A qualitative study of carers' experiences of dementia cafés: a place to feel supported and be yourself. *BMC Geriatr*. 2017;17(1):164. https://doi.org/10.1186/s12877-017-0559-4
30. Simon L. Memory cafes: an environmental scan. Health Foundation for Western & Central New York. Published 2020. Accessed May 31, 2024. https://hfwcny.org/resource/memory-cafes-an-environmental-scan/
31. Commonwealth of Massachusetts. Support groups for family caregivers. Accessed May 31, 2024. https://www.mass.gov/info-details/support-groups-for-family-caregivers
32. Alzheimer's Association. Early stage programs and services. Alzheimer's disease and dementia. Accessed May 31, 2024. https://alz.org/manh/helping_you/pwd-services
33. Bernabéu-Álvarez C, Lima-Rodríguez JS, Lima-Serrano M. Effect of support groups on caregiver's quality of life. *Fam Process*. 2022;61(2):643-658. https://doi.org/10.1111/famp.12684
34. Chu H, Yang CY, Liao YH, et al. The effects of a support group on dementia caregivers' burden and depression. *J Aging Health*. 2011;23(2):228-241. https://doi.org/10.1177/0898264310381522
35. Chien LY, Chu H, Guo JL, et al. Caregiver support groups in patients with dementia: a meta-analysis. In: *Database of Abstracts of Reviews of Effects (DARE): Quality-Assessed Reviews*. Centre for Reviews and Dissemination (UK); 2011. Accessed November 15, 2023. https://www.ncbi.nlm.nih.gov/books/NBK91330/
36. Commonwealth of Massachusetts. General Law—Part I, Title VII, Chapter 40, Section 8B. Accessed January 5, 2024. https://malegislature.gov/Laws/GeneralLaws/PartI/TitleVII/Chapter40/Section8B

37. Mutchler J, Somerville C. *A Comprehensive Database of Senior Centers in Massachusetts*. Center for Social and Demographic Research on Aging Publications. Published online October 1, 2018. Accessed May 31, 2024. https://scholarworks.umb.edu/demographyofaging/89.
38. Congdon W, Simms M, De Vita C. *Assessing the Impact of Community-Level Initiatives: A Literature Review*. Office of Planning, Research, and Evaluation, Administration for Children and Families, US Department of Health and Human Services; 2020.
39. Harner LT, Kuo ES, Cheadle A, et al. Using population dose to evaluate community-level health initiatives. *Am J Prev Med*. 2018;54(5):S117-S123. https://doi.org/10.1016/j.amepre.2018.01.026
40. Bloom HS. The core analytics of randomized experiments for social research. In: *The SAGE Handbook of Social Research Methods*. SAGE Publications Ltd; 2008:115-133.
41. Census.gov. Guide to State and Local Census Geography—Massachusetts. Accessed May 31, 2024. https://www2.census.gov/geo/pdfs/reference/guidestloc/ma_gslcg.pdf.
42. Kind AJH, Buckingham WR. Making neighborhood-disadvantage metrics accessible—the Neighborhood Atlas. *N Engl J Med*. 2018;378(26):2456-2458. https://doi.org/10.1056/NEJMp1802313
43. Centers for Disease Control and Prevention. CDC/ATSDR Vulnerability Index 2016 Database MA. Published December 22, 2022. Accessed January 22, 2024. https://www.atsdr.cdc.gov/placeandhealth/svi/data_documentation_download.html
44. Maroko AR. Integrating social determinants of health with treatment and prevention: a new tool to assess local area deprivation. *Prev Chronic Dis*. 2016;13:E128. https://doi.org/10.5888/pcd13.160221.
45. Hagland M. *Breaking: CMS's 2023 PFS Final Rule Makes Changes to MSSP*. Healthcare Innovation. Published November 1, 2022. Accessed December 7, 2023. https://www.hcinnovationgroup.com/policy-value-based-care/accountable-care-organizations-acos/article/21285793/breaking-cmss-2023-pfs-final-rule-makes-changes-to-mssp
46. Thorpe JM, Van Houtven CH, Sleath BL, Thorpe CT. Rural-urban differences in preventable hospitalizations among community-dwelling veterans with dementia. *J Rural Health*. 2010;26(2):146-155. https://doi.org/10.1111/j.1748-0361.2010.00276.x
47. Reuben DB, Tan ZS, Romero T, Wenger NS, Keeler E, Jennings LA. Patient and caregiver benefit from a comprehensive dementia care program: 1-year results from the UCLA Alzheimer's and Dementia Care Program. *J Am Geriatr Soc*. 2019;67(11):2267-2273. https://doi.org/10.1111/jgs.16085
48. Hazzan AA, Dauenhauer J, Follansbee P, Hazzan JO, Allen K, Omobepade I. Family caregiver quality of life and the care provided to older people living with dementia: qualitative analyses of caregiver interviews. *BMC Geriatr*. 2022;22(1):86. https://doi.org/10.1186/s12877-022-02787-0
49. Gitlin LN, Reever K, Dennis MP, Mathieu E, Hauck WW. Enhancing quality of life of families who use adult day services: short- and long-term effects of the adult day services plus program. *Gerontologist*. 2006;46(5):630-639. https://doi.org/10.1093/geront/46.5.630
50. Fleet A, Shalev D, Spaeth-Rublee B, et al. Behavioral health integration in the Program of All-inclusive Care for the Elderly (PACE): a scoping review. *J Am Geriatr Soc*. 2023;71(9):2956-2965. https://doi.org/10.1111/jgs.18416
51. Meret-Hanke LA. Effects of the program of all-inclusive care for the elderly on hospital use. *Gerontologist*. 2011;51(6):774-785. https://doi.org/10.1093/geront/gnr040
52. Jones D, Duda N, Schmitz B, et al. *Study of access and quality of care in for-profit PACE*. Mathematica. Published 2013. Accessed May 31, 2024. https://www.mathematica.org/publications/study-of-access-and-quality-of-care-in-forprofit-pace
53. Town of Dighton, dightonma.gov. Prime Time Supportive Adult Day Program, Dighton, MA. Accessed May 31, 2024. https://www.dighton-ma.gov/453/Prime-Time-Supportive-Adult-Day-Program.
54. National PACE Association. Eligibility Requirements. Default. Published n.d. Accessed May 31, 2024. https://www.npaonline.org/eligibility-requirements
55. Segelman M, Szydlowski J, Kinosian B, et al. Hospitalizations in the program of all-inclusive care for the elderly. *J Am Geriatr Soc*. 2014;62(2):320-324. https://doi.org/10.1111/jgs.12637
56. Arku D, Felix M, Warholak T, Axon DR. Program of All-inclusive Care for the Elderly (PACE) versus other programs: a scoping review of health outcomes. *Geriatrics*. 2022;7(2):31. https://doi.org/10.3390/geriatrics7020031
57. Wieland D, Lamb VL, Sutton SR, et al. Hospitalization in the Program of All-inclusive Care for the Elderly (PACE): rates, concomitants, and predictors. *J Am Geriatr Soc*. 2000;48(11):1373-1380. https://doi.org/10.1111/j.1532-5415.2000.tb02625.x
58. US Census Bureau. Latest city and town population estimates of the decade show three-fourths of the nation's incorporated places have fewer than 5,000 people. Census.gov. Accessed January 22, 2024. https://www.census.gov/library/stories/2020/05/america-a-nation-of-small-towns.html
59. US Census Bureau. American Community Survey Data Tables B01001 and B01001H (2018-2022). Census.gov. Accessed January 22, 2024. https://www.census.gov/programs-surveys/acs/data.html
60. Chen AT, Smith DO, Ojikutu BO, Auerbach J. The community as a full partner: a new model for public health. *Health Aff (Millwood)*. 2024;43(6):805-812. https://doi.org/10.1377/hlthaff.2024.00033
61. Ungar A, Cherubini A, Fratiglioni L, et al. Carta of Florence against ageism: no place for ageism in healthcare. *J Gerontol A Biol Sci Med Sci*. 2024;79(3):glad264. https://doi.org/10.1093/gerona/glad264.
62. US Department of Health and Human Services. HHS Delivers Strategic Framework for National Plan on Aging. Published May 30, 2024. Accessed June 11, 2024. https://www.hhs.gov/about/news/2024/05/30/hhs-delivers-strategic-framework-national-plan-aging.html
63. Brewster AL, Wilson TL, Frehn J, Berish D, Kunkel SR. Linking health and social services through area agencies on aging is associated with lower health care use and spending. *Health Aff (Millwood)*. 2020;39(4):587-594. https://doi.org/10.1377/hlthaff.2019.01515
64. Akincigil A, Greenfield EA. Housing plus services, IADL impairment, and healthcare expenditures: evidence from the Medicare current beneficiaries survey. *Gerontologist*. 2020;60(1):22-31. https://doi.org/10.1093/geront/gny181