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Rural/Urban Disparities in Utilization of Diabetes Self-Management Training to the Fee-for-Service Medicare Population

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Overview of Key Findings

- In 2016, rural fee-for-service (FFS) Medicare beneficiaries represented 21.7% of the population diagnosed with diabetes, but only 2.7% of the population utilizing Diabetes Self-Management Training.
- Utilization of DSMT services in 2016 occurred in 76 rural counties and 309 urban counties.
- Average utilization rates of DSMT services were greater in rural counties than urban counties (5.5% vs. 2.5%).

Introduction

Diabetes mellitus (DM) is a complex chronic disease affecting 34.2 million people in the U.S. in 2018.[1] Unmanaged diabetes commonly can lead to complications such as cardiovascular disease, nephropathy, retinopathy, neuropathy, and other comorbid conditions. Effective management of diabetes and prevention of complications requires multiple treatment approaches, including patient self-management education.[2]

Diabetes Self-Management Training (DSMT) is the process of providing patients with the management skills necessary for diabetes self-care in order to improve quality of life, clinical outcomes, and health status. DSMT may include a description of treatment options, beneficial lifestyle changes, or monitoring strategies, and it should be tailored to each patient's individual needs.[3] DSMT has been shown to improve patient knowledge, ability to self-treat, and health outcomes. Additionally, provision of DSMT has been observed to reduce the odds of hospitalization and emergency department (ED) visits in a cost-effective manner for Medicare beneficiaries.[4] Medicare covers up to 10 hours of DSMT in the initial year of diagnosis, 1 hour of individual training and 9 hours of group training. Medicare may also cover up to 2 hours of follow-up training in the next calendar year after the patient receives their initial training.[5]

For these reasons, DSMT is recommended for all patients upon diagnosis of diabetes and as needed thereafter.[2,5] Despite this recommendation, there is a low utilization rate of DSMT among patients newly diagnosed with diabetes.[6,7] Utilization of DSMT services varies by several demographic factors, including age, race, insurance status, and the presence of comorbidities.[6-9] The patient's ability to utilize self-management techniques may also vary based upon patient cultural beliefs, perceived quality of patient-provider interaction, and other factors.[10,11]

Another important variable to examine in DSMT utilization is the availability of DSMT services in rural versus urban counties. Instances of diagnosed diabetes are higher in the Southeast, especially in rural areas.[1] However, 62% of rural counties do not have American Diabetes Association®/American Association of Diabetes Educators (ADA/AADE)-accredited DSMT programs.[12] The objective of this study was to identify the extent of the rural/urban disparity in the utilization of DSMT in FFS Medicare beneficiaries in 2016.

Methods

The Medicare Physician and Other Supplier Public Use File (PUF) provides information on services and procedures provided to fee-for-service (FFS) Medicare beneficiaries by physicians and other health care providers (including pharmacies and nurse practitioners).[13] The PUF data contain information on utilization, payment, and charges by National Provider Identifier (NPI), Healthcare Common Procedure Coding System (HCPCS) code, and provider type for all providers delivering services to FFS Medicare beneficiaries. At the time of the study, 2016 was the most recent PUF available. The 2016 Medicare provider data were extracted and HCPCS codes G0108 and G0109 were used to determine the number of units of DSMT services provided, the number of health care providers administering the service, and the number of beneficiaries served by each provider. Provider services and beneficiaries were then aggregated at the county level using provider location data. Rural-Urban Continuum Codes (RUCCs) were used to assign counties to rural versus urban designations, with codes 1-3 designated as urban and codes 4-9 designated as rural.[14] The 2016 FFS Medicare enrollment data[15] and diabetes prevalence rates[16] were observed in aggregate and applied at the county level to calculate potentially eligible enrollees and DSMT utilization rates.

Findings

Table 1. Rural and Urban Enrollment in FFS Medicare Nationwide and in Counties Providing DSMT Services

2016 Nationwide Medicare FFS Enrollees					
		RUCC 1-3 (Urban)		RUCC 4-9 (Rural)	
Category	Total	Enrollees	Percentage	Enrollees	Percentage
All	33,851,996	26,455,562	78.2%	7,396,434	21.8%
With Diabetes	9,247,673	7,245,302	78.3%	2,002,371	21.7%
2016 Medicare FFS Enrollees in Counties that Utilized DSMT Services					
All	16,086,764	15,611,227	97.0%	475,537	3.0%
With Diabetes	4,385,009	4,264,964	97.3%	120,045	2.7%

As seen in Table 1, in 2016 nationwide FFS Medicare enrollees increased to 33.9 million, with a roughly 4:1 ratio of enrollees residing in urban (RUCC 1-3) to rural (RUCC 4-9) counties. More than a quarter (9.2 million, 27.3%) of all FFS enrollees had diabetes. The ratio of urban to rural enrollees with diabetes was comparable to the urban to rural ratio for the total FFS population.

Of these nationwide enrollees, just under half (16.1 million, 47.5%) resided in counties that provided DSMT services in 2016. Of the 9.2 million nationwide enrollees that had diabetes, 4.3 million (47.4%) lived in a county in which DSMT services were utilized. Approximately 4.2 million of this population lived in urban counties, or 58.9% of all urban FFS enrollees with diabetes. Comparatively, only 120,045, or 6% of all rural FFS enrollees with diabetes resided in a county where DSMT services were utilized.

In 2016, a total of 1,173 unique providers administered 208,821 units of DSMT services to 64,221 unique beneficiaries (Table 2). On average, DSMT beneficiaries utilized 3.2 units of services in 2016. Beneficiaries who used services in urban counties utilized more (3.3 units) on average, while beneficiaries in rural counties utilized less (3.0 units), suggesting shorter or fewer sessions of DSMT. Greater than 10 cumulative hours of DSMT has been associated with significant disease biomarker (A1c) improvement.[17] The average DSMT provider administered 178 units of DSMT, and urban providers provided more DSMT (184 units) than those practicing in rural counties (126.8 units).

Table 2. FFS Medicare DSMT Providers, Service Hours, and Beneficiaries in 2016

Category	Total	RUCC 1-3 (Urban)	RUCC 4-9 (Rural)
Providers	1,173	1,050	123
Service Units	208,821	193,226	15,595
Beneficiaries	64,221	59,003	5,218
Average County Utilization Rate	3.1%	2.5%	5.5%

County utilization rates were calculated as the number of Medicare FFS beneficiaries using DSMT services in a county divided by the number of Medicare FFS beneficiaries with diabetes residing in a county. The overall average county utilization rate is 3.1%. When rural and urban counties are examined separately, rural counties are shown on average to have a higher utilization rate (5.5% rural; 2.5% urban).

Figure 1. Diabetes Prevalence in the FFS Medicare Population in 2016

Diabetes Prevalence
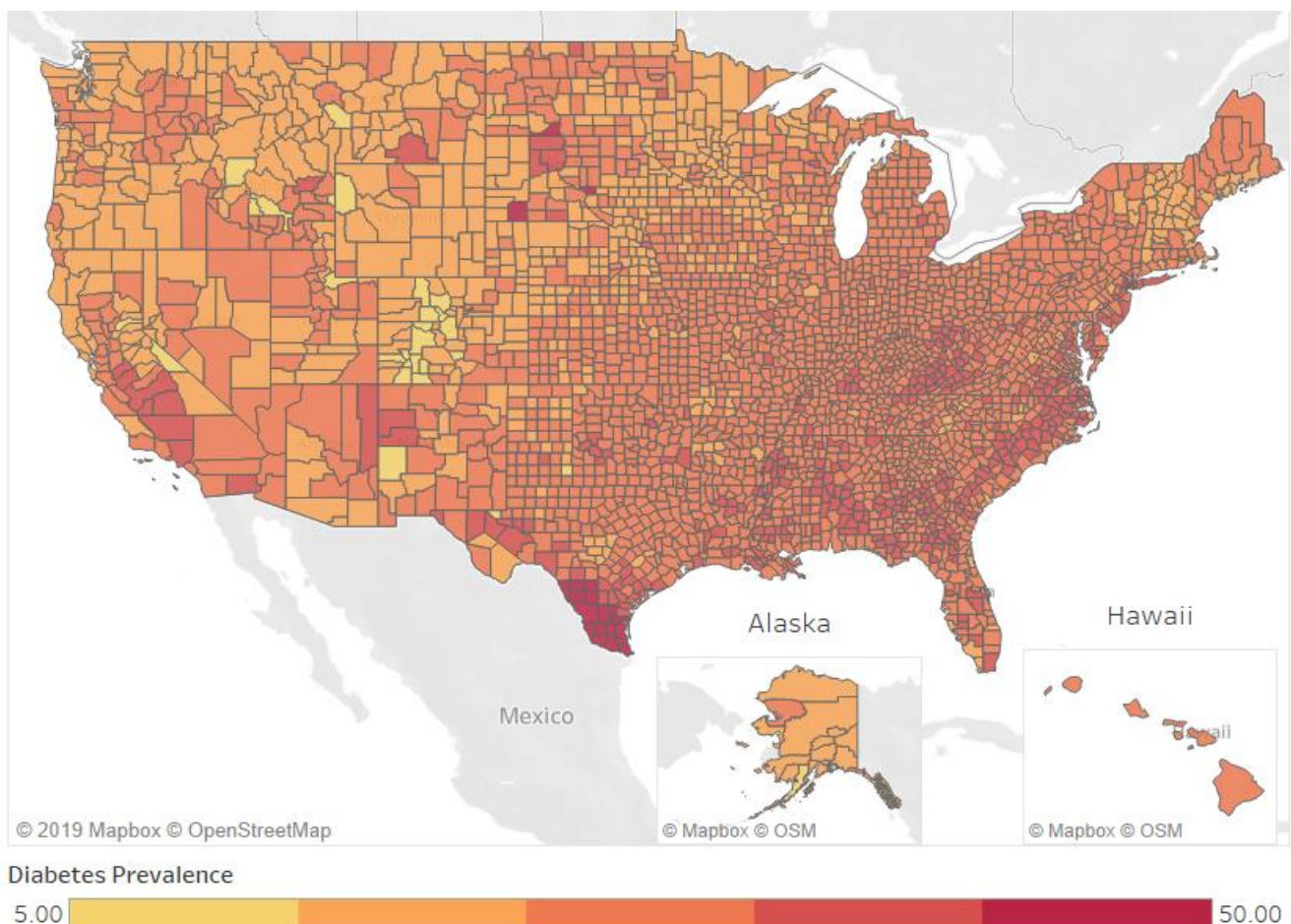5.00 ——————————————————— 50.00

Figure 1 displays diabetes prevalence by county in the FFS Medicare population. This can be compared to the actual utilization of DSMT services at the county level, as displayed in Figure 2. Services appear to be predominantly clustered around urban centers, especially in the Northeast and Midwest regions. In contrast, diabetes prevalence rates appear to be greatest in the Southeast and Southwest regions. Interactive maps displaying DSMT providers, service hours, beneficiaries and utilization rates at the county level can be found at https://ruhrc.uky.edu/infographics/.

Figure 2. Counties with Utilization of DSMT and Associated Utilization Rate in 2016
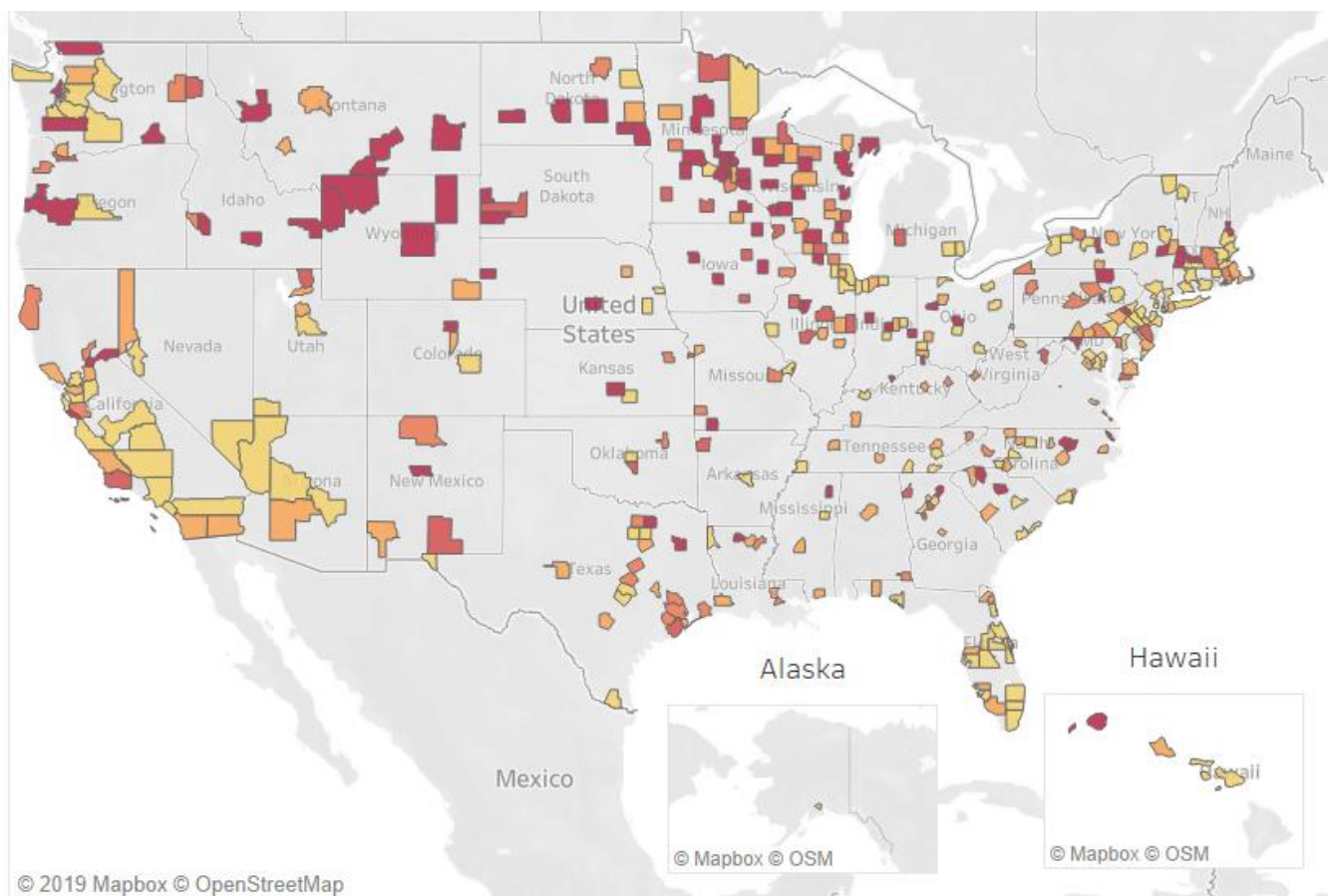
Prevalence data from a total of 3,140 counties were observed, and utilization of DSMT services was observed to occur in 385 counties (Table 3). Counties where DSMT services were utilized appear to have a lower average prevalence of diabetes than counties without DSMT utilization. While the average prevalence of diabetes is similar between rural and urban counties, urban counties represented a much greater proportion (80.2%) of counties where DSMT utilization occurred.

Table 3. County Utilization of DSMT Services as Compared to Average County Prevalence, 2016

Category	All Counties		Counties Utilizing DSMT		Counties without DSMT Utilization	
	Number	Average Prevalence of DM	Number	Average Prevalence of DM	Number	Average Prevalence of DM
Total	3,140	26.8%	385	26%	2,755	26.9%
Urban (RUCC 1-3)	1,165	27.1%	309	26.2%	856	27.4%
Rural (RUCC 4-9)	1,975	26.6%	76	25%	1,899	26.7%

Conclusion/Discussion

In 2016, the pattern of utilization of DSMT services by FFS Medicare beneficiaries is observed to vary based upon rural/urban residence. A much higher proportion of urban beneficiaries with diabetes resided in counties that utilized DSMT as compared to rural beneficiaries with diabetes. Moreover, while rural utilization rates of DSMT services were higher than urban rates, rural beneficiaries typically utilized fewer units of service than those in urban counties. The utilization of DSMT occurred in many fewer rural counties than urban counties, which cannot be wholly attributed to fewer eligible beneficiaries with diabetes. Finally, there is geographic evidence that DSMT services may not be utilized in areas with the greatest diabetes prevalence. A lack of rural access to DSMT services, or rural beneficiaries traveling to urban providers to receive DSMT may be potential explanations for these observations. However, the limitations of the Medicare PUF prevent these possibilities from being further examined. Regardless of cause, the lower utilization of DSMT services may lead to a clinical outcome disparity between rural and urban patients. Expansion of ADA/AADE-accredited DSMT programs into rural areas, particularly in areas a significant distance from areas with urban programs, may help address this disparity and improve diabetes outcomes in rural populations.

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