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Quality of Skilled Nursing Facilities Serving Rural Medicare Beneficiaries

KEY FINDINGS

- Rural fee-for-service Medicare beneficiaries receive care from skilled nursing facilities (SNFs) located in both rural and urban communities; in 2018, 45.4% of all SNFs could be considered rural-serving, including SNFs located in rural communities (28.7% of all SNFs) and SNFs located in urban communities that had patient populations consisting of 10% or more rural beneficiaries (16.7% of all SNFs; 23.4% of urban SNFs).
- Overall SNF star ratings and staffing star ratings from Nursing Home Compare are not significantly associated with rural-serving status after controlling for other SNF characteristics.
- In contrast, quality star ratings from Nursing Home Compare are significantly associated with rural-serving status: compared to urban SNFs with fewer than 10% rural patients, urban SNFs with at least 10% rural patients are 34% less likely to have high quality star ratings, and SNFs located in large rural, small rural, and isolated small rural communities are 44%, 41%, and 25% less likely to have high quality star ratings, respectively.
- Survey star ratings (i.e., ratings based on findings from state health inspections) from Nursing Home Compare were not significantly associated with rural-serving status with one exception: SNFs located in isolated small rural communities were 33% more likely to have high survey star ratings compared to urban SNFs with fewer than 10% rural patients.

BACKGROUND

Skilled nursing facilities (SNFs) provide post-acute care nursing, therapy, social work, and aide services to almost 1.5 million Medicare fee-for-service beneficiaries annually to help them recover following hospitalization and transition safely back to the community.[1] SNFs are the most common site for Medicare beneficiaries for post-acute care following hospitalization with about 20% of hospitalized beneficiaries discharging to SNFs.[1,2] While beneficiaries who live in rural communities utilize SNF care less than their urban counterparts, SNFs remain the most common post-acute care discharge destination with almost 17% of rural beneficiaries admitted to SNFs following hospital discharge.[3]

Almost 9 in 10 beneficiaries live in communities served by multiple SNFs.[1] Rural beneficiaries may choose from SNFs located within their communities if present or SNFs located in urban areas that are closer to family and/or the discharging hospital. One factor that may be used to select a SNF when more than one option is available is quality, especially since there is wide and persistent variation in SNF quality.[1,4] Prior research on quality of SNFs based on rural-urban location is limited and

results are mixed. Some studies suggest poorer quality in rural SNFs compared to urban SNFs,[5,6] while others suggest rural SNFs may perform better than urban SNFs on rates of hospital readmission, emergency department use, and vaccination.[7-10] However, some of these studies focus on quality indicators only pertinent for long-stay residents receiving custodial care, not short-stay residents receiving post-acute care services. In addition, these studies only consider rural-urban location and do not account for urban SNFs that serve rural beneficiaries.

SNF performance on select quality measures became available nationwide on the Nursing Home Compare (NHC) website in 2002. However, in recognition of the need for easy-to-understand, summary information on quality to help with SNF selection, the Centers for Medicare & Medicaid Services (CMS) launched a star ratings system in 2008. While the star ratings system has been revised several times since its initial introduction, it retains the goal of providing consumers, families and caregivers, providers, and other stakeholders with a summary of SNF performance across multiple indicators of care quality. The purpose of this study was to examine the quality of SNFs that serve rural beneficiaries based on star ratings.

METHODS

This study was a secondary analysis of administrative data on Medicare-certified SNFs operating in 2018. We used publicly available, SNF-level data from CMS, including the 2018 NHC Provider File and the 2018 Post-Acute Care and Hospice Utilization and Payment Public Use File (PAC PUF).

Our outcome of interest was SNF quality. We used a series of star ratings from NHC to capture SNF quality, including overall star rating and three sub-ratings that are used to determine the overall star rating: quality star rating, survey star rating, and staffing star rating. The quality star rating is derived from 15 resident-level clinical measures. Quality star ratings are based on Minimum Data Set (MDS) measures and Medicare claims. The survey star rating is based on annual health and safety inspections by state inspectors to examine compliance with Medicare and Medicaid regulations. The staffing star rating is based on the ratio of nurse staffing hours per resident per day with more stars given for higher levels of staffing. See Box 1 for additional details on star ratings methodology. We used the quarterly star ratings data reported in NHC to calculate average star ratings for 2018.

Box 1. Overview of Methodology for Nursing Home Compare Star Ratings

Star Rating	Measure Description
Overall	• **Composite star rating based on three sub-ratings of quality, survey, and staffing stars** • **Overall rating is assigned using a three-step process:** o Start with the survey star rating o Add one star if the staffing rating is four or five stars and greater than the survey star rating OR subtract one star if the staffing star rating is one star, noting the overall rating cannot be more than five stars or less than one star o Add one star if the quality rating is five stars OR subtract one star if the quality rating is one star, noting the overall rating cannot be more than five stars or less than one star • **The one exception to the process described above is that facilities with only one survey star cannot be upgraded by more than one star even if criteria for upgrading are met for both staffing and quality ratings**

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Star Rating	Measure Description
Quality	• **Based on performance on 15 measures reported on Nursing Home Compare that are derived from the Minimum Data Set (MDS) and Medicare claims** • **Short-stay resident measures** o Percentage of residents who improved their ability to move independently (MDS) o Percentage of residents with pressure ulcers or pressure injuries that are new or worsened (MDS) o Percentage of residents who got antipsychotic medication for the first time (MDS) o Percentage of residents who were re-hospitalized after a nursing home admission (claims) o Percentage of residents who have had an outpatient emergency department visit (claims) o Rate of successful return to home and community from facility (claims) • **Long-stay resident measures** o Percentage of residents whose need for help with daily activities increased (MDS) o Percentage of residents whose ability to move independently worsened (MDS) o Percentage of high-risk residents with pressure ulcers (MDS) o Percentage of residents who have or had a catheter inserted and left in their bladder (MDS) o Percentage of residents with a urinary tract infection (MDS) o Percentage of residents experiencing one or more falls with major injury (MDS) o Percentage of residents who got an antipsychotic medication (MDS) o Number of hospitalizations per 1,000 resident days (claims) o Number of outpatient emergency department visits per 1,000 resident days (claims) • **Case-mix adjustment is used for all five claims-based measures and four of the ten MDS-based measures (short-stay improvement in ability to move independently, short-stay new or worsened pressure ulcers, long-stay decline in ability to move independently, and long-stay catheter)** • **Points are given for each measure based on national distributions and then summed for an overall quality score which is used to assign stars** • **Ratings are calculated using the four most recent quarters of data for each measure with the exception of the successful return to home and community measure which uses eight quarters of data**
Survey	• **Contains information from the three most recent state health inspections and substantiated findings from the most recent 36 months of complaint investigations** • **Weighted by timing of survey with most recent survey weighted more highly** • **Weighted by scope and severity of deficiencies found and number of revisits required to ensure corrective actions have been taken** • **Scope of deficiency options** o Isolated o Pattern o Widespread • **Severity of deficiency options** o Immediate jeopardy to resident health or safety o Actual harm that is not immediate jeopardy o No actual harm with potential for more than minimal harm that is not immediate jeopardy o No actual harm with potential for minimal harm

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Star Rating	Measure Description
Staffing	• **Includes two measures of staffing that account for the number and case-mix of residents cared for by the facility:** o Registered nurse hours per resident per day o Total nurse hours per resident per day, including registered nurse, licensed practical nurse, and nurse aide • **Uses separate cut points for number of stars for registered nurse staffing and total nurse staffing from a percentile-based method that also takes into account clinical evidence on staffing and quality** • **Staffing hours are taken from the Payroll-Based Journal, a mandatory reporting system developed by CMS for submission of staffing data, and resident census is calculated from the Minimum Data Set**

Source: https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandComplianc/Downloads/usersguide.pdf; https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandComplianc/FSQRS

Our key independent variable was rural-serving status, which we specified using a two-step process to categorize SNFs based on rural-urban location and percent of short-stay residents who were from rural communities. First, we classified SNFs by location using the ZIP code approximation of the Rural-Urban Commuting Area (RUCA) codes, which characterize the rural-urban status of areas based on U.S. Census Bureau definitions and work commuting information.[11,12] We used the 2010 RUCA codes to classify SNFs as located in urban (codes 1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, 10.1), large rural (codes 4.0, 5.0, 6.0), small rural (codes 7.0, 7.2, 8.0, 8.2, 9.0), and isolated small rural (codes 10.0, 10.2, 10.3) communities. Second, we further classified SNFs located in urban areas based on whether the short-stay residents served by the SNF in 2018 consisted of 10% or more rural beneficiaries versus fewer than 10% of rural beneficiaries using PAC PUF data. The PAC PUF uses RUCA codes (primary digit 4 or higher) based on ZIP code of residence to designate beneficiaries as rural to provide percentage of beneficiaries served by a SNF that live in rural communities. We selected the threshold of 10% based on data distribution and the notion that urban SNFs serving at least 1 in 10 short-stay residents from a rural community would have more experience providing post-acute care services and coordinating discharge back to the community for rural beneficiaries than urban SNFs that rarely serve rural beneficiaries. The final categorization of SNFs was: (1) urban SNF serving fewer than 10% rural beneficiaries (non-rural-serving urban SNF), (2) urban SNF serving 10% or more rural beneficiaries (rural-serving urban SNF), (3) SNF located in large rural community, (4) SNF located in small rural community, and (5) SNF located in isolated small rural community. Thus, SNFs were considered rural-serving if they were located in rural communities or if they were located in urban communities with at least 10% of their patient population consisting of rural beneficiaries.

We used NHC and PAC PUF data to create control variables for SNF characteristics. Profit status was categorized as for-profit, nonprofit, or governmental. We measured size by number of certified beds and volume by number of total stays for post-acute care (short-stay residents only). We dichotomized years certified by Medicare as before and after implementation of prospective payment in July 1998. We used Census Division to indicate geographic location. We used indicators to account for whether the SNF was located in a hospital versus free-standing and whether the SNF was part of a continuing care retirement community or not.

Our descriptive analysis compared star ratings and other SNF characteristics across our rural-serving categorization. We used chi-square tests to compare categorical variables and ANOVA to compare continuous variables. We then used

logistic regression models to examine the association between rural-serving category and high quality (4 or 5 stars) versus low to moderate quality (1 to 3 stars) for the overall, quality, survey, and staffing star ratings, controlling for other SNF characteristics described above. We accounted for clustering of SNFs within states using a generalized estimating equation (GEE) approach for our models. We also performed a sensitivity analysis by running the same regression models with a recategorization of our key independent variable where an urban SNF was considered rural-serving if it served any rural beneficiaries (versus 10% or more rural beneficiaries in the original categorization) and non-rural serving if it served no rural beneficiaries (versus fewer than 10% in the original categorization).

FINDINGS

A total of 14,685 SNFs operating in 2018 had data available in both NHC and the PAC PUF files and were eligible for analysis. Of these SNFs, 28.7% were located in rural communities, 71.3% in urban communities. Of the urban SNFs, 23.4% were rural-serving (serving 10% or more rural beneficiaries). Table 1 shows results of descriptive analysis of SNF characteristics based on rural-serving status. The overall market is dominated by for-profit, free-standing SNFs that were originally certified before July 1998. However, there was significantly higher non-profit ownership for SNFs in isolated small rural communities and significantly higher governmental ownership in all rural-serving SNFs compared with non-rural-serving urban SNFs. A significantly higher percentage of rural-serving SNFs were located in hospitals compared to non-rural-serving urban SNFs. A significantly lower percentage of rural-serving SNFs were located in continuing care retirement communities compared to non-rural-serving urban SNFs. Rural-serving SNFs also had significantly lower total post-acute care stays and number of certified beds compared to non-rural-serving urban SNFs.

Table 1. Characteristics of Skilled Nursing Facilities (SNFs) in 2018 by Rural-Serving Status

	All SNFs (n=14,685)	Urban SNF serving < 10% rural beneficiaries (n=8,011)	Urban SNF serving 10%+ rural beneficiaries (n=2,454)	SNF in large rural community (n=1,944)	SNF in small rural community (n=1,385)	SNF in isolated small rural community (n=891)
Profit Status*, %**						
For-profit	71.6%	73.3%	75.3%	68.9%	69.9%	54.7%
Non-profit	22.7%	23.2%	18.1%	22.6%	21.1%	33.7%
Governmental	5.7%	3.5%	6.6%	8.5%	9.0%	11.7%
Certification, %						
Before July 1998	75.5%	76.2%	73.7%	75.7%	74.4%	75.3%
After July 1998	24.5%	23.8%	26.3%	24.3%	25.6%	24.7%
In Hospital*, %**						
No	96.5%	97.9%	95.8%	94.9%	94.0%	94.4%
Yes	3.5%	2.1%	4.2%	5.1%	6.0%	5.6%
Continuing Care Retirement Community*, %**						
No	89.0%	86.1%	92.3%	90.4%	93.7%	95.7%
Yes	11.0%	13.9%	7.7%	9.6%	6.3%	4.3%

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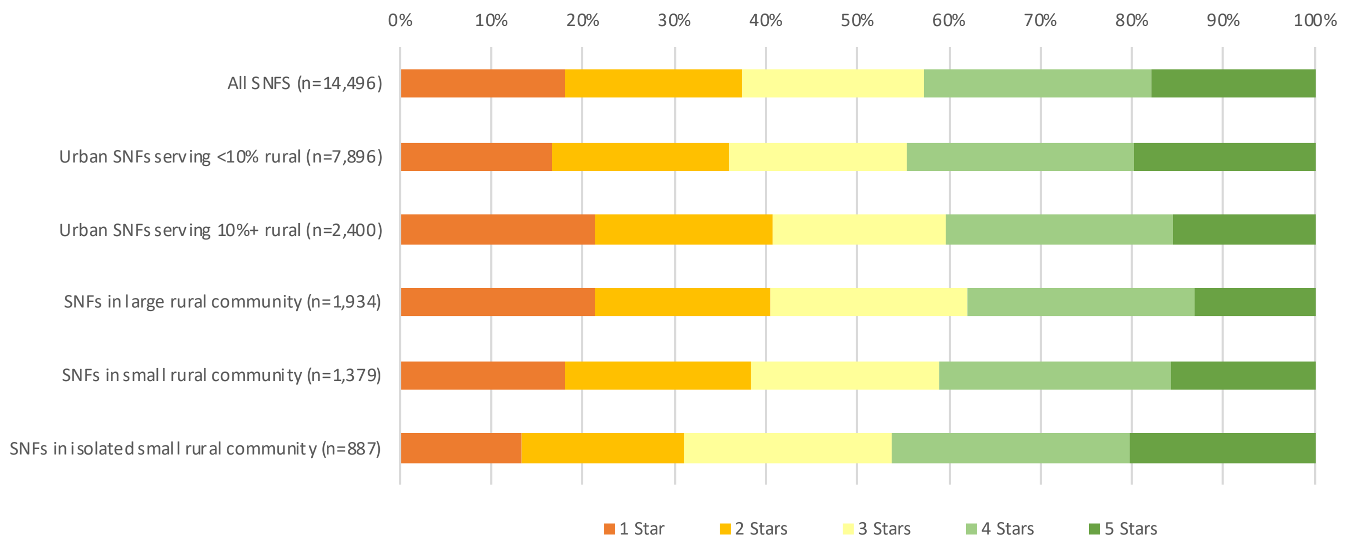
	All SNFs (n=14,685)	Urban SNF serving < 10% rural beneficiaries (n=8,011)	Urban SNF serving 10%+ rural beneficiaries (n=2,454)	SNF in large rural community (n=1,944)	SNF in small rural community (n=1,385)	SNF in isolated small rural community (n=891)
Census Division*, %**						
New England	6.0%	8.4%	2.4%	2.9%	3.8%	3.4%
Middle Atlantic	11.1%	15.8%	6.0%	7.1%	3.7%	4.3%
East North Central	20.0%	19.9%	16.5%	24.0%	24.2%	16.3%
West North Central	12.7%	6.1%	13.9%	16.0%	23.1%	45.3%
South Atlantic	15.7%	19.3%	13.0%	12.2%	9.9%	7.7%
East South Central	6.7%	3.8%	9.3%	11.5%	11.3%	8.4%
West South Central	13.2%	10.7%	17.5%	16.0%	17.6%	10.3%
Mountain	4.8%	3.2%	10.2%	5.5%	4.8%	3.5%
Pacific	9.8%	12.9%	11.2%	4.9%	1.7%	0.8%
Total Post-Acute Care Stays*, mean (SD)**	157.4 (147.2)	193.0 (168.8)	145.1 (126.5)	124.8 (88.5)	84.0 (59.3)	57.4 (45.1)
Number of Certified Beds*, mean (SD)**	108.9 (60.3)	121.7 (68.9)	101.1 (47.6)	98.2 (42.8)	87.8 (34.8)	70.2 (32.1)

***p=<.0001
Notes: Statistically significant differences in SNF characteristics by rural-serving status were determined using chi-square tests for categorical variables and ANOVA for continuous variables. SNF location was determined using Rural-Urban Commuting Area (RUCA) codes. Percentage of rural beneficiaries served for urban SNFs was determined using Post-Acute Care and Hospice Provider Utilization and Payment Public Use Files. Column percentages may not total 100 due to rounding.
Source: 2018 Nursing Home Compare and Post-Acute Care and Hospice Provider Utilization and Payment Public Use Files.

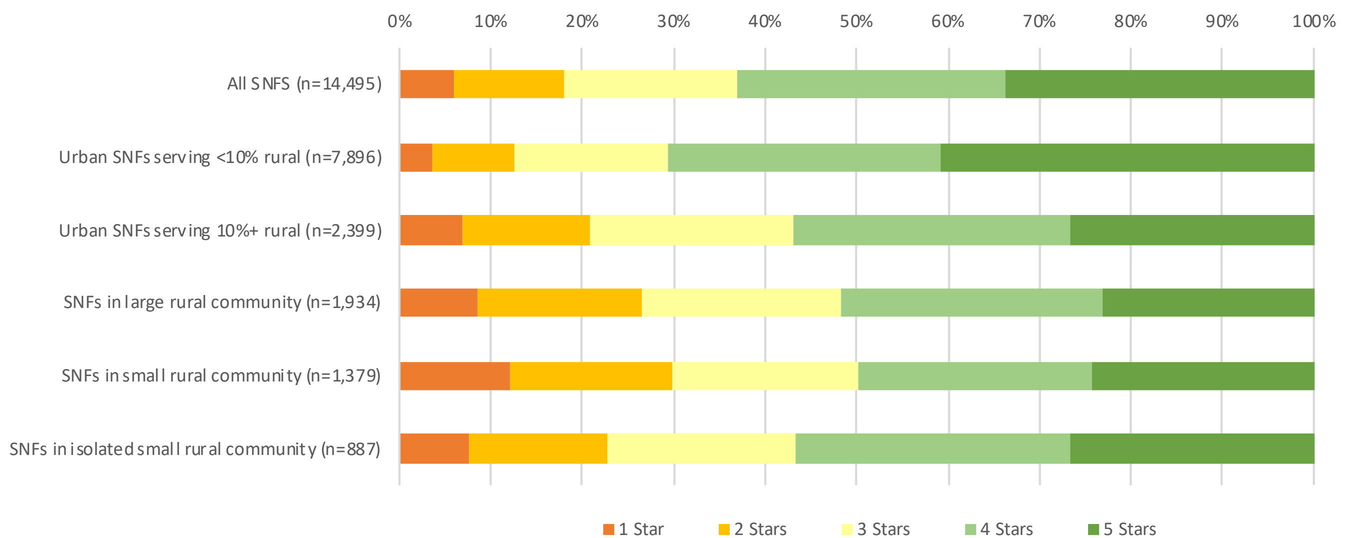
Figures 1-4 show the distribution of star ratings by rural-serving status for overall, quality, survey, and staffing star ratings. The distribution of each type of star rating was significantly different across rural-serving status (p<.0001), but differences were not consistent across type of star rating. A higher percentage of non-rural-serving urban SNFs and SNFs in isolated small rural communities had 4-5 overall stars compared to rural-serving urban SNFs and SNFs in large and small rural communities. SNFs in isolated small rural communities had the highest percentage of 4-5 survey stars and staffing stars, while non-rural-serving urban SNFs had the highest percentage of 4-5 quality stars.

Figure 1. Overall Star Rating of Skilled Nursing Facilities in 2018 by Rural-Serving Status



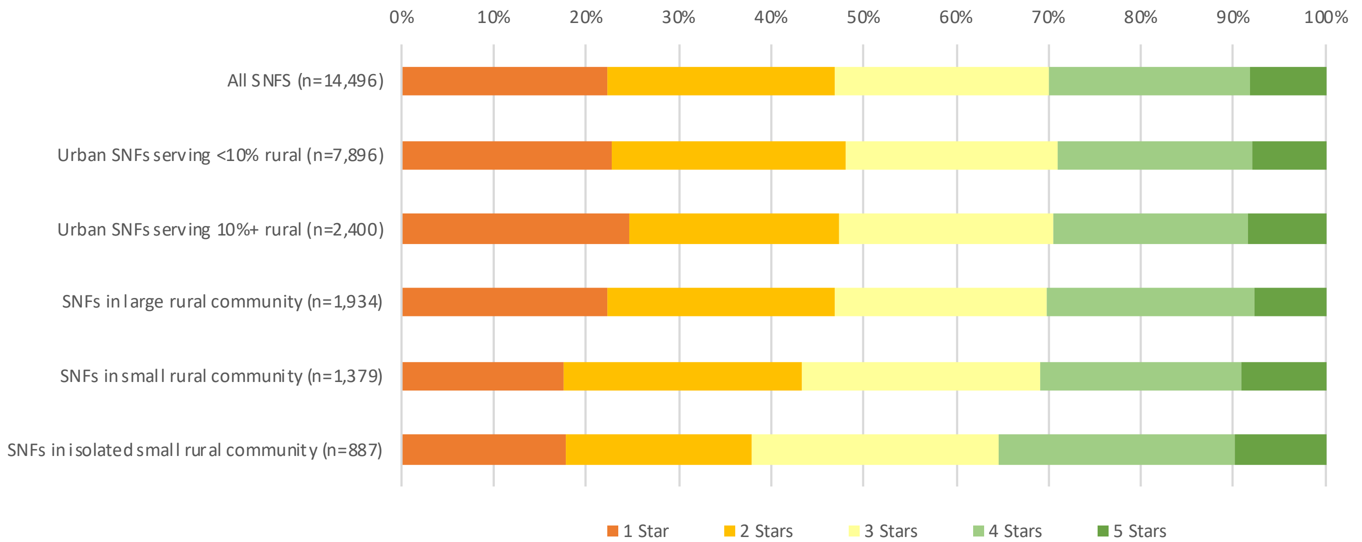
*p=<.0001 comparing overall star rating category across rural-serving status using chi-square test.
Notes: Location of skilled nursing facility was determined using Rural-Urban Commuting Area (RUCA) codes. SNF location was determined using Rural-Urban Commuting Area (RUCA) codes. Percentage of rural beneficiaries served for urban SNFs was determined using Post-Acute Care and Hospice Provider Utilization and Payment Public Use Files. Overall star rating represents the average of quarterly star ratings for each skilled nursing facility for 2018.
Source: 2018 Nursing Home Compare and Post-Acute Care and Hospice Provider Utilization and Payment Public Use Files.

Figure 2. Quality Star Rating of Skilled Nursing Facilities in 2018 by Rural-Serving Status



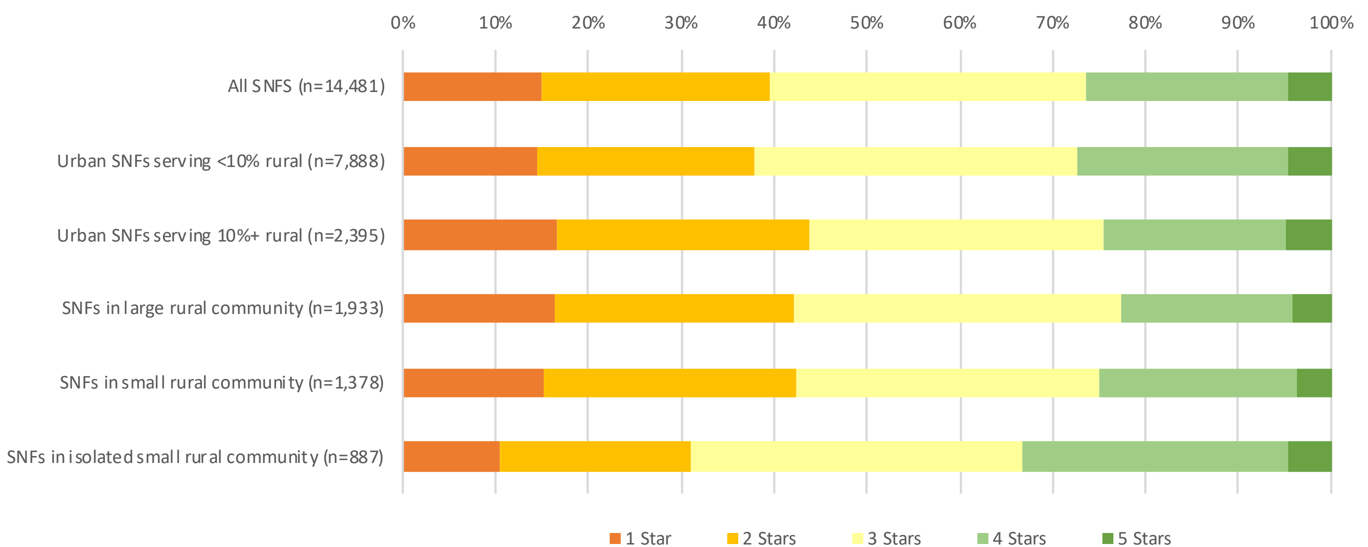
*p=<.0001 comparing quality star rating category across rural-serving status using chi-square test.
Notes: Location of skilled nursing facility was determined using Rural-Urban Commuting Area (RUCA) codes. SNF location was determined using Rural-Urban Commuting Area (RUCA) codes. Percentage of rural beneficiaries served for urban SNFs was determined using Post-Acute Care and Hospice Provider Utilization and Payment Public Use Files. Quality star rating represents the average of quarterly star ratings for each skilled nursing facility for 2018.
Source: 2018 Nursing Home Compare and Post-Acute Care and Hospice Provider Utilization and Payment Public Use Files.

Figure 3. Survey Star Rating of Skilled Nursing Facilities in 2018 by Rural-Serving Status



*p=<.0001 comparing survey star rating category across rural-serving status using chi-square test.
Notes: Location of skilled nursing facility was determined using Rural-Urban Commuting Area (RUCA) codes. SNF location was determined using Rural-Urban Commuting Area (RUCA) codes. Percentage of rural beneficiaries served for urban SNFs was determined using Post-Acute Care and Hospice Provider Utilization and Payment Public Use Files. Survey star rating represents the average of quarterly star ratings for each skilled nursing facility for 2018.
Source: 2018 Nursing Home Compare and Post-Acute Care and Hospice Provider Utilization and Payment Public Use Files.

Figure 4. Staffing Star Rating of Skilled Nursing Facilities in 2018 by Rural-Serving Status



*p=<.0001 comparing staffing star rating category across rural-serving status using chi-square test.
Notes: Location of skilled nursing facility was determined using Rural-Urban Commuting Area (RUCA) codes. SNF location was determined using Rural-Urban Commuting Area (RUCA) codes. Percentage of rural beneficiaries served for urban SNFs was determined using Post-Acute Care and Hospice Provider Utilization and Payment Public Use Files. Staffing star rating represents the average of quarterly star ratings for each skilled nursing facility for 2018.
Source: 2018 Nursing Home Compare and Post-Acute Care and Hospice Provider Utilization and Payment Public Use Files.

Table 2 presents the relationships between star ratings and rural-serving status, controlling for other SNF characteristics. There were no significant differences in overall and staffing star ratings by rural-serving status. Rural-serving urban SNFs and SNFs located in all types of rural communities were significantly less likely to have high quality star ratings compared to non-rural-serving urban SNFs. SNFs located in isolated small rural communities were significantly more likely to have high survey star ratings compared to non-rural-serving urban SNFs.

Table 2. Adjusted Relationships between Star Ratings and Rural-Serving Status for Skilled Nursing Facilities (SNFs) in 2018

	Overall Stars – High versus Low-Moderate Quality (n=14,496)		Quality Stars – High versus Low-Moderate Quality (n=14,495)		Survey Stars – High versus Low-Moderate Quality (n=14,496)		Staffing Stars – High versus Low-Moderate Quality (n=14,481)	
	AOR (95% CI)	p	AOR (95% CI)	p	AOR (95% CI)	p	AOR (95% CI)	p
Urban SNF serving <10% rural beneficiaries	(Reference)		(Reference)		(Reference)		(Reference)	
Urban SNF serving 10%+ rural beneficiaries	0.88 (0.73, 1.05)	.16	0.66 (0.56, 0.77)	<.0001	1.05 (0.87, 1.26)	.61	0.88 (0.67, 1.15)	.35
SNF in large rural community	0.83 (0.66, 1.03)	.10	0.56 (0.47, 0.91)	<.0001	1.04 (0.84, 1.29)	.69	0.78 (0.59, 1.03)	.08
SNF in small rural community	1.03 (0.84, 1.26)	.76	0.59 (0.48, 0.73)	<.0001	1.14 (0.94, 1.36)	.18	0.91 (0.68, 1.22)	.52
SNF in isolated small rural community	1.17 (0.92, 1.49)	.21	0.75 (0.60, 0.95)	.01	1.33 (1.10, 1.62)	<.01	1.08 (0.73, 1.58)	.71

Notes: Adjusted odds ratios (AORs) represent adjusted odds that SNFs in each rural-serving category have a high star rating (4-5 stars) versus a low-moderate star rating (1-3 stars) compared to non-rural-serving urban SNFs (reference group). Models are adjusted for profit status, number of post-acute care stays, number of certified beds, certified before versus after implementation of prospective payment in July 1998, Census Division, whether the SNF is located in a hospital versus free-standing, and whether the SNF is located in a continuing care retirement community. Standard errors are clustered by state. SNF location was determined using Rural-Urban Commuting Area (RUCA) codes. Percentage of rural beneficiaries served for urban SNFs was determined using Post-Acute Care and Hospice Provider Utilization and Payment Public Use Files. Sample sizes vary across models due to differences in amount of available data for each type of star rating.
Source: 2018 Nursing Home Compare and Post-Acute Care and Hospice Provider Utilization and Payment Public Use Files.

Results from the sensitivity analysis for which we recategorized rural-serving urban SNFs as serving any rural beneficiaries versus at least 10% rural beneficiaries were generally consistent with the primary results. The number of urban SNFs considered rural-serving increased to 8,443 (80.7% of urban SNFs). There remained no significant differences in overall stars and staffing stars based on rural-serving status and rural-serving SNFs continued to be significantly less likely to have 4-5 quality stars compared to non-rural-serving urban SNFs. However, SNFs in isolated small rural communities were no longer significantly more likely to have 4-5 survey stars compared to non-rural-serving urban SNFs.

LIMITATIONS

This study has several limitations that should be considered when interpreting results. First, not all SNFs operating in 2018 were included in the analysis. There were 15,230 Medicare-certified SNFs operating in 2018,[13] so results are not generalizable to the SNFs that were excluded from analysis due to missing star ratings data or missing from the PAC PUF data set. For example, very low volume providers or providers that newly opened in late 2018 would not have enough data for calculation of star ratings and would also have data suppressed in the PAC PUF file. Second, the NHC star ratings do not include swing beds, used to provide either acute or SNF-level care by qualifying small, rural hospitals or Critical Access Hospitals. Therefore, this analysis does not provide information on quality for beneficiaries receiving SNF-level care via swing beds. Third, star ratings were designed to provide summary metrics of SNF quality that are easy to understand but are necessarily limited in their ability to show differences in individual quality measures that may be prioritized by some consumers or other stakeholders. Available individual quality measures on NHC can be used as a supplement to or replacement for star ratings, especially when overall star ratings are not well correlated with measures of interest.[14-17] Star ratings also do not include a patient and family satisfaction component, which may yield a different view of quality from star ratings.[18,19] Fourth, while we controlled for other SNF characteristics in our analysis and most star ratings include some adjustments for patient-mix, other factors not included in our models or star ratings may influence results. Finally, star ratings of rural-serving urban SNFs represent ratings for all beneficiaries served (rural plus urban beneficiaries) and ratings may be more heavily weighted towards care provided to urban beneficiaries. Research using beneficiary-level data is needed to determine whether rural beneficiaries being served by urban SNFs have similar outcomes to urban beneficiaries within those same SNFs.

CONCLUSIONS

About four-fifths of urban SNFs served at least one rural beneficiary, and among nearly one-quarter of urban SNFs' rural beneficiaries made up 10% or more of their short-stay residents, demonstrating the role of both urban and rural SNFs in providing post-acute care services to rural beneficiaries. While rural-serving status was not significantly associated with overall star ratings in our analysis that adjusted for other SNF characteristics, we found significant variation based on rural-serving status in two of the three sub-ratings used to calculate the overall star rating: quality and survey star ratings. Rural-serving urban SNFs and SNFs located in rural communities were less likely to have high quality star ratings compared to non-rural-serving urban SNFs. In contrast, SNFs located in isolated small rural communities were more likely to have high survey star ratings compared to non-rural-serving urban SNFs. Thus, our findings suggest that rural beneficiaries served by urban SNFs do not necessarily receive care from a more highly rated facility than if they received care from a rural SNF. In addition, our findings support use of both the overall star rating and the three sub-ratings when evaluating SNF quality given that the relationship between rural-serving status and star ratings is not consistent across the different types of star ratings.

Our finding of no significant relationship between overall star rating and rural-serving status is not consistent with a prior study that found rural SNFs were less likely to have an overall star rating of 4-5 stars compared to urban SNFs.[5] This difference may be related to our use of more recent data (2018 versus 2010) that used updated methodologies for calculation of star ratings and more SNF characteristics included as controls. In addition, our specification of rural-serving status split urban SNFs into rural-serving and non-rural-serving which we believe is important given the number of rural beneficiaries served by urban SNFs. It is also possible that rural SNFs have improved their quality over time to be more in line with urban SNFs as a result of improved survey and staffing star ratings that compensate for lower quality star ratings in the overall star rating calculation, or that quality of urban SNFs has declined. A longitudinal analysis of SNF star ratings that examines trends in all types of star ratings over time would be helpful for assessing quality improvement across rural-serving status but would

need to consider revisions to star ratings methodology as well as other initiatives designed to improve quality. For example, the SNF Value-Based Purchasing (SNF-VBP) is a mandatory program that awards incentive payments based on each SNF's performance on the 30-day all-cause readmissions quality measure compared to national SNF performance and within-SNF improvement over time.

Finally, it is important to note that while some beneficiaries may be able to choose between multiple SNFs, not all beneficiaries have access to multiple SNFs or highly rated SNFs. Prior research found low correlation between county-level availability of beds and availability of beds in facilities with an overall star rating of 5 stars, suggesting extensive geographic variation in access to high quality care.[4] While our models controlled for geography and our specification of rural-serving status considered intra-rural variation and recognized that some urban SNFs serve substantial proportions of rural beneficiaries, there is still heterogeneity within this categorization. Moreover, recent research suggests that certain populations have significantly worse access to highly rated SNFs, including beneficiaries who are non-white, dually eligible for Medicaid, or reside in socioeconomically disadvantaged counties.[20-22] Future research is needed to understand variation in supply of highly rated SNFs serving rural beneficiaries broadly as well as vulnerable populations in rural communities specifically.

IMPLICATIONS FOR POLICY AND PRACTICE

Rural beneficiaries traveling to receive care from urban providers even when rural providers are available in their communities, a phenomenon known as rural bypass, was first studied for hospital care and appears to be driven by both hospital-level and patient-level factors.[23-28] Our findings suggest that it is possible bypassing rural SNFs may enable some rural beneficiaries to access SNFs with higher quality star ratings. Yet bypassing a SNF in a rural community for an urban SNF with experience serving rural beneficiaries may not provide an advantage in care quality since only urban SNFs serving fewer than 10% rural beneficiaries were more likely on average to have high quality star ratings compared to rural SNFs. Of note, our study used publicly available SNF-level data instead of beneficiary-level data, so conclusions cannot be drawn about whether rural beneficiaries are actually bypassing SNFs with lower star ratings in their own communities for SNFs with higher star ratings in urban areas. Prior research using beneficiary-level data on the rural bypass phenomenon in SNFs suggests that while over two-thirds of rural beneficiaries who receive acute care from urban hospitals return to their rural communities for SNF care, there are differences in rural bypass based on characteristics of the beneficiaries and discharging hospitals.[29] This study did not include characteristics of SNFs as predictors of receiving care near home; therefore, further research is needed on the relationship between star ratings and rural bypass for SNF care. Additional studies at the beneficiary-level are also needed to examine rural bypass for SNF care and related effects on rural-serving SNFs (e.g., operating at capacity, profit margins, closures).

Also, the utility of star ratings is limited if they are not actually used in the SNF selection process. While the initial set of publicly reported quality measures on NHC resulted in increased choice of higher quality SNFs, the effect was very small.[30] Discharging hospitals may also not be providing quality information on SNFs from NHC due to concerns about violating patient choice regulations, suggesting a need for more guidance from discharge planners for patients and families regarding what data are available and how best to utilize this data in choosing a SNF.[31] Research is needed on how patients and families use star ratings when selecting SNFs and how they prioritize star ratings in decision-making with respect to other factors such as location near family and friends to allow for visiting; recommendations from family, friends, or discharging hospitals; and reputation based on factors other than star ratings. Understanding current use of star ratings in practice may help inform modifications to discharge planning processes for discharging hospitals, which are even more important in light of updated Medicare Conditions of Participation that require hospitals to provide additional assistance with transitions to post-acute care.[32]

SNFs are also in the midst of managing recent policy changes as well as the aftermath of the COVID-19 pandemic. CMS implemented an entirely new payment model for SNFs called the Patient-Driven Payment Model (PDPM) in October 2019. While the PDPM is not directly linked to quality in general or star ratings specifically, changes in payments may differentially impact SNFs based on rural-serving status, which in turn may affect resources to invest in quality initiatives. A CMS impact analysis released prior to PDPM implementation anticipated that rural SNFs will receive payment increases of about 8% on average compared to less than 3% for urban SNFs,[33] which may help some rural SNFs with lower quality star ratings invest more resources to improve or maintain quality. A recent survey suggested that rural SNFs were just as likely to employ quality improvement initiatives as urban SNFs and that more extensive quality improvement changes were associated with higher quality star ratings.[34] However, not all SNFs choose to invest in quality improvement to increase star ratings when faced with competing goals such as profit maximization.[35] Unlike the PDPM, the SNF VBP program is directly tied to quality. Starting in October 2018, all SNFs began to receive payment adjustments based on their rehospitalization rate the prior year and year-over-year improvement in rehospitalization rate. Early evaluation of the SNF VBP suggests rural SNFs outperformed urban SNFs on average, with rural SNFs significantly less likely to be penalized than urban SNFs in the first year of payment adjustments.[8] However, since the SNF VBP only uses a single quality indicator in calculations for payment adjustments, it may not incentivize improvement in other areas of quality not linked to rehospitalization. Therefore, the impact of the PDPM and the SNF VBP on SNF quality remains to be seen, especially in light of the COVID-19 pandemic, which had a disproportionate impact on both SNFs and rural communities.[36-38] Continuing research on star ratings over time will be necessary to monitor changes in quality for SNFs serving rural beneficiaries and inform policy and practice to ensure rural beneficiaries are able to access high quality post-acute care.

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