

Post-Acute Skilled Nursing Care Availability in Rural United States

Darcy McMaughan, PhD; Ifedioranma O. Anikpo, MPH; Scott Horel, MAG; Jennifer Ozmetin

Purpose

The purpose of this policy brief is to explore the availability of post-acute skilled nursing care in rural counties in the United States. The focus of the analyses is on the availability of post-acute skilled nursing care through swing bed programs in critical access hospitals (CAHs) and short-term general hospitals (STGHs), as well as skilled nursing facilities (SNFs). We look at descriptions of counties with and without post-acute skilled nursing care, and what factors are associated with counties that lack this care.

Background

Previous research on how rural patients flow from inpatient care to post-acute care suggests that rural patients are not utilizing post-acute skilled nursing care at the same rate as other, non-rural, patients. Patients admitted to rural hospitals are discharged to post-acute skilled nursing care settings at a smaller rate compared to national discharges. This raises a question of why rural patients are not discharged to post-acute skilled nursing care at a rate similar to national rates. While 20% of all hospitalized patients in the U.S. are discharged to post-acute skilled nursing care (the vast majority to skilled nursing facilities), the rural hospital discharge rate for post-acute skilled nursing care is much lower (12%), with the majority of discharges (around 80%) sent home, either to self-care or home health care (MedPAC, 2015; Freeman, Randolph, & Holmes, 2014). When rural patients are discharged to post-acute skilled nursing care, they are more likely to be discharged to SNFs. Almost 90% of post-acute skilled nursing care days are provided by community-based SNFs (Reiter & Freeman, 2011). A small portion of those rural hospital discharges to post-acute skilled nursing care (14% of the 12%) are sent

¹ For the purpose of this brief, skilled nursing availability is defined as the presence of a skilled nursing facility in the geographic area of interest, or the presence of a critical access hospital with a licensed swing bed program in the geographic area of interest.

Key Findings

- ◆ Overall, most rural counties (92%) in the United States have at least one facility providing post-acute skilled nursing care (in the form of swing bed programs or skilled nursing facilities). By rural county designation, the majority of micropolitan (96%) and noncore counties (90%) had post-acute skilled nursing. Examining post-acute skilled nursing services by provider setting, swing bed services were available¹ in 44% of micropolitan counties and 61% of noncore counties. Skilled nursing facility services were available in 95% of micropolitan counties and 83% of noncore counties.
- ◆ However, 8% of rural counties contained no post-acute skilled nursing care. The majority of those counties were rural noncore counties (127 counties, or 10% of the noncore counties). About 4.1% of rural micropolitan counties (26 counties) had no post-acute skilled nursing services.
- ◆ Counties with no post-acute skilled nursing care were less densely populated (less than 10 people per square mile), less impoverished, and had a (relatively) higher proportion of black residents.
- ◆ The percentage of the population 65 years and older was not associated with the presence of post-acute skilled nursing in a rural county.

to swing beds in swing bed programs.² This may be due to a number of factors, including the availability of post-acute skilled nursing care providers, and characteristics of the communities in which post-acute skilled nursing care providers are found. In 2008, while the majority (80%) of rural counties contained at least one option for post-acute skilled nursing, 8.3% of the more rural counties offered swing beds as the only option for post-acute skilled nursing care, and 11.3% lacked any type of post-acute skilled care (Reiter & Freeman, 2011).

This policy brief presents updated information on the availability of post-acute skilled nursing care providers (skilled nursing facility and swing bed programs) in rural counties. It also provides an analysis of contextual factors that describe counties lacking any post-acute skilled nursing. Using data from the Area Health Resource Files (AHRF) and the Flex Monitoring Team database we describe counties with and without post-acute skilled nursing and then use a logistic regression model to evaluate the factors associated with post-acute skilled nursing care availability in rural counties.

Methods

Data Sources and Variables

Data for the analyses were obtained from three sources: the 2014 county-level AHRF located in the HRSA data warehouse, Urban-Rural codes available from the National Center for Health Statistics (NCHS), and 2017 CAH data obtained from the Flex Monitoring Team database.

The Flex data contained CAH name, location, and swing bed licensure status. Data on the location and number of STGHs with swing beds and the number of SNFs per county, hospital utilization rates, population distribution, population density, racial and ethnic breakdown, poverty levels per county,³ and the density of older adults per county were obtained from the AHRF. The NCHS Urban-Rural codes contain indicators of rurality, which were defined as the two nonmetropolitan levels in the 2013 Urban-Rural Classification scheme of the NCHS: Micropolitan – counties in micropolitan statistical areas; Noncore – non-metropolitan counties that did not qualify as micropolitan.⁴

All three data sets were merged by county Federal Information Processing Standard (FIPS) codes. Variables were created representing availability of post-acute skilled nursing care in a given county. For example, the AHRF variable containing the number of skilled nursing facilities per county in 2014 was recoded and dichotomized to obtain a new variable representing counties with or without skilled nursing facilities. This recoding and dichotomizing was performed for the number of STGHs with swing beds in the AHRF data and the number of CAHs with swing bed licensure in the Flex data.

² Swing beds are hospital beds used to provide both acute and post-acute skilled nursing care for hospitalized patients after a minimum three-day inpatient stay. Rural hospitals with 100 or fewer beds are eligible, through Medicare, to participate in the swing bed program. This program allows rural patients needing post-acute skilled nursing care to remain in hospital facilities after being discharged from acute care, and provides an alternative to post-acute skilled nursing care in a SNF. Swing bed programs arose out of a recognition by Congress that rural hospitals had excess bed capacity and low volume. This low volume allowed small, rural hospitals the flexibility to ‘swing’ beds from acute to post-acute skilled care, without the need for an entire skilled nursing unit.

³ This poverty variable is sourced from the Census Bureau’s Small Area Income and Poverty Estimates Program based on the Census Bureau’s poverty definition. This definition can be found at: <https://www.census.gov/topics/income-poverty/poverty/guidance/poverty-measures.html>

⁴ The 2013 Urban-Rural Classification scheme of the National Center for Health Statistics can be found at: https://www.cdc.gov/nchs/data_access/urban_rural.html

Analysis

Descriptive Analysis: Describing Counties With and Without Post-Acute Skilled Nursing Care. Summary statistics were computed to obtain the proportions of rural counties with and without swing bed services and skilled nursing facilities. Characteristics of counties with no post-acute skilled nursing care were further analyzed for contextual information on county population, older adult population, race, and percentage of persons in poverty.

Logistic Regression Analysis: Comparing Counties With and Without Post-Acute Skilled Nursing Care. The data were also modeled using logistic regression procedures to calculate odds ratios to describe the odds of a county having post-acute skilled nursing care, given the following: county population per square mile, percentage population living in poverty, percentage older adult population, number of hospitals (STGHs) with $\geq 80\%$ utilization rate, percentage black population, and percentage Hispanic population. This analysis provides a comparison of the

characteristics of counties with post-acute skilled nursing care to counties without post-acute skilled nursing care. If the odds ratio of a county characteristic is greater than 1 (OR>1), then that characteristic is associated with higher odds of a county having post-acute skilled nursing care, compared to the reference category.

Results

Results show that post-acute skilled nursing care was available in the vast majority (92%) of rural counties in the study (**Table 1**). However, there were 26 micropolitan counties (4.1%) and 127 noncore counties (10%) with no post-acute skilled nursing services available ($p < 0.001$). See **Figure 1** (next page) for a map of counties with no post-acute skilled nursing services. We further find that 44% of rural micropolitan counties and 61% of rural noncore counties have swing bed programs ($p = 0.001$). In contrast, SNFs were available in 95% of rural micropolitan counties and 83% of rural noncore counties ($p = 0.054$).

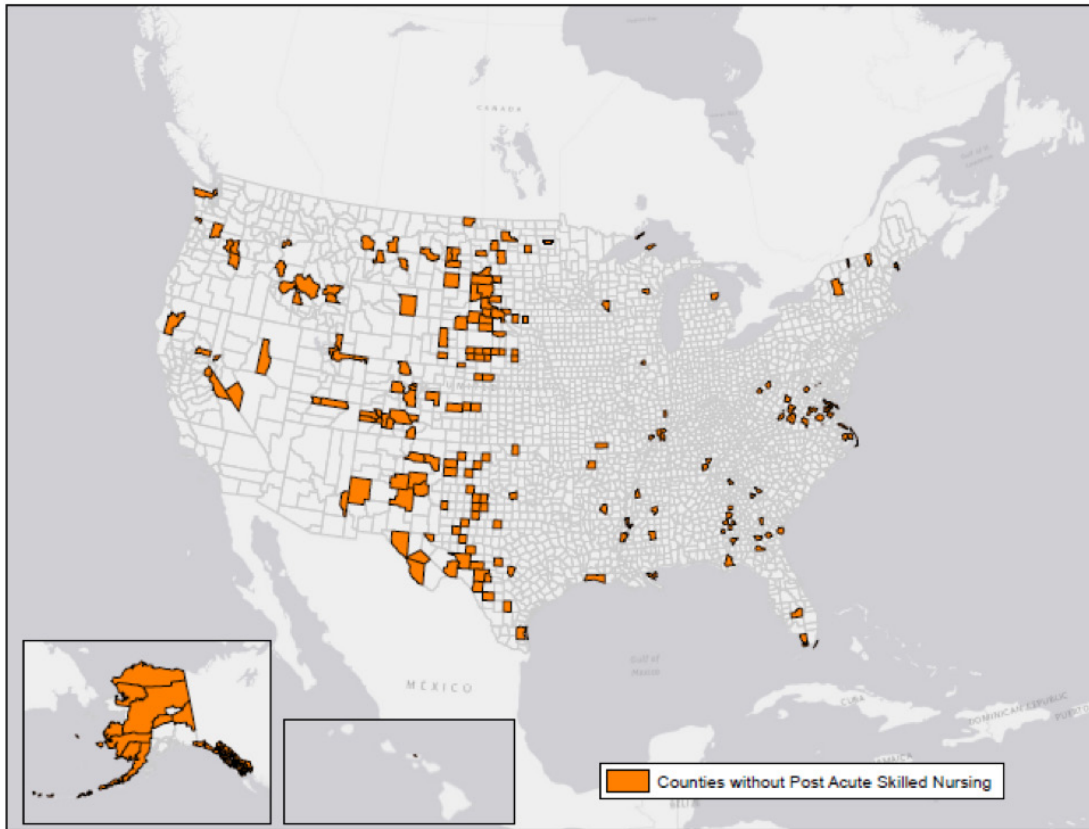
Table 1: Distribution of Rural Micropolitan and Noncore Counties based on Availability of Post-Acute Skilled Nursing Services.

Characteristics	Micropolitan (n=641)	Noncore (n=1339)	All Rural Counties (n=1,980)
Counties with swing beds	44% (280) †	61% (822) †	56% (1,102)
Counties with only swing beds	1% (8) †	8% (93) †	5% (101)
Counties with SNFs	95% (607)	83% (1109)	87% (1,716)
Counties with only SNF	52% (335) †	28% (380) †	36% (715)
Counties with both swing beds and SNFs	42% (272) †	55% (729) †	51% (1,001)
Counties with any post-acute skilled nursing (swing bed or SNF)	96% (615)	90% (1202)	92% (1817)
Counties with no post-acute skilled nursing (no swing bed and no SNF)	4% (26) †	10% (127) †	8% (153)

Note: Percentages shown are proportions of total number of counties with available information. Any counties with missing values for each category were excluded where necessary, hence, some percentages may differ slightly from the percentages obtainable from the county numbers shown (n) for micropolitan and noncore counties.

† Indicates Significant Difference Between Micropolitan and Noncore

Figure 1: Map of Counties without Post-Acute Skilled Nursing



Characteristics of Rural Counties with No Post-Acute Skilled Nursing

Table 2 (next page) shows the detailed distribution of county populations and other features of micropolitan and noncore counties that have no post-acute skilled nursing.

Rural micropolitan counties with no post-acute skilled nursing services: Twenty-six (4%) of the 641 micropolitan counties in the data set contained no post-acute skilled nursing care. The mean population for these micropolitan counties was 8,657, and the median population was 4,318, with a range of 400 to 52,921. The majority of these counties (80%) had populations of less than 10,000 individuals. The mean older adult population was 1,143 and ranged from 61 to 4,312, and the percentage older adult populations ranged from 8.1% to 30.9% of the county population. The percentage of persons in poverty ranged from 6.3% to 29.1% of county population. Twenty-five

of the 26 micropolitan counties with no post-acute skilled nursing (96%) had majority (>50%) white populations.

Rural noncore counties with no post-acute skilled nursing services: One hundred and twenty-seven (9.6%) of the 1,339 noncore counties in the U.S. contained no post-acute skilled nursing services. The mean population for these noncore counties with no post-acute skilled nursing care was 4,067, and the median population was 2,649. Populations ranged from a minimum of 86 to a maximum of 19,706. As with micropolitan counties with no post-acute skilled nursing, the majority of these counties (90%) were sparsely populated with less than 10,000 individuals living in the county. The mean older adult population was 766 and ranged from 13 to 5,184, and the percentage older adult population ranged from 4.8% to 35% of the county population. The percentage of persons in poverty ranged from 7.1% to 47.4%. One hundred and seven counties (84%) had majority (>50%) white populations.

Table 2: Features of Micropolitan and Noncore Counties that have no Post-Acute Skilled Nursing

Population	Micropolitan		Noncore	
Mean Population	8,657		4,067	
Median Population	4,318		2,649	
Population Distribution	Number of Counties	Percentage %	Number of Counties	Percentage %
0 – 499	2	8%	4	3%
500 – 999	2	8%	25	20%
1000 – 4999	10	38%	65	51%
5000 – 9999	7	27%	21	17%
≥ 10,000	5	19%	12	9%
Population Density (per sq. mile)	Micropolitan		Noncore	
Distribution	Number of Counties	Percentage %	Number of Counties	Percentage %
≤1	5	19%	35	28%
>1 to 5	6	23%	58	46%
>5 to 10	4	15%	12	9%
>10	11	42%	22	17%
Older Adult Population (2014)	Micropolitan		Noncore	
Mean Older Adult Population	1,143		766	
Older Adult Population Range	61 to 4,312		13 to 5,184	
% Older Adult Population Range	8% to 31%		5% to 35%	
Poverty (2014)	Micropolitan		Noncore	
Mean Persons in Poverty	1027		752	
Persons in Poverty Range	69 to 4,116		8 to 4,671	
% Persons in Poverty Range	6% to 29%		7% to 47%	
Race (White Population) 2010	Micropolitan		Noncore	
Counties with >50% White Population	25		107	
% Counties with >50% White Population	96%		84%	

Multivariable Logistic Regression Analysis

As shown in **Table 3**, counties with population densities less than 10 people per square mile were significantly less likely to have post-acute skilled nursing compared to counties with higher population densities. The lower the population density, the lower the odds of post-acute skilled nursing availability. Counties with higher relative percentage black populations were also significantly less likely to have post-acute skilled nursing care (compared to counties with less than 10% black pop-

ulation). On the other hand, having a larger portion of the population in poverty was associated with a greater odds of having post-acute skilled nursing care. Compared to counties with less than 10% population in poverty, counties with higher percentage populations in poverty were significantly more likely to have skilled nursing services available. The percentage elderly population, number of hospitals with high utilization rates, and percentage Hispanic population were not significantly associated with the availability of post-acute skilled nursing care.

Table 3 – Multivariate Analysis of Selected Factors Associated with Post-Acute Skilled Nursing Availability in Rural Counties

		Post-Acute Skilled Nursing Availability in Rural Counties	
Factor	Values	Odds Ratio (Adjusted)	95% CI
Pop. Density (per sq. mile) 2014	≤1	0.006	0.003 – 0.013 [†]
	>1 to 5	0.046	0.025 – 0.087 [†]
	>5 to 10	0.153	0.073 – 0.320 [†]
	>10	Ref	-
% Pop. In Poverty (2014)	<10%	Ref	-
	10% to <20%	3.710	2.063 – 6.674 [†]
	≥20%	2.889	1.439 – 5.800 [†]
% Elderly Pop (2014)	<20%	Ref	-
	≥20%	0.833	0.543 – 1.279
Hosp with 80+% Utilization Rate (STGH) 2014	None	Ref	-
	One or more	5.031	0.657 – 38.500
% Black Pop (2010)	<10%	Ref	-
	10-50%	0.168	0.078 – 0.361 [†]
	>50%	0.161	0.051 – 0.508 [†]
% Hispanic Pop (2010)	<10%	Ref	-
	10-50%	0.782	0.486 – 1.260
	>50%	0.406	0.163 – 1.011

[†] Of Significant Value

Discussion

Most rural counties in this study (92%) contained facilities offering post-acute skilled nursing care. This is an increase from the 80% of rural counties in 2008 found in the Reiter and Freeman study (Reiter & Freeman, 2011). Similarly, while the majority of rural counties did have some form of post-acute skilled nursing care, 8% (153 rural counties) did not offer any post-acute skilled nursing care, representing a 27% decrease (from 11%) in the number of counties lacking this care since 2008. In our study, counties lacking post-acute skilled nursing care were mostly noncore, predominantly white, and were more likely to be sparsely populated and less impoverished. Although most of the counties with no post-acute skilled nursing had populations that were majority white, a higher relative percentage of black residents was still associated with lack of available post-acute skilled nursing. Contrary to expectations, the number of older adults living in a county appeared to have no effect on whether or not the county had post-acute skilled nursing care.

Implications

Access to post-acute skilled nursing care in rural America can take many forms. Access can be defined as the physical presence of facilities offering post-acute skilled nursing care, the ability of rural residents to transport themselves to post-acute skilled nursing facilities, and the ability of rural residents to pay for post-acute skilled nursing. Before other access issues such as transportation and affordability can be fully explored, a very important condition must first be met—facilities offering post-acute skilled nursing care must be physically present in rural areas. This research shows that portions of rural America are possibly skilled nursing deserts, thus lacking the physical presence of any facility (SNFs, CAHs or STGHs) that provides post-acute skilled nursing care. These post-acute skilled nursing deserts affect an estimated 741,598 rural residents, among them about 127,043 elderly individuals, residing in a total of 153 rural counties.

Study Limitations & Recommendations

Further research is recommended, as this brief is only the first step in determining gaps in post-acute skilled nursing care in rural America. The number of rural residents forfeiting needed post-acute skilled nursing care may be higher once other factors related to access to care are explored. For example, a large county with concentrated pockets of residents may indeed contain facilities offering post-acute skilled nursing care. However, these facilities may be inaccessible to residents on the more remote edges of the county (Cococino County in Arizona on the Arizona/Utah border is an example). It is also possible that rural residents needing post-acute skilled nursing care are relocated to facilities far from home. This could be explored in future research comparing residents' ZIP code of residence to ZIP code of the facility where residents receive care, or through a case study analysis of a county with no post-acute skilled nursing care. Furthermore, given that counties having skilled nursing were more likely to have higher poverty percentages, it is worth exploring the relationship between other factors that may be related to poverty such as state Medicaid generosity and Medicaid expansion.

This policy brief also does not take into account possible differences in quality of care or outcomes between SNFs and CAHs or STGHs with swing beds. Nor does it take into account issues related to access to post-acute skilled nursing care, such as lack of Medicare providers or affordable care. A full post-acute care needs assessment would help determine the nature of post-acute care gaps in rural America, and predict future care issues should the availability of rural post-acute skilled nursing decline. Furthermore, to better understand the impact of CAH and STGH swing beds in rural America, a full comparison of the costs, quality, and access issues around SNF and CAH/STGH swing beds is necessary. It is important to understand what factors affect where patients receive post-acute skilled nursing care, and how much individual choice and care availability affect the receipt of post-acute care.

In addition, the NCHS urban-rural codes were unavailable for 85 counties, most of which were in the U.S. island territories of Puerto Rico, Guam, and the Virgin Islands. Hence, our analysis did not include most of these territories. Categorizing counties with swing bed facilities using AHRF data for STGHs and Flex data for CAHs brought about the possibility of double-counting swing-bed facilities. However, this did not affect the validity of the results because the analysis focused on county-level counts and not actual number of facilities. This effect was found to be favorable for the analysis, as it ensured that no counties with any kind of swing bed facility was omitted. Similarly, swing bed data obtained from AHRF did not clearly identify which facilities were Progressive Payment System hospitals. There exists a possible loss of information at the facility (or other sub-county) level due to analysis of aggregate level data. Thus, interpretations should be limited to the county level. The analysis did not take into consideration other environmental or geographical factors that may also account for the absence of a facility in a county.

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Darcy McMaughan¹; Ifedioranma O. Anikpo; Scott Horel¹; Jennifer Ozmetin¹;

¹Department of Health Policy and Management, School of Public Health, Texas A&M University, College Station, TX 77843-1266, USA; dmcmaughan@tamu.edu (D.M.)

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Southwest Rural Health Research Center
Texas A&M School of Public Health
212 Adriance Lab Road
MS 1266
College Station, TX 77843

For more information, contact Natasha Johnson:
Phone | 979.436.9512
Email | nyjohnson@tamu.edu



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