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Who Owns Rural Hospitals? A Comparison of Findings across Four National Datasets

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INTRODUCTION

Recent mergers and acquisitions[1] and the rise of private equity in health care have raised concerns among researchers, hospital practitioners, and lawmakers. Changes in hospital ownership have been linked to various outcomes, including medical productivity,[2] preventable adverse clinical effects,[3,4] and the type of services provided.[5] These recent trends indicate the need for an updated national profile of current hospital ownership. Although multiple national datasets include information on hospital ownership, there is uncertainty about whether the datasets agree or disagree on commonly reported characteristics. A thorough comparison can examine the level of agreement across datasets and provide greater insight into the ownership traits of rural and urban hospitals.

Among recent studies examining hospital ownership, only a few stratify findings based on hospital rural-urban status. Jiang and colleagues examined acquired hospitals in rural ZIP Codes and matched control-group rural hospitals from 2009 to 2016. Among 721 selected rural hospitals, the authors found that 46.1 percent of hospitals had public ownership, 49.4 percent of hospitals had nonprofit ownership, and 4.6 percent of hospitals had for-profit ownership, as recorded in American Hospital Association (AHA) Annual Survey data.[6] Furthermore, Oyeka and colleagues examined 2020 AHA survey data for hospitals in nonmetropolitan counties and found 52.1 percent of these hospitals belonged to a system.[7]

The objective of this study was to build on previous findings by comparing reported hospital ownership characteristics across multiple major national datasets while stratifying on hospital rural-urban status. By examining the concordance (or discordance) in reported data across major datasets, our analysis can serve as a useful resource for researchers and health policymakers requiring accurate information on hospital ownership.

KEY FINDINGS

Comparing reported ownership characteristics across multiple datasets, this study found that:

- Most rural short-term, nonfederal acute care hospitals reported nonprofit or government ownership, including 90.2 percent of rural hospitals recorded by the Healthcare Cost Report Information System (HCRIS) and 87.4 percent of rural hospitals recorded by the Provider Enrollment, Chain, and Ownership System (PECOS).
- 5.0 percent of rural hospitals recorded by PECOS had evidence of private equity ownership; in comparison, 3.7 percent of rural hospitals recorded by the Private Equity Stakeholder Project (PESP) Hospital Tracker had evidence of private equity ownership.
- 48.9 percent of rural hospitals recorded by HCRIS and 60.1 percent of rural hospitals recorded by the Agency for Healthcare Research and Quality (AHRQ) Compendium of U.S. Health Systems reported belonging to a hospital system.
- Hospitals that reported the same ownership and affiliation across datasets were significantly more likely to have Critical Access Hospital status, Rural Health Clinic services, fewer acute beds, fewer full-time equivalents, lower net patient revenue, and greater outpatient revenue as a percentage of total revenue.
- Health policy researchers interested in hospital ownership should consider possible differences in variable reporting across national datasets and whether these differences will have important effects on analyses.

METHODS

Sample, Data, and Measures

We included ownership data from the following four sources in the study:

1. *Centers for Medicare & Medicaid Services (CMS) Healthcare Cost Reporting Information* System *(HCRIS).* The study sample included short-term, nonfederal acute care hospitals (excluded specialty, federal, and

Indian Health Service [IHS] hospitals) identified in the 2023 release of data from HCRIS.[8] HCRIS is the system used by CMS to collect and store cost report data from Medicare Administrative Contractors on health care providers who provide services to Medicare clients and seek reimbursement from CMS. The HCRIS data are often used by researchers to analyze trends in Medicare services, compare different providers' costs, and determine where improvements in hospital management can be made.[9–11] After identifying hospitals with cost reports covering a period of at least 360 days, we used data from Worksheet S-2, Part I, Line 21, Column 1 to identify the type of ownership control for each hospital. Specifically, we classified hospitals into one of the following five ownership categories: nonprofit or government-owned; sole proprietor; proprietary (i.e., for-profit) corporation; proprietary partnership; and other types of proprietary ownership. In addition, we used data from Worksheet S-2, Part I, Line 141, Column 1 to identify the system affiliation status of each hospital.

2. *CMS Provider Enrollment, Chain, and Ownership System (PECOS)*. We used November 2023 data from the CMS Hospital Enrollments file[12] which is sourced from PECOS and provides self-reported enrollment information (e.g., organization/ownership type, nonprofit/for-profit status, address, CMS Certification Number [CCN]) for all hospitals currently enrolled in Medicare. Using hospital CCN identifiers, we merged the Hospital Enrollments data with HCRIS data to compare hospital ownership characteristics across the two datasets. We also used November 2023 data from the CMS Hospital All Owners file to gather information on private equity ownership of hospitals.[13] The Hospital All Owners data are sourced from PECOS and include additional self-reported ownership characteristics beyond those provided in the Hospital Enrollments file. To classify private equity ownership using the All Owners data, we identified all hospitals that reported having at least one owner designated as either a holding company or investment firm.

3. *Private Equity Stakeholder Project (PESP)*. We used January 2024 data from PESP to gather further information on private equity ownership of hospitals.[14] The PESP's Hospital Tracker directly identifies hospitals with private equity ownership through a combination of news searches and the online PitchBook data platform,[15] which tracks private equity-related firms and deals. We merged the Hospital All Owners and PESP data to the combined HCRIS and Hospital Enrollments dataset using hospital CCN identifiers.

4. *Agency for Healthcare Research and Quality (AHRQ)*. We used the AHRQ Compendium of U.S. Health Systems.[16] Released in December 2023, the newest Compendium is based on underlying data from IQVIA OneKey and AHA Annual Survey databases.[17,18] The Compendium combines, matches, and harmonizes data from both sources to provide current information on U.S. health systems, which are defined as systems that include at least one hospital and at least one group of physicians providing comprehensive care who relate to each other and with the hospital through common ownership or joint management. The Compendium is used to track trends in health system affiliation and consolidation over time and provides information on the structure, staffing, and program participation of U.S. health systems. We identified hospitals in the Compendium that were part of a system based on the presence or absence of a health system ID. As with the previous steps, we merged AHRQ Compendium data to the other data files using hospital CCN identifiers.

A summary of study outcomes by data source is provided in Appendix Table A1.

Lastly, we identified the rural status of each hospital using criteria outlined by the Federal Office of Rural Health Policy (FORHP) in the Health Resources & Services Administration (HRSA) starting in fiscal year 2022.[19] Namely, we considered a hospital to be rural if the hospital was located in a nonmetropolitan county, OR a metropolitan Census tract with a Rural-Urban Commuting Area (RUCA) code between 4 – 10, OR a large area metropolitan Census tract of at least 400 square miles in area with a population density of 35 or less per square mile and a RUCA code between 2 – 3, OR an outlying metropolitan county without an urbanized area.

Statistical Analyses

In our initial analysis, we used the chi-square test of independence to examine whether the distribution of reported hospital ownership type (nonprofit or government-owned vs. sole proprietor vs. proprietary corporation vs. proprietary partnership vs. proprietary "other" owner) differed across HCRIS and PECOS datasets.

Our second analysis examined whether reported hospital private equity ownership differed across PECOS and PESP datasets, and our third analysis examined whether reported hospital system affiliation differed across HCRIS and AHRQ datasets. Each of these analyses used the chi-square test of independence as well.

For our fourth analysis, we separated hospitals into two groups. The first group included hospitals that reported the same (i.e., consistent) ownership and system affiliation characteristics across all datasets – hospitals with the same reported ownership type across HCRIS and PECOS databases, the same private equity ownership status across PECOS and PESP databases, and the same system affiliation status across HCRIS and AHRQ databases. The second group included hospitals with inconsistent ownership or system affiliation characteristics (e.g., a hospital that reported as nonprofit in HCRIS and for-profit in PECOS). After separating hospitals into groups, we investigated if there were additional differences between hospitals with consistent ownership and affiliation characteristics and hospitals with inconsistent characteristics. Specifically, we explored group-level differences in hospital location (i.e., Census division), Medicare payment classification, long-term care and Rural Health Clinic service availability, number of acute beds, number of full-time equivalents, net patient revenue, outpatient revenue, and uncompensated care. We tested for differences in hospital characteristics using the chi-square test of independence (categorical variables) and the *t*-test for equality of means (continuous variables). For tests involving continuous variables, we also conducted sensitivity analyses using the nonparametric Wilcoxon rank-sum test.

We stratified all analyses based on hospital rural-urban status. In addition, we completed all analyses using the R programming language, version 4.3.1.

RESULTS

Table 1 compares reported ownership type for rural hospitals across HCRIS and PECOS datasets. Among 2,151 rural hospitals with available HCRIS and PECOS data, we found that the majority reported nonprofit or government ownership (90.2 percent of HCRIS observations and 87.4 percent of PECOS observations). The next most common ownership type was proprietary corporation, with 8.9 percent of HCRIS observations and 10.2 percent of PECOS observations belonging to this category. The least common ownership types were sole proprietor (0.2 percent of HCRIS observations and 0.0 percent of PECOS observations), proprietary partnership (0.4 percent of HCRIS observations and 0.7 percent of PECOS observations), and proprietary "other" (0.3 percent of HCRIS observations and 1.7 percent of PECOS observations). The chi-square test of independence yielded a *p*-value less than .001, indicating a statistically significant difference in the distribution of reported hospital ownership type between the HCRIS and PECOS datasets. Appendix Table A2 provides additional information on the distribution of reported rural hospital ownership type within each dataset; approximately 100 rural hospitals designated as nonprofit in HCRIS were designated as proprietary corporations, proprietary "other", or had missing ownership data in PECOS. Appendix Table A3 compares reported ownership type for *urban* hospitals across HCRIS and PECOS datasets; relative to rural hospitals, urban hospitals had a lower percentage of nonprofit or government ownership (74.6 percent of HCRIS observations and 74.3 percent of PECOS observations) and a greater percentage of proprietary corporation ownership (19.7 percent of HCRIS observations and 21.1 percent of PECOS observations) and proprietary partnership ownership (3.4 percent of HCRIS observations and 2.9 percent of PECOS observations).

Table 1. Comparison of Reported Rural Hospital Ownership across HCRIS and PECOS Datasets (*n* = 2,151)

	HCRIS	PECOS	*p*[a]
Nonprofit or Government-Owned	90.2%	87.4%	
Sole Proprietor	0.2%	0.0%	
Proprietary Corporation[b]	8.9%	10.2%	< .001
Proprietary Partnership	0.4%	0.7%	
Proprietary Other	0.3%	1.7%	

Notes: Among 2,176 rural hospitals, 25 hospitals (1.1%) had missing PECOS data. Percentages in Table 1 are among 2,151 hospitals with available HCRIS and PECOS data.

Abbreviations: HCRIS = Healthcare Cost Report Information System; PECOS = Provider Enrollment, Chain, and Ownership System.

[a] *p*-value for chi-square test of independence, testing association between ownership characteristics and dataset. The chi-square test also yields $p < .001$ when excluding the "Sole Proprietor" row from analysis due to small cell size.

[b] Includes Limited Liability Companies (LLCs).

Table 2 compares reported rural hospital private equity ownership across PECOS and PESP datasets. Among 2,150 rural hospitals with available PECOS and PESP data, we found that 5.0 percent of PECOS observations had evidence of private equity ownership and 3.7 percent of PESP observations had evidence of private equity ownership. The chi-square test of independence yielded a *p*-value equal to .19, indicating the difference in reported private equity ownership between the PECOS and PESP datasets was not statistically significant. Appendix Table A4 shows that this result was driven by agreement between the two datasets on which hospitals did *not* have private equity ownership rather than on which hospitals *did* have evidence for private equity ownership. Appendix Table A5 compares reported *urban* hospital private equity ownership across datasets. According to PECOS, urban hospitals were more likely than rural hospitals to have private equity ownership (9.0 percent of urban hospital observations vs. 5.0 percent of rural hospital observations). However, the PESP dataset suggests that the likelihood of private equity ownership was similar among urban and rural hospitals (3.5 percent of urban hospital observations vs. 3.7 percent of rural hospital observations). Appendix Figures A1 and A2 show how the proportion of rural hospitals with for-profit or private equity ownership differs by state and dataset. Collectively, the two figures demonstrate that rural hospitals in the southern half of the United States are more likely to have evidence of for-profit or private equity ownership. In some states, as many as one-third of rural hospitals have for-profit or private equity ownership.

Table 2. Comparison of Reported Rural Hospital Private Equity Ownership across PECOS and PESP Datasets (*n* = 2,150)

	PECOS	PESP	*p*[a]
Private Equity Ownership			
Yes	5.0%	3.7%	.19
No	95.0%	96.3%	

Notes: Among 2,176 rural hospitals, 25 hospitals (1.1%) had missing PECOS data, and 1 hospital (0.1%) had missing PESP data. Zero hospitals had missing data from both datasets. Percentages in Table 2 are among 2,150 hospitals with available PECOS and PESP data.

Abbreviations: PECOS = Provider Enrollment, Chain, and Ownership System; Private Equity Stakeholder Project.

[a] *p*-value for chi-square test of independence, testing association between private equity ownership and dataset.

Table 3 compares reported rural hospital system affiliation across HCRIS and AHRQ datasets. Among 2,172 hospitals with available HCRIS and AHRQ data, we found that 48.9 percent of HCRIS observations and 60.1 percent of AHRQ observations reported belonging to a system; this difference in reported system affiliation was statistically significant based on the chi-square test of independence ($p < .001$). Appendix Table A6 shows that, among 1,306 rural hospitals designated as system-affiliated by AHRQ, 327 were designated as unaffiliated by HCRIS. Appendix Table A7 compares reported urban hospital system affiliation across datasets. Urban hospitals were more likely than rural hospitals to be system affiliated, with 76.3 percent reporting system affiliation in HCRIS and 89.8 percent reporting system affiliation in AHRQ data.

Table 3. Comparison of Rural Hospital System Affiliation across HCRIS and AHRQ Datasets (*n* = 2,172)

	HCRIS	AHRQ	*p*[a]
System Affiliation			
Yes	48.9%	60.1%	< .001
No	51.1%	39.9%	

Notes: Among 2,176 rural hospitals, 4 hospitals (0.2%) had missing AHRQ data. Percentages in Table 3 are among 2,172 hospitals with available HCRIS and AHRQ data.

Abbreviations: HCRIS = Healthcare Cost Report Information System; AHRQ = Agency for Healthcare Research and Quality.

[a] *p*-value for chi-square test of independence, testing association between system affiliation and dataset.

Table 4 provides a comparison of rural hospitals with the same (i.e., consistent) ownership and system affiliation characteristics across datasets versus different (i.e., inconsistent) characteristics. In total, we analyzed 2,147 hospitals with available information across HCRIS, PECOS, PESP, and AHRQ datasets. 1,606 rural hospitals had consistent ownership and system affiliation characteristics, and 541 hospitals had inconsistent characteristics. We found that ownership and system consistency was significantly associated with hospital Census division and region; rural hospitals

with consistently reported characteristics were more likely to be in the East North Central, West North Central, Mountain, and Pacific divisions (Midwest and West Census regions), and rural hospitals with inconsistent reported characteristics were more likely to be in the New England, Middle Atlantic, South Atlantic, East South Central, and West South Central divisions (Northeast and South Census regions). Reporting consistency was also significantly associated with Medicare payment classification, as Critical Access Hospitals were more likely to have consistent reported characteristics compared to other types of rural hospitals. Furthermore, rural hospitals with consistent reported characteristics were more likely to have Rural Health Clinic services, fewer acute beds, fewer full-time equivalents, lower net patient revenue, and a greater outpatient revenue as a percentage of total revenue. Appendix Table A8 provides a comparison of urban hospitals with consistent versus inconsistent reported characteristics. The consistency of reported characteristics among urban hospitals was also significantly associated with hospital Census division and Medicare payment classification. The statistical significance of associations with other urban hospital characteristics (e.g., acute beds, full-time equivalents, net patient revenue, uncompensated care) differed based on the type of test used (*t*-test versus Wilcoxon test; see Appendix Table A8 for additional details).

Table 4. Comparison of Rural Hospitals with Consistent Vs. Inconsistent Ownership Reports

	Hospitals with Consistent Ownership Characteristics[a] (*n* = 1,606)	Hospitals with Inconsistent Ownership Characteristics[b] (*n* = 541)	*p*[c]
Census Division, *n* (%)			
East North Central	251 (15.6)	76 (14.0)	
East South Central	177 (11.0)	67 (12.4)	
Middle Atlantic	59 (3.7)	34 (6.3)	
Mountain	172 (10.7)	48 (8.9)	
New England	46 (2.9)	17 (3.1)	< .001
Pacific	129 (8.0)	17 (3.1)	
South Atlantic	136 (8.5)	88 (16.3)	
West North Central	397 (24.7)	107 (19.8)	
West South Central	239 (14.9)	87 (16.1)	
Medicare Payment Classification, *n* (%)			
Critical Access Hospital	1,009 (62.8)	270 (49.9)	
Medicare-Dependent Hospital	83 (5.2)	37 (6.8)	
Prospective Payment System[d]	171 (10.6)	86 (15.9)	< .001
Rural Referral Center	55 (3.4)	26 (4.8)	
Sole Community Hospital	200 (12.5)	71 (13.1)	
Joint Designation or Other	88 (5.6)	51 (9.4)	
Has Long-Term Care Services, *n*[e] (%)	291 (18.1)	97 (17.9)	.93
Has Rural Health Clinic Services, *n* (%)	986 (61.4)	297 (54.9)	< .01
Acute Beds, Mean (SD)	40.6 (44.3)	51.8 (58.5)	< .001
Full-Time Equivalents, Mean (SD)	303.4 (420.9)	403.5 (472.5)	< .001
Net Patient Revenue ($10M), Mean (SD)	6.0 (8.2)	7.6 (9.6)	< .001
Percent Outpatient Revenue,[f] Mean (SD)	77.1 (12.3)	74.9 (12.7)	< .001
Percent Uncompensated Care,[g] Mean (SD)	4.4 (4.5)	4.5 (4.0)	.61

Notes: 29 hospitals (1.3%) were excluded from analysis; 25 hospitals had missing PECOS data, 1 hospital had missing PESP and AHRQ data, and 3 hospitals had missing AHRQ data only. Summary statistics in Table 4 are among 2,147 hospitals with available HCRIS, PECOS, PESP, and AHRQ data.
Abbreviations: SD = standard deviation; HCRIS = Healthcare Cost Report Information System; PECOS = Provider Enrollment, Chain, and Ownership System; PESP = Private Equity Stakeholder Project; AHRQ = Agency for Healthcare Research and Quality.
[a] Hospitals with consistent ownership and system affiliation characteristics reported across the HCRIS, PECOS, PESP, and AHRQ datasets.
[b] Hospitals with inconsistent ownership or system affiliation characteristics reported across the HCRIS and PECOS datasets, PECOS and PESP datasets, or HCRIS and AHRQ datasets.
[c] *p*-value associated with either chi-square test of independence (categorical variables) or *t*-test for equality of means (continuous variables). We also assessed continuous variables using the nonparametric Wilcoxon rank-sum test. Findings for the Wilcoxon test were similar to those from the *t*-test for equality of means.
[d] Hospital is a Prospective Payment System hospital with no other special payment designations.
[e] 1 hospital had missing data for the provision of long-term care services.
[f] Expressed as a percentage of total patient revenue.
[g] Expressed as a percentage of total operating expenses.

DISCUSSION

The objective of this study was to compare reported hospital ownership characteristics across multiple major national datasets while stratifying on hospital rural-urban status. Approximately three-fourths of rural hospitals and two-thirds of urban hospitals had consistent reported ownership and system affiliation characteristics across datasets. Among rural hospitals, the reported characteristics most likely to differ by dataset were general ownership type (e.g., nonprofit or government-owned versus for-profit) and system affiliation. Among urban hospitals, the reported characteristics most likely to differ by dataset were private equity ownership and system affiliation.

Previous research does not provide many opportunities for direct comparison with our results because they often did not stratify findings based on hospital rural-urban status.[20–22] In contrast, Jiang and colleagues examined 721 selected hospitals in rural ZIP Codes from 2009 to 2016 and found that 46.1 percent of hospitals had public ownership, 49.4 percent of hospitals had nonprofit ownership, and 4.6 percent of hospitals had for-profit ownership, as recorded in AHA Annual Survey data.[6] The proportion of rural hospitals with for-profit ownership was greater in our study sample, perhaps due to the use of more recent data and/or a wider sample of rural hospitals. In addition, Oyeka and colleagues examined 2020 AHA survey data for hospitals in nonmetropolitan counties and found 52.1 percent of these hospitals belonged to a system.[7] This estimate is lower than the AHRQ estimate provided in Table 3, which also utilizes AHA survey data in its methodology. This lower estimate may reflect the fact that the data used by Oyeka and colleagues did not incorporate additional data from IQVIA OneKey, were slightly older, and based only on hospitals in nonmetropolitan counties (rather than including hospitals located in rural ZIP Codes of metropolitan counties).

LIMITATIONS

One of the four main data sources for our research was the PECOS database, which was used by CMS to produce the Hospital Enrollments and Hospital All Owners files. These files were first introduced in late 2022 and provide exciting research opportunities. However, one drawback of using the new datasets is that there are no set standards for using the data to identify private equity-owned hospitals; our approach assumes that having at least one owner designated as a holding company or investment firm implies private equity ownership as well. Although these ownership types have overlapping definitions,[23–25] there are also occasional differences, such as differences in the involvement with day-to-day business decisions and differences in investment time horizon. The PECOS-based measure in this study produced greater estimates of private equity ownership than the measure produced by the PESP. Given that the PESP measure more directly identifies private equity ownership (rather than using holding company or investment firm ownership as proxies for private equity ownership), we suggest that the PECOS-based measure may overestimate private equity ownership among hospitals, particularly among urban hospitals. As a second limitation, the analysis in this study focused on descriptive statistics and single-variable statistical tests to compare hospital characteristics across groups and a selected set of national datasets. Future research can build upon our findings by examining possible differences in variable definitions, reporting, and tabulation methods across additional datasets or through the consideration of multivariable regression techniques. For the latter suggestion, researchers could consider the associations of differing reported hospital ownership characteristics with patient health and local community outcomes to better understand whether this variation in reported ownership and system affiliation affects the conclusions of policy analyses using these characteristics.

APPLICATION OF FINDINGS AND CONCLUSIONS

Our research shows that reported hospital ownership characteristics can vary depending on the national dataset being used. Although the ownership measures used within a dataset are not necessarily better or worse than those used by another dataset in general, one set of measures may be better suited for a specific research objective.

For instance, consider the PECOS and PESP measures of private equity ownership. The PECOS measure assumes that having at least one owner designated as a holding company or investment firm implies private equity ownership as well. As noted above, this assumption may not always hold. Thus, given that the PESP measure more directly identifies private equity ownership (rather than using holding company or investment firm ownership as proxies for private equity ownership), we suggest that the measure may be better suited for research aiming to directly and efficiently identify private equity involvement in hospitals. The strengths of the PECOS database should still be acknowledged, however, as the Hospital Enrollments and Hospital All Owners files present unique opportunities for identifying and

disaggregating the names, roles, and dates of association for individual and organizational owners of multi-owner hospitals. This feature of the data has important implications for researchers and policymakers interested in ownership transparency.

As another example, the HCRIS system affiliation variable used in this study is defined based on cost report Worksheet S-2, Part I, Line 141, Column 1, which asks hospitals to identify whether the facility is part of a "chain organization" and, if so, asks hospitals to further provide the name and address of the chain organization's "home office." In contrast, the AHRQ system affiliation variable is based on a process of combining, matching, and harmonizing data from IQVIA OneKey and AHA Annual Survey databases. Under the AHRQ Compendium definition, a health system is defined based on the inclusion of at least one hospital and at least one group of physicians providing comprehensive care who relate to each other and with the hospital through common ownership or joint management. From our findings, the HCRIS definition appears to be narrower in scope and could be better suited for studies specifically examining hospitals with a designated home office. In comparison, the broader AHRQ definition may be better suited for analyses aiming to identify hospitals with connections to physician groups or other hospitals with common ownership or joint management.

This report emphasizes that health policy researchers interested in hospital ownership should consider possible differences in variable reporting across national datasets and whether these differences will have important effects on further analyses. Through careful consideration of the similarities and differences between national datasets, rural researchers – and the policymakers and interested parties that use their research – can more effectively assess important topics in rural health.

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APPENDIX

Table A1. Study Outcomes by Dataset

	HCRIS	PECOS	PESP	AHRQ
Ownership	X	X		
Private Equity Ownership		X	X	
System Affiliation	X			X

Abbreviations: HCRIS = Healthcare Cost Report Information System; PECOS = Provider Enrollment, Chain, and Ownership System; PESP = Private Equity Stakeholder Project; AHRQ = Agency for Healthcare Research and Quality.

Table A2. Full Tabulation of Reported Rural Hospital Ownership across HCRIS and PECOS Datasets (*n* = 2,176)

		HCRIS				
		Nonprofit/Govt	Sole Proprietor	Corporation[a]	Partnership	Other
PECOS	Nonprofit/Govt	1,858	2	17	1	2
	Sole Proprietor	0	0	0	0	0
	Corporation[a]	49	2	157	7	5
	Partnership	0	0	13	1	0
	Other	33	0	4	0	0
	Missing Data	22	0	0	0	0

Abbreviations: HCRIS = Healthcare Cost Report Information System; PECOS = Provider Enrollment, Chain, and Ownership System.

[a] Includes Limited Liability Companies (LLCs).

Table A3. Comparison of Reported Urban Hospital Ownership across HCRIS and PECOS Datasets (*n* = 2,205)

	HCRIS	PECOS	*p*[a]
Nonprofit or Government-Owned	74.6%	74.3%	.25
Sole Proprietor	0.2%	0.0%	
Proprietary Corporation[b]	19.7%	21.1%	
Proprietary Partnership	3.4%	2.9%	
Proprietary Other	2.0%	1.6%	

Notes: Among 2,267 urban hospitals, 62 hospitals (2.7%) had missing PECOS data. Percentages in Table A3 are among 2,205 hospitals with available HCRIS and PECOS data.

Abbreviations: HCRIS = Healthcare Cost Report Information System; PECOS = Provider Enrollment, Chain, and Ownership System.

[a] *p*-value for chi-square test of independence, testing association between ownership characteristics and dataset. The chi-square test also yields $p < .001$ when excluding the "Sole Proprietor" row from analysis due to small cell size.

[b] Includes Limited Liability Companies (LLCs).

Table A4. Full Tabulation of Reported Rural Hospital Private Equity Ownership across PECOS and PESP Datasets (*n* = 2,176)

		PECOS		
		Private Equity	Not Private Equity	Missing Data
PESP	Private Equity	65	15	0
	Not Private Equity	32	2,038	25
	Missing Data	0	1	0

Abbreviations: PECOS = Provider Enrollment, Chain, and Ownership System; PESP = Private Equity Stakeholder Project.

Table A5. Comparison of Reported Urban Hospital Private Equity Ownership across PECOS and PESP Datasets (*n* = 2,204)

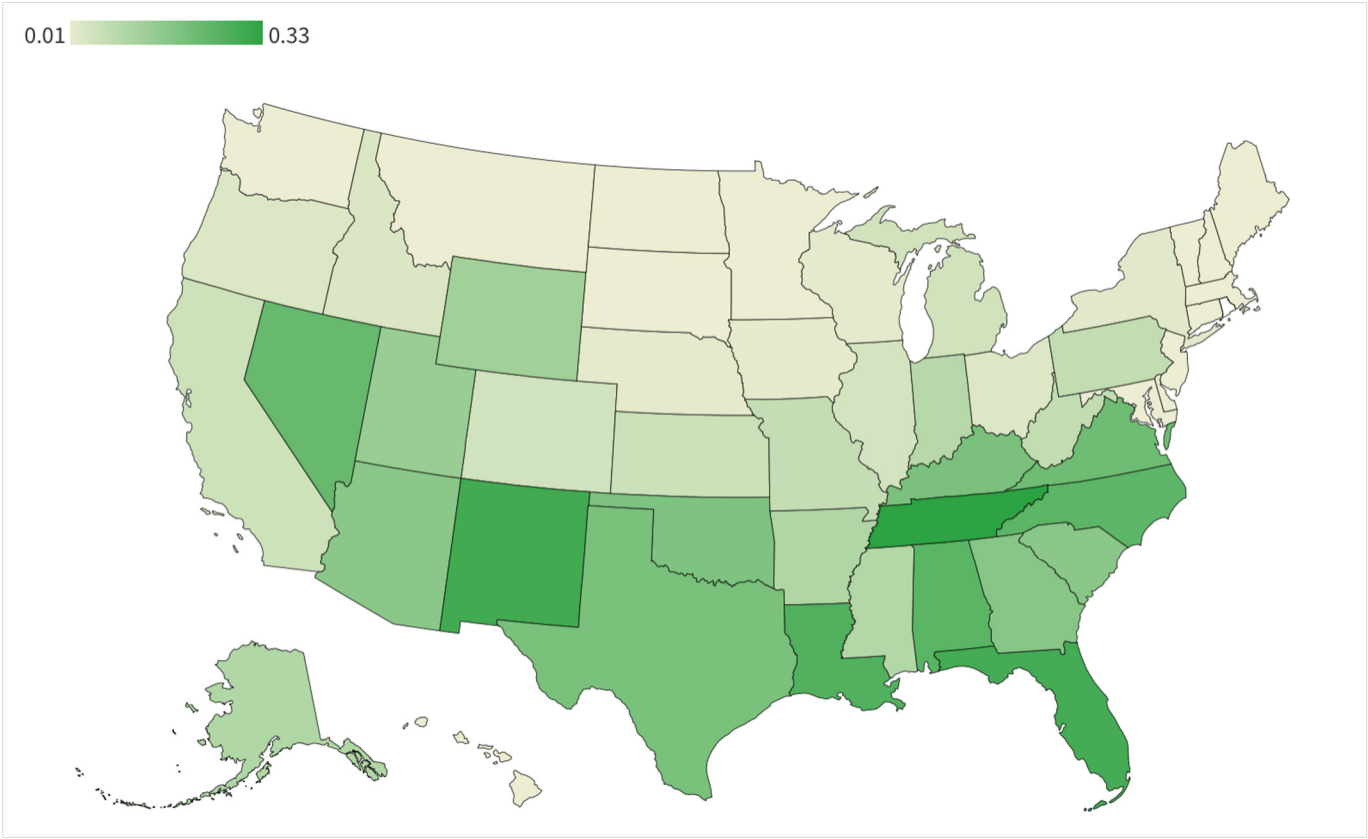
	PECOS	PESP	*p*[a]
Private Equity Ownership			
Yes	9.0%	3.5%	< .001
No	91.0%	96.5%	

Notes: Among 2,267 urban hospitals, 62 hospitals (2.7%) had missing PECOS data, and 1 hospital (0.0%) had missing PESP data. Zero hospitals had missing data from both datasets. Percentages in Table A5 are among 2,204 hospitals with available PECOS and PESP data.

Abbreviations: PECOS = Provider Enrollment, Chain, and Ownership System; Private Equity Stakeholder Project.

[a] *p*-value for chi-square test of independence, testing association between private equity ownership and dataset.

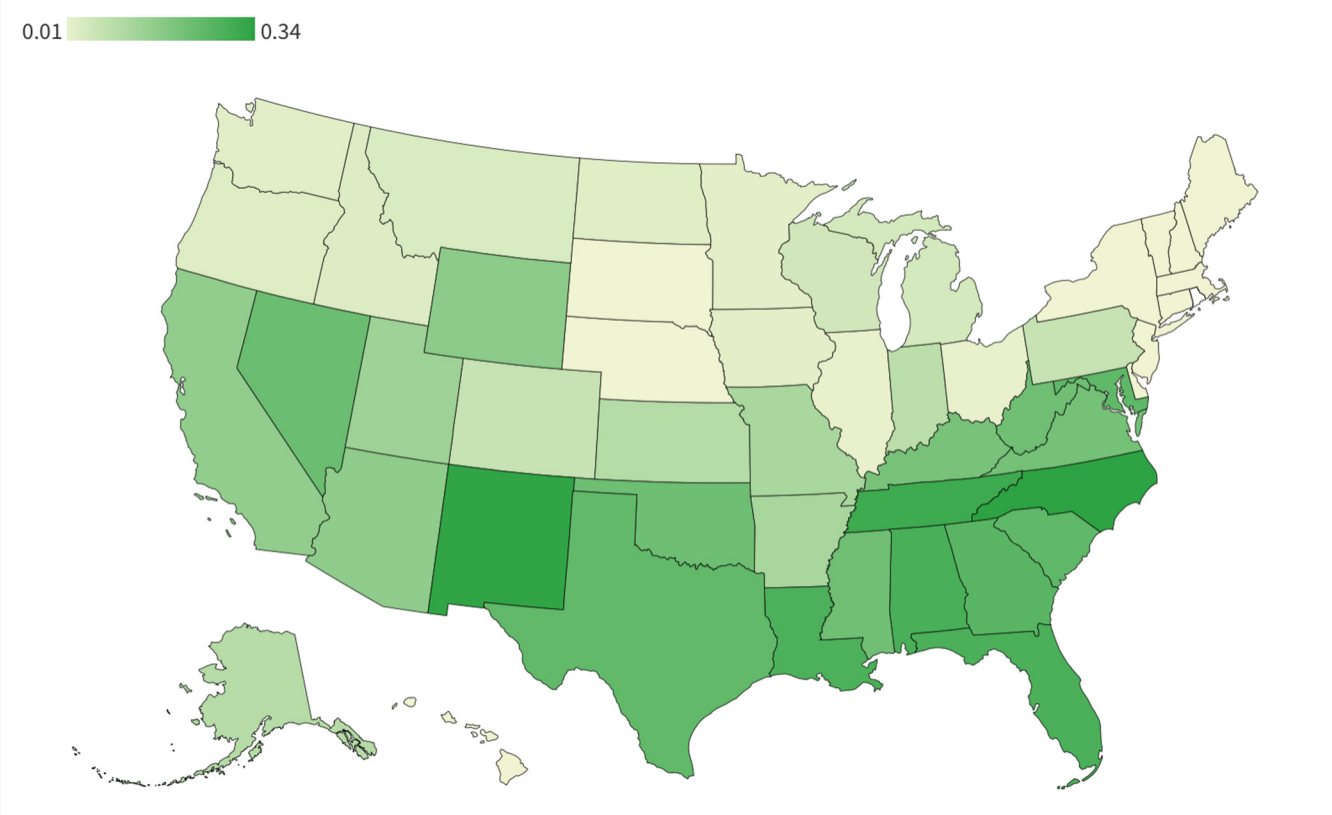
Figure A1. Proportion of In-State Rural Hospitals with For-Profit or Private Equity Ownership Reported across HCRIS and PESP Datasets



Notes: Rhode Island and Washington D.C. have zero rural hospitals in the study sample.

Abbreviations: HCRIS = Healthcare Cost Report Information System; PESP = Private Equity Stakeholder Project.

Figure A2. Proportion of In-State Rural Hospitals with For-Profit or Private Equity Ownership Reported in PECOS Datasets



Notes: Rhode Island and Washington D.C. have zero rural hospitals in the study sample.
Abbreviations: PECOS = Provider Enrollment, Chain, and Ownership System.

Table A6. Full Tabulation of Reported Rural Hospital System Affiliation across HCRIS and AHRQ Datasets (*n* = 2,176)

		HCRIS		
		Affiliated	Unaffiliated	Missing Data
AHRQ	Affiliated	979	327	0
	Unaffiliated	83	783	0
	Missing Data	1	3	0

Abbreviations: HCRIS = Healthcare Cost Report Information System; AHRQ = Agency for Healthcare Research and Quality.

Table A7. Comparison of Reported Urban Hospital System Affiliation across HCRIS and AHRQ Datasets (*n* = 2,257)

	HCRIS	AHRQ	*p*[a]
System Affiliation			
Yes	76.3%	89.8%	< .001
No	23.7%	10.2%	

Notes: Among 2,267 urban hospitals, 10 hospitals (0.4%) had missing AHRQ data. Percentages in Table A7 are among 2,257 hospitals with available HCRIS and AHRQ data.
Abbreviations: HCRIS = Healthcare Cost Report Information System; AHRQ = Agency for Healthcare Research and Quality.
[a] *p*-value for chi-square test of independence, testing association between system affiliation and dataset.

APPENDIX continued

Table A8. Comparison of Urban Hospitals with Consistent Vs. Inconsistent Ownership Reports

	Hospitals with Consistent Ownership Characteristics[a] (*n* = 1,468)	Hospitals with Inconsistent Ownership Characteristics[b] (*n* = 730)	*p*[c]
Census Division, *n* (%)			< .001
East North Central	264 (18.0%)	81 (11.1%)	
East South Central	76 (5.2%)	35 (4.8%)	
Middle Atlantic	163 (11.1%)	95 (13.0%)	
Mountain	118 (8.0%)	49 (6.7%)	
New England	68 (4.6%)	38 (5.2%)	
Pacific	245 (16.7%)	97 (13.3%)	
South Atlantic	368 (18.3%)	132 (18.1%)	
West North Central	102 (6.9%)	41 (5.6%)	
West South Central	164 (11.2%)	162 (22.2%)	
Medicare Payment Classification, *n* (%)			< .01
Critical Access Hospital	43 (2.9%)	12 (1.6%)	
Medicare-Dependent Hospital	12 (0.8%)	5 (0.7%)	
Prospective Payment System[d]	1,008 (68.7%)	560 (76.7%)	
Rural Referral Center	355 (24.2%)	127 (7.4%)	
Sole Community Hospital	15 (1.0%)	12 (1.6%)	
Joint Designation or Other	35 (2.4%)	14 (1.9%)	
Has Long-Term Care Services, *n*[e] (%)	134 (9.1%)	74 (10.1%)	.44
Has Rural Health Clinic Services, *n* (%)	48 (3.3%)	25 (3.4%)	.85
Acute Beds, Mean (SD)	248.9 (221.9)	237.2 (249.3)	.28
Full-Time Equivalents, Mean (SD)	1,697.4 (1,790.0)	2,083.9 (2,716.3)	.42
Net Patient Revenue ($10M), Mean (SD)	44.8 (53.4)	42.3 (66.5)	.36
Percent Outpatient Revenue,[f] Mean (SD)	54.5 (16.0)	55.0 (18.6)	.46
Percent Uncompensated Care,[g] Mean (SD)	3.6 (3.4)	4.0 (4.9)	< .05

Notes: 69 hospitals (3.0%) were excluded from analysis; 59 hospitals had missing PECOS data only, 4 hospitals had missing PECOS and AHRQ data, 1 hospital had missing AHRQ and PESP data, and 6 hospitals had missing AHRQ data only. Summary statistics in Table A8 are among 2,198 hospitals with available HCRIS, PECOS, PESP, and AHRQ data.

Abbreviations: SD = standard deviation; HCRIS = Healthcare Cost Report Information System; PECOS = Provider Enrollment, Chain, and Ownership System; PESP = Private Equity Stakeholder Project; AHRQ = Agency for Healthcare Research and Quality.

[a] Hospitals with consistent ownership and system affiliation characteristics reported across the HCRIS, PECOS, PESP, and AHRQ datasets.

[b] Hospitals with inconsistent ownership or system affiliation characteristics reported across the HCRIS and PECOS datasets, PECOS and PESP datasets, or HCRIS and AHRQ datasets.

[c] *p*-value associated with either chi-square test of independence (categorical variables) or *t*-test for equality of means (continuous variables). We also assessed continuous variables using the nonparametric Wilcoxon rank-sum test. Using the Wilcoxon test, group differences in acute beds, full-time equivalents, and net patient revenue were statistically significant. In contrast, the group difference in uncompensated care was not statistically significant when using the Wilcoxon test.

[d] Hospital is a Prospective Payment System hospital with no other special payment designations.

[e] 1 hospital had missing data for the provision of long-term care services.

[f] Expressed as a percentage of total patient revenue.

[g] Expressed as a percentage of total operating expenses.

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