

# RUPRI Center for Rural Health Policy Analysis

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## **Changes in Service Offerings Post-System Affiliation in Rural Hospitals**

*Onyinye Oyeka, MPH, PhD; Fred Ullrich, BA; Dan Shane, PhD; Keith J. Mueller, PhD*

### **Background and Purpose**

Affiliations between rural hospitals and regional and national health systems have increased[1] from 10 to 30 per year in the 2000s to approximately 30 to 70 per year in the 2010s.[2] Rural hospital leaders have indicated that hospital affiliation with a regional or national system can result in substantial benefits through access to capital investments. Benefits may include updating systems and equipment, reducing costs through clinical process standardization, improving access to specialists, and adding service lines.[3, 4] However, affiliation may negatively affect rural hospitals and patients if it leads to higher prices,[5, 6] rural hospital closure,[7, 8] or eliminating essential health care services and service lines.[3] Prior research evaluating the impact of system affiliation in rural hospitals often focused on the financial performance, cost, quality, and service utilization in these hospitals post-affiliation.[9-12] There is limited research on what happens to hospital services in communities after the local hospital enters into system affiliation. One recent study reported reduced service availability in rural hospitals following system affiliation. However, that study focused on a limited set of service offerings.[3]

System affiliation may lead to an increase or decline in the number of services offered in the local hospital. This may have positive or negative effects for patients and may change both access to care and quality of care. Plausible mechanisms for these effects include hospital systems' decisions to align services and resources such that areas of clinical excellence and cost performance across member hospitals are optimized and decisions to maintain or augment local access to services based on the need for frequent patient contact or a need to move low-acuity cases out of tertiary and quaternary care facilities. In these instances, primary care and telemedicine service offerings may increase.

This policy brief aims to understand the range of effects on service offerings after rural hospitals become part of, or leave, a regional or national health care system. This analysis does not evaluate patient-level access to care and does not assign a positive or negative value to services gained or lost.



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RUPRI Center for Rural Health Policy Analysis, University of Iowa  
College of Public Health, Department of Health Management and Policy,  
145 Riverside Dr., Iowa City, IA 52242-2007, (319) 384-3831  
<http://www.public-health.uiowa.edu/rupri>  
E-mail: [cph-rupri-inquiries@uiowa.edu](mailto:cph-rupri-inquiries@uiowa.edu)

## Key Findings

- Of the 62 service offerings examined in the study period (2008 through 2020), there was a 5-percentage point or more increase in hospitals offering 23 of these services and a 5-percentage point or more decline in hospitals offering 10 services.
- Changes in service offerings (either gains or losses) occurred across all hospital types regardless of whether the hospitals joined or left systems or were never or always in a system.
- Compared with other hospitals in the study, service additions occurred more frequently in hospitals that left systems (35.4 percent), while the majority of service losses occurred in hospitals that joined systems (46.2 percent).

## Methods

### *Systems*

To identify and define system affiliation, we followed the American Hospital (AHA) definition, which defines a multihospital health care system “as an entity with two or more hospitals owned, leased, sponsored, or contract managed by a central organization.”[13] System membership is attributed to hospitals based on data taken from the AHA Annual Survey.

### *Hospitals*

AHA annual survey data from 2008 through 2020 was used to identify hospitals and services. The AHA data were restricted to include nonfederal, general medical, and surgical hospitals in the 50 states and the District of Columbia. Nonmetropolitan hospitals were identified by linking the hospital ZIP Code (in 2008) to the Rural-Urban Commuting Area (RUCA) data (note that the RUCA data used were based on 2010 decennial census data). Hospitals in a ZIP Code with a RUCA code greater than three (i.e., nonmetropolitan) were retained for the analysis. Hospitals were linked over the survey years based on their actual location. Hospitals in this report include both critical access hospitals (CAHs) and rural prospective payment system (PPS) hospitals (which include Medicare-Dependent Hospitals, Sole Community Hospitals, and Rural Referral Centers).

### *Services*

AHA data provided information on the availability of 142 hospital services in 2008. Many of the services were offered by a small proportion of the hospitals in this analysis. Therefore, we adapted the approach from a similar study[14, 15] using a more inclusive approach by considering the following: (1) services offered by 30 percent or more of hospitals in 2008, (2) services identified from the *AHA Task Force on Ensuring Access in Vulnerable Communities*[16] report, and (3) additional services that we felt should be considered for inclusion based on previous literature.[12, 17-19] There were 62 hospital services analyzed for this study.

To study the relationship between changes in system affiliation and services, we created four cohorts of hospitals based on their system activity during the study period: (1) joined a system, (2) left a system, (3) always in a system, and (4) never in a system. Hospitals that either joined or left a system between 2008 and 2017 comprised the treatment groups. It is important to note that the data reflects only a single (first) change in system status for each hospital. Therefore, if a hospital joined a system and then left the system, only the first joining event is considered (a second change in status was a rare event

during this study period). Propensity matching (forcing exact matching on hospital state and CAH status, with total beds for close matching) was used to select control hospitals from among those that were never or always in a system. Control group hospitals do not have a date of status change, therefore the year of system status change from the matched case hospital was used as a surrogate date of change for control hospitals. The state of service offerings at each always-in- and never-in-system hospital were established three years post system status change in the matched joined-system and left-system hospital. The propensity matching approach ensured comparability in important characteristics between the hospital groups. A one-to-one match was sought but given the relatively sparse number of hospitals available for matching and the strict model chosen, matching pairs could not always be established. Unmatched case and control hospitals were discarded from further analysis.

## Results/Findings

Table 1 shows hospital system status and changes in system status for all rural hospitals by CAH and PPS classification, respectively. Between 2008 through 2020, system affiliation increased in rural CAH and PPS hospitals, although system affiliation among rural PPS hospitals had always been higher. The number and proportion of hospitals newly joining or affiliating with a hospital system each year (i.e., they were not previously a member of any hospital system) was relatively low (less than 5 percent) and appears to have declined in recent years. Similarly, the number and proportion of hospitals leaving a system (i.e., they were a member of a system and then left the system without joining another) year-to-year was lower (less than 2 percent) and was nearly always smaller than the number of hospitals joining systems. The number and proportion of hospitals remaining in the same system year-to-year, however, continued to remain high (greater than 90 percent).

**Table 1: AHA Responding Rural Hospitals, Annual System Status,<sup>1</sup> 2008–2020**

Year <sup>1</sup>	Total Count		Percent in System <sup>2</sup>		System Status Change Over Two-Year Period													
					Joined <sup>3</sup>		In Same <sup>4</sup>		In Different <sup>5</sup>		Left <sup>6</sup>		Never <sup>7</sup>		Unknown <sup>8</sup>			
	CAH	PPS	CAH	PPS	CAH	PPS	CAH	PPS	CAH	PPS	CAH	PPS	CAH	PPS	CAH	PPS		
2009	1,139	1,020	38.7%	46.8%	1.9%	1.4%	33.7%	43.4%	2.7%	0.9%	0.6%	1.1%	59.7%	51.0%	1.3%	2.3%		
2010	1,169	982	39.1%	47.8%	2.0%	1.8%	36.3%	44.9%	0.6%	0.4%	1.8%	1.2%	59.0%	50.7%	0.3%	0.9%		
2011	1,175	979	40.5%	49.3%	2.3%	2.2%	37.9%	45.3%	0.2%	1.4%	0.9%	0.6%	58.0%	49.6%	0.9%	0.8%		
2012	1,167	971	41.9%	50.5%	2.0%	2.3%	38.4%	46.4%	1.3%	1.3%	0.8%	1.3%	57.0%	47.9%	0.6%	0.7%		
2013	1,184	948	42.4%	51.6%	1.0%	1.8%	39.3%	45.5%	1.9%	4.2%	0.6%	0.6%	56.4%	47.6%	0.8%	0.3%		
2014	1,181	936	43.3%	53.0%	1.5%	2.1%	40.8%	48.4%	0.8%	2.4%	0.5%	0.7%	55.9%	46.0%	0.5%	0.3%		
2015	1,182	915	44.2%	55.0%	1.1%	2.6%	41.1%	47.9%	1.9%	4.3%	0.3%	0.5%	55.2%	44.3%	0.3%	0.4%		
2016	1,192	904	44.3%	57.7%	1.1%	2.8%	41.9%	53.1%	1.1%	1.4%	0.8%	0.4%	54.6%	41.7%	0.5%	0.6%		
2017	1,195	895	44.6%	59.1%	1.2%	2.1%	42.6%	53.5%	0.8%	3.4%	0.7%	0.9%	54.4%	39.7%	0.3%	0.4%		
2018	1,197	871	46.7%	59.8%	2.4%	1.6%	40.9%	54.5%	3.3%	3.4%	0.3%	1.1%	53.0%	38.8%	0.1%	0.5%		
2019	1,207	845	46.1%	59.8%	1.2%	0.7%	44.5%	57.4%	0.4%	1.5%	1.5%	1.3%	52.2%	38.9%	0.2%	0.1%		
2020	1,208	835	45.9%	61.0%	0.9%	1.7%	44.3%	56.6%	0.6%	2.0%	1.2%	1.0%	52.9%	38.0%	0.2%	0.7%		

Source 2008-2020 AHA annual data survey. Notes: Superscript numbers in the table denote the following: 1, end of two-year period; 2, system membership status at the end of the two-year period; 3, hospitals that were not system members at the beginning of the period but were members at the end; 4, hospitals that were members of the same system in both years; 5, hospitals that were system members in both years but were in different systems in each year; 6, hospitals that were system members at the beginning of period but not at the end; 7, hospitals that were not system members in either year; 8, inability to determine system membership status over both years. Percentages represent the proportion of all CAH and PPS hospitals in each column.

Table 2 presents the set of hospital service offerings and the proportion of rural hospitals offering the services included in the analysis. The hospitals offered 62 services in 2008 based on the following inclusion criteria: (1) services met the 30 percent threshold, (2) services were identified in the task force report, and (3) services were added by this project’s investigators based on previous literature.

**Table 2: Rural Hospital Service Offerings in 2008**

<b>Services Meeting the 30 percent Threshold</b>					
Emergency dept	98.8%	Community outreach	63.6%	Patient education	45.6%
CT scanner	94.5%	Birthing room	61.2%	Optical colonoscopy	45.0%
Outpatient surgery	90.0%	Obstetrics	61.1%	Linguistic/translation services	44.6%
Ultrasound	88.6%	Occupational health	60.7%	Chemotherapy	42.5%
Physical rehab	82.9%	Patient controlled analgesia	59.1%	Home health services	42.4%
Breast screening	80.9%	Orthopedic services	58.3%	Oncology services	39.7%
Health screening	79.0%	Medical/surgical ICU	57.6%	Skilled nursing	38.6%
Social work	78.8%	MRI	57.4%	Primary care department	36.6%
Health fair	78.7%	Patient represent. services	57.0%	Women’s health center	36.4%
Case management	73.5%	Cardiac rehabilitation	56.1%	Enrollment assistance program	34.6%
Hospital-based outpatient	72.6%	Support groups	53.7%	Pain management program	34.3%
Volunteer services	70.3%	Multislice spiral CAT <64	53.5%	Trauma center	34.1%
Auxiliary services	70.0%	Chaplain/pastor. care services	52.8%	Sports medicine	33.5%
Nutrition program	68.1%	Wound management services	48.1%	Geriatric services	32.1%
Swing bed services	68.0%	Tobacco treatment services	46.5%	Immunization program	30.3%
Airborne infect isolation room	67.7%	Diagnostic radiation facility	46.4%		
Health information center	66.0%	Sleep center	46.1%		
<b>Additional Task Force Report Services</b>					
Hospice	24.8%	Psychiatric geriatric	17.8%	Assisted living	7.4%
Rehabilitation care	21.2%	Cardiac ICU	17.2%	Neonatal ICU	4.0%
Psychiatric emergency	17.9%	Dental services	12.2%	Acute long-term care	3.9%
<b>Services Added Based on Previous Literature</b>					
Fitness center	28.3%	Palliative care program	17.4%		
Ambulance services	21.8%	Ambulatory surgery center	17.4%		

Source: 2008–2020 AHA annual data survey.

Table 3 presents the services that changed substantively in the proportion of rural hospitals offering such services from 2008 through 2020. We define substantive change as an increase (or decrease) of at least 5 percentage points in the proportion of hospitals offering the service. On balance, we found more service line increases than decreases in rural hospitals across the 62 services evaluated (23 services with substantive increases, 10 services with substantive decreases).

**Table 3: Changes in Rural Hospital Service Offerings, 2008-2020**

Services	2008	2020	Percentage point change
Optical colonoscopy	45.0%	72.6%	27.6
Enrollment assistance program	34.6%	60.8%	26.2
Immunization program	30.3%	50.7%	20.4
Health information center	66.0%	85.8%	19.8
Primary care department	36.6%	55.9%	19.3
Wound Management services	48.1%	66.6%	18.5
Airborne infection isolation room	67.7%	85.7%	18.0
Trauma center	34.1%	48.3%	14.2
Case management	73.5%	87.3%	13.8
Pain management program	34.3%	47.3%	13.0
Women’s health center	36.4%	49.1%	12.7
Sports medicine	33.5%	45.5%	12.0
MRI	57.4%	67.5%	10.1
Patient representative services	57.0%	65.8%	8.8
Patient controlled analgesia	59.1%	67.8%	8.7
Community outreach	63.6%	71.8%	8.2
Cardiac rehabilitation	56.1%	64.0%	7.9
Health screening	79.0%	86.2%	7.2
Palliative care program	17.4%	24.5%	7.1
Linguistic/Translation services	44.6%	50.9%	6.3
Hospital-based outpatient	72.6%	78.7%	6.1
Psychiatric emergency	17.9%	23.4%	5.5
Occupational health	60.7%	66.0%	5.3
Psychiatric geriatric	17.8%	12.7%	-5.1
Auxiliary services	70.0%	63.6%	-6.4
Medical/surgical ICU	57.6%	51.2%	-6.4
Hospice	24.8%	18.1%	-6.7
Obstetrics	61.1%	54.0%	-7.1
Birth room	61.2%	53.9%	-7.3
Cardiac	17.2%	9.8%	-7.4
Skilled nursing	38.6%	30.4%	-8.2
Multislice spiral CAT	53.5%	43.4%	-10.1
Home health services	42.4%	24.7%	-17.7

Source 2008-2020 AHA annual data survey.

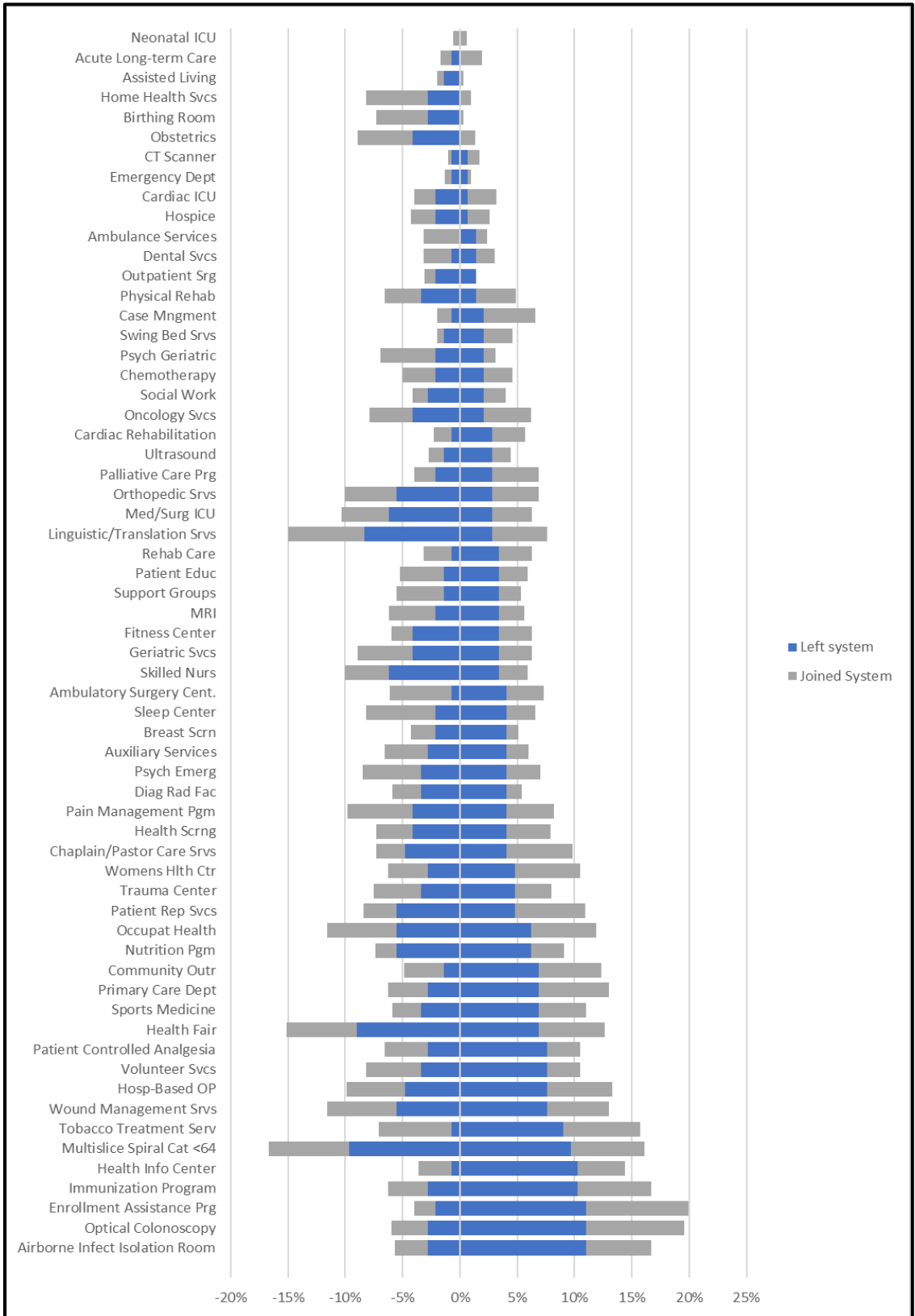
Table 4 presents the number of rural hospitals pre-match and the sample of rural hospitals in each cohort after the matching process (i.e., post-match). Figure 1 shows the proportion of hospitals that gained and lost services within a 3-year window of either joining or leaving a system for all 62 services in the sample. The figure shows that while services were gained and lost in hospitals that left and joined a system, more services were gained among hospitals that left a system. Appendix Table A presents the detailed table for the change in services among all cohorts. Across all hospital cohorts (left a system, always in a system, never in a system, and joined a system), there were seventy-four (74) service changes (either gain or loss) of 5 percentage points or more. Many of the changes were for new services, with 65 percent of hospitals adding new services across all hospital cohorts. The biggest change in services offered among the cohorts was service gains in hospitals that left systems: airborne infection isolation room (11 percent), health information center (10.3 percent), optical colonoscopy (11 percent), enrollment assistance program (11 percent), and immunization program (10.3 percent). The plurality of service additions occurred in hospitals that left systems (35.4 percent). However, the plurality of services lost occurred in hospitals that joined systems (46.2 percent).

**Table 4: Pre-/Post-matching Hospital Counts**

<b>Cohort</b>	<b>Pre-match Count</b>	<b>Post-match Count</b>
Always in a system	654	393
Joined a system	357	314
Left a system	164	145
Never in a system	909	66

Source 2008-2020 AHA annual data survey. Note: Forced exact propensity score matching was used to assign the never-in-system hospital cohorts and always-in-system hospital cohort to the joined- and left-system cohort based on the state where the hospital was located, CAH status, and bed size.

**Figure 1: Proportion of Hospitals that Gained or Lost Services**



Source: 2008-2020 AHA annual data survey. Note: The blue bars represent service changes in hospitals that left a hospital system, and the gray bars represents changes in hospitals that joined systems. Services gained in hospitals that left a system are displayed in ascending order. Negative sign denotes loss of services and positive denotes service gains.

## Discussion

In this policy brief, we examined the changes in service offerings at rural hospitals following system affiliation change (joining or leaving a health care system). We found that the change in a hospital's system status was associated with changes in the availability of services provided at the local hospital three years after a system status change. The results show that while rural hospitals both affiliating with and disassociating from a system experienced gains and losses of services, the largest changes in service offerings were gains in services among hospitals that left a hospital system. Specifically, 35.4 percent of the services that increased in availability by 5 percentage points or more occurred in hospitals that left a system. In contrast, 46.2 percent of the services that decreased in availability by 5 percentage points or more occurred in hospitals that affiliated with a health care system. Note that this analysis does not seek to assign value to a service gain or harm to a service loss.

Rural hospitals play a key role in the timely delivery of health care services, and they have a unique opportunity to identify the health care needs of the local community. However, many rural hospitals are faced with myriad demographic, social, economic, and policy challenges that threaten their financial viability and capacity to deliver essential health care services.[20-22] Between 2010 and 2022, 140 rural hospitals have closed\*, and many more are at risk of closure.[23] Affiliation with hospital systems has been proposed as an alternative for struggling rural hospitals to remain open and continue to serve their communities.[4] While system affiliation may be protective for financially distressed hospitals, thus enabling them to remain operational,[10] it may not be protective of health care services that were previously available to the community. Similar to the current study, prior research examining access to health care services provides evidence for service volume decline and the closure of service lines post-system affiliation.[3, 12, 24] Specifically, these studies found a reduction in the volume of outpatient visits and mental/substance use disorder stays, and the elimination of surgical, primary care, skilled nursing facilities, and obstetric service lines.[3, 12, 19] The effect of service elimination is mixed. Service elimination may result in increased patient costs (travel and time) and delay in seeking care, particularly for health care services that are time-sensitive, chronic, and complex.[25, 26] In particular, research provides evidence for poor birth outcomes and increased suicide rates due to the reduction in obstetric and behavioral health services, respectively.[27, 28] However, service elimination may also result in improved care quality and health outcomes if patients needing eliminated services are transferred to higher volume hospitals in the system. Research has shown that greater hospital volume is associated with better surgical outcome, reduced surgery-related mortality, and non-surgical outcomes including but not limited to treatment of congestive heart failure and obstetric care.[29-31] Other examples include regionalization of care strategies such as the Rural Maternity and Obstetrics Management (RMOM) program which aims to improve maternal care by coordinating care between larger hospitals and smaller rural hospitals.[32]

This study also suggests that hospitals leaving systems may be offering new service lines not previously available in the local hospital when it was part of the system. The factors

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\* Rural hospital closures as of November 23, 2022. Hospitals are considered closed when the facility no longer provides health care services or ceases to provide inpatient services but continues to provide some health care services (i.e., primary care). Hospital closures can be complete closures or converted closures (i.e., converted to some other type of health care facility).



associated with service line addition after system disassociation are not clear. Rural hospitals no longer affiliated with a system may be driven to expand service offerings because of their mission to maintain or improve access to care, the community's health needs,[33] regaining decision-making autonomy, and competition.[34] However, increases in services over time may also be attributed to technological advancement and improvements in the practice of medicine.

This analysis has several limitations. This study uses a loose definition of system affiliation, including mergers, acquisitions, joint ventures, and other forms of agreement between hospitals. AHA annual survey data may be subject to measurement error and recall bias. Although the AHA tries to report data on every hospital every year, the actual survey response rate (during this period) ranged from 86 percent in 2008 to 75 percent in 2020. For non-responding hospitals, AHA uses an estimation process to impute some missing statistical values and uses other resources to fill out hospital records. For this analysis, only hospitals that actually responded to the annual survey are retained. Only the first change in system status was used to classify hospitals as joining a system, but this is unlikely to bias our findings because there was minimal "system churn" (i.e., hospitals repeatedly joining/leaving systems) during this period. Only two hospitals had more than one joining event, and nine hospitals had more than one leaving event. This explorative analysis is descriptive and does not intend to infer causality.

Note that hospitals respond to the AHA survey based on their fiscal year and nearly all of this study's hospitals responded to the 2020 survey using information from a fiscal year that ended well after the advent of the Public Health Emergency (1/31/2020). Certainly COVID-19 had a significant impact on service delivery at hospitals across the country. But as our focus was on service status three years following change in system affiliation, a "PHE effect" would only be seen in hospitals (or their matched controls) that changed status in 2017 – less than five percent of all hospitals in our analysis. Further, examination of service changes at all hospitals between 2019 and 2020 shows only four notable service availability changes in that year. The percentage of hospitals offering:

- |                                   |                |
|-----------------------------------|----------------|
| • Health fairs                    | declined 3.9%  |
| • Support groups                  | declined 4.0%  |
| • Airborne Infect Isolation Rooms | increased 2.7% |
| • Immunization programs           | increased 4.4% |

Service-offering decisions may be a means for rural hospitals to strategically position themselves to improve local access, improve efficiency, and remain financially viable; however, these decisions should prioritize the health care needs of the local community. Future research should consider the impact of these changes (gains and losses) in service offerings on patient and population health in the local community. Additionally, future research is needed to compare existing policy recommendations to actual service availability in rural communities, which will also be useful to highlight the effectiveness of these policy recommendations and any existing gaps at the community level.

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**Appendix Table A: Gains and Losses in Service Offerings Among Hospital Cohorts, 2008-2020**

Service	Left system (n=145)					Always system (n=393)					Never system (n=66)					Joined system (n=314)				
	Lost	Gain	Nvr	Alwy	Unk	Lost	Gain	Nvr	Alwy	Unk	Lost	Gain	Nvr	Alwy	Unk	Lost	Gain	Nvr	Alwy	Unk
Emergency dept	0.7%	0.7%	0.7%	60.0%	37.9%	0.3%	0.0%	0.0%	74.6%	25.2%	1.5%	0.0%	0.0%	50.0%	48.5%	0.6%	0.3%	0.0%	65.9%	33.1%
CT scanner	0.7%	0.7%	0.7%	60.0%	37.9%	0.5%	0.5%	1.0%	72.8%	25.2%	0.0%	1.5%	0.0%	50.0%	48.5%	0.3%	1.0%	1.0%	64.6%	33.1%
Outpatient surgery	2.1%	1.4%	3.4%	55.2%	37.9%	0.8%	1.0%	4.1%	69.0%	25.2%	0.0%	0.0%	3.0%	48.5%	48.5%	1.0%	0.0%	5.4%	60.5%	33.1%
Ultrasound	1.4%	2.8%	4.8%	53.1%	37.9%	1.0%	1.0%	4.1%	68.7%	25.2%	0.0%	1.5%	3.0%	47.0%	48.5%	1.3%	1.6%	4.1%	59.9%	33.1%
Physical rehab	3.4%	1.4%	9.0%	48.3%	37.9%	3.3%	1.5%	10.7%	59.3%	25.2%	1.5%	0.0%	4.5%	45.5%	48.5%	3.2%	3.5%	8.3%	51.9%	33.1%
Breast screening	2.1%	4.1%	12.4%	43.4%	37.9%	0.5%	0.8%	7.9%	65.6%	25.2%	0.0%	0.0%	0.0%	51.5%	48.5%	2.2%	1.0%	8.0%	55.7%	33.1%
Health screening	4.1%	4.1%	6.9%	46.9%	37.9%	2.5%	3.3%	6.1%	62.8%	25.2%	0.0%	3.0%	3.0%	45.5%	48.5%	3.2%	3.8%	6.7%	53.2%	33.1%
Social work	2.8%	2.1%	12.4%	44.8%	37.9%	3.1%	2.3%	12.0%	57.5%	25.2%	1.5%	0.0%	3.0%	47.0%	48.5%	1.3%	1.9%	9.9%	53.8%	33.1%
Health fair	9.0%	6.9%	7.6%	38.6%	37.9%	3.8%	3.1%	8.9%	59.0%	25.2%	0.0%	3.0%	3.0%	45.5%	48.5%	6.1%	5.7%	6.7%	48.4%	33.1%
Case management	0.7%	2.1%	4.8%	54.5%	37.9%	1.0%	3.1%	10.4%	60.3%	25.2%	0.0%	1.5%	6.1%	43.9%	48.5%	1.3%	4.5%	4.1%	57.0%	33.1%
Hospital-based outpatient	4.8%	7.6%	11.7%	37.9%	37.9%	2.0%	5.3%	11.7%	55.7%	25.2%	0.0%	3.0%	7.6%	40.9%	48.5%	5.1%	5.7%	9.9%	46.2%	33.1%
Volunteer services	3.4%	7.6%	18.6%	32.4%	37.9%	2.8%	3.6%	13.5%	55.0%	25.2%	1.5%	1.5%	3.0%	45.5%	48.5%	4.8%	2.9%	10.5%	48.7%	33.1%
Auxiliary services	2.8%	4.1%	17.2%	37.9%	37.9%	3.1%	1.8%	22.9%	47.1%	25.2%	4.5%	1.5%	4.5%	40.9%	48.5%	3.8%	1.9%	16.2%	44.9%	33.1%
Nutrition program	5.5%	6.2%	19.3%	31.0%	37.9%	3.6%	3.1%	15.0%	53.2%	25.2%	0.0%	1.5%	4.5%	45.5%	48.5%	1.9%	2.9%	15.3%	46.8%	33.1%
Swing bed services	1.4%	2.1%	11.0%	47.6%	37.9%	2.5%	1.0%	18.6%	52.7%	25.2%	1.5%	3.0%	13.6%	33.3%	48.5%	0.6%	2.5%	22.3%	41.4%	33.1%
Airborne infect isolation rm	2.8%	11.0%	7.6%	40.7%	37.9%	0.8%	3.8%	11.2%	59.0%	25.2%	1.5%	1.5%	6.1%	42.4%	48.5%	2.9%	5.7%	8.0%	50.3%	33.1%
Health info center	0.7%	10.3%	10.3%	40.7%	37.9%	2.0%	6.1%	10.4%	56.2%	25.2%	0.0%	0.0%	6.1%	45.5%	48.5%	2.9%	4.1%	7.6%	52.2%	33.1%
Community outreach	1.4%	6.9%	22.1%	31.7%	37.9%	2.5%	3.8%	16.3%	52.2%	25.2%	1.5%	0.0%	15.2%	34.8%	48.5%	3.5%	5.4%	14.0%	43.9%	33.1%
Birthing room	2.8%	0.0%	33.8%	25.5%	37.9%	2.5%	0.0%	32.1%	40.2%	25.2%	1.5%	0.0%	4.5%	45.5%	48.5%	4.5%	0.3%	25.8%	36.3%	33.1%
Obstetrics	4.1%	0.0%	31.7%	26.2%	37.9%	3.6%	1.8%	30.3%	39.2%	25.2%	4.5%	0.0%	4.5%	42.4%	48.5%	4.8%	1.3%	25.2%	35.7%	33.1%
Occupational health	5.5%	6.2%	20.7%	29.7%	37.9%	2.0%	3.8%	24.7%	44.3%	25.2%	0.0%	0.0%	10.6%	40.9%	48.5%	6.1%	5.7%	15.9%	39.2%	33.1%
Patient controlled analgesia	2.8%	7.6%	20.7%	31.0%	37.9%	2.0%	3.1%	18.1%	51.7%	25.2%	0.0%	4.5%	9.1%	37.9%	48.5%	3.8%	2.9%	18.5%	41.7%	33.1%
Orthopedic services	5.5%	2.8%	29.0%	24.8%	37.9%	3.1%	3.8%	20.9%	47.1%	25.2%	1.5%	1.5%	9.1%	39.4%	48.5%	4.5%	4.1%	19.1%	39.2%	33.1%
Med/surg ICU	6.2%	2.8%	31.0%	22.1%	37.9%	3.3%	2.3%	29.5%	39.7%	25.2%	0.0%	0.0%	15.2%	36.4%	48.5%	4.1%	3.5%	24.2%	35.0%	33.1%
MRI	2.1%	3.4%	22.8%	33.8%	37.9%	2.3%	3.3%	20.9%	48.3%	25.2%	1.5%	1.5%	19.7%	28.8%	48.5%	4.1%	2.2%	20.7%	39.8%	33.1%
Patient represent. services	5.5%	4.8%	22.8%	29.0%	37.9%	2.5%	4.6%	24.9%	42.7%	25.2%	0.0%	4.5%	12.1%	34.8%	48.5%	2.9%	6.1%	23.9%	34.1%	33.1%
Cardiac rehabilitation	0.7%	2.8%	33.8%	24.8%	37.9%	2.5%	3.1%	23.9%	45.3%	25.2%	0.0%	1.5%	10.6%	39.4%	48.5%	1.6%	2.9%	20.4%	42.0%	33.1%
Support groups	1.4%	3.4%	33.1%	24.1%	37.9%	4.1%	5.6%	25.2%	39.9%	25.2%	3.0%	1.5%	10.6%	36.4%	48.5%	4.1%	1.9%	25.5%	35.4%	33.1%
Multislice spiral CAT <64	9.7%	9.7%	17.2%	25.5%	37.9%	8.9%	6.1%	24.7%	35.1%	25.2%	1.5%	4.5%	18.2%	27.3%	48.5%	7.0%	6.4%	26.8%	26.8%	33.1%
Chaplain/pastor care services	4.8%	4.1%	29.7%	23.4%	37.9%	3.6%	2.3%	23.9%	45.0%	25.2%	3.0%	1.5%	21.2%	25.8%	48.5%	2.5%	5.7%	25.5%	33.1%	33.1%
Wound manage. services	5.5%	7.6%	20.0%	29.0%	37.9%	5.6%	5.9%	27.2%	36.1%	25.2%	1.5%	4.5%	10.6%	34.8%	48.5%	6.1%	5.4%	25.2%	30.3%	33.1%
Tobacco treatment services	0.7%	9.0%	32.4%	20.0%	37.9%	4.8%	5.9%	30.8%	33.3%	25.2%	1.5%	4.5%	16.7%	28.8%	48.5%	6.4%	6.7%	24.8%	29.0%	33.1%
Diagnostic radiation facility	3.4%	4.1%	31.0%	23.4%	37.9%	2.5%	3.3%	37.2%	31.8%	25.2%	0.0%	0.0%	16.7%	34.8%	48.5%	2.5%	1.3%	29.3%	33.8%	33.1%

Service	Left system (n=145)					Always system (n=393)					Never system (n=66)					Joined system (n=314)				
	Lost	Gain	Nvr	Alwy	Unk	Lost	Gain	Nvr	Alwy	Unk	Lost	Gain	Nvr	Alwy	Unk	Lost	Gain	Nvr	Alwy	Unk
Sleep center	2.1%	4.1%	33.1%	22.8%	37.9%	4.3%	3.1%	30.8%	36.6%	25.2%	3.0%	6.1%	19.7%	22.7%	48.5%	6.1%	2.5%	26.8%	31.5%	33.1%
Patient educ	1.4%	3.4%	36.6%	20.7%	37.9%	3.6%	3.3%	34.4%	33.6%	25.2%	0.0%	0.0%	24.2%	27.3%	48.5%	3.8%	2.5%	32.8%	27.7%	33.1%
Optical colonoscopy	2.8%	11.0%	11.0%	36.6%	38.6%	2.0%	8.9%	20.1%	43.3%	25.7%	1.5%	1.5%	12.1%	36.4%	48.5%	3.2%	8.6%	16.2%	38.9%	33.1%
Linguistic/translation svcs.	8.3%	2.8%	27.6%	23.4%	37.9%	4.8%	6.6%	29.3%	34.1%	25.2%	0.0%	3.0%	28.8%	19.7%	48.5%	6.7%	4.8%	32.2%	23.2%	33.1%
Chemotherapy	2.1%	2.1%	40.0%	17.9%	37.9%	3.8%	3.6%	41.2%	26.2%	25.2%	4.5%	4.5%	16.7%	25.8%	48.5%	2.9%	2.5%	32.2%	29.3%	33.1%
Home health services	2.8%	0.0%	44.8%	14.5%	37.9%	3.6%	0.5%	56.0%	14.8%	25.2%	1.5%	3.0%	27.3%	19.7%	48.5%	5.4%	1.0%	41.1%	19.4%	33.1%
Oncology services	4.1%	2.1%	45.5%	10.3%	37.9%	2.3%	3.1%	45.3%	24.2%	25.2%	9.1%	0.0%	18.2%	24.2%	48.5%	3.8%	4.1%	33.8%	25.2%	33.1%
Skilled nursing	6.2%	3.4%	37.9%	14.5%	37.9%	1.8%	2.5%	49.6%	20.9%	25.2%	3.0%	3.0%	28.8%	16.7%	48.5%	3.8%	2.5%	41.4%	19.1%	33.1%
Primary care dept	2.8%	6.9%	21.4%	31.0%	37.9%	3.6%	6.6%	36.6%	28.0%	25.2%	1.5%	1.5%	19.7%	28.8%	48.5%	3.5%	6.1%	30.6%	26.8%	33.1%
Women's health center	2.8%	4.8%	37.2%	17.2%	37.9%	3.3%	4.1%	41.5%	26.0%	25.2%	0.0%	0.0%	18.2%	33.3%	48.5%	3.5%	5.7%	32.2%	25.5%	33.1%
Enrollment assist. program	2.1%	11.0%	27.6%	21.4%	37.9%	1.0%	6.6%	32.3%	34.9%	25.2%	0.0%	10.6%	16.7%	24.2%	48.5%	1.9%	8.9%	24.2%	31.8%	33.1%
Pain management program	4.1%	4.1%	36.6%	17.2%	37.9%	5.3%	5.1%	39.7%	24.7%	25.2%	1.5%	4.5%	15.2%	30.3%	48.5%	5.7%	4.1%	35.4%	21.7%	33.1%
Trauma center	3.4%	4.8%	28.3%	25.5%	37.9%	3.6%	4.8%	38.4%	28.0%	25.2%	0.0%	3.0%	30.3%	18.2%	48.5%	4.1%	3.2%	34.4%	25.2%	33.1%
Sports medicine	3.4%	6.9%	37.9%	13.8%	37.9%	4.3%	4.3%	40.2%	26.0%	25.2%	0.0%	4.5%	18.2%	28.8%	48.5%	2.5%	4.1%	33.8%	26.4%	33.1%
Geriatric services	4.1%	3.4%	41.4%	13.1%	37.9%	3.3%	3.1%	47.8%	20.6%	25.2%	1.5%	3.0%	28.8%	18.2%	48.5%	4.8%	2.9%	40.4%	18.8%	33.1%
Immunization program	2.8%	10.3%	33.1%	15.9%	37.9%	2.8%	6.9%	42.0%	23.2%	25.2%	0.0%	4.5%	18.2%	28.8%	48.5%	3.5%	6.4%	32.2%	24.8%	33.1%
Fitness center	4.1%	3.4%	46.9%	7.6%	37.9%	2.3%	3.6%	50.9%	18.1%	25.2%	1.5%	1.5%	25.8%	22.7%	48.5%	1.9%	2.9%	46.2%	15.9%	33.1%
Hospice	2.1%	0.7%	49.7%	9.7%	37.9%	3.1%	1.5%	61.1%	9.2%	25.2%	0.0%	3.0%	30.3%	18.2%	48.5%	2.2%	1.9%	51.3%	11.5%	33.1%
Ambulance services	0.0%	1.4%	51.7%	9.0%	37.9%	0.8%	1.0%	61.8%	11.2%	25.2%	1.5%	0.0%	37.9%	12.1%	48.5%	3.2%	1.0%	51.0%	11.8%	33.1%
Rehab care	0.7%	3.4%	44.8%	13.1%	37.9%	1.8%	3.6%	58.8%	10.7%	25.2%	1.5%	4.5%	40.9%	4.5%	48.5%	2.5%	2.9%	49.0%	12.4%	33.1%
Psych emergency	3.4%	4.1%	45.5%	9.0%	37.9%	2.8%	1.8%	59.5%	10.7%	25.2%	0.0%	0.0%	39.4%	12.1%	48.5%	5.1%	2.9%	49.7%	9.2%	33.1%
Psych geriatric	2.1%	2.1%	47.6%	10.3%	37.9%	2.5%	1.8%	63.4%	7.1%	25.2%	3.0%	6.1%	33.3%	9.1%	48.5%	4.8%	1.0%	53.2%	8.0%	33.1%
Palliative care program	2.1%	2.8%	47.6%	9.7%	37.9%	2.3%	5.6%	55.2%	11.7%	25.2%	1.5%	3.0%	30.3%	16.7%	48.5%	1.9%	4.1%	49.4%	11.5%	33.1%
Ambulatory surgery cent.	0.7%	4.1%	48.3%	9.0%	37.9%	3.1%	3.6%	56.2%	12.0%	25.2%	3.0%	0.0%	39.4%	9.1%	48.5%	5.4%	3.2%	50.0%	8.3%	33.1%
Cardiac ICU	2.1%	0.7%	56.6%	2.8%	37.9%	2.8%	1.5%	64.4%	6.1%	25.2%	1.5%	0.0%	45.5%	4.5%	48.5%	1.9%	2.5%	52.2%	10.2%	33.1%
Dental services	0.7%	1.4%	56.6%	3.4%	37.9%	2.8%	0.3%	67.7%	4.1%	25.2%	0.0%	0.0%	39.4%	12.1%	48.5%	2.5%	1.6%	58.9%	3.8%	33.1%
Assisted living	1.4%	0.0%	60.0%	0.7%	37.9%	0.8%	0.3%	70.7%	3.1%	25.2%	0.0%	1.5%	43.9%	6.1%	48.5%	0.6%	0.3%	63.7%	2.2%	33.1%
Neonatal ICU	0.0%	0.0%	62.1%	0.0%	37.9%	0.5%	1.3%	71.0%	2.0%	25.2%	0.0%	0.0%	51.5%	0.0%	48.5%	0.6%	0.6%	64.6%	1.0%	33.1%
Acute long-term care	0.7%	0.0%	60.7%	0.7%	37.9%	2.0%	1.0%	70.2%	1.5%	25.2%	0.0%	0.0%	51.5%	0.0%	48.5%	1.0%	1.9%	63.1%	1.0%	33.1%

Source 2008-2020 AHA annual data survey. Note: Left-system, Always-in-system, Never-in-system, and Joined-system represent hospital cohorts. Lost and Gain denote changes in the number and proportion of hospitals offering the service offering hospital cohorts. Nvr stands for Never and means the service was never offered in the hospital cohort. Alwy stands for Always and means the services was always offered in the hospital cohort. Unk stands for unknown and represents unknown service offering due to survey nonresponse. For each column, numerator is the number of hospitals within each cohort that experienced a change (loss/gain/never/always/unknown) in service offering and denominator is the total count of hospitals in each cohort.