



# An Examination of All-Payer Inpatient Rural Hospital Bypass

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Many rural hospitals across the country experience financial challenges due to low patient volumes, shifts from inpatient to outpatient care, and competition from non-hospital providers.<sup>1</sup> Financial vulnerability is exacerbated when rural residents obtain care outside of their communities for services that are available locally – termed rural hospital bypass. This study examines the extent to which rural patients bypassed their nearest rural hospital for inpatient care in eight states – Arizona, Iowa, Kentucky, New York, North Carolina, Vermont, Washington, and Wisconsin.

## Background

Rural health care in the U.S. is facing numerous challenges, including the financial vulnerability of rural hospitals, which is contributing to closures.<sup>1</sup> Rural hospitals often operate with low patient volume and high fixed costs, which limits their ability to absorb the loss of admissions and associated revenue. When rural residents receive care outside their local communities for services that could have been provided locally, that revenue and service volume leave the community, placing additional strain on small rural hospitals and potentially weakening local access to care. As a result, rural hospital bypass rates have become an area of concern for policymakers and researchers.

Previous research identified several factors which influence bypass rates, including patient and hospital characteristics and the availability of certain services in rural areas. Weigel et al. (2017) found that rural hospital bypass rates were associated with the availability of specific types of care in rural areas, while Malone and Holmes (2020) identified factors such as income, insurance coverage, and location associated with rural hospital bypass.<sup>2,3</sup>

Rural residents bypassing their local hospital for an urban hospital (i.e., rural to urban hospital bypass) may further intensify these pressures by shifting inpatient volume away from rural facilities that depend on a relatively small number of admissions to support operations. Zhang et al. noted that rural to urban bypass contributes to financial strain, and studies have reported instances of up to two-thirds of rural patients choosing urban hospitals over their local ones.<sup>4,5</sup> Factors influencing rural hospital bypass are complex and can be broadly categorized as patient-related and hospital-related.

## Key Takeaways

- Within the eight included states, 30 percent of inpatient discharges were not at patients' local rural hospitals (hospital bypass) for services that could be provided locally.
- Patients more likely to bypass their local rural hospital included those admitted for elective conditions, with private insurance, and fewer comorbidities.
- Critical Access Hospitals (CAHs) experienced higher bypass rates than their Prospective Payment System counterparts in rural areas.

Patient-related factors include insurance type, transportation access, location of family members, and continuity of care. Hospital-related factors include surgical call coverage, waiting times, and resource availability.<sup>6,7</sup> Additionally, patient perceptions, such as concerns about privacy and impressions of care quality may also influence a rural patient's decision to bypass their local hospital.<sup>7,8</sup>

This study builds on previous research by refining the definition of rural hospital bypass and estimating all-payer inpatient hospital bypass rates for rural hospitals.<sup>5,7</sup> We identify the factors associated with hospital-level bypass rates by analyzing data from the Healthcare Cost & Utilization Project (HCUP) for eight states, while considering the hospital service areas where patients reside. The findings of this study provide policymakers and health care providers with insights into the factors contributing to rural hospital bypass and potential solutions to improve access to care in rural communities. This study also contributes to the growing body of literature on rural health care and efforts to improve health care access and outcomes in rural communities.

## Methods

### *Data Sources*

The study focused on inpatient hospital admissions for U.S. rural residents using the 2018 Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) from eight states with two from each of the four U.S. Census Regions: Arizona and Washington (West), Iowa and Wisconsin (Midwest), Kentucky and North Carolina (South), and New York and Vermont (Northeast). The SID data included ZIP codes of hospitals and patients which was used to identify distances travelled for care. The data file also contained inpatient admission records, including diagnosis codes, disposition, and payer information, as well as demographic data. Data analyzed were from adults aged 18 years or older and admitted as inpatients, who were not transferred to or from another hospital, resided within an identified hospital service area, and were admitted for care within their state of residence. These data were combined with data from the American Hospital Association (AHA) survey, which informed whether a hospital either owned or provided skilled nursing care, inpatient surgical services, oncology services, obstetric services, and/or pain management services. Though the study's geographic focus was limited to eight states, the findings are generally applicable to rural areas.

### *Definition of Rurality*

The HCUP SID data are provided at the ZIP code level. We used the Federal Office of Rural Health Policy (FORHP) rural definition's eligible ZIP codes file to determine rurality.<sup>i,9</sup> Then we categorized the rural ZIP codes into micropolitan for RUCA codes 4-6, small towns for RUCA codes 7-9, and rural areas for RUCA code 10 using the USDA ERS 2010 RUCA ZIP code file.<sup>10</sup>

### *Dependent variable*

Rural hospital bypass was defined as an inpatient general medical or surgical admission at an acute care hospital outside the patient's local hospital service area, excluding transfers to or from another facility. Local hospital service areas were identified using the ZIP codes accounting for 80 percent of a hospital's inpatient admission volume. In cases where ZIP codes overlapped multiple hospital service areas, the

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<sup>i</sup> FORHP eligible ZIP code file accessed in January, 2023

local hospital was defined as the closest hospital to the weighted center of the patient's ZIP code. Avoidable bypass specifically refers to admissions for conditions routinely treated by rural hospitals, identified by the top 50 Diagnosis Related Groups (DRGs) across rural hospitals included in the analysis.

### ***Independent variables***

Several key factors influence health care access and utilization among rural communities. Demographic characteristics and patient preferences can shape decisions; for example, patients with negative perceptions about the quality of care at their local rural hospital may choose to seek care elsewhere. Factors, such as transportation availability and cost, income, and type of health insurance, can either facilitate or hinder access to and use of care. Lastly, factors related to medical necessity, including severity of illness or injury, diagnosis type, perceived urgency, and the capability of the local rural hospital to adequately address medical needs, also influence care-seeking behavior. This analysis specifically considered rurality, insurance coverage type, diagnosis, and illness type to assess rural residents obtaining inpatient hospital care outside their communities.

### ***Inpatient study population***

Patients included in the analysis were aged 18 years or older, admitted as inpatients, and were diagnosed for care using one of the conditions routinely treated by rural hospitals. Patients excluded from the analysis were those transferred to or from another hospital, resided outside an identified hospital service area, and those admitted for care outside their state of residence.

### ***Statistical Analysis***

The study aimed to analyze rural hospital bypass rates for rural inpatient hospitalizations and explore the factors associated with these rates. Descriptive statistics were used to report the distribution of rural hospital bypass rates and the characteristics of hospitals and patients associated with these rates. Analyses were stratified by rural or urban hospital location, hospital type in terms of Critical Access Hospital (CAH) or acute care hospital paid under the prospective payment system (PPS hospital), and whether admission was classified as rural hospital bypass. Linear combinations compared proportions of rural hospital bypass to non-bypass admissions by independent variable to identify differences.

### ***Findings***

The study included 394,741 rural inpatient hospital admissions. Of these, 274,611 (70 percent) were for care at the patients' local hospitals and 120,130 admissions (30 percent) were for care at hospitals outside of patients' home communities.

Table 1 presents hospital characteristics of rural and urban hospitals included in the analysis. Of the 746 hospitals included, 55.8 percent were rural and 44.2 percent urban. The largest proportion of hospitals in rural areas were those with 25 or fewer beds (60.4 percent) while the largest proportion of hospitals in urban areas had more than 200 beds (57.1 percent). Ownership status showed that most hospitals were non-profit (64.7 percent in rural areas and 78.4 percent in urban areas). Rural hospitals were more frequently government-owned (28.8 percent) than urban hospitals (14.0 percent).

Service availability varied significantly, with 60.6 percent of rural and 80.2 percent of urban hospitals offering obstetric care. Oncology services were available in fewer than half of rural hospitals (48.5 percent) and 83.6 percent of urban hospitals, Skilled Nursing Facility (SNF) in nearly one-third of rural (32.7 percent) and around one in eight urban hospitals (12.6 percent). Generally, rural hospitals had fewer of these services compared to urban hospitals with the exception of skilled nursing care.

**Table 1: Hospital Characteristics by Rurality**

| Characteristics                             | Rural | Urban | Difference | 95% Confidence Interval |
|---|-------|-------|------------|-------------------------|
| <b>Number of Hospitals</b>                  | 417   | 329   | -          | -                       |
| <b>Staffed Beds</b>                         |       |       |            |                         |
| 25 or fewer                                 | 60.4  | 5.5   | 55.0***    | (-60.3, -49.7)          |
| 26-50                                       | 8.6   | 2.1   | 6.5***     | (-9.6, -3.4)            |
| 51-100                                      | 12.7  | 7.9   | 4.8*       | (-9.1, -0.5)            |
| 101-200                                     | 13.4  | 27.4  | -13.9***   | (8.1, 19.8)             |
| 201 or more                                 | 4.8   | 57.1  | -52.3***   | (46.6, 58.1)            |
| <b>Census Region</b>                        |       |       |            |                         |
| Midwest                                     | 40.5  | 21.3  | 19.3***    | (-25.7, -12.8)          |
| Northeast                                   | 15.3  | 31.9  | -16.6***   | (10.4, 22.7)            |
| South                                       | 30.2  | 20.4  | 9.9**      | (-16.1, -3.6)           |
| West  | 13.9  | 26.4  | -12.5***   | (6.7, 18.4)             |
| <b>Ownership Control</b>                    |       |       |            |                         |
| Government                                  | 28.8  | 14.0  | 14.8***    | (-20.5, -9.0)           |
| Non-profit                                  | 64.7  | 78.4  | -13.7***   | (7.3, 20.1)             |
| For-profit                                  | 6.5   | 7.6   | -1.1       | (-2.6, 1.8)             |
| <b>Obstetric Care Available</b>             | 60.6  | 80.2  | -19.6**    | (12.6, 26.6)            |
| <b>Surgical Care, Inpatient</b>             | 90.4  | 98.8  | -8.4***    | (5.3, 11.4)             |
| <b>Oncology Services</b>                    | 48.5  | 83.6  | -35.1***   | (28.3, 42.0)            |
| <b>Skilled Nursing Facility<sup>1</sup></b> | 32.7  | 12.6  | 20.1***    | (-26.4, -13.8)          |
| <b>Pain management program</b>              | 55.5  | 74.4  | -18.9***   | (11.6, 26.3)            |

Notes: Authors' estimates, HCUP data for sample states of Arizona, Iowa, Kentucky, New York, North Carolina, Vermont, Washington, and Wisconsin. Differences may reflect rounding; \*p<0.05, \*\*p<0.01, \*\*\*p<0.001 denotes statistical significance of difference between rural and urban. 1: Defined within the AHA survey as either owned or provided by the hospital or its subsidiary.

Patients who bypassed their closest hospital differed across several medical characteristics. Table 2 presents findings describing how study characteristics differed between patients residing in rural areas who used their local hospital and those who bypassed for inpatient care. Elective admissions were more common among patients obtaining care outside their community (31.6 percent) compared to those using local hospitals (14.4 percent). Conversely, emergency admissions predominated among those treated locally (70.4 percent) relative to those who bypassed their nearest hospital (52.1 percent). Overall, rural patients bypassing local hospitals tended to have elective admissions, private insurance, and fewer comorbidities than patients treated at their local hospital. Patients treated locally more often had emergency admissions, Medicare coverage, and respiratory system diagnoses.

Insurance coverage also varied between the groups. Medicare was more prevalent among patients treated locally (63.9 percent) versus those who bypassed their local hospital (51.2 percent). Private insurance was more common among patients receiving care elsewhere (27.4 percent) compared to local care users (16.9 percent). Medicaid coverage proportions were similar across both groups.

Patients without comorbidities were more likely to bypass their local hospital (11.6 percent) compared to those with one or more comorbidities (7.4 percent). Diagnostic categories also showed distinct differences. Rural hospitals treated a higher proportion of patients with respiratory system diagnoses such as asthma, COPD, or pneumonia (22.7 percent), whereas patients bypassing their nearest hospital were more frequently diagnosed with musculoskeletal system issues (23.1 percent) such as osteoarthritis or fibromyalgia.

**Table 2: Comparison of Patient Characteristics by Rural Hospital Bypass Status**

| Variable  | Local Hospital Admission | Bypass Admission | Difference | 95% Conf. Interval |
|---|--------------------------|------------------|------------|--------------------|
|   | %                        | %                | %          | %                  |
| <b>Number of inpatient admissions</b>                             | 274,611                  | 120,130          | 154,481    | -                  |
| <b>Patient Admission Rurality (RUCA code)</b>                     |                          |                  |            |                    |
| Micropolitan (4-6)  | 57.2                     | 50.0             | 7.2***     | (6.8, 7.5)         |
| Small Town (7-9)  | 27.1                     | 31.6             | -4.5***    | (-4.8, -4.2)       |
| Rural Areas (10)  | 15.8                     | 18.5             | -2.7***    | (-2.9, -2.4)       |
| <b>Admission Type</b>   |                          |                  |            |                    |
| Emergency   | 70.4                     | 52.1             | 18.3***    | (18, 18.7)         |
| Urgent  | 15.0                     | 15.8             | -0.9***    | (-1.1, -0.6)       |
| Elective  | 14.4                     | 31.6             | -17.2***   | (-17.5, -16.9)     |
| Other   | 0.2                      | 0.5              | -0.3***    | (-0.3, -0.2)       |
| <b>Primary Payer</b>  |                          |                  |            |                    |
| Medicare <sup>1</sup>   | 63.9                     | 51.2             | 12.8***    | (12.4, 13.1)       |
| Medicaid  | 15.1                     | 16.2             | -1.1***    | (-1.4, -0.9)       |
| Private   | 16.9                     | 27.4             | -10.5***   | (-10.7, -10.2)     |
| Self-pay  | 2.1                      | 2.3              | -0.2**     | (-0.3, -0.1)       |
| Other   | 1.9                      | 2.9              | -1.1***    | (-1.2, -0.9)       |
| <b>Dual Eligibility (Medicare and Medicaid) Status</b>            |                          |                  |            |                    |
| No  | 86.9                     | 92.8             | -5.9***    | (-6.1, -5.7)       |
| Yes   | 13.1                     | 7.2              | 5.9***     | (5.7, 6.1)         |
| <b>Number of Comorbidities</b>                                    |                          |                  |            |                    |
| None  | 7.4                      | 11.6             | -4.1***    | (-4.3, -3.9)       |
| 1-2   | 32.1                     | 34.9             | -2.8***    | (-3.2, -2.5)       |
| 3-4   | 34.1                     | 30.5             | 3.7***     | (3.3, 4)           |
| 5 or more   | 26.4                     | 23.1             | 3.3***     | (3, 3.6)           |
| <b>Major Diagnosis Category</b>                                   |                          |                  |            |                    |
| Respiratory system  | 22.7                     | 8.6              | 14.1***    | (13.9, 14.3)       |
| Circulatory system  | 15.4                     | 16.9             | -1.5***    | (-1.8, -1.3)       |
| Infectious and parasitic diseases                                 | 15.5                     | 12.0             | 3.5***     | (3.2, 3.7)         |
| Musculoskeletal system  | 8.6                      | 23.1             | -14.4***   | (-14.7, -14.2)     |
| Digestive system  | 8.6                      | 7.5              | 1.1***     | (0.9, 1.3)         |
| Mental diseases and disorders                                     | 7.1                      | 9.6              | -2.5***    | (-2.7, -2.3)       |
| Kidney and urinary tract  | 8.3                      | 4.9              | 3.5***     | (3.3, 3.6)         |
| Diseases and disorders of the eye                                 | 2.8                      | 5.1              | -2.3***    | (-2.4, -2.1)       |
| Other   | 11.0                     | 12.4             | -1.4***    | (-1.6, -1.2)       |
| <b>Distance from Patient ZIP Code to Nearest Hospital (miles)</b> | 4.9                      | 12.7             | -7.7***    | (-8.1, -7.3)       |
| <b>Distance Traveled for Inpatient Care (miles)</b>               | 8.9                      | 50.2             | -41.3***   | (-41.9, -40.7)     |

| Variable | Local Hospital Admission | Bypass Admission | Difference | 95% Conf. Interval |
|----------|--------------------------|------------------|------------|--------------------|
|          | %                        | %                | %          | %                  |

NOTES: Authors' estimates, HCUP data for sample states of Arizona, Iowa, Kentucky, New York, North Carolina, Vermont, Washington, and Wisconsin. Differences may reflect rounding; \*p<0.05, \*\*p<0.01, \*\*\*p<0.001 denotes statistical significance of difference between rural and urban. 1: Within the HCUP SID data, Medicare includes both Traditional Medicare and Medicare Advantage.

Table 3 presents a more detailed analysis of rural hospital bypass patterns by focusing solely on local hospital bypass admissions and comparing patient medical characteristics by whether they were treated at an acute care Prospective Payment System (PPS) hospital or a Critical Access Hospital (CAHs). Overall, patients from micropolitan areas (RUCA codes 4-6) exhibited the highest bypass rates, at 59.3 percent for CAHs and 49.9 percent for PPS hospitals.

Bypass rates among rural patients varied by major diagnosis category (MDC). Musculoskeletal system issues had the highest bypass rates, whether the patient's local hospital was a CAH (36.8 percent) or a PPS hospital (22.9 percent).

**Table 3: Patient Characteristics Among Bypass Admissions by Patient's Local Hospital Type**

| Variable   | PPS Hospital | CAH  | Difference | 95% Conf. Interval |
|--|--------------|------|------------|--------------------|
|  | %            | %    | %          | %                  |
| <b>Patient Admission Rurality (RUCA code)</b>          |              |      |            |                    |
| Micropolitan (4-6)                                     | 49.9         | 59.3 | -9.5***    | (-11.8, -7.1)      |
| Small Town (7-9)                                       | 31.6         | 29.2 | 2.4*       | (2.0, 4.5)         |
| Rural Areas (10)                                       | 18.6         | 11.5 | 7.1***     | (5.6, 8.6)         |
| <b>Admission Type</b>                                  |              |      |            |                    |
| Emergency  | 52.2         | 45.5 | 6.7***     | (4.3, 9.0)         |
| Urgent   | 15.9         | 7.6  | 8.4***     | (7.1, 9.6)         |
| Elective   | 31.4         | 46.9 | -15.5***   | (-17.9, -13.1)     |
| Other  | 0.5          | 0.0  | 0.5***     | (0.4, 0.5)         |
| <b>Primary Payer</b>                                   |              |      |            |                    |
| Medicare <sup>1</sup>                                  | 51.1         | 56.5 | -5.4***    | (-7.7, -3.0)       |
| Medicaid   | 16.2         | 12.6 | 3.6***     | (2.0, 5.2)         |
| Private  | 27.4         | 25.5 | 1.9        | (-0.2, 3.4)        |
| Self-pay   | 2.3          | 1.4  | 0.9**      | (0.3, 1.5)         |
| Other  | 2.9          | 4.0  | -1.1*      | (-2.0, -0.1)       |
| <b>Dual Eligibility (Medicare and Medicaid) status</b> |              |      |            |                    |
| No   | 92.8         | 90.9 | 2.0**      | (0.6, 3.3)         |
| Yes  | 7.2          | 9.1  | -2.0**     | (-3.3, -0.6)       |
| <b>Number of Comorbidities</b>                         |              |      |            |                    |
| None   | 11.6         | 9.4  | 2.2**      | (0.8, 3.6)         |
| 1-2  | 34.9         | 39.3 | -4.4***    | (-6.8, -2.1)       |
| 3-4  | 30.4         | 31.1 | -0.7       | (-2.9, 1.5)        |
| 5 or more  | 23.1         | 20.1 | 3.0**      | (1.0, 4.9)         |
| <b>Major Diagnosis Category</b>                        |              |      |            |                    |
| Respiratory system                                     | 8.6          | 8.3  | 0.3        | (-1.0, 1.6)        |
| Circulatory system                                     | 17.0         | 14.4 | 2.6**      | (0.9, 4.3)         |
| Infectious and parasitic diseases                      | 12.0         | 10.9 | 1.1        | (-0.4, 2.6)        |
| Musculoskeletal system                                 | 22.9         | 36.8 | -13.9***   | (-16.2, -11.6)     |
| Digestive system                                       | 7.5          | 7.5  | 0.0        | (-1.2, 1.3)        |
| Mental diseases and disorders                          | 9.8          | 16.9 | -8.1***    | (-11.4, -4.8)      |

| Variable   | PPS Hospital | CAH  | Difference | 95% Conf. Interval |
|--|--------------|------|------------|--------------------|
|  | %            | %    | %          | %                  |
| Kidney and urinary tract                                   | 4.9          | 5.6  | -0.8       | (-1.9, 0.3)        |
| Diseases and disorders of the eye                          | 5.1          | 4.9  | 0.1        | (-0.9, 1.1)        |
| Other  | 12.5         | 10.0 | 2.6***     | (1.1, 4.0)         |
| Distance from Patient ZIP Code to Nearest Hospital (miles) | 12.7         | 11.2 | 1.4        | (-0.6, 2.9)        |
| Distance Traveled for Inpatient Care (miles)               | 50.2         | 49.5 | 0.7        | (0.0, 2.9)         |

**NOTES:** Authors' estimates, HCUP data for sample states of Arizona, Iowa, Kentucky, New York, North Carolina, Vermont, Washington, and Wisconsin. Differences may reflect rounding; \*p<0.05, \*\*p<0.01, \*\*\*p<0.001 denotes statistical significance of difference between rural and urban. 1: Within the HCUP SID data, Medicare includes both Traditional Medicare and Medicare Advantage.

## Conclusion

Rural hospital bypass contributes to challenges that rural hospitals face in remaining financially viable and ensuring access to care locally. The study analyzed data on inpatient hospital admissions among rural patients in eight states, comprised of almost 400,000 inpatient claims, to understand factors associated with rural hospital bypass. Consistent with other studies analyzing rural hospital bypass, we found that around 30 percent of inpatient admissions for rural patients were at hospitals that were not the nearest rural hospital for services that are likely provided locally.

Overall, patients' decisions to bypass their local hospitals were influenced significantly by the type of hospital (PPS or CAH), with notable differences based on admission type, primary payer, and diagnostic categories. Findings showed that patients bypassing local hospitals were generally younger, privately insured, and had fewer comorbidities, but traveled longer distances for care. Conversely, older patients, particularly those covered by Traditional Medicare and Medicare Advantage, were less likely to bypass their local hospitals, highlighting the important role rural hospitals play in providing care for older adults.

The type of local hospital (CAH or PPS hospital) was also associated with patients' decisions to bypass their local rural hospitals. Patients admitted for elective conditions, with private insurance, and with fewer comorbidities were more likely to bypass their local hospital if it was a CAH. Conversely, those who received care in their local hospital (CAH or PPS hospital) were more likely to be admitted for an emergency, had Medicare as their source of health insurance coverage, a respiratory diagnosis, and multiple comorbidities.

Ensuring rural residents can access high-quality health care locally is essential, particularly for older adults and people with lower incomes who may lack resources to travel for care. Further research is needed to explore care access patterns among rural patients, especially considering the increasing prevalence of Medicare Advantage (MA). The structure of the HCUP databases used for this analysis did not allow the study to distinguish between Medicare beneficiaries enrolled in Traditional Medicare and those in MA plans. However, this distinction may be important to explore in future work. Unlike Traditional Medicare, which allows beneficiaries to seek care from any enrolled provider, MA plans contract with specific provider networks. These network contracting arrangements may unintentionally disadvantage rural hospitals by steering patients away from local hospitals and toward larger facilities that are part of the plan's network – even when services are locally available. Policy strategies may consider these emerging complexities to enhance patient health outcomes and support rural hospital viability.

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